

DIGITAL FATIGUE AMONG SCHOOL STUDENTS AND ITS INFLUENCE ON LEARNING

ANAMIKA SHARMA

Abstract

The growing use of digital devices has changed the way school students learn, communicate and spend their leisure time. Smartphones, tablets, computers and online learning platforms have made educational resources more accessible, but prolonged and poorly regulated screen exposure may also create a state of physical and mental tiredness commonly described as digital fatigue. This paper examines the concept of digital fatigue among school students and discusses its possible influence on attention, concentration, motivation, classroom participation, study habits and learning effectiveness. The paper adopts a conceptual research approach based on a review of relevant educational literature. Existing research indicates that the relationship between technology use and learning is not simply positive or negative; it depends on the purpose, duration and manner of digital engagement. Excessive or distracting technology use has been associated with weaker academic outcomes in several studies, while purposeful educational technology can support learning. Recent research also suggests that the younger school population requires greater research attention because much of the existing literature on media multitasking has focused on college and university students. The paper argues for a balanced approach in which digital technology remains an educational resource without becoming a source of continuous cognitive and physical overload. Schools, teachers and parents can contribute by promoting purposeful screen use, regular breaks, healthy study routines and digital self-regulation among students.

Keywords: Digital fatigue, school students, screen exposure, digital learning, attention, concentration, academic learning, technology use, student well-being

1. Introduction

Digital technology has become an important part of contemporary education. Students increasingly use smartphones, computers, tablets, digital classrooms, educational applications and online resources for completing assignments, accessing study material and communicating with teachers. Technology has therefore moved beyond being an additional educational resource and has become a regular part of students' academic lives.

The expansion of digital learning has created several educational opportunities. Digital resources can provide students with quick access to information, multimedia explanations, interactive activities and learning materials beyond the physical classroom. Research on mobile learning has also reported positive effects on learning achievement under appropriate instructional conditions. (ERIC^[OBJ])

However, the increasing presence of screens in students' everyday lives has also created a new concern: digital fatigue. Digital fatigue refers broadly to the feeling of mental, emotional or physical tiredness associated with prolonged or intensive engagement with digital devices and environments. It may be expressed through difficulty maintaining attention, reduced motivation, eye discomfort, headaches, mental exhaustion, irritability or a desire to disengage from digital activities.

Digital fatigue should not be understood simply as the result of the number of hours spent in front of a screen. The nature of digital activity is equally important. A student watching an educational video, attending an online class, playing a digital game and continuously switching between social media notifications may spend similar amounts of time with a device, but the cognitive demands of these activities are very different.

Recent educational research has increasingly examined excessive technology use, digital distraction and media multitasking. A recent scoping review identified 66 studies examining media multitasking and academic achievement, but noted that much of the available research has focused on university students rather than younger learners. (ERIC^{OBJ}) This creates a meaningful area for educational research at the school level.

2. Concept of Digital Fatigue

Digital fatigue can be understood as a condition of tiredness that develops when a learner experiences prolonged, intensive or poorly regulated interaction with digital environments.

For school students, digital fatigue may emerge from several overlapping activities:

- * prolonged online classes;
- * excessive smartphone use;
- * continuous video consumption;
- * social-media engagement;
- * online gaming;
- * frequent switching between applications;
- * excessive digital homework;
- * continuous notifications and interruptions;
- * studying from small screens for extended periods;
- * insufficient breaks between digital activities.

An important feature of digital fatigue is that it may involve both physical and cognitive dimensions.

The physical dimension can include eye discomfort, headaches, neck or shoulder discomfort and general tiredness. The cognitive dimension may involve reduced concentration, mental overload, difficulty processing information and declining interest in academic tasks.

Therefore, digital fatigue is better viewed as a multidimensional educational issue rather than simply a “screen-time problem.”

3. Digital Fatigue and Learning

Learning requires attention, mental processing, memory, motivation and active engagement. When students are mentally overloaded or repeatedly distracted, these processes may become less effective.

Research on technology use has provided evidence that excessive or poorly regulated digital engagement can be associated with weaker learning outcomes. For example, a population-based study using PISA data found that frequent ICT use at school was associated with weaker

performance across several cognitive learning outcomes, although the researchers also discussed possible explanations such as working-memory overload and task switching. (ERIC^[OBI])

Similarly, research using PISA data from OECD countries reported an inverted-U relationship between ICT use at school and mathematics performance, suggesting that the educational value of technology cannot be separated from the amount and manner of its use. (ERIC^[OBI])

These findings indicate that technology itself should not automatically be considered harmful. Rather, educational outcomes may depend on whether digital tools are used purposefully or whether they create distraction, multitasking and cognitive overload.

4. Major Dimensions of Digital Fatigue Among School Students

4.1 Reduced Attention Span

Continuous exposure to rapidly changing digital content may make sustained attention to slower academic activities more difficult for some students. Switching between videos, messages, games and study material may encourage fragmented attention.

Media multitasking has been associated with academic difficulties in a substantial body of research, although recent reviews indicate that the strength of the relationship varies across studies and educational levels. (ERIC^[OBI])

4.2 Cognitive Overload

Students often receive information through several digital channels simultaneously. Notifications, messages, videos, hyperlinks and multiple applications can compete for attention.

When students attempt to process too many sources at once, some of their mental resources may be spent managing distractions rather than understanding academic content. This is consistent with the cognitive-load explanation discussed in recent research on digital distractions and study discipline. (ERIC^[OBI])

4.3 Reduced Learning Motivation

Digital fatigue may also influence students' willingness to participate in academic activities. After spending substantial time online, students may feel less interested in additional screen-based assignments, even when those assignments are educational.

This creates an important distinction between digital access and productive digital engagement.

4.4 Physical Discomfort

Long periods of screen exposure may be accompanied by physical discomfort such as eye strain, headaches and musculoskeletal discomfort. These experiences can make it difficult for students to remain comfortable and attentive during study.

4.5 Disrupted Study Habits

Students who frequently move between academic and recreational digital activities may find it difficult to maintain a consistent study routine. Social media, entertainment and gaming can easily interrupt homework and revision.

A 2026 study among secondary school students reported that social-media use was associated with reduced academic performance while study time and sleep duration were positively related to academic outcomes. (ERIC^[OBJ])

5. Digital Fatigue Is Not the Same as Digital Learning

One of the most important points emerging from the literature is that digital technology cannot be treated as a single category.

Educational technology can support learning when it is:

- * relevant to the learning objective;
- * appropriately timed;
- * interactive;
- * guided by teachers;
- * combined with discussion and practical activities;
- * used with opportunities for rest and reflection.

In contrast, digital engagement becomes problematic when students experience constant notifications, unnecessary multitasking, passive consumption or prolonged recreational screen exposure.

Research on mobile learning among school-aged students has found positive effects under particular instructional conditions, showing that technology can enhance learning when the activity, instructional approach and learner role are appropriately designed. (ERIC^[OBJ])

Therefore, the educational question should not be “Should students use technology?” but rather “How, why, when and for how long should students use technology for learning?”

6. Objectives of the Study

The present conceptual paper has the following objectives:

1. To understand the concept of digital fatigue among school students.
2. To identify major factors contributing to digital fatigue.
3. To examine the possible influence of digital fatigue on students’ learning behaviour.
4. To analyse the relationship between excessive digital engagement and attention, concentration and motivation.
5. To highlight the need for balanced and purposeful use of digital technology in school education.
6. To suggest practical measures for reducing digital fatigue among school students.

7. Research Questions

The paper addresses the following questions:

1. What is digital fatigue among school students?
2. What factors contribute to digital fatigue in school-age learners?
3. How can digital fatigue influence students' attention and concentration?
4. What relationship may exist between digital fatigue and learning effectiveness?
5. How can schools and families promote healthier digital learning practices?

8. Methodology

The present study follows a conceptual research design based on a review and synthesis of relevant academic literature.

The study does not claim to present original survey findings. Instead, it examines existing research related to digital technology use, digital distraction, media multitasking, screen exposure and academic learning.

Relevant literature was examined to identify recurring themes concerning:

- * students' digital behaviour;
- * technology-related distraction;
- * cognitive load;
- * attention and concentration;
- * academic achievement;
- * digital learning practices;
- * student well-being.

The conceptual approach was selected because the purpose of the paper is to develop an educational understanding of digital fatigue and identify areas that can be examined through future school-level empirical research.

9. Discussion

The literature suggests that the relationship between digital technology and learning is complex. Technology can improve access to educational resources, support interactive learning and provide opportunities for personalised instruction. At the same time, excessive or unstructured digital engagement can create distraction and cognitive demands that interfere with learning.

An important finding from the existing literature is that quantity alone cannot explain the educational consequences of screen use. The purpose of use, type of content, degree of multitasking, level of student engagement and learning environment all matter.

For example, research on smartphones and academic performance in India found that excessive smartphone use did not necessarily have a simple direct relationship with academic performance; instead, technoferece was identified as an important mediating factor. (ERIC^{Full Text Provided by ERIC}) This supports the idea that the way technology interrupts academic activity may be more educationally important than merely counting hours of use.

Another important consideration is age. Younger students may have less-developed self-regulation skills and may require greater adult guidance in managing digital activities. Yet recent reviews indicate that a considerable proportion of research on media multitasking and academic

achievement has concentrated on university students. (ERIC^{Full Text Provided by ERIC}) School-level research can therefore contribute valuable evidence to the field.

The issue also requires a balanced interpretation. Current evidence does not justify the conclusion that every form of screen use reduces learning. Indeed, educational technology can improve achievement when it is appropriately designed and implemented. The challenge is therefore to distinguish productive digital learning from excessive or distracting digital engagement.

10. Educational Implications

The findings of this conceptual review have several implications for schools.

For Teachers

Teachers can:

- * avoid unnecessary digital tasks;
- * combine screen-based activities with offline learning;
- * provide short breaks during extended digital lessons;
- * discourage unnecessary multitasking;
- * use technology only when it adds educational value;
- * encourage students to take handwritten notes, discuss concepts and participate in classroom activities.

For Schools

Schools can:

- * develop age-appropriate digital-use guidelines;
- * promote digital well-being education;
- * provide comfortable learning environments;
- * encourage regular physical and visual breaks;
- * include digital self-regulation in student guidance programmes.

For Parents

Parents can:

- * establish predictable study routines;
- * avoid unrestricted recreational screen use;
- * encourage adequate sleep and physical activity;
- * discuss responsible digital behaviour with children;
- * distinguish educational screen use from entertainment.

For Students

Students can be encouraged to:

- * switch off unnecessary notifications while studying;
- * study one task at a time;

- * take regular breaks;
- * avoid simultaneous social-media use during study;
- * maintain a healthy balance between digital and non-digital learning;
- * recognise early signs of mental or physical digital fatigue.

11. Research Gap

The existing literature provides substantial evidence about technology use, digital distraction and academic outcomes. However, several areas require further investigation.

First, the concept of digital fatigue specifically among school students requires clearer operationalisation. Digital fatigue is sometimes discussed through related concepts such as screen time, digital eye strain, media multitasking, technology overuse and digital distraction. These concepts overlap but are not identical.

Second, a considerable amount of existing research focuses on university students. A recent scoping review specifically highlighted the limited evidence concerning younger educational levels. (ERIC )

Third, more context-specific studies are needed in Indian schools, particularly government schools, rural schools and areas where access to digital devices varies considerably. Finally, future research should examine not only the amount of digital exposure but also what students are doing online, why they are using the technology, whether they multitask, how frequently they take breaks and how they regulate their own digital behaviour.

12. Suggested Conceptual Framework

The phenomenon can be represented through the following conceptual pathway:

Digital Exposure



Duration + Frequency + Type of Digital Activity



Multitasking / Notifications / Cognitive Load



Digital Fatigue



Reduced Attention + Mental Tiredness + Lower Motivation



Study Behaviour and Classroom Engagement



Learning Effectiveness

This framework also recognises the possible moderating role of:

Sleep + Physical Activity + Parental Guidance + Teacher Support + Digital Self-Regulation

Thus, digital exposure does not automatically produce poor learning outcomes. Its effect may depend on several personal, family, school and technological factors.

13. Conclusion

Digital technology has become an important part of modern education, but its educational value depends largely on how it is used. Digital fatigue represents an emerging concern because

students are increasingly required to spend substantial amounts of time in digital environments for both academic and recreational purposes.

The literature reviewed in this paper suggests that excessive digital engagement, multitasking and distraction may interfere with attention and learning, while purposeful and well-structured technology use can support educational achievement. The available evidence therefore points towards the importance of balance rather than complete avoidance of technology.

Schools should not treat digital technology as either completely beneficial or completely harmful. Instead, students need to develop the ability to use digital tools purposefully, recognise signs of fatigue and maintain healthy boundaries between academic and recreational screen use.

Future empirical research can strengthen this field by developing a reliable scale for measuring digital fatigue among school students and examining its relationship with academic achievement, attention, sleep, motivation and classroom participation. Such research would be particularly valuable in diverse Indian school settings where students' access to technology and patterns of digital use may differ considerably.

References

Akpadaka, V. O. O., & Akpadaka, O. S. (2026). Digital distractions and study discipline: An empirical study of academic performance in selected secondary schools in Rivers State, Nigeria. *Asian Journal of Contemporary Education*, 10(1), 60–71. (ERIC )

Ammunje, R. N., Prabhu, M. H., & Barkur, G. (2023). Smartphones and academic performance: Evidence from India. *Interactive Technology and Smart Education*, 20(2), 161–176. (ERIC )

Dong, Z., Chiu, M. M., Zhou, S., & Zhang, Z. (2024). The effect of mobile learning on school-aged students' science achievement: A meta-analysis. *Education and Information Technologies*, 29, 517–544. (ERIC )

Gorjón, L., & Osés, A. (2023). The negative impact of information and communication technologies overuse on student performance: Evidence from OECD countries. *Journal of Educational Computing Research*, 61(4), 723–765. (ERIC )

Lax, M., Mölsä, M. E., Korhonen, J., & Söderberg, P. (2026). Media multitasking and academic achievement among different educational levels: A scoping review. *Discover Education*, 5, Article 29. (ERIC )

Saarinen, A. I. L., Lipsanen, J., Hintsanen, M., Huotilainen, M., & Keltikangas-Järvinen, L. (2021). The use of digital technologies at school and cognitive learning outcomes: A population-based study in Finland. *International Journal of Educational Psychology*, 10(1), 1–26. (ERIC )