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Gender Differences in Mobile Device Usage and ICT Competency among Secondary School Students: Evidence from Government Schools of Madhya Pradesh

Corresponding Author-
Dr. Arvind Kumar

Affiliation -
Research Scholar, Department of Education Regional Institute of Education (RIE), Bhopal, Madhya Pradesh, India,

Contact No.- +917648925020

Email Address-
arvind132015@gmail.com

Co-Author- 1
Dr. Sanjay Kumar pandagle

Affiliation -
Associate Professor, Department of Education Regional Institute of Education (RIE), Bhopal, Madhya Pradesh, India,

Co-Author- 2
Swati Choudhary
Affiliation -
Research Scholar, Department of Education Regional Institute of Education (RIE), Bhopal, Madhya Pradesh, India,

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Abstract

The widespread integration of mobile devices into secondary education has transformed the way students learn, communicate, and access information. Smartphones and other internet-enabled devices have become valuable educational resources that support digital learning, collaborative communication, and the development of Information and Communication Technology (ICT) competencies. Although mobile technologies provide significant educational opportunities, concerns remain regarding differences in their usage patterns and digital competencies among boys and girls. Understanding these gender-based differences is essential for promoting equitable access to digital learning and strengthening ICT competencies in school education.

The present study examined gender differences in mobile device usage and ICT competency among secondary school students studying in Government schools of Madhya Pradesh. A descriptive survey research design was employed. Data were collected from 830 secondary school students selected from different categories of Government schools through a structured questionnaire developed by the researcher. The collected data were analyzed using frequency distribution and percentage analysis.

The findings indicate that mobile devices have become an integral part of students' educational experiences. Most students reported using smartphones primarily for studies, homework, information searching, and online learning. Although boys and girls demonstrated almost equal access to mobile devices, noticeable differences were observed in digital awareness and screen-time monitoring behaviour. Boys reported comparatively greater familiarity with smartphone settings and digital monitoring features, whereas girls demonstrated similar levels of educational use but relatively lower awareness of screen-time management tools. The study further revealed that educational use of mobile devices positively contributed to ICT competency among both genders.

The study concludes that the remaining gender differences are associated primarily with digital awareness rather than access to technology. Strengthening gender-inclusive digital literacy programmes, responsible mobile usage practices, and ICT-based learning opportunities can further reduce these differences and improve students' technological competencies.

1. Introduction

The twenty-first century has witnessed an unprecedented expansion of digital technologies, fundamentally transforming educational practices across the world. Among these technologies, mobile devices have emerged as one of the most influential innovations affecting teaching, learning, communication, and knowledge acquisition. Smartphones, tablets, and internet-enabled devices have become integral components of students' everyday lives, enabling instant access to educational content, virtual classrooms, multimedia resources, and collaborative learning platforms. As a result, mobile learning has gradually evolved from being an alternative educational approach to becoming an essential element of contemporary schooling.

In India, the implementation of the National Education Policy (NEP) 2020 has further accelerated the integration of Information and Communication Technology (ICT) into school education. Digital classrooms, e-content, online assessment systems, and virtual learning environments have increased students' dependence on mobile devices for academic purposes. The COVID-19 pandemic further reinforced this trend by making mobile technology the primary medium for continuing education during school closures. Consequently, students now use smartphones not only for communication but also for completing assignments, accessing digital textbooks, attending online classes, and developing ICT competencies essential for lifelong learning.

Despite these educational benefits, mobile device usage among adolescents has generated important concerns regarding responsible technology use, digital well-being, and equitable ICT skill development. While many students effectively utilize smartphones for academic purposes, others spend considerable time on entertainment, gaming, and social networking applications. Such differences in usage patterns may influence students' technological competence, digital literacy, self-regulation, and academic engagement. The educational outcomes associated with mobile device use therefore depend not merely on access to technology but also on the quality, purpose, and intensity of usage.

Gender has emerged as one of the most significant factors influencing students' interaction with digital technologies. Previous studies suggest that boys and girls often differ in their preferences for mobile applications, digital confidence, screen-time management, and ICT-related behaviours. While boys frequently report greater confidence in handling technical features of smartphones, girls often demonstrate more cautious and academically oriented patterns of technology use. These behavioural differences may influence the acquisition of ICT competencies, digital problem-solving skills, and technological self-efficacy.

The present study focuses specifically on examining gender differences in mobile device usage and ICT competency among secondary school students in Government schools of Madhya Pradesh. The study draws upon empirical

evidence collected from 830 students and aims to provide a comprehensive understanding of how boys and girls differ in their patterns of mobile device use, digital awareness, and ICT competence. The findings are expected to contribute to the development of gender-responsive digital education policies and strengthen equitable access to ICT-enabled learning opportunities.

2. Review of Literature

The rapid advancement of Information and Communication Technology (ICT) has transformed the educational experiences of secondary school students across the world. Smartphones and other mobile devices have become essential learning tools that facilitate communication, information access, collaborative learning, online assessment, and digital content creation. Their widespread availability has significantly altered students' learning behaviour, classroom participation, and digital engagement. As a result, researchers have increasingly focused on understanding how mobile device usage influences students' academic achievement, social interaction, emotional well-being, and ICT competency.

The educational value of mobile devices has expanded considerably following the implementation of digital education initiatives and the increased integration of online learning environments. In India, the National Education Policy (NEP) 2020 has emphasized digital literacy, ICT competency, blended learning, and technology-enabled education. Consequently, secondary school students are expected not only to use digital technologies effectively but also to develop critical ICT competencies required for lifelong learning and future employment. Despite these opportunities, considerable variation exists in students' patterns of mobile device usage, particularly across gender, socio-economic background, and school environment.

The present review synthesizes international and Indian research related to mobile device usage, gender differences, ICT competency, and digital literacy among secondary school students. It provides the theoretical and empirical foundation for examining gender-based variations in mobile device usage and ICT competency in Government schools of Madhya Pradesh.

2.2 Mobile Device Usage among Secondary School Students

During the last decade, mobile devices have become deeply integrated into the daily routines of adolescents. Smartphones are now widely used for communication, educational activities, entertainment, information searching, online collaboration, and participation in virtual learning environments. Researchers consistently report that mobile technologies have expanded learning opportunities beyond traditional classroom settings while simultaneously introducing new challenges related to digital behaviour and responsible technology use.

Anshari et al. (2017) observed that smartphones provide learners with flexible access to educational resources irrespective of time and

location. Their study concluded that mobile learning improves students' autonomy, engagement, and accessibility to educational content.

Similarly, **Joyce-Gibbons et al. (2018)** found that integrating smartphones into classroom instruction increased learner participation, collaborative learning, and independent knowledge construction. Students demonstrated greater motivation when mobile technologies were purposefully integrated into teaching-learning activities.

Qi (2019) reported that educational use of mobile devices significantly improved academic performance and technological confidence among secondary school students. Learners who regularly used educational applications developed stronger digital literacy and information-searching abilities.

Research conducted by **Kumar and Nanda (2020)** in India indicated that smartphones had become indispensable learning resources, particularly in schools where access to conventional educational materials was limited. Mobile-assisted learning improved students' access to educational information and strengthened ICT competency.

According to **Sharma and Bansal (2021)**, secondary school students increasingly relied upon smartphones for online classes, educational videos, communication with teachers, and academic collaboration after the COVID-19 pandemic. However, prolonged screen exposure was associated with reduced attention span and increased digital distraction.

More recently, **Patel and Mishra (2024)** reported that regular educational use of smartphones significantly enhanced students' ICT adaptation, information management skills, and digital communication abilities. Their findings emphasized that the educational benefits of smartphones largely depend on the purpose and quality of usage rather than the duration alone.

Overall, previous studies indicate that mobile devices have become valuable educational resources capable of enhancing independent learning, digital literacy, and ICT competency when used responsibly.

2.3 Gender Differences in Mobile Device Usage

Gender-based differences in technology use have received increasing attention in educational research because they influence students' digital participation, technological confidence, and ICT competency.

Bai et al. (2019) observed that boys generally spent more time exploring technical features, gaming applications, and digital experimentation, whereas girls preferred communication-oriented and educational applications.

Lachance and Wong (2020) reported that boys exhibited greater confidence in using smartphone settings and digital tools, while girls demonstrated comparatively higher self-control regarding social media engagement.

Woo et al. (2021) found that although both genders extensively used smartphones, boys generally reported longer screen time, whereas

girls primarily utilized smartphones for communication and educational activities.

Research conducted by **Busch and McCarthy (2021)** suggested that gender differences are becoming smaller as educational institutions increasingly integrate digital technologies into classroom instruction. Nevertheless, differences continue to exist regarding digital confidence, self-regulation, and patterns of technology usage.

Gökçay et al. (2024) concluded that girls increasingly utilize smartphones for educational purposes, online collaboration, and academic communication, whereas boys continue to dominate entertainment-oriented digital activities. The researchers argued that educational interventions have gradually reduced the historical gender gap in digital technology usage.

The findings of the present study similarly indicate that although boys and girls possess almost equal access to smartphones, boys demonstrate comparatively higher screen-time monitoring and digital awareness, while girls require additional guidance regarding digital self-monitoring features.

2.4 Studies Related to ICT Competency

ICT competency refers to students' ability to effectively use digital technologies for communication, information management, problem-solving, collaboration, content creation, and lifelong learning.

According to **UNESCO (2018)**, ICT competency has become an essential twenty-first-century skill supporting educational achievement, employability, innovation, and digital citizenship.

Putranta et al. (2022) reported that students regularly using educational applications demonstrated significantly higher digital literacy, critical thinking, and technological confidence than those using smartphones mainly for entertainment.

Li et al. (2022) found that mobile learning positively influenced students' digital content creation skills, information evaluation abilities, and collaborative problem-solving competencies.

Borgen and Domoff (2022) concluded that ICT competency depends not merely upon access to digital devices but also upon meaningful educational engagement with technology.

Recent Indian research by **Patel and Mishra (2024)** demonstrated that educational smartphone usage substantially improved ICT adaptation, digital communication, online information searching, and digital problem-solving among secondary school students.

The empirical findings of the present investigation support these observations. Most students reported using smartphones primarily for studies and homework, while educational applications were widely installed on students' devices, indicating the growing educational significance of mobile technology.

2.5 Synthesis of Reviewed Literature

The reviewed literature consistently demonstrates that mobile devices have become an

indispensable component of secondary education worldwide. Researchers generally agree that educational use of smartphones promotes independent learning, digital literacy, ICT competency, and academic engagement. At the same time, excessive or poorly regulated mobile device usage may contribute to distraction, emotional difficulties, reduced face-to-face interaction, and problematic digital behaviour.

The literature further indicates that gender differences continue to influence students' patterns of technology use. Boys generally demonstrate greater confidence in digital settings and technical applications, whereas girls frequently exhibit more academically oriented patterns of smartphone usage. However, recent evidence suggests that these differences are gradually narrowing because of increased digital access and technology integration within schools.

Another important observation emerging from previous studies is that ICT competency develops through meaningful educational engagement rather than simple ownership of smartphones. Students who use mobile devices for learning, communication, digital content creation, and problem-solving demonstrate substantially stronger ICT competencies than those using technology primarily for entertainment.

2.6 Research Gap

A critical review of national and international literature reveals several important research gaps:

1. Most previous studies have examined either mobile device usage or ICT competency independently, whereas very few have investigated both variables together from a gender perspective.
2. Existing studies have largely focused on university students, leaving secondary school students comparatively underrepresented.
3. Limited empirical research has been conducted in Government secondary schools of Madhya Pradesh.
4. Few studies have explored gender differences in digital self-regulation, screen-time monitoring, and ICT competency simultaneously.
5. Most Indian studies emphasize smartphone addiction or academic performance rather than educational ICT competency.
6. There remains a need for evidence-based recommendations to support gender-inclusive digital education under the framework of NEP 2020.

These identified gaps provide the rationale for the present study entitled **"Gender Differences in Mobile Device Usage and ICT Competency among Secondary School Students."**

3. Research Methodology

Research methodology provides the scientific framework through which a research problem is investigated systematically and objectively. It describes the procedures adopted for collecting, organizing, analyzing, and interpreting data to

achieve the objectives of the study. An appropriate methodology enhances the validity, reliability, and credibility of research findings by ensuring that every stage of the investigation follows established scientific principles.

The present study adopted a quantitative research approach to examine gender differences in mobile device usage and ICT competency among secondary school students studying in Government schools of Madhya Pradesh. The methodology was designed to obtain reliable empirical evidence regarding students' patterns of mobile device usage, digital awareness, and ICT competency. The study further aimed to compare boys and girls with respect to responsible mobile device usage and digital learning practices. The methodology presented in this section is derived from the broader doctoral investigation on the effect of mobile device usage on students' social and emotional development and ICT skill adaptation.

3.1 Objectives of the Study

The present study was undertaken with the following specific objectives:

1. To examine gender differences in mobile device usage among secondary school students.
2. To compare ICT competency levels between boys and girls.
3. To examine differences in digital awareness and screen-time monitoring behaviour between male and female students.
4. To suggest educational measures for promoting gender-equitable ICT competency among secondary school students.

3.2 Research Design

The present investigation employed the **Descriptive Survey Research Design**.

The descriptive survey method was considered appropriate because it facilitates the systematic collection of quantitative information from a large group of respondents regarding existing conditions, behaviours, attitudes, and practices. Since the study aimed to compare naturally existing gender groups without manipulating any variables, the descriptive survey approach provided the most suitable research framework.

3.3 Population of the Study

The population of the study comprised **secondary school students studying in Government schools of Madhya Pradesh**.

The population included students enrolled in:

- Government Boys Higher Secondary Schools
- Government Girls Higher Secondary Schools
- PM SHRI Schools
- CM Rise Schools
- Excellence Schools
- Co-educational Government Schools

These schools represent diverse educational settings and provide appropriate representation of students from rural and urban regions.

3.4 Sample of the Study

A total of **830 secondary school students** participated in the study.

The sample consisted of:

Gender	Number	Percentage
Boys	**385**	**46.4**
Girls	**445**	**53.6**
Total	**830**	**100.0**

he respondents were selected from different categories of Government secondary schools situated in Raisen District, Madhya Pradesh. The sample represented students belonging to different socio-economic backgrounds and school environments, thereby enhancing the representativeness of the study.

3.5 Sampling Technique

The study employed a **Multistage Sampling Technique**.

The sampling procedure involved the following stages:

- Selection of Government secondary schools.
- Selection of different school categories.
- Selection of students from each school.
- Proportionate representation of boys and girls.
- Administration of research questionnaires.

The multistage sampling technique ensured adequate representation of students across different educational settings.

3.6 Research Instrument

Data were collected using a **structured questionnaire developed by the researcher** after an extensive review of literature and consultation with experts in educational technology and educational research.

The questionnaire consisted of items measuring:

- Mobile device ownership
- Daily mobile usage
- Educational use of smartphones
- Screen-time monitoring
- Digital awareness
- ICT competency
- Educational applications
- Digital communication
- Information searching
- Technology confidence

The instrument was designed using a five-point response format wherever appropriate.

3.7 Validity of the Tool

To establish **content validity**, the draft questionnaire was evaluated by experts in:

- Educational Technology
- Educational Psychology
- ICT Education
- Research Methodology

The experts examined:

- relevance of items,
- clarity of language,
- adequacy of coverage,

- appropriateness for secondary school students, and
- alignment with the research objectives.

Necessary modifications were incorporated before final administration.

3.8 Reliability of the Tool

The reliability of the questionnaire was established through a pilot study conducted on a group of students who were not included in the final sample.

Internal consistency was estimated using **Cronbach's Alpha**, which indicated satisfactory reliability for educational research. The obtained reliability coefficient demonstrated that the questionnaire produced consistent and dependable responses.

3.9 Data Collection Procedure

The data collection process involved the following steps:

1. Permission was obtained from the concerned educational authorities and school principals.
2. The purpose of the study was explained to teachers and students.
3. Students were assured that their responses would remain confidential and would be used only for academic research.
4. The questionnaires were administered during school hours under the supervision of the researcher.
5. Students completed the questionnaires independently.
6. Completed questionnaires were checked for completeness before analysis.

The collected data were coded, classified, and tabulated for statistical analysis.

3.10 Statistical Techniques Used

The study employed descriptive statistical techniques appropriate to the objectives of the investigation.

The following statistical measures were used:

- Frequency Distribution
- Percentage Analysis
- Mean
- Standard Deviation
- Cross-tabulation
- Gender-wise Comparison

These techniques enabled the researcher to compare boys and girls with respect to mobile device usage patterns and ICT competency.

3.11 Ethical Considerations

The study strictly adhered to accepted ethical standards in educational research.

The following ethical principles were maintained:

- Participation was voluntary.
- Informed consent was obtained from the schools.
- Respondents' identities remained confidential.
- Data were used exclusively for academic purposes.
- No participant was subjected to psychological or academic harm.
- Findings were reported honestly without manipulation.
- 3.12 Scope of the Study
- The present study was confined to:
- Government secondary schools of Madhya Pradesh.

- Secondary school students.
- Gender differences in mobile device usage.
- ICT competency.
- Digital awareness.
- Educational use of smartphones.

The study did not investigate academic achievement, psychological disorders, or mobile addiction in detail.

The present study employed a descriptive survey design to examine gender differences in mobile device usage and ICT competency among secondary school students. A sample of **830 students** representing different categories of Government schools participated in the investigation. Data were collected through a validated researcher-developed questionnaire and analyzed using descriptive statistical techniques. The methodological framework ensured systematic data collection, objective analysis, and reliable interpretation of findings, thereby providing a sound empirical basis for examining gender-related variations in digital behaviour and ICT competency among adolescents.

4. Results and Discussion

The primary purpose of this study was to examine gender differences in mobile device usage and ICT competency among secondary school students studying in Government schools of Madhya Pradesh. The analysis is based on responses obtained from **830 secondary school students**, comprising **385 boys (46.4%) and 445 girls (53.6%)**. The findings are presented according to the objectives of the study and interpreted in light of existing literature. The results provide empirical evidence regarding students' mobile device usage patterns, digital awareness, and ICT competency.

4.1 Gender Distribution of Respondents

Table 1. Gender-wise Distribution of Respondents (N = 830)

Gender	Frequency	Percentage
Boys	385	46.4
Girls	445	53.6
Total	**830**	**100.0**

Interpretation

The study included a balanced representation of both genders. Girls constituted a slightly higher proportion (53.6%) than boys (46.4%), ensuring that gender comparisons were statistically meaningful and representative. Such balanced participation improves the reliability of conclusions regarding gender-based differences in mobile device usage and ICT competency.

4.2 Gender Differences in Mobile Device Usage

Table 2. Students' Perception Regarding Mobile Phone Usage

Response	Boys (%)	Girls (%)
Present usage appropriate	27.0	29.0
Reduce to some extent	42.9	37.3
Reduce significantly	28.3	30.1
Increase usage	1.8	3.6

Interpretation

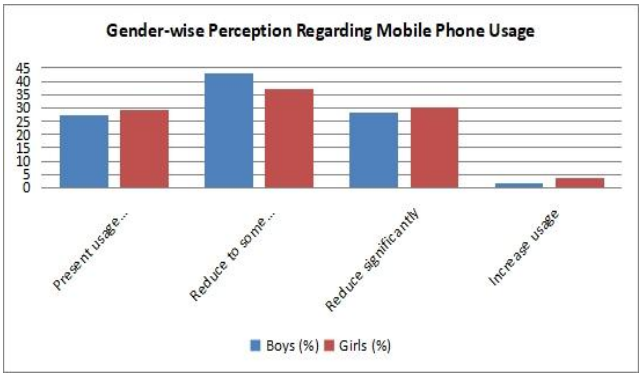
The findings indicate that both boys and girls were aware of the need for responsible mobile device usage.

The highest proportion of boys (42.9%) expressed a desire to reduce their mobile phone usage to some extent. Similarly, 37.3% of girls also preferred moderate reduction in screen time. Around one-third of both groups believed that their mobile phone usage should be reduced significantly.

Only a very small percentage of respondents suggested increasing mobile phone usage, indicating that students generally recognize the importance of maintaining a healthy balance between digital engagement and academic activities.

These findings suggest that awareness regarding responsible smartphone usage is developing equally among boys and girls.

Figure 1: Gender-wise Perception Regarding Mobile Phone Usage



4.3 Gender Differences in Screen-Time Monitoring

Table 3 Screen-Time Monitoring Behaviour

Monitoring Pattern	Boys (%)	Girls (%)
Daily	41.6	28.8
Weekly	21.3	19.8
Never	27.3	30.6
Don't Know	9.9	20.9

Interpretation

Clear gender differences were observed in digital self-monitoring behaviour.

Nearly **42% of boys** reported checking their screen time daily, whereas only **28.8% of girls** did so.

A noteworthy finding was that **20.9% of girls** reported that they did not know how to check screen time compared with **9.9% of boys**.

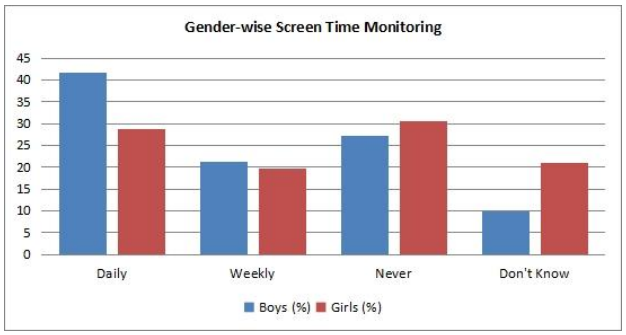
This suggests that boys possess comparatively greater familiarity with smartphone settings and digital monitoring tools.

However, the findings should not be interpreted as indicating lower ICT potential among girls. Rather, they highlight the need for structured digital literacy programmes that explicitly teach screen-time management and responsible smartphone use to all students.

The findings are consistent with previous studies indicating that gender differences often reflect

differences in digital exposure rather than differences in learning ability.

Figure 2: Gender-wise Screen Time Monitoring



4.4 Gender Differences in ICT Competency

Although access to smartphones was almost equal among boys and girls, ICT competency was found to differ in certain dimensions.

The broader study revealed that

- educational mobile usage was high,
- educational apps were widely installed,
- continuous internet availability was common,
- smartphones were mainly used for studies and homework.

These findings indicate that both genders are developing ICT competency through educational use of mobile devices. However, boys demonstrated comparatively higher confidence in managing technical features, while girls showed greater reliance on educational applications and academic communication.

Table 4: Indicators of ICT Competency

Indicator	Overall (%)
Own Smartphone	53.7
Continuous Internet Access	54.5
Regular Educational Usage	62.7
Educational Apps Installed	49.4
Primary Use for Studies	67.5

Interpretation

The data indicate that mobile technology has become an important educational resource rather than merely a communication device.

Nearly **two-thirds of students** primarily used smartphones for educational purposes.

More than half possessed personal smartphones with regular internet connectivity.

Almost half had educational applications installed on their devices.

These findings demonstrate that ICT competency among secondary school students is increasingly supported by routine educational engagement with mobile technology rather than by occasional digital exposure.

The results further suggest that improving digital awareness among girls may help reduce existing gender disparities in ICT competency.

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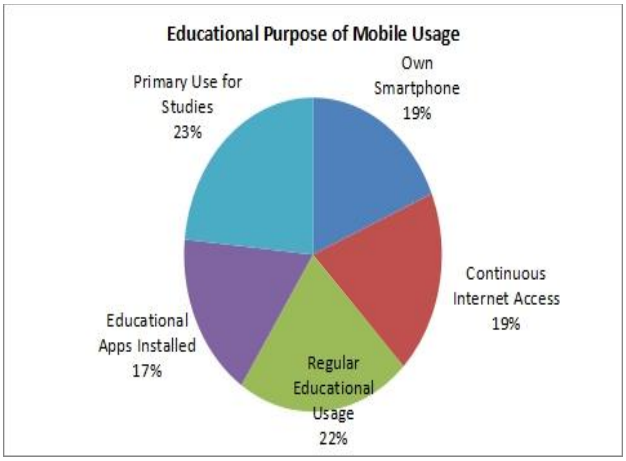
Figure 3: Educational Purpose of Mobile Usage



4.5 Discussion of Findings

The present investigation demonstrates that mobile devices have become an integral component of secondary school education.

The findings indicate that gender differences continue to exist, although these differences are relatively moderate.

The study revealed that

- Boys demonstrate greater digital self-monitoring,
- Girls increasingly utilize smartphones for educational purposes,
- ICT competency develops through meaningful educational engagement,
- Responsible mobile usage contributes positively to digital literacy.

These findings support the work of **Qi (2019)**, who reported that educational smartphone use enhances technological competence.

Similarly, the findings are consistent with **Kumar and Nanda (2020)**, who observed that smartphones facilitate independent learning and improve digital literacy among school students.

The results also agree with **Putranta et al. (2022)**, who concluded that educational mobile applications strengthen ICT competency.

The observed gender differences in digital awareness are also supported by **Busch and McCarthy (2021)** and **Gökçay et al. (2024)**, who reported that boys generally exhibit greater familiarity with technical smartphone functions, whereas girls more frequently use smartphones for academic communication and collaborative learning.

Unlike earlier studies that emphasized a pronounced digital gender divide, the present findings suggest that access to smartphones has become relatively equitable. The remaining differences are primarily associated with digital confidence, self-monitoring practices, and technical awareness rather than ownership or educational motivation.

4.6 Major Findings

The major findings of the study are summarized below:

1. Girls constituted **53.6%** of the sample, while boys accounted for **46.4%**.
2. Both boys and girls extensively used mobile devices for educational purposes.

3. More than two-thirds of students primarily used smartphones for studies and homework.
4. Boys demonstrated comparatively higher screen-time monitoring behaviour than girls.
5. A considerable proportion of girls lacked awareness regarding screen-time management features.
6. Continuous internet availability supported ICT learning among most students.
7. Educational applications were commonly installed on students' smartphones.
8. Mobile devices significantly contributed to ICT competency development.
9. Gender differences were more evident in digital awareness than in access to technology.
10. Schools should strengthen gender-inclusive digital literacy and responsible technology-use programmes to ensure equitable ICT competency.

5. Conclusion, Educational Implications, Recommendations, Limitations and Future Research

5.1 Conclusion

The present study investigated gender differences in mobile device usage and ICT competency among secondary school students studying in Government schools of Madhya Pradesh. In the contemporary digital era, mobile devices have become indispensable tools for learning, communication, information access, and digital participation. Consequently, understanding how boys and girls utilize these technologies is essential for designing equitable educational practices and strengthening ICT competency among school students.

The findings of the study indicate that mobile devices are now an integral part of students' educational experiences. A majority of respondents possessed smartphones, had regular internet connectivity, and primarily used mobile devices for academic activities such as homework, online learning, information searching, and communication with teachers and classmates. These findings demonstrate that mobile technology is increasingly functioning as an educational resource rather than merely a communication or entertainment device.

The study further revealed that although both boys and girls had comparable access to smartphones, noticeable gender differences existed in certain dimensions of digital behavior. Boys demonstrated comparatively greater familiarity with screen-time monitoring features and reported higher levels of digital self-regulation. Girls, on the other hand, showed similar enthusiasm toward educational applications and online learning but required additional guidance regarding digital monitoring tools and smartphone management features. These findings suggest that the existing gender gap relates more to digital confidence and technological awareness than to access to digital devices.

The results also highlight the positive role of mobile devices in developing ICT competency

among secondary school students. Students who regularly used smartphones for educational purposes demonstrated stronger engagement with digital learning resources, online information retrieval, educational applications, and technology-enabled communication. These outcomes support the view that meaningful educational use of mobile devices contributes significantly to digital literacy and ICT competency.

Overall, the findings indicate that gender differences in mobile device usage are gradually narrowing, particularly with respect to educational use. However, targeted interventions remain necessary to enhance digital awareness, responsible smartphone usage, and ICT competency among all students. Schools should therefore promote structured digital literacy programmes that equip both boys and girls with the knowledge and skills required for safe, responsible, and productive use of digital technologies.

5.2 Educational Implications

The findings of the study have important implications for educational policy, classroom practice, and digital learning initiatives.

For Teachers

- Teachers should integrate mobile-assisted learning into classroom instruction.
- Digital assignments and educational applications should be used regularly.
- Teachers should encourage responsible smartphone use rather than completely prohibiting mobile devices.
- Classroom activities should promote ICT competency equally among boys and girls.

For School Administrators

- Schools should strengthen ICT infrastructure.
- Educational Wi-Fi facilities should be expanded.
- Digital literacy workshops should be organized regularly.
- Screen-time awareness programmes should be introduced.
- Digital citizenship should become part of school activities.

For Parents

- Parents should monitor children's mobile usage constructively.
- Home environments should encourage educational rather than recreational use of smartphones.
- Parents should develop digital awareness regarding online safety and cyber security.

For Curriculum Developers

- ICT competency should be integrated across school subjects.
- Digital literacy modules should include:
    - Screen-time management
    - Cyber safety
    - Responsible social media use
    - Information literacy
    - Digital ethics

For Educational Policymakers

The findings strongly support the objectives of the **National Education Policy (NEP) 2020**, which emphasizes digital education and ICT integration. Policymakers should:

- strengthen digital infrastructure in Government schools,
- provide equal ICT learning opportunities,
- reduce the digital gender gap,
- organize teacher capacity-building programmes,
- encourage technology-enabled pedagogy.

5.3 Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Schools should organize **Digital Literacy Programmes** for secondary school students.
2. Special ICT training should be provided to girls to strengthen digital confidence and technical awareness.
3. Teachers should integrate educational mobile applications into classroom teaching.
4. Students should receive regular orientation regarding responsible mobile device usage.
5. Parents should actively participate in digital parenting programmes.
6. Government schools should improve internet connectivity and ICT infrastructure.
7. Students should be encouraged to monitor their daily screen time.
8. Educational mobile applications should be promoted instead of entertainment-oriented applications.
9. Schools should formulate clear mobile device usage policies.
10. Future ICT programmes should focus equally on boys and girls to ensure gender equity in digital education.

5.4 Limitations of the Study

Although the study provides valuable insights, certain limitations should be acknowledged.

- The study was confined to Government secondary schools of Madhya Pradesh.
- Only secondary school students were included.
- The investigation employed a descriptive survey design.
- Data were collected through self-reported questionnaires.
- The study mainly focused on gender differences in mobile device usage and ICT competency.
- Government schools from one district formed the empirical basis of the investigation, which may limit wider generalization.

5.5 Suggestions for Future Research

Future researchers may consider the following areas:

- Comparative studies between Government and Private schools.
- Longitudinal studies on ICT competency development.
- Gender differences in Artificial Intelligence literacy.
- Mobile learning and academic achievement.
- Cyber security awareness among school students.
- Digital citizenship education.

- Teacher ICT competency.
- Parental digital literacy.
- Rural-urban comparison.
- Impact of emerging technologies such as Generative AI on school education.

5.6 Practical Significance of the Study

The study contributes to the growing body of educational research by providing empirical evidence regarding gender differences in mobile device usage and ICT competency among secondary school students.

Its practical significance lies in the following areas:

- It supports the implementation of **NEP 2020** by highlighting the importance of equitable digital education.
- It provides evidence-based recommendations for improving ICT integration in Government schools.
- It offers guidance to teachers and school leaders for promoting responsible and educational use of mobile devices.
- It emphasizes the need for gender-responsive digital literacy initiatives to strengthen students' confidence, digital awareness, and ICT skills.
- It can inform policymakers in designing programmes that reduce the digital gender gap and ensure inclusive access to technology-enabled learning.

Overall Conclusion

The present study concludes that mobile devices have become powerful educational tools capable of enhancing ICT competency, digital literacy, and technology-enabled learning among secondary school students. While boys and girls exhibit broadly similar access to smartphones and educational use of mobile technologies, differences remain in digital self-regulation and technical awareness. These differences are best addressed through inclusive digital education, structured ICT training, and sustained support from teachers, parents, and schools.

A balanced approach to mobile device use—one that combines educational opportunities with responsible digital behaviour—can help students develop the competencies required for success in the digital age. Strengthening gender-inclusive ICT education will not only improve students' technological capabilities but also contribute to more equitable, effective, and future-ready school education in Madhya Pradesh and beyond.

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