

Decolonising the Digital
Classroom: Equity,
Cultural Agency, and
Access in
Tech-Integrated
Ecosystems

Decolonising the Digital Classroom: Equity, Cultural Agency, and Access in Tech-Integrated Ecosystems

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Preface

Education in the twenty-first century stands at a crossroads one where technology promises access, inclusion, and innovation, but simultaneously challenges the very ethics, identities, and pedagogies that have long anchored the human experience of learning. The digital turn has redefined not only how teachers teach and students learn but also what constitutes knowledge, community, and belonging in an age of constant connectivity. From the flicker of a smartphone screen to the architecture of artificial intelligence, the classroom has extended far beyond its walls, morphing into a dynamic, and sometimes disorienting, ecosystem of data, emotion, and design. Decolonising the Digital Classroom: Equity, Cultural Agency, and Access in Tech-Integrated Ecosystems emerges from this shifting landscape as both critique and possibility a scholarly effort to reimagine education where technology serves humanity rather than governs it.

The volume was conceived as a response to the growing need for critical, culturally grounded, and ethically informed research on digital education. As editors and contributors, we have sought to interrogate not only the pedagogical but also the philosophical, social, and political implications of technology integration in Indian classrooms. Each chapter, while rooted in local realities, contributes to a broader global conversation about digital sovereignty, well-being, and decolonial futures. Together, they reflect a collective commitment to rethinking technology as a medium of empowerment rather than control, and to restoring human dignity, multilingualism, and inclusivity as central tenets of twenty-first-century pedagogy. The structure of this book follows a thematic and conceptual progression that moves from understanding digital behaviour and competence to exploring inclusive pedagogies, ethical governance, and decolonial frameworks for digital learning.

Section I: Digital Habits, Learning Behaviour, and Well-being

This opening section brings together empirical studies that

examine how technology reshapes cognition, motivation, and educational practice. Aditya Majee and Dr. Abhisek Panda investigate the effects of smartphone addiction on students' learning habits in Purulia, exposing the behavioural and emotional costs of unregulated screen time. Balwinder Singh and Prashant Gautam present a mixed-methods exploration of gamification as an inclusive pedagogical tool, revealing both its motivational potential and its possible exclusions. Amal Sankar Mukherjee demonstrates how multilingualism and local knowledge systems can strengthen cognitive flexibility and classroom engagement. Monojit Pal's study on ICT competence among primary educators in Burdwan exposes gaps in access, while Kakali Kundu, Dr. Debabrata Sarkar, and Tanmay Das explore the effectiveness of inquiry-based training for fostering higher-order thinking.

Section II: Pedagogical Innovations and Transformative Learning Models

Here, the focus shifts to experimentation and reflection in technology-enabled teacher education. Purba Sil and Amit Manna investigate hybrid and blended learning models, comparing student outcomes and perceptions in teacher education programs. Dr. Prasanta Gayen, Dr. Madhurima Chakraborty, and Dr. Suchandrika Hazra deconstruct curriculum design through a technological lens, while Asmita Chakraborty addresses mobile learning as a tool to bridge the rural–urban divide. Srijata Biswas and Dr. Ankhi Goon explore e-inclusion as a revolutionizing force in inclusive education, and Dr. Sweetly Lakra articulates a model of cyber resilience and digital citizenship to promote student well-being in the age of online harassment.

Section III: Digital Ethics, Citizenship, and Psychological Health

The third segment explores the moral, emotional, and behavioural dimensions of technology. Jaly Kundu Pramanick and Dr. Md Nawaz Sarif provide a theoretical lens on cyberbullying and online safety as integral to school well-being, while Shelly Das and Ankita Mahato advance this discourse with a nuanced empirical exploration of cyberbullying's psychological, academic, and social consequences among adolescents. Their chapter synthesizes global evidence to illustrate how cyberbullying

correlates with anxiety, loneliness, depression, and somatic distress, while proposing school-based preventive strategies that can serve as protective interventions. Ankana Banerjee, Dr. Brotati Chakraborty, and Kunal Chakraborty discuss digital psychology as a framework to understand motivation and mental health. Srijona Bhattacharyya and Ankita Biswas engage with the ethics of data privacy and student consent, while Dr. Deeksha Saraswat and Dr. Vishal Kumar critique assessment and feedback systems in technology-enhanced education. Jayashree Singha and Tandra Bhattacharjee close this section with a panoramic analysis of how digital classrooms reshape teaching and learning in the twenty-first century.

Section IV: Cultural Knowledge, Language, and Decolonial Pedagogy

Education, when mediated by technology, risks erasing local voices—but it can also amplify them. Dr. V.R. Rajesh and Mr. Kalyan Banerjee present digital storytelling as a decolonial pedagogy for reclaiming narrative agency. Ishani Das and Dr. Md Nawaz Sarif offer a comparative framework connecting Bhutan's Gross National Happiness and India's NEP 2020 to revive regional languages through Indian Knowledge Systems. Wali Rahman Rahmani and Sourav Saha discuss SDG 4.7 and tech sovereignty as pathways to digital empowerment. Smriti Banerjee foregrounds multilingual and mother-tongue instruction as essential to equity and identity in classrooms, while other authors' reflections on curriculum deconstruction align these cultural efforts with critical pedagogical ethics.

Section V: Human Flourishing, Physicality, and Empathy in the Digital Era

The final section returns to the human body and spirit as the heart of education. Srinath M. S. and Dr. K. Jothi Dayanandan explore how resistance training shapes discipline and physiological well-being, while Dr. N. Kodeeswaran and colleagues trace the moral and physical dimensions of Silambam in nurturing holistic development. Meenakshi S R focuses on empathy as a collective safeguard against cyberbullying, Dr. Brotati Chakraborty and Akash Neogi place dignity at the ethical core of digital learning, and Pratibha Liana reflects on the opportunities and challenges of teacher internships in technology-integrated classrooms. The

volume concludes with Simron Saha and Debapriya Sarkar's vision of transforming digital tools into spaces of relational, sustainable pedagogy.

Across all five sections, this volume stands as a call to rethink digital education as a moral, cultural, and emotional project. The contributors—drawn from universities, schools, and research institutions across India—represent the collective pulse of a nation negotiating the promises and perils of the digital age. Together, they remind us that decolonising the digital classroom is not a rejection of technology, but a reclamation of agency, empathy, and equity in the way we teach, learn, and live.

We extend our deepest gratitude to all authors for their intellectual commitment, to peer reviewers and mentors for their guidance, and to the School of Education, Adamas University, for anchoring this dialogue in the spirit of collaboration and critical inquiry. May this book inspire educators, policymakers, and learners to envision classrooms where technology amplifies humanity, sustains cultural plurality, and advances justice through knowledge.

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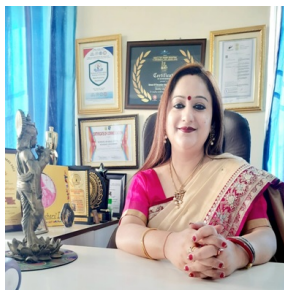
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Prof. (Dr.) Shauli Mukherjee is a passionate academician, global thought leader and internationally acclaimed inspirational speaker with more than 22 years of expertise in the education space. She has been awarded as India's Top 50 Women Leaders in the Education Industry and Top 20 Revolutionary Education Leaders as well as among 99 Women Achievers of India for the year 2021. She has been listed among the Top 50 Most Courageous Women in Business, Leadership and Entertainment in 2022. She has been the Founder Principal of Adamas World School and the first STEM School of West Bengal which was awarded as the 2nd Best International Day School in West Bengal by Education World under her inspiring leadership. Prof. Mukherjee has also held senior academic and administrative positions in some of the reputed institutions of West Bengal.

Prof. Mukherjee has 60+ publications in Scopus Indexed and other international journals along with Patents, Copyrights, Educational Psychological Scales, Authored and Edited Books to her credit. She has been featured in 50+ national and international journals, newspapers and magazines (including Cover Features), the Convener of 250+ national and international

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Prof. Mukherjee has represented her current University in International Summits, Conclaves, Conferences and Pavilion in the UK, USA, Canada, Egypt, Kenya, Ivory Coast, South Africa, Vietnam, Philippines, Malaysia, Nepal and Bhutan. As an internationally acclaimed inspirational speaker, Prof. Mukherjee is regularly invited to numerous national and international Conferences, Universities and Conclaves to share her insights on the futuristic and transformative role of education. Prof. Mukherjee is associated with premiere educational organizations across India as well as globally in senior advisory capacity.

She has been the recipient of 200+ prestigious awards including **Gem of India** Award, **National Education Leadership** Award, **Bhartiya Gyan Ratna** Award and **World Peace** Award. She is currently working as the Professor and Dean - School of Education & Dean - International Relations at Adamas University, India.



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Prof. Syiem holds an M.A. (Education), B.Ed., and Ph.D., along with UGC-NET and JRF qualifications. Her academic and research interests encompass Educational Psychology, Guidance and Counselling, Environmental Education, and Early Childhood Education. A dedicated research mentor, she has successfully supervised nine Ph.D. scholars and seven M.Phil dissertations, nurturing a generation of educationists and researchers in the region.

Her scholarship is reflected through an extensive list of publications, including books, edited volumes, and over two dozen research papers in reputed national and international journals. Some of her notable works focus on emotional intelligence, teacher effectiveness, study habits, and environmental awareness. She

has also edited books such as *Transforming Teacher Education in the North Eastern Region of India* and *Contemporary Issues of Indian Education*, which have been valuable contributions to the discourse on educational reform.

Prof. Syiem has coordinated several UGC-sponsored and ICSSR-supported research projects, including the landmark study on Emotional Intelligence and Personality among Secondary School Students of Meghalaya. Her leadership extends beyond academia; she has been Head of the Department of Education, NEHU since July 2019 and serves as the Presiding Officer of NEHU's Internal Complaints Committee (ICC), reflecting her strong commitment to institutional governance and gender sensitization.

She is a Life Member of the Indian Academy of Social Sciences, All India Association for Educational Research, and North-East India Education Society (NEIES), where she also serves as Treasurer. In recognition of her academic stature, Prof. Syiem has served on editorial and advisory boards of reputed journals, including the NEHU Journal and *InterViews: An Interdisciplinary Journal in Social Sciences*. Her lifelong dedication to research, mentorship, and educational innovation continues to inspire scholars and practitioners across India's Northeastern region and beyond.



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With previous teaching experience as a Guest Lecturer at NEHU, Dr. Sarif brings both classroom insight and research depth to his current academic role. His scholarly work explores the intersections of education, mental health, and geopolitics in South Asia, engaging with critical themes such as psychosocial well-being, digital anxiety, student movements, soft power in higher education, and the integration of indigenous epistemologies. He has authored more than thirteen peer-

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Dr. Sarif is a sought-after academic voice, having presented more than twenty-one research papers at national and international conferences, including the Global Summit on Social Innovation, Education and Sustainability (Jadavpur University, 2025), ICCMS, Semarang, Indonesia (2024), and those organised by Taylor & Francis and SAGE (London). He has participated in more than twenty-three faculty development programmes and completed several UGC-HRDC-accredited courses in research methodology, SPSS, NVivo, and mixed-methods research. He often serves as session chair, invited speaker, and resource person at institutions across India. His engagement with public discourse is equally noteworthy—he has authored over twenty-seven op-eds and popular articles in leading national newspapers and magazines, advocating for educational equity, digital well-being, inclusive pedagogy, and institutionalised support for student mental health. He is also a peer reviewer for five academic journals indexed by Taylor & Francis, adding to his growing influence in the peer-reviewed academic ecosystem.

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Chapter 1

Screen Over Studies: A Study on Smartphone Addiction and Its Impact on Learning Habits of Secondary School Students in Purulia

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Abstract

Smartphone addiction is a significant global challenge today. After the COVID-19 pandemic, the majority of adolescents have become addicted to smartphones. Sometimes, learners' study or learning habits are positively or negatively affected by smartphone addiction. This can demotivate children, preventing them from understanding their potential. This study investigates the impact of smartphone addiction on the learning habits of senior secondary school students. It is widely recognized that good study habits are essential for academic success, and smartphone addiction is an emerging concern with potential consequences for students' learning behavior. The study uses a descriptive survey design and involves a sample of 54 senior secondary school students. Data is collected through questionnaires designed to explore smartphone usage patterns, identify smartphone addiction, and assess learning habits. By examining the complex relationship between smartphone use and learning habits, this study contributes to the broader discussion on technology's impact on learning behavior and academic outcomes.

Keywords: Smart Phone, Smart Phone Addiction, Learning habits.

Introduction

Smartphone addiction is a significant challenge in today's digital world. Previous research shows that adolescent students are easily addicted to smartphones (*Smith, Rainie, & Zickuhr, 2011*). The trends also indicate that, according to the *nationwide survey of 2010*, smartphones and mobile phones are effective means of communication and entertainment for both adolescents and adults. Because of this, the majority of adolescent students spend most of their time on smartphones (*Odgers, 2018*). They believe that a smartphone is their second self (*Cha and Seo, 2018*), and many smartphone users report that they could not live without them (*Wajcman et al., 2007*). A survey by software services firm TCS found that 70% of students own a smartphone and use it extensively. Therefore, we can say that most of the adolescent population is addicted to smartphone use (*Smith, Rainie, & Zickuhr, 2011*). One study shows that 62.6% of 7th and 8th-grade students in the Philippines are smartphone addicted (*Buctot, Kim, & Kim, 2020*).

There are several studies conducted on smartphone addiction and academic achievement, mental health, and students' learning. The majority of the studies revealed that smartphone addiction had a negative impact on adolescents' or adults' mental or physical health (*Akashe, Z.B. et al, 2014; Acharya, J. P. et al., 2013; Shoukat, S., 2018; and Nikolopoulou, K. & Gialamas, V., 2018*). These studies revealed that long-term use of smartphones causes students to suffer from headache, irritability/anger, lack of concentration and academic performance, insomnia, anxiety, etc. A few studies also said that smartphone usage is not related to the symptoms of depression, and is also partially related to symptoms of anxiety (*Longnecker, 2019*). It also explored that excessive use of smartphones can reduce the level of anxiety. On the other hand, several studies revealed that the uses of smartphones significantly influence the academic achievement of students (*Rabiu, et al. 2016, Jairus, et al 2017, Hossian, 2019*). According to *Hossian (2019)* study the proper use of smartphones has influenced the students' academic performance. It also said heavy use of cell phones has a negative effect on academic performance. In these conflict phases, several studies also revealed that overuse of smartphones has negatively influenced students' academic

performance (*Arefin et al, 2017; Amez & Baert, 2019; Ng et al., 2017; Darko-Adje, 2019*). Some studies show that access to social networking sites through using cell phones has negatively affected students' grade point average (*Junco, 2012; Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2013; Kirschner & Karpinskib, 2010; Stollak, Vandenberg, Burklund, & Weiss, 2011*). Few studies also revealed that smartphone addiction scores are not associated with their academic performance (*Boumosleh & Jaalouk, 2018*). So, on the basis of the review, the researcher found that there is a contradictory result on the influence of smartphone use and the academic performance of the students. On the other side of the basis of review, no study was conducted on the influence of smartphone use on the lifestyle of the learners and the instructional process of smartphone use learning. On the other hand, the researcher observed that the majority of the studies were conducted outside India. Here is a contextual gap that was found. So, for fulfilling the contextual gap, the variable gap, and the lack of understanding of smartphone addiction and mental health, and academic performance, the investigator feels an in-depth study is very much necessary at the micro level for an overall understanding of the topic. On the other hand, there is a little study that was conducted on remedial measures for recovering smartphone addiction. Thus, to fulfill this gap, the researcher will investigate this.

By examining the impact of smartphone addiction on students' mental health, academic performance, and remedial measures for recovering students from smartphone addiction in multiple contexts, the researcher can understand smartphone usage for students' learning and its positive or negative impact on academic performance, learning, lifestyle, and mental health of all levels of students. With this understanding, the teacher and administrators can plan interventions to the proper instruction on how to use smartphones in daily life and also provide information related to the negative effects of smartphone addiction to solve that type of challenge.

Rationale of the Study

In the digital era, smartphones have become an essential part of our lives. Because it positively affected different aspects of life,

like lifestyle, education, social communication, ensuring safety, online marketing, health, banking, business, and entertainment etc. In 2015, the government launched the Digital India campaign to ensure that government services are available online and make India digitally empowered. After launching this campaign, the number of smartphone users has significantly increased. According to the India Cellular & Electronics Association report (*July 2020*), there were 500 million people using smartphones at the end of 2019, and its will reach expected to reach 829 million by 2022. As per Kantar's findings, the digital India revolution was continuing in rural areas, and it also found that 304 million rural people used the internet in India till 2020.

A few years ago, there were so many state governments (Tamil Nadu, Karnataka, Kerala, Odisha, Maharashtra, Gujrat, and Tripura) that banned mobile phones in school and college campuses in 2009 (*The Times of India, 2009*). Due to the reason of creating disturbance in the institution campus, negative impact on students' health, their way of using smartphones, etc. (Goswami, Singh, 2015). But after the COVID-19 pandemic, the necessity of smartphones or laptops increased due to the conduct of online learning. For that reason, there are many state governments have thought that they should provide smartphones to the higher secondary school students. Thus, recently the West Bengal government announced that the government would provide 10000 rupees to all the higher secondary school students for buying a smartphone or a a tabletlet for online education (*The New Indian Express, 22 December 2020*). Another side, many previous research studies show that adolescents are easily addicted to their smartphones (*Smith, Rainie, & Zickuhr, 2011*). Previous studies also revealed that smartphone addiction had adversely affected to adolescent's lifestyle (*Carter, Rees, Hale, Bhattacharjee, & Paradkar, 2016; Colten et al., 2006*), mental health (*Akashe, et al, 2014; Acharya, et al, 2013; Shoukat, 2018; Torous & Powel, 2015; Goswami, & Singh, 2016; Wu, 2018; Mohamed, & Mostafa, 2020*), physical health (*Kim, Kim, and Jee, 2015*), academic performance and learning activities (*Anwar, E., 2014; Arefin, M. S. et al, 2017; Arefin, M. S. et al, 2017; Ng, et al. 2017; Amez & Baert, 2019; Darko-Adje, 2019*). So, for recovering addicted adolescents and adults from smartphone or

mobile phone addiction, conducting much research on remedial measures will be very necessary in the future.

Objectives of the Study

- i. To explore the pattern of smartphone usage of senior secondary school students.
- ii. To study the impact of smartphone addiction on the learning habits of senior secondary school students.

Operational Definition

Smartphone addiction:

It refers to addictive behaviors of students that come from overuse and frequent use of smartphones. These addicted behaviors are frequent smartphone use, withdrawal problems, conflict, dependence, and problems with sleep habits, etc.

Learning habits:

learning habits refer to the habits of reading, writing, and attentively listening in class of the students. But this study learning habits refers to lack of concentration and lack of attention in study time, a decline in academic scores, time given for study, and use of smartphones for learning, etc.

Research Questions

- i. What is the pattern of using smartphones by higher secondary school students?
- ii. How smartphone addiction affects the learning habits of senior secondary school students.

Methodology and Research Procedures

Design of The Study:

For conducting this study, the researcher will use a descriptive survey design.

Sample:

The sample will be selected purposively. 54 students from a senior secondary school will be selected as a sample for this study.

Tools:

The proposed tools for data collection will be

- Questionnaire to explore the pattern of smartphone use
- Questionnaire for testing learning habits.

Data Analysis Procedure

The proposed tools for data analysis will be:

- Objective no 1 & 2: Percentage analysis

Result and discussion

The study was conducted to explore the pattern of smartphone usage and the effect of smartphone addiction on the learning habits of senior secondary school students. Here, the researchers analyze the data objectively.

Objectives 1: To explore the pattern of smartphone usage of senior secondary school students.

Here, the researchers analyze the data according to the addiction level of smartphones and also analyze on two bases, like using time of smartphones per day and the purpose of use of smartphone use.

Table 1.1: Data related to the number of hours using smartphones/day based on smartphone addiction level

Time (hr)	0-5 hr	6-10 hr	11-15 hr	16-20 hr
Mild	6 (67%)	3 (33%)	0	0
Moderate	0	24 (100%)	0	0
Sever	0	9 (43%)	12 (57%)	0
Total	6 (11%)	36 (67%)	12 (22%)	0

This table shows that in total no of students, most of the students of senior secondary school were using their smartphones 6-10 hours per day. There are 22% students using their smartphones 11-16 hr per day, and only a few (11%) students use their smartphones 0-5 hours per day. This table also indicates that the majority of the mild level of addicted students were using their smartphones 0-5 hours per day, and only a few students were using their smartphones 6-10 hours per day. From moderately smartphone addicted student, all were using their smartphones 6-10 hours a day. Lastly, due to severe smartphone addiction, more than half of the students were using their smartphones 11-15 hours per day, and 43% students were using their smartphones 6-10 hr per day. The above table data is shown in the figure below.

The table indicated that the majority of the students were spending a long time by using their smartphone in browsing

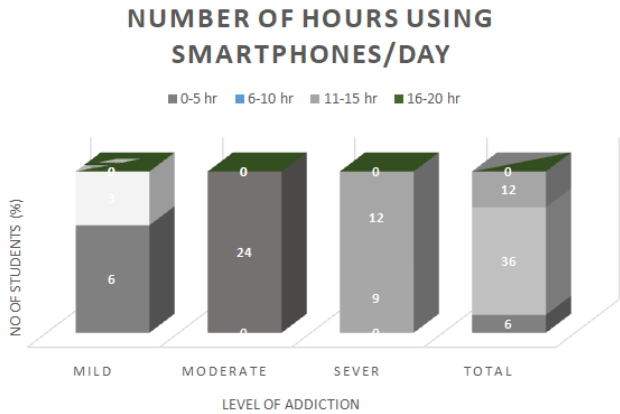


Figure 1.1: Data related to the number of hours using smartphones/day based on smartphone addiction level

Table 1.2: Data related to the pattern of using smartphones by all students for different purposes

Time (hr)	0-3 hr	4-6 hr	7-9 hr	10-13 hr
Calling	48	6	0	0
Social networking site	30	15	6	3
Playing game	51	3	3	0
Watching Film & others	51	3	0	0
Studying	36	18	0	0

social network site like half (56%) of the students 0-3 hours/day, 27% students spending 4-6 hr/day, 11% students 7-9 hr/day, and 6% students spending 10-13hr hours/day. For playing games, watching movies, and other purposes, the students were spending less time (0-3 hours/day, like 94% students were spending 0-3 hr/day, and only 6% students were spending 4-6 hr/day. For calling purposes, the majority of the students were spending 0-3 hours/day, and only a few students were spending 4-6 hours/day. For study purposes, 67% students spend 0-3 hr/day, and the other 33% students spend 4-6 hr/day using smartphones. This table also indicates that, overall, most students spend a long time using their smartphones for entertainment. The above table data is shown in the figure below.

Table no.3 indicated that most of the students who were mildly smartphone addicted spent 0-3 hr in a day. For calling,

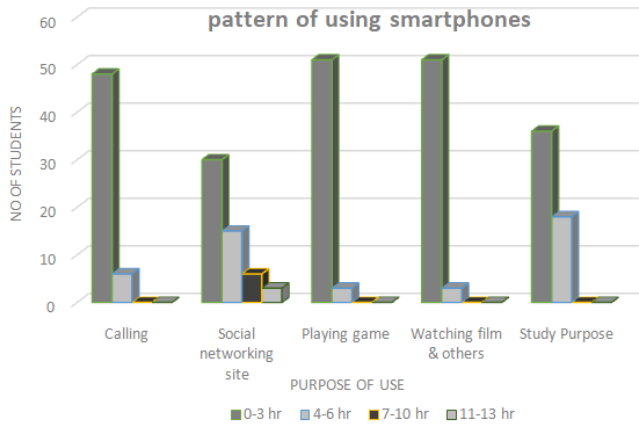


Figure 1.2: Data related to the pattern of using smartphones by all students for different purposes

Table 1.3: Pattern of use of smartphones for different purposes of mild level addiction.

Purpose of use	0-3 hr	4-6 hr	7-9 hr	10-13 hr
Calling	9 (100%)	0	0	0
Social networking site	6 (67%)	3 (33%)	0	0
Playing game	9 (100%)	0	0	0
Watching films & others	9 (100%)	0	0	0
Study purpose	9 (100%)	0	0	0

playing games, watching films & others and other study purposes, all the students spend their time in 0-3 hr/day, and only a few students spend 4-6 hr/day browsing social networking websites like Facebook, Instagram. Below the above table is shown in a figure.

The table 4. shows that the majority (75%) of students who are moderately addicted to smartphones were spending their time in 0-3 hr/day for calling, and only some (25%) of the students were spending 4-6 hr/day. For browsing social networking sites, more than half (63%) of the participants were spending their time in 0-3 hr/day, and others (37%) students spent 4-6 hr/day. For playing games, all the students spend 0-3 hr/day. 88% of

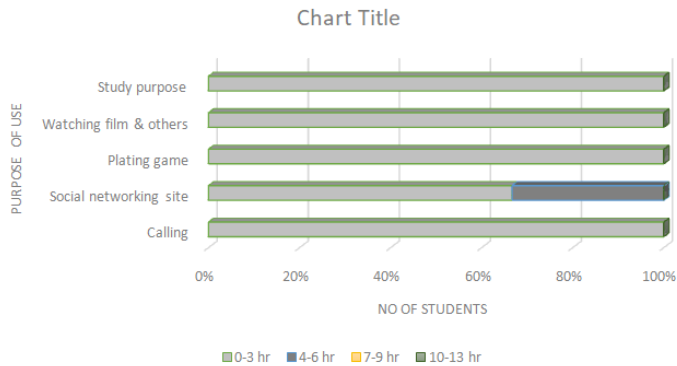


Figure 1.3: Pattern of use of smartphones for different purposes of mild level addiction.

Table 1.4: Pattern of use of smartphones for different purposes of moderate-level addicted students

Purpose of use	0-3 hr	4-6 hr	7-9 hr	10-13 hr
Calling	18 (75%)	6 (25%)	0	0
Social networking site	15 (63%)	9 (37%)	0	0
Playing game	24 (100%)	0	0	0
Watching films & others	21 (88%)	3 (12%)	0	0
Study purpose	12 (50%)	12 (50%)	0	0

students who are moderately addicted to the smartphone were spending their time in 0-3 hr/day, and only a few participants were spending time 4-6 hr/day. At last, half of the students use their smartphone for study in 0-3 hr/day, and the other half of the students use their smartphone in 4-6 hr/day to prepare notes and watch academic content-related videos on YouTube. This table also indicates that 25% students who are moderately addicted to smartphones were spending 4-6 hr/day for different purposes like calling, browsing social networking sites, watching films & others, and study purposes. The above table is shown in the figure below.

From the above table, it is found that all (100%) the severe category students spend a minimum of 3 hours per day calling and

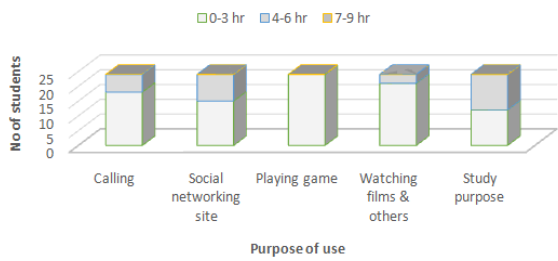


Figure 1.4: Pattern of use of smartphones for different purposes among moderate-level addicted students

Table 1.5: data related to the pattern of use of smartphones for different purposes of every level of addicted students

Purpose of use	0-3 hr	4-6 hr	7-9 hr	10-13 hr
Calling	21 (100%)	0	0	0
Social networking site	9	3	6	3
Playing game	18	3	0	0
Watching films & others	21	0	0	0
Study purpose	15	6	0	0

watching films, etc. The result also shows that Many students are severely smartphone addicted by the differently use of following purpose like, for o-3 hours/day: Playing game (86%), Study purpose (71%), browsing Social networking site (43%); for 4-6 hours/day: Study purpose (29%), Playing game and Social networking site (14%). The table also indicates that 43% of respondents spent more than 7 hours browsing social networking sites only.

From the table, it is concluded that approximately half of the total student population is severely addicted due to the reason for long-time using social networking sites, and many students excessively use their smartphones for each purpose, for at least 2 hours/day, which helps to increase the addiction level.

Objective no 3: To study the effect of smartphone addiction on the learning habits of senior secondary school students.

In this objective, researchers analyze the data related to the

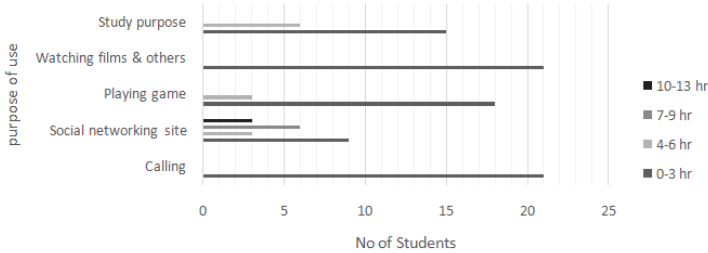


Figure 1.5: Data related to the pattern of using smartphones for different purposes among severe-level addicted students effect of addiction on learning habits according to the question.

Question no. 1: How much time do you use a smartphone for study purposes?

In question no-1, data indicated that the majority (67%) of the students used their smartphone 0-3 hr/ day for study purposes, and only some (33%) students spent 3-6 hr/day. Another side researcher also investigated that there was a majority of the students using their smartphones for 6-10 hr in a day. So researchers analyzed the above two sentences, concluded that the majority of the students spend their valuable time using smartphones, which directly negatively affects their study time, and also only a few students positively use their smartphones for study purposes, which helps their learning.

The above table 6. indicates that many students (33.3%) reject the claim that excessive use of smartphones can hamper their school grades. Simultaneously, 33.3% also accept that excessive smartphone use may affect their academic grade. So it can be inferred from the previous explanation that the students who rejected statement 1 are mildly addicted, and those who accept this statement are moderately and severely addicted to smartphones. The majority of the students did not give any positive or negative response, while 33% students realized that they cannot succeed in their study plan, and 22.2 of % students thought their study plan was not affected by excessive use of smartphones. 44.4% respondents say that they don't destruct from their study as a reason for smartphone addiction, while 38.9% respondents respond against it. In the other statement, the majority of the students (56%) give their opinion that mobile technology is responsible for their low academic achievement, and the data also says that 22.2% respondents deny it. After that, the majority of the students deny that mobile technology helps their learning and academic performance, while 33.3% of students support it. This table data and all above table

Table 1.6: Data related to the effect of smartphone addiction on the learning habits of the senior secondary students.

Statements	SDA	DA	N	A	SA
My school grades dropped due to excessive smartphone use.	15 (27.8%)	3(5.6%)	18 (33.3%)	18 (33.3%)	0
I have a hard time doing what I have planned (study, do homework, or go to after-school classes) due to using my smartphone.	12 (22.2%)	0	24 (44.4%)	18 (33.3%)	0
My smartphone does not distract me from my studies	6 (11.1%)	18 (33.3%)	9 (16.7%)	12 (22.2%)	916.7%
My mobile phone is responsible for my low academic achievement	6 (11.1%)	6 (11.1%)	12 (22.2%)	15 (27.8%)	15 (27.8%)
My academic performance has increased due to mobile technology	27 (50%)	9 (16.7%)	0	12 (22.2%)	6 (11.1%)
Statements	Always	often	Some times	Rarely	Never

data also indicated that majority of the students who are moderately and severely addicted by smartphone they face lot of problems in study time due to the reason of lack of concentration, a lot of time spending by using smartphone for entertainment purpose in a day and other side majority of mildly addicted and some moderately/severely addicted students enjoy their learning with the help of smartphone due to that reason of control smartphone use, use smartphone for preparing note and understand the different content by watching and browsing study related content.

Continued...

Statements	SDA	DA	N	A	SA
How often does the use of mobile devices in class assist your learning?	18 (33.3%)	24 (44.4%)	0	0	12 (22.2%)
How often does the use of a mobile phone during your study time distract you	6 (11.1%)	6 (11.1%)	32 (61.1%)	3 (5.6%)	6 (11.1%)
How often do the calls/messages received just before class impact your ability to concentrate	9 (16.7%)	15 (28.8%)	18 (33.3%)	9 (16.7%)	3 (5.6%)

In the question of help in learning, the majority of students respond that smartphone use assists their classroom learning often (44.4%) and always (33.3%), and only a few people say it never assists their learning. Another question, most of the students answer that often (11.1%) and sometimes (61.1%) they are distracted from their learning by using a smartphone during study hours. Because they often (28.8%) and sometimes (33.3%) receive friends' calls and messages during the study. The data also indicated that a few respondents were given their concentration for study due to the lack of receiving friend calls and messages during study hours.

Educational Implication

Based on the above expected outcomes, the future implications of the proposed study will have the practical implication:

- This study will be more helpful for students to understand that they are addicted to smartphones and their negative impact on their health, lifestyle, social relationships, and learning activities. It also helps to know how to recover from addiction by following the remedial measures.
- This study is also helpful for parents to recognize whether their children are smartphone addicted or not. If addicted, then they will take the necessary steps for recovery.

- This study is also helpful for the teachers so that they can identify their learners who are suffering from smartphone addiction. It also helps the teachers to know what kind of remedial measures are more helpful for recovering from smartphone addiction.
- Researchers will give their best for an in-depth study on remedial measures for recovering from smartphone addiction.
- This study is also helpful for policymakers to make further policies related to introducing online learning through smartphones and allowing its use in educational institutions.
- This study is also helpful for curriculum designers to introduce new content related to present problems like smartphone addiction and its impacts, different types of awareness program related to these issues in the school curriculum.

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Chapter 2

Gamification as a Pedagogical Tool for Enhancing Learning Outcomes in Inclusive Classrooms: A Mixed-Methods Investigation

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Abstract

Inclusive education requires creative teaching methods that support the varied needs of all learners and keep them meaningfully engaged. This study explores how gamification—using game-like elements in teaching—can boost academic performance, social interaction, and motivation among students with and without disabilities in inclusive classrooms. A mixed-methods design was used with 240 students aged 11–14 from six schools, of whom 78 had special educational needs (SEN). Over 12 weeks, students participated in a gamified curriculum that included point systems, achievement badges, leaderboards, quest-based activities, and team challenges in mathematics and science. Data were gathered through pre- and post-tests, motivation scales, engagement measures, and insights from teacher interviews and student focus groups. The findings showed significant academic gains for both SEN and non-SEN students ($p < 0.001$), with strong effect sizes ($d = 0.82$ and $d = 0.76$). Notably, students with learning disabilities showed marked improvements in intrinsic motivation (23%), peer collaboration (31%), and classroom participation (28%). However, competitive features worked differently for different learners—while they encouraged high-achievers, they sometimes discouraged those who struggled. Overall, the study suggests that when thoughtfully designed, gamification can foster inclusive, equitable learning environments that recognise and celebrate diverse abilities. At the same time, its implementation

must be sensitive to individual learning profiles and avoid placing too much emphasis on competition.

Keywords: Educational Technology, Gamification, Inclusive Education, Learning Motivation, Special Educational Needs, Universal Design for Learning

Introduction

Inclusive education represents a fundamental shift in educational philosophy, advocating for the integration of students with diverse abilities, backgrounds, and learning needs within mainstream classroom environments (UNESCO, 2020). Despite widespread policy adoption globally, practitioners continue to face significant challenges in creating learning experiences that genuinely engage all students while addressing individual educational requirements (Florian & Black-Hawkins, 2011). The heterogeneity inherent in inclusive classrooms encompassing students with learning disabilities, physical impairments, autism spectrum disorders, and neurotypical learners demands pedagogical innovation beyond traditional instructional methods.

Gamification, defined as the application of game-design elements and game principles in non-game contexts (Deterding et al., 2011), has emerged as a promising pedagogical strategy in contemporary education. By incorporating mechanics such as points, badges, leaderboards, narratives, and challenges into learning activities, gamification seeks to leverage the motivational affordances of games to enhance educational outcomes (Dicheva et al., 2015). The theoretical foundations of gamification intersect with established learning theories including Self-Determination Theory (Deci & Ryan, 2000), which emphasizes autonomy, competence, and relatedness as key motivational drivers, and Flow Theory (Csikszentmihalyi, 1990), which describes optimal engagement through balanced challenge and skill.

Recent meta-analyses indicate that gamification can positively impact learning outcomes, with moderate to large effect sizes reported across various educational contexts (Sailer & Homner, 2020). However, research specifically examining gamification within inclusive education settings remains limited. The unique needs of students with disabilities including requirements for differentiated instruction, assistive technologies, and individualized support raise critical questions about whether gamification strategies developed for general populations translate effectively to inclusive environments.

This study addresses this gap by investigating how gamified learning experiences influence academic achievement, motivation, and social participation across the ability spectrum within inclusive classrooms. Specifically, we examine whether gamification elements can support