

“Impact of Technology on Growth and Development of Adolescents from Selected Educational Institutes of Pune City”

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ABSTRACT

Introduction: Technology has become a defining feature of the 21st century, influencing nearly every aspect of human life, particularly among adolescents. As digital natives, adolescents are growing up in an era where smartphones, social media, online education, and digital entertainment are not just tools but fundamental elements of their daily routines. The integration of technology into education, communication, and social interactions has reshaped how adolescents learn, develop relationships, and engage with the world around them.

Aims of the Study: To assess the impact of technology on growth and development of adolescents from selected educational institutes of Pune city.

Methodology: This quantitative study used a descriptive research design to collect data from adolescents at a selected educational institute in Pune City. Teenagers between the ages of 14 and 18 who attend particular educational institutions make up the accessible population. Sample size was 500 and non-probability purposive technique was used. Data was gathered using Structured Questionnaire to assess Technology use among adolescents.

Results: The data indicates that technology's impact on adolescents is largely neutral, with 86.2% of respondents rating it within the neutral range (57-112). The mean score of 100.29 and standard deviation of 13.83 suggest that adolescents generally perceive technology neither as significantly beneficial nor harmful. While 13.8% view it positively, recognizing benefits like enhanced learning and social interaction, none see it as negative. This suggests that technology's role in adolescent development is complex and context-dependent, with potential for both support and hindrance based on usage patterns.

Conclusion: Overall, the data suggests that certain demographic factors, such as age and gender, significantly affect how adolescents perceive the impact of technology, with younger males tending to view technology more positively. However, factors like residence, number of siblings, internet access, and screen time do not significantly affect perceptions. The findings highlight that while technology's influence is nuanced and variable, certain demographics may experience or recognize its impact differently.

Keywords: Assess, Impact, Technology, Growth & Development, Adolescent.

INTRODUCTION

Technology has revolutionized the way adolescents learn, communicate, and interact with their environment. The rapid proliferation of digital tools, social media platforms, and online learning systems has made technology an indispensable part of adolescent life. From accessing information to developing new skills, technology plays a crucial role in shaping cognitive, emotional, and social development. One of the major concerns surrounding technology use among adolescents is its impact on physical health. Prolonged screen exposure has been linked to a rise in sedentary behaviour, obesity, and related health complications.

Technology has a profound impact on the overall growth and development of adolescents, influencing their physical, cognitive, emotional, and social well-being. While digital advancements provide numerous benefits, excessive and unregulated use can have negative consequences on various aspects of adolescent development. The family environment also plays a crucial role in determining the effects of technology use on adolescent development. Parental monitoring, guidance, and digital literacy significantly influence how adolescents engage with technology. Research suggests that families that set screen time limits and encourage offline activities promote healthier technology habits among adolescents. It is a crucial period in shaping an individual's future well-being, behaviour, and cognitive abilities. Technology has become an inseparable part of adolescents' lives, playing a vital role in their education, socialization, and personal development.

While technology offers numerous advantages, such as enhanced learning experiences, global

connectivity, and access to information, concerns have emerged about its excessive use leading to adverse physical, cognitive, emotional, and social consequences. Understanding the implications of technology use on adolescent development is essential for guiding responsible digital behaviour and ensuring overall well-being. Emotionally, social media plays a significant role in shaping adolescent self-perception, mental health, and emotional resilience. While digital communication helps in maintaining social connections, excessive use has been linked to increased levels of anxiety, depression, and low self-esteem.

NEED OF THE STUDY:

The World Health Organization (WHO) states that adolescents (10–19 years) who spend more than two hours per day on screens are at a higher risk of anxiety and depression. A UNICEF (2022) study found that one in three internet users globally is a child, and excessive screen time negatively impacts sleep and mental well-being. According to Common Sense Media (2023), 59% of teenagers worldwide feel addicted to social media.

A survey by the Maharashtra Education Department (2023) revealed that 80% of school-going adolescents own smartphones, with 60% spending more than five hours daily on screens. Research from Lokmanya Tilak Medical College (2023) found that 28% of teenagers in Maharashtra suffer from technology-induced insomnia. A Symbiosis International University (2023) study found that 72% of Pune adolescents (13–19 years) use smartphones for more than four hours a day. Fergusson College (2022) reported that 40% of Pune teens check social media both upon waking and before sleeping. BJ Government Medical College (2023) found that 35% of students face stress and anxiety due to social media overuse.

Technology improves communication but reduces in-person interaction, contributing to loneliness, sleep issues, and even job displacement. This study aims to explore technology's impact on adolescent development and to support balanced tech use among students through informed parental and educational guidance.

Scholar view:

With the advancement of technology and requirement in educational settings, adolescents are anyhow concerned to use the technology, but it has been viewed that the adolescents are very much dependent on the technology and take the advantages as a requirement in the advanced education. Considering with this, there should be limitation in the use of technology but when it becomes habitual, dependent and totally addicted towards the technology, it becomes a health hazards and effect on the growth and development. Thus, the researcher felt to conduct a study on the impact of technology towards growth and development.

AIMS OF THE STUDY: To assess the impact of technology on growth and development of adolescents from selected educational institutes of Pune city.

RESEARCH METHODOLOGY:

A quantitative research approach with a descriptive research design was adopted to study the impact of technology on the growth and development of adolescents. The study was conducted in selected educational institutes of Pune city. The target population included adolescents, with the accessible population being those aged 14–18 years. A total sample of 500 adolescents was selected. The tool consists of two sections namely section A is a demographic variable and section B is a structured questionnaire. Reliability, assessed using the test-retest method and Karl Pearson's formula, was conducted from 4th to 5th March 2025 on 50 participants, yielding a reliability coefficient of $r = 0.8634$. Informed consent was obtained, and confidentiality was maintained. A pilot study was carried out at Chintamani Madhyamik Vidyamandir, Pune, on 5th and 6th March 2025 using a self-structured questionnaire, confirming the feasibility of the main study.

RESULTS

Section-I Analysis related to Demographic Profile of adolescents.

The demographic profile of the respondents indicates that most adolescents fall within the 14 to 16-year age group, with 42.6% aged between 14–15 years and 45.6% between 15.1–16 years. The gender distribution shows a higher proportion of males (72.6%) compared to females (27.4%), with no transgender participants. In terms of educational level, the majority of students were from VIII (38.4%) and IX standard (42.4%), followed by XI standard students (19.2%). Notably, all participants were day

scholars, and none resided in hostels, ensuring a consistent living arrangement across the sample. Family structure data revealed that 63.4% of students had one sibling, 35% had two, and only 1.6% had three siblings. Internet access was found to be widespread, with 90.8% having access at home. Only a small percentage (1.2%) lacked internet access, suggesting strong digital connectivity. When examining technology usage, social media (30.4%) and streaming services (29%) were the most frequently used, followed by gaming devices (24.8%). Educational apps were used regularly by only 15.4% of the participants, indicating a preference for entertainment over learning tools. In terms of time spent, the majority (88%) reported using these technologies for 1–2 hours daily, while a small fraction (12%) used them for three or more hours, pointing to possible concerns about overuse in a few cases.

Section II: Finding related to assess the impact of technology on growth and development of adolescents.

Table No.2 –Related to impact of technology on growth and development.

n=500				
Impact of Technology	f	%	Mean	SD
Negative (1-56)	0	0	100.29	13.83
Neutral (57-112)	431	86.2		
Positive (113-170)	69	13.8		

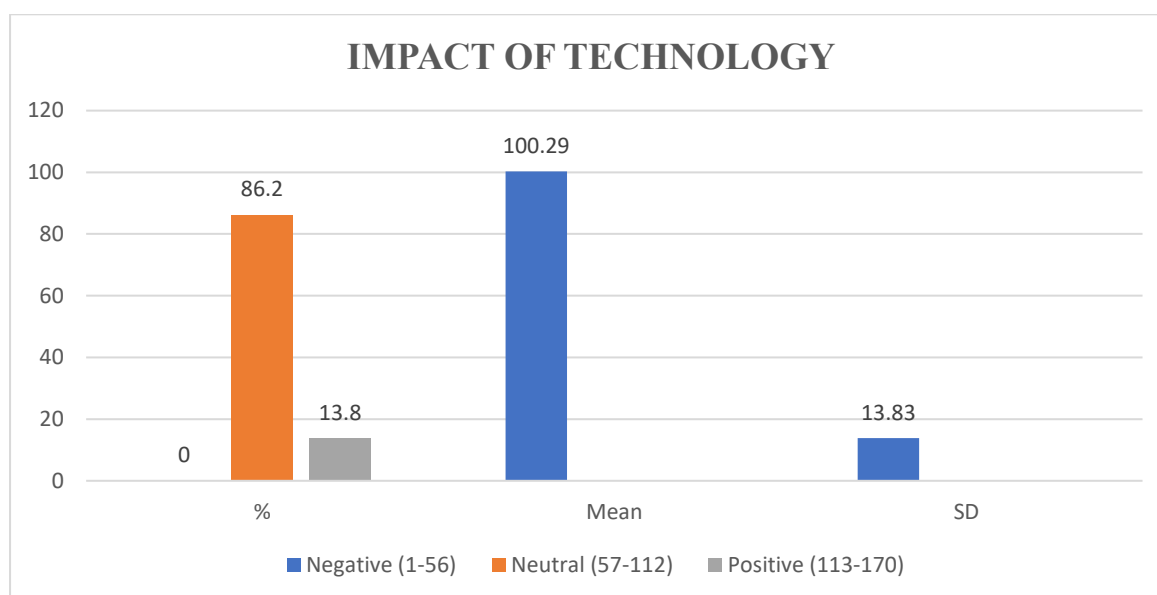


Fig.1. Figure showing impact of technology.

The data provided suggests that the impact of technology on adolescents is largely neutral, with the majority of respondents (86.2%) falling within the neutral range (57-112). This indicates that technology neither has a strongly negative nor positive influence on their growth and development, but rather a mixed or balanced effect. The mean score of 100.29, combined with a standard deviation of 13.83, suggests that most adolescents perceive technology as neither significantly beneficial nor harmful, falling in a middle ground.

However, there is a smaller proportion of adolescents who view technology's impact as either negative (0%) or positive (13.8%). Those in the positive category might see technology as a tool for enhancing learning, social interaction, and access to information, which could support their intellectual and social development. On the other hand, the absence of respondents in the negative range suggests that the perceived harms, such as technology's potential for distraction, addiction, or fostering unhealthy behaviours, may be less emphasized in this sample.

Overall, the impact of technology on adolescent growth and development appears to be mostly neutral, with room for further exploration into how various factors—such as the type of technology, usage patterns, and individual differences—might influence these outcomes more significantly. This balanced view underscores the complexity of technology's role in adolescents' lives, suggesting that it neither universally impedes nor promotes growth, but rather has the potential to support or hinder development depending on how it is used.

Section III: Finding related to association with selected demographic variables.

The chi-square test revealed a significant association between the impact of technology and the variables age group, gender, and educational standard. This suggests that adolescents' perceptions of technology's impact vary meaningfully based on their age, gender, and current academic level. On the other hand, no significant association was found with variables like residence, number of siblings, internet access, type of technology used, and time spent using technology. This indicates that these factors do not significantly influence how adolescents perceive the impact of technology on their growth and development in this study.

FINDINGS

The study found that technology has a mostly neutral to slightly positive impact on adolescents in selected Pune schools. Most students (86.2%) viewed its effect as neutral, while 13.8% saw it as positive, with no reports of negative impact. The average impact score was 100.29 (SD ± 13.83), indicating balanced perceptions. Age and gender showed significant influence, with younger students and males viewing technology more positively. However, factors like residence, internet access, and screen time showed no significant effect. Overall, technology's impact varies by individual and demographic factors, suggesting the need for further study into specific usage patterns.

DISCUSSION

Adolescents' usage of digital technology has been shown to improve their cognitive abilities, social-emotional growth, along with general well-being, according to a scoping study conducted in 2022. Findings revealed that digital engagement, particularly through educational apps and video games, enhanced executive functions such as problem-solving, working memory, and visual-spatial skills. Additionally, moderate social media use was linked to increased socialization, creativity, and emotional support among peers, fostering positive developmental outcomes. The study results emphasized that while digital technology offers numerous advantages, balanced and mindful usage is crucial. Adolescents who used technology in moderation exhibited improved academic performance and social interactions. However, excessive screen time was associated with risks like reduced physical activity and attention span issues. The authors recommended structured interventions to maximize the benefits while mitigating potential drawbacks. These findings underscore the importance of responsible digital engagement in supporting adolescent development.

The study found that technology has a significant impact on teenage development, particularly in areas such as cognitive skills, social interaction, and academic performance. A large number of adolescents reported regular use of digital tools for learning, indicating the increasing integration of technology into modern education. Educational apps, online platforms, and digital resources have enhanced students' problem-solving abilities, critical thinking, and overall academic achievement. These tools offer personalized learning experiences, quick access to information, and engaging content, which help students stay motivated and independent in their studies. On the positive side, teenagers using technology for academic purposes often perform better in school, collaborate effectively in group tasks, and develop important 21st-century skills. Features like gamification and interactive modules also increase student engagement and support self-directed learning. Overall, while technology can be a powerful educational tool, its influence depends largely on how it is used. A balanced, mindful approach is essential to ensure that its benefits are maximized without compromising teenagers' holistic growth.

CONCLUSION:

The purpose of the study was to evaluate how technology affected the development and progress of teenagers from particular Pune City educational institutions. The findings indicate that the majority of adolescents (86.2%) perceive technology's impact as neutral, suggesting that while it plays a significant role in their daily lives, it is not overwhelmingly beneficial or harmful. A smaller proportion (13.8%) viewed technology positively, highlighting its advantages in learning, communication, and entertainment. Notably, no respondents categorized the impact as negative, reflecting an overall acceptance of technology in adolescent life.

The chi-square analysis revealed that age, gender, and grade level significantly influenced adolescents' perception of technology, with younger students and males more likely to view it positively. However,

factors such as residence, number of siblings, internet access, type of technology used, and time spent on digital devices did not significantly affect their perception.

These results emphasize the need for balanced technology use, ensuring that adolescents harness its benefits while minimizing potential risks. Educators, parents, and policymakers should focus on promoting responsible digital habits and integrating technology in ways that enhance academic, social, and emotional development. Future research can explore the long-term effects of digital exposure and strategies to optimize its role in adolescent growth.

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