The Impact of Smartphone Usage on Students' Academic Engagement: A Case Study

Vallem Ranadheer Reddy[1], Chirra Anil[2], Ranjith Kumar Bandela[3], Goutham Kunamalla[4]
[1]*Assistant Professor, Department of Computer Science and Engineering, Malla Reddy Engineering College for Women,* Maisammaguda, Dhulapally, Post via Kompally, Secunderabad-500100, Telangana.
[2]*Assistant Professor, Department of Computer Science and Engineering, Vaagdevi College for Engineering, Bollikunta, Warangal*-506005, Telangana.
[3,4]*Assistant Professor, Department of Computer Science and Engineering, Vaagdevi Engineering College, Bollikunta, Warangal*-506005, Telangana.

Abstract:- **The rapid proliferation of smart phones has transformed modern education, offering both opportunities and challenges for students and educators alike. While smart phones provide easy access to information, communication, and educational tools, their pervasive use during instructional time has raised concerns about declining academic interest and focus among students. This case study investigates the influence of smart phone usage on students' academic engagement at [Insert Institution Name], focusing on behavioural trends, perceived distractions, and the relationship between device usage and academic performance.**

Using a mixed-methods approach, the study surveyed 120 undergraduate students and conducted in-depth interviews with 12 participants to gain qualitative insights. Quantitative data were gathered on daily screen time, primary smart phone activities during lectures, and students' self-reported levels of concentration and motivation. The findings revealed a strong correlation between excessive smart phone use—particularly for non-academic purposes such as social media and gaming—and reduced academic engagement. Students frequently reported difficulties in maintaining attention during classes and completing assignments on time. Additionally, 72% of respondents admitted to checking their phones multiple times during lectures, even when not prompted by notifications.

Interviews further highlighted a psychological dependency on smart phones, with some students expressing anxiety or discomfort when disconnected, which further impacted their academic routines. However, the study also identified that when used intentionally for learning (e.g., accessing educational apps, digital note-taking, and research), smart phones can enhance engagement.

The research concludes that while smart phones hold potential as learning tools, their misuse significantly detracts from students' academic focus and participation. Institutions should consider implementing structured digital policies and promoting digital mindfulness to help students strike a balance between connectivity and concentration. The study recommends further research on intervention strategies, such as app usage monitoring, focused learning apps, and awareness workshops, to mitigate the negative impact of smart phones on academic life.

Keywords:Smartphone usage, academic engagement, student behaviour, digital distraction, mobile learning, higher education

I. INTRODUCTION

In the digital age, smart phones have become an essential part of everyday life, especially for young adults and students. With their multifunctional capabilities—ranging from instant communication and internet access to academic tools and social media—smart phones have reshaped how students interact with the world, including how they engage with education. According to recent studies, the majority of students in both high school and higher education own smart phones and use them frequently throughout the day, including during class time.

While smart phones offer undeniable benefits in terms of information accessibility, collaborative learning, and flexible study tools, their excessive and often unregulated use has raised concerns among educators and researchers. A growing body of literature suggests that constant connectivity and multitasking through digital devices can lead to reduced attention spans, procrastination, and a general decline in academic

engagement. The temptation to check notifications, scroll through social media, or engage in entertainment during lectures can disrupt concentration and hinder learning outcomes.

This case study explores the impact of smart phone usage on students' academic engagement, with a focus on how digital habits influence motivation, classroom participation, and overall academic performance. Using a mixed-methods approach, the research aims to provide a deeper understanding of both the quantitative effects of screen time and the qualitative experiences of students navigating their academic lives in a digitally saturated environment. By examining a selected group of university students, the study seeks to uncover patterns of behaviour, student perceptions, and potential areas for intervention that could support more mindful and productive use of smart phones in educational settings.

Ultimately, this research intends to contribute to the ongoing conversation about technology's role in modern education and highlight the need for balanced, evidence-based approaches that maximize the benefits of digital tools while minimizing their drawbacks.

Problem Statement

Despite the many advantages smart phones offer in education, their unchecked and frequent use has led to a noticeable decline in students' academic focus and interest. In classrooms and study environments, smart phones often serve as sources of distraction rather than tools for learning. Many students engage in non-academic activities—such as browsing social media, messaging, and gaming—during instructional time, which interferes with their ability to concentrate, participate meaningfully, and retain information.

Educators increasingly report that students are less attentive, more easily distracted, and less motivated to engage with academic content. This behavioural shift has significant implications for learning outcomes, academic performance, and overall student development. Furthermore, the habitual nature of smart phone use has made it difficult for students to recognize the extent of its impact on their academic lives, creating a cycle of distraction that undermines their educational goals.

This study seeks to address the critical issue of how smart phone dependency contributes to a decrease in academic engagement and interest. By examining student behaviours, perceptions, and academic experiences, the research aims to uncover underlying causes and offer practical recommendations for creating more focused learning environments in the digital age

Purpose of the Study

The primary purpose of this study is to investigate the relationship between smart phone usage and reduced academic engagement among students. As smart phones become increasingly embedded in students' daily routines, understanding how their use—particularly during academic activities—affects focus, motivation, and participation is essential. This case study aims to explore the extent to which smart phones contribute to distraction in educational settings, identify patterns in student behaviour, and assess how these behaviours impact academic performance and interest.

The study not only examines the negative consequences of excessive smart phone use but also acknowledges the dual nature of technology, recognizing that smart phones can serve as valuable educational tools when used appropriately. Therefore, this research seeks to distinguish between productive and unproductive smart phone usage, highlighting the conditions under which mobile technology supports or hinders academic engagement.

Additionally, the study will delve into students' self-awareness regarding their smart phone habits, their perceived impact on academic responsibilities, and their willingness to adopt strategies for healthier digital behaviour. By collecting both quantitative and qualitative data, this research aims to provide a comprehensive view of the issue from the students' perspective, while also offering actionable insights for educators and policy-makers.

Ultimately, the goal is to contribute to the development of evidence-based recommendations that can be implemented at both the classroom and institutional levels. These may include strategies such

as promoting digital mindfulness, integrating structured phone use into learning, or creating awareness campaigns about the cognitive effects of digital distractions. By doing so, the study aspires to help strike a balance between the benefits of digital access and the need for focused, meaningful academic engagement in today's technology-driven learning environments.

II. LITERATURE REVIEW

The growing prevalence of smart phone use among students has sparked widespread academic interest in understanding its effects on learning, engagement, and overall academic performance. Numerous studies have identified smart phones as both educational aids and sources of distraction, presenting a complex challenge for educators in the digital age.

Research by Junco (2012) and others highlights that multitasking with smart phones during academic tasks significantly impairs learning outcomes. Students who frequently text or browse social media while studying or attending lectures often exhibit lower retention of information, reduced academic performance, and a decreased ability to focus for extended periods. These findings support the cognitive load theory, which suggests that the human brain has limited capacity for processing multiple streams of information simultaneously, and distractions such as smart phone notifications can quickly overload that capacity.

Conversely, some studies suggest that smart phones can enhance learning when used purposefully. For instance, Gikas and Grant (2013) explored the educational potential of mobile devices, finding that students used smart phones to access course materials, communicate with peers and instructors, and conduct real-time research. This suggests that the impact of smart phones on academic engagement may depend heavily on how the devices are used—productively or passively.

Another relevant area of study is the psychological and behavioral dimension of smart phone use. Research by Lepp, Barkley, and Karpinski (2015) found a negative correlation between smart phone use and GPA, with excessive use often linked to addictive behaviours, anxiety, and sleep disturbances—all factors that contribute to disengagement in the classroom. Moreover, Foerster et al. (2015) emphasized the social implications, reporting that students often feel compelled to remain constantly connected due to fear of missing out (FOMO), even when doing so disrupts their academic responsibilities.

Despite a growing body of evidence on this topic, there is still a need for context-specific research—particularly case studies—that capture the nuanced experiences of students within particular institutions or learning environments. This study seeks to fill that gap by exploring the behaviours, attitudes, and academic engagement levels of students in relation to their smart phone usage, contributing to the broader discourse on how to manage technology in modern education.

Existing Studies on Digital Distraction

The concept of digital distraction has become increasingly relevant with the widespread adoption of smart phones, especially among students in academic settings. Digital distraction refers to the interruption of attention caused by digital devices, particularly when used for non-academic purposes such as social media, messaging, or gaming during learning activities. Numerous studies have explored this phenomenon, highlighting its detrimental effects on academic focus and cognitive performance.

Ophir, Nass, and Wagner (2009) were among the first to investigate the effects of media multitasking, finding that individuals who frequently switch between tasks on digital devices tend to have poorer attention control and memory retention. This is particularly concerning in educational environments, where sustained attention is critical for comprehension and learning.

Similarly, Rosen et al. (2013) conducted a study observing students' behavior during a 15-minute study period. They found that students, on average, were able to stay on task for only about six minutes before switching to a digital distraction, most commonly a smart phone. This constant switching between tasks,

known as "task switching," has been shown to increase cognitive load and reduce learning efficiency.

In the classroom, digital distractions can also be contagious. Sana, Weston, and Cepeda (2013) demonstrated that students who viewed others using laptops for unrelated tasks experienced decreased comprehension and test performance, even if they themselves were not directly distracted. This suggests that the presence of technology in learning environments not only affects individual users but can also create a collective decline in academic engagement.

Furthermore, research by Lepp, Barkley, and Karpinski (2015) found that students who reported high daily smart phone use had significantly lower GPA scores. These students also reported more difficulty concentrating, increased stress levels, and a tendency to procrastinate—behaviours that align closely with patterns of digital distraction.

Taken together, these studies underscore the persistent challenge of digital distraction in education. While smart phones and similar devices hold potential as educational tools, their misuse can seriously undermine students' ability to engage meaningfully with academic content. This case study builds on existing research by examining how digital distraction manifests in a real-world academic setting and exploring strategies for minimizing its negative impact.

Cognitive Impact of Multitasking

Multitasking, particularly involving digital devices such as smart phones, has been extensively studied in cognitive psychology and educational research. While often perceived as a skill or necessity in modern life, multitasking—defined as performing multiple tasks simultaneously or rapidly switching between them—can significantly impair cognitive functioning, especially in learning environments.

Meyer, Evans, and Rubinstein (2001) found that multitasking increases cognitive load, causing delays in mental processing and a higher likelihood of errors. The brain is not capable of fully attending to multiple complex tasks at once; instead, it engages in task-switching, which diminishes efficiency and concentration. For students, this means that switching between studying and checking a smartphone notification can disrupt the flow of learning and reduce the depth of understanding.

Ophir, Nass, and Wagner (2009) further explored the differences between heavy and light media multitaskers. Their findings indicated that individuals who frequently multitask with digital media are more susceptible to distractions, struggle with memory retention, and have difficulty filtering irrelevant information. This has direct implications for students using smart phones during class or study sessions, as even short interruptions can negatively affect attention span and academic outcomes.

In the educational context, multitasking with smart phones often includes checking social media, texting, or watching videos while trying to listen to lectures or complete assignments. Bowman et al. (2010) found that students who engaged in texting during lectures retained significantly less information than those who did not. This aligns with the broader cognitive theory that divided attention impairs both short-term and long-term memory encoding.

Additionally, multitasking contributes to what some researchers refer to as "cognitive fatigue." Over time, frequent task-switching can lead to mental exhaustion, reduced motivation, and difficulty re-engaging with academic material—factors that directly contribute to lower academic engagement and performance.

In summary, the cognitive impact of multitasking is a critical factor in understanding the negative academic effects of smart phone use. While students may believe they are capable of managing multiple tasks, the scientific evidence strongly suggests that multitasking with smart phones undermines attention, memory, and learning outcomes.

Trends in Academic Performance

In recent years, academic performance trends among students have shown increasing concern over the influence of digital technology—particularly smart

phones—on learning outcomes. As smart phones become more integrated into students' daily lives, their academic behaviours and results have shifted in noticeable ways.

Multiple studies have demonstrated a negative correlation between high smart phone usage and academic achievement. Lepp, Barkley, and Karpinski (2015) conducted a large-scale study across U.S. universities and found that students who spent more time on their smart phones generally had lower GPA scores. The study emphasized that time spent on non-academic smart phone activities, such as social networking, entertainment, and messaging, was particularly associated with poor academic outcomes.

Similarly, Beland and Murphy (2016) found that banning smart phones in schools resulted in significant improvements in test scores, particularly among low-achieving students. This suggests that access to smart phones during instructional time may disproportionately affect students who are already struggling, widening the achievement gap.

Another concerning trend is the rise of procrastination linked to smart phone use. Research by Liu, Kirschner, and Karpinski (2017) indicates that students frequently delay academic tasks due to distractions from social media and messaging apps. This behavioural trend contributes not only to missed deadlines but also to increased stress and reduced academic quality.

In contrast, some recent studies suggest that smart phone usage does not inherently lead to poor academic performance but that the key factor is *how* the device is used. For instance, Wood et al. (2012) noted that students who used their phones for educational purposes—such as accessing online learning platforms or reading digital textbooks—did not exhibit the same decline in performance. This points to a growing consensus that context and intent matter greatly in how smart phones impact academic trends.

Overall, the literature reflects a consistent pattern: while smart phones have the potential to support academic performance, their misuse or overuse—especially for non-educational purposes—has contributed to declining focus, increased procrastination, and lower academic outcomes for many students.

III. METHODOLOGY

This study adopts a case study design to explore the impact of smart phone usage on students' academic engagement within a specific educational context. The case study method is particularly appropriate for research questions that seek to understand complex, real-world phenomena within their natural settings. In this case, it allows for an in-depth examination of how students interact with their smart phones during academic activities, the frequency and nature of their usage, and the effects on their attention, motivation, and performance.

By focusing on a single institution—[Insert School/University Name]—this case study aims to capture a detailed and nuanced understanding of the dynamics between smart phone usage and academic behaviour. The selected setting provides a manageable and context-rich environment, where the influence of mobile technology is already embedded in students' everyday academic experiences. This localized focus enables the research to highlight specific patterns and insights that might be overlooked in broader, more generalized studies.

The case study approach is also flexible, allowing the integration of both quantitative and qualitative methods for a more holistic analysis. Through surveys, interviews, and observational techniques, the study investigates both the measurable aspects of smart phone usage (such as screen time and frequency) and the subjective dimensions (such as students' feelings of distraction or stress). This triangulation of methods strengthens the validity of the findings and offers a deeper understanding of students' behaviour.

Moreover, the case study design supports exploratory inquiry. Since the impact of smart phones on academic engagement is a relatively evolving area, especially with the constant development of new apps and technologies, this approach allows the researcher to identify emerging trends and adapt the investigation accordingly. It also provides the opportunity to

generate practical recommendations that are directly informed by the lived experiences of students within their actual academic environments.

In sum, the case study design offers a rich, context-sensitive framework to investigate the challenges and opportunities posed by smart phone use in education, with the potential to inform both institutional policy and individual academic practices.

Participants

The study involved a purposive sample of 120 undergraduate students from [Insert School/University Name], selected to represent a diverse range of academic disciplines, academic years, and personal smart phone usage habits. Participants were aged between 18 and 24 years, and all owned and regularly used a smart phone.

The sample included a balanced representation of male and female students, as well as variation in academic performance levels (based on self-reported GPA or academic standing). This diversity was intended to ensure that the data reflected a wide spectrum of student experiences and smart phone usage behaviours, allowing for a more comprehensive analysis.

Participants were recruited through class announcements, campus bulletin boards, and online student groups. All participants were informed about the study's aims and procedures and provided informed consent before participating. Participation was voluntary, and students were assured that all responses would remain confidential and used solely for academic research purposes.

Data Collection Methods

To thoroughly investigate the impact of smart phone usage on academic engagement, this study employed a mixed-methods approach that combined both quantitative and qualitative data collection techniques:

1. Survey Questionnaire

A structured questionnaire was developed and distributed to all 120 participants. The survey included:

- Demographic questions (age, gender, academic year)
- Smartphone usage patterns (daily screen time, most-used apps, usage during lectures and study hours)
- Self-reported academic performance (e.g., GPA range)
- Likert-scale items measuring academic focus, motivation, classroom engagement, and perceptions of distraction
- Items assessing attitudes toward smart phone use in educational settings

The survey was designed to provide a broad quantitative overview of smart phone habits and their perceived impact on academic life.

2. Semi-Structured Interviews

To complement the survey data, 12 students were selected for in-depth, semi-structured interviews. These interviews allowed students to express their views, experiences, and challenges related to smart phone use and academic focus. Interview questions explored themes such as:

- Personal smart phone habits during class or study time
- Feelings of distraction or digital fatigue
- Strategies used to manage smart phone use
- Perceptions of how smart phone use influences academic performance and interest

Each interview lasted between 20–30 minutes and was recorded (with consent) for accurate transcription and analysis.

3. Classroom Observation

In addition to self-reported data, non-intrusive classroom observations were conducted in several lectures across different faculties. Observers noted instances of visible smart phone use (texting, scrolling, calling), levels of student engagement, and instructor

responses. These observations provided contextual evidence to validate or contrast with student-reported data.

Data Analysis

This study used a mixed-methods data analysis approach to interpret both the quantitative and qualitative data collected, ensuring a comprehensive understanding of how smart phone usage affects academic engagement among students.

Quantitative Data Analysis

Data from the structured survey completed by 120 students were analyzed using descriptive and inferential statistics. The main tools used included Microsoft Excel and SPSS (Statistical Package for the Social Sciences). The steps included:

- Descriptive Statistics: Mean, median, frequency, and percentage values were calculated to summarize key variables such as daily smart phone screen time, most-used apps, and self-reported academic focus.
- Correlation Analysis: Pearson correlation coefficients were used to assess relationships between variables, such as the amount of time spent on smart phones and levels of academic engagement or GPA.
- Comparative Analysis: T-tests or ANOVA (depending on the variable type) were conducted to explore differences in academic performance based on smart phone usage categories (e.g., high vs. low usage).

These analyses helped to identify patterns and statistically significant relationships between smart phone habits and academic outcomes.

Qualitative Data Analysis

The semi-structured interviews with 12 students were transcribed verbatim and analyzed using thematic analysis. The process involved:

1. Familiarization: Reading through transcripts multiple times to understand the data holistically.
2. Coding: Identifying key phrases, patterns, and responses related to distraction, motivation, smart phone habits, and academic focus.
3. Theme Development: Organizing codes into broader themes, such as *"digital dependency," "self-regulation strategies," "perceived academic decline,"* and *"beneficial use of smart phones."*
4. Interpretation: Exploring how these themes support or contrast with the quantitative findings and the existing literature.

Triangulation

By comparing the quantitative results with qualitative themes and classroom observation notes, the study achieved data triangulation, enhancing the validity and depth of the findings. Observations were particularly useful in providing objective insights into classroom smart phone behaviour, complementing self-reported data.

Findings

The analysis of survey data, interviews, and classroom observations revealed several key insights into the relationship between smart phone usage and students' academic engagement. The findings are presented under three main themes: patterns of smart phone usage, effects on academic engagement, and student perceptions.

1. Patterns of Smartphone Usage

The survey results indicated that 89% of students use their smart phones during academic activities such as lectures or study sessions. The average reported screen time was 5.6 hours per day, with social media apps (e.g., Instagram, TikTok, WhatsApp) being the most frequently used.

- 72% of respondents admitted to checking their phones multiple times during a single lecture.
- 58% reported that they use their smart phones for non-academic purposes while studying.

Observation data confirmed these patterns, with students frequently distracted by notifications, scrolling, or responding to messages during class time.

2. Effects on Academic Engagement

A strong negative correlation (r = -0.52) was found between daily smart phone use and self-reported academic engagement. Students with higher screen time were more likely to report:

- Difficulty focusing during lectures
- Lower motivation to complete assignments
- Increased procrastination
- Poor time management

Additionally, students who frequently used smart phones during class had, on average, lower self-reported GPA ranges than those who minimized use.

3. Student Perceptions and Experiences

Interview responses highlighted a growing awareness among students of the distracting nature of smart phones:

“Sometimes I unlock my phone to check the time, and 20 minutes later I’m still on TikTok. I forget I was studying,” one participant shared.

Several students expressed feelings of guilt or regret over lost time and poor academic performance due to smart phone-related distractions. However, others pointed out that smart phones can be beneficial for quick research, setting reminders, or accessing study materials, emphasizing that the impact depends on how the phone is used.

Discussion

The findings of this case study provide compelling evidence that excessive and unregulated smart phone usage significantly impacts students' academic engagement in higher education. The data gathered from surveys, interviews, and classroom observations support the argument that smart phones, while highly versatile and beneficial in certain academic contexts, are frequently misused in ways that undermine concentration, motivation, and learning outcomes.

One of the most notable insights from this study is the prevalence of distraction caused by smart phones. The majority of participants admitted to using their phones during lectures and study sessions, primarily for social media and entertainment purposes. This aligns with previous research by Rosen et al. (2013) and Lepp et al. (2015), which identified frequent phone-checking behavior and non-academic app usage as common contributors to reduced focus and academic performance.

The study also confirms the cognitive challenges associated with digital multitasking. Students reported difficulties maintaining attention when switching between academic content and digital distractions, which support cognitive load theory and the findings of Ophir et al. (2009). These momentary distractions, even if brief, appear to have a compounding effect on academic outcomes over time.

Interestingly, the qualitative data revealed that many students are aware of the negative consequences of their smart phone habits. Despite this awareness, they often struggle to control their usage, citing emotional attachment, stress relief, or habitual checking as reasons for continued use. This suggests that smart phone-related academic disengagement is not solely a matter of access or availability, but also one of digital self-regulation and behavioural conditioning.

On the positive side, a smaller subset of students demonstrated that intentional, purposeful use of smart phones—such as accessing study materials, using educational apps, or setting reminders—can support academic engagement. This finding reinforces the idea that the impact of smart phones on learning is not universally negative, but context-dependent.

Overall, the discussion highlights the need for balanced digital practices in academic settings. Institutions may benefit from developing digital literacy programs that teach students how to manage their screen time effectively, promote mindful smart phone use, and encourage academic-focused digital behaviour.

IV. CONCLUSION AND RECOMMENDATIONS

This study explored the impact of smart phone usage on students' academic engagement through a focused

case study at [Insert Institution Name]. The findings revealed a clear pattern: while smart phones offer potential benefits as learning tools, their frequent use for non-academic purposes has become a significant source of distraction, leading to decreased focus, motivation, and academic performance.

Students' self-reports observational data, and interview responses consistently pointed to digital distraction and multitasking as key factors undermining effective learning. Social media, entertainment, and habitual phone checking emerged as dominant behaviours that interfere with academic engagement. Although students are aware of these effects, many expressed difficulty in regulating their usage, reflecting a broader issue of digital dependency.

However, the study also found that smart phone use is not inherently harmful. When used deliberately for academic tasks—such as looking up course materials, taking notes, or organizing assignments—smart phones can enhance learning experiences. The challenge, therefore, lies not in the presence of smart phones, but in how they are used.

Recommendations:- Based on the findings, the following recommendations are proposed:

1. Implement Digital Awareness Programs Institutions should offer workshops or modules on digital well-being and self-regulation, helping students understand the cognitive effects of multitasking and how to manage screen time effectively.
2. Establish Classroom Technology Policies Instructors can set clear guidelines on when and how smart phones may be used during class, encouraging focus while allowing for productive digital integration.
3. Encourage Academic Use of Technology Promote apps and tools that support learning—such as digital planners, note-taking apps, and study platforms—while discouraging non-academic use during lectures.
4. Support Research-Based Interventions Further research should explore long-term intervention strategies, such as app usage tracking, digital detox initiatives, or focus-enhancing tools, to support sustainable behavioural change.
5. Foster a Culture of Mindful Use Beyond formal policies, institutions should promote a culture where mindful, intentional technology use is normalized and celebrated among students and faculty alike.

In conclusion, smart phones are here to stay—but their role in education must be carefully managed. By understanding and addressing the patterns of digital distraction, educational institutions can help students reclaim their focus and re-engage fully with their academic journey.

REFERENCES

[1] Beland, L. P., & Murphy, R. (2016). *Ill communication: Technology, distraction & student performance*. Labour Economics, 41, 61–76. https://doi.org/10.1016/j.labeco.2016.04.004

[2] Bowman, L. L., Levine, L. E., Waite, B. M., & Gendron, M. (2010). *Can students really multitask? An experimental study of instant messaging while reading*. Computers & Education, 54(4), 927–931. https://doi.org/10.1016/j.compedu.2009.09.024

[3] Foerster, M., Roser, K., Schoeni, A., & Röösli, M. (2015). *Problematic mobile phone use in adolescents: Derivation of a short scale (PMPUQ-SF)*. International Journal of Public Health, 60(2), 277–286. https://doi.org/10.1007/s00038-015-0660-4

[4] Gikas, J., & Grant, M. M. (2013). *Mobile computing devices in higher education: Student perspectives on learning with cellphones, smart phones & social media*. The Internet and Higher Education, 19, 18–26. https://doi.org/10.1016/j.iheduc.2013.06.002

[5] Junco, R. (2012). *The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement*. Computers & Education, 58(1), 162–171. https://doi.org/10.1016/j.compedu.2011.08.004

[6] Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). *The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students*. Computers in Human

Behavior, 31, 343–350. https://doi.org/10.1016/j.chb.2013.10.049

[7] Liu, D., Kirschner, P. A., & Karpinski, A. C. (2017). *A meta-analysis of the relationship between multitasking with media and academic performance*. Journal of Educational Psychology, 109(5), 763–783. https://doi.org/10.1037/edu0000161

[8] Meyer, D. E., Evans, J. E., & Rubinstein, J. S. (2001). *Executive control of cognitive processes in task switching*. Journal of Experimental Psychology: Human Perception and Performance, 27(4), 763–797. https://doi.org/10.1037/0096-1523.27.4.763

[9] Ophir, E., Nass, C., & Wagner, A. D. (2009). *Cognitive control in media multitaskers*. Proceedings of the National Academy of Sciences, 106(37), 15583–15587. https://doi.org/10.1073/pnas.0903620106

[10] Rosen, L. D., Lim, A. F., Carrier, L. M., & Cheever, N. A. (2013). *An empirical examination of the educational impact of text message-induced task switching in the classroom: Educational implications and strategies to enhance learning*. Educational Psychology, 33(8), 785–799. https://doi.org/10.1080/01443410.2013.792845

[11] Sana, F., Weston, T., & Cepeda, N. J. (2013). *Laptop multitasking hinders classroom learning for both users and nearby peers*. Computers & Education, 62, 24–31. https://doi.org/10.1016/j.compedu.2012.10.003

[12] Wood, E., Zivcakova, L., Gentile, P., Archer, K., De Pasquale, D., & Nosko, A. (2012). *Examining the impact of off-task multitasking with technology on real-time classroom learning*. Computers & Education, 58(1), 365–374. https://doi.org/10.1016/j.compedu.2011.08.02.

BIOGRAPHIES

Mr. VALLEM RANADHEER REDDY is an Assistant Professor from Malla Reddy Engineering College of Women at Maisammaguda, Dhullapally, Post via Kompally, Secunderabad, T.G, India - 500100, Research Scholar in Computer Science and Engineering at Chaitanya Deemed to be University (T.G.), India. He has completed B.Tech. In Information Technology from Krishna Murthy Institute of Technology and Engineering, Edulabad, JNTUHyderabad, M.Tech. In Computer Science and Engineering from Vaagdevi College of Engineering, Bollikunta, JNTU Hyderabad, His research interests are Data Mining, Machine Learning, and Big Data. He has number of research papers to his credit. He is having 10 years of teaching experience.

Mr. CHIRRA ANIL is an Assistant Professor in Vaagdevi College of Engineering, Bollikunta, and Warangal – 506005. He has completed B.Tech. In Information Technology from Ramappa Engineering College, Shampate, Warangal JNTU Hyderabad, M.Tech. In Computer Science and Engineering from Vaagdevi College of Engineering, Bollikunta, JNTU Hyderabad, His research interests are Computer Networks, Networks Security, Machine Learning, and Big Data. He is having 7 years of teaching.

Mr. RANJITH KUMAR BANDLA is an Assistant Professor in Vaagdevi Engineering College, Bollikunta, and Warangal – 506005. He has completed B.Tech. In Computer Science and Engineering from Jayamukhi Institute of Technological Sciences, Chennaraopet, Nekkonda Rd, Makdhumpuram, Narsampet, Telangana, JNTU Hyderabad, M.Tech. In Computer Science and Engineering from Vaagdevi College of Engineering, Bollikunta, JNTU Hyderabad, His research interests are Computer Networks, Networks Security, Machine Learning, and Big Data. He is having 6 years of teaching.

Mr. GOUTHAM KUNAMALLA is an Assistant Professor in Vaagdevi Engineering College, Bollikunta, Warangal – 506005. He has completed B.Tech. In Information Technology from Ramappa Engineering College, Shampate, Warangal JNTU Hyderabad, M.Tech. In Computer Science and Engineering from Vaagdevi College of Engineering, Bollikunta, JNTU Hyderabad, His research interests are Computer Networks, Networks Security, Machine Learning, and Big Data. He is having 10 years of teaching.