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A STUDY ON CORRELATION BETWEEN SCREEN TIME DURATION AND SCHOOL PERFORMANCE AMONG PRIMARY SCHOOL CHILDREN IN RAJASTHAN

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ABSTRACT

Background: *Recently, a growing concern impacting the academic performance of children is the increasing amount of screen time. This study aimed to investigate the relationship between the duration of screen time and academic achievement among primary school children in Rajasthan, India.*

Methods: *This cross-sectional observational study involved 134 primary school students in Rajasthan, India, from October 2023 to December 2023 Information on screen time was gathered from parents, while teachers provided data on school performance using a pre-designed questionnaire. Statistical analysis of the collected data was conducted using appropriate methods with SPSS 25 software.*

Results: *Out of the 268 children surveyed, 144 (53.7%) were boys and 124 (46.3%) were girls. The age distribution was as follows: 104 children (38.8%) were between 6 and 7 years old, 97 children (35.1%) were between 8 and 9 years old, and 70 children (26.1%) were between 10 and 11 years old. A significant portion of the children (56.7%) reported an average daily screen time of over 120 minutes. This was followed by 29.1% of children who reported 61 to 120 minutes of daily screen time, and 14.2% who reported 60 minutes or less.*

In terms of academic performance, 46 children (17.2%) were classified as having poor academic performance, 142 children (52.9%) were classified as average, and 80 children (29.9%) were classified as good. These observations statistically found a significant correlation between screen time duration and composite academic performance, including performance in specific subjects such as mathematics, science, and language (p-value < 0.05).

Conclusions: *This study found a significant correlation between screen time duration and school performance among primary school children in Jaipur, Rajasthan. However, further research is necessary to investigate the impact of screen time on different aspects of learning and its long-term effects on cognition and educational attainment.*

Keywords: *Primary school children's academic performance, Academic performance in Rajasthan, Relationship between screen time and school performance, Screen time among children, Screen time habits in primary school children, Screen time trends in Rajasthan..*

Introduction

The shift towards digitalization is gradually transforming educational technology from a mere teaching tool into a comprehensive platform focused on enhancing students' capabilities. This transformation goes beyond the traditional use of technology for delivering content and managing classroom activities. It now encompasses personalized learning experiences, interactive and immersive

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educational environments, and tools that support the development of critical thinking, creativity, and problem-solving skills. (Ye S., Chen L., Wang Q., Li Q., 2018)[1]

Digital platforms are leveraging advanced technologies such as artificial intelligence, virtual reality, and data analytics to provide tailored learning experiences that cater to the unique needs of each student. These platforms can assess individual learning styles and progress, offering customized content and feedback that help students understand and master concepts at their own pace. (Ham O.K., Sung K.M., Kim H.K., 2013)[2]

Moreover, digitalization is facilitating collaborative learning by connecting students with peers and educators globally, fostering a diverse and inclusive educational environment. This connectivity enables the sharing of knowledge and resources, promoting cultural exchange and broadening students' perspectives. (Fakhouri T.H., Hughes J.P., Brody D.J., Kit B.K., Ogden C.L., 2013)[3]

Interactive technologies, such as gamified learning and simulations, are engaging students in ways traditional methods cannot. These tools make learning more enjoyable and effective by immersing students in real-world scenarios where they can apply theoretical knowledge practically. (Regondola E.N., Barbado L.N., 2017)[4]

Furthermore, digital tools are equipping educators with powerful resources to track student progress, identify areas of difficulty, and intervene promptly. This data-driven approach ensures that no student is left behind and that each receives the support they need to succeed. (Ferguson C.J., 2015)[5]

The ongoing digitalization in education is not just about integrating technology into teaching but is about creating dynamic and adaptive learning environments that enhance students' overall capabilities and prepare them for the challenges of the future. (Adelantado-Renau M., Moliner-Urdiales D., Cavero-Redondo I., Beltran-Valls M.R., Martínez-Vizcaíno V., Álvarez-Bueno C., 2019)[6]

Early childhood school performance plays a crucial role in shaping future academic success and professional growth. Establishing a strong academic foundation during these formative years is essential for long-term educational attainment and career opportunities. However, in recent years, the escalating screen time among children has emerged as a significant contributor to poor academic performance. (Bhattacharya S., Munasib A., 2008)[7]

Excessive screen time not only affects schooling but is also linked to various adverse physical, psychological, and social effects in children. Physically, prolonged screen exposure can lead to issues such as eye strain, disrupted sleep patterns, and a sedentary lifestyle, which can contribute to obesity and related health problems. Psychologically, it can impact attention spans, increase anxiety levels, and reduce the ability to engage in creative play. Socially, excessive screen time can lead to reduced face-to-face interactions, impairing the development of crucial social skills. (Borzekowski D.L., Robinson T.N., 2005)[8]

Recognizing these concerns, numerous health organizations, including the American Academy of Pediatrics (AAP), the World Health Organization (WHO), the Pediatric Society, and the Indian Government, have issued guidelines regarding screen time for children. These guidelines are designed to help parents and educators manage and mitigate the negative impacts of screen time by recommending limits on daily screen use and encouraging balanced activities that promote physical, cognitive, and social development. (Hancox R.J., Milne B.J., Poulton R., 2005)[9]

The aim of this study was to investigate the relationship between screen time duration and school performance among primary school children in Jaipur, a city in the state of Rajasthan, India. By examining this correlation, the study seeks to provide insights that can inform policies and practices to enhance educational outcomes and overall well-being for children in this region. (Zimmerman F.J., Christakis D.A., 2005)[10]

Literature Review

In the 21st century, digital skills are essential, encompassing cognitive capabilities for technology application and critical thinking. These skills, including digital competence and critical thinking, are vital for both teachers and students navigating today's digital landscape. (Kostyrka-Allchorne K., Cooper N.R., Simpson A., 2017)[11] Research indicates that digital proficiency begins with ICT skills and extends to collaboration, critical thinking, and creativity. Digital education technology facilitates personalized learning, offering tailored content and adaptive environments that cater to diverse learning styles. Compared to traditional methods, digital technology enables faster acquisition of knowledge, skills, and attitudes. (Zheng Y., Wang Yang C., Yan X., Zhang Z., Zheng Y., 2020)[12]

Digital skills have become essential for everyone, expanding into the realm of learning. Digital learning technology (DLT) includes any form of learning facilitated by educational technology. It involves using digital tools like computers, the internet, animations, games, and virtual reality to enhance teaching and learning processes. (Alakrash H.M., Razak N.A., 2021)[13] Over the past three decades, advances in information technology have integrated multimodal computer technology, AI, and big data into education, transforming traditional methods into digital education technology. This evolution emphasizes the intellectualization, individualization, and adaptability of teaching, focusing on how digital tools can enhance cognitive development. Digital tools, such as computers, serve operational, informational, and learning purposes, influenced by factors like teaching experience and prior ICT use. The theory of technology acceptance highlights the importance of effectively applying technology, fostering innovation and creativity in both educators and learners. (Zhang R.Y., 2022)[14]

The shift from traditional paper-based instruction to digital models has been transformative, offering both challenges and opportunities. Digital technology, being intuitive and user-friendly, can enhance cognitive development, provided it is perceived as useful and easy to use. (Ramlee N., Rosli M.S., Saleh N.S., 2019)[15] According to Technology Acceptance Theory (TAM), perceived usefulness and ease of use influence user behavior. When students find technology beneficial and user-friendly, they are more likely to experience cognitive benefits. New digital tools like smartphones and tablets increase student engagement through interactive applications, helping build a strong conceptual foundation. (Xu Z., Jang E.E., 2017)[16] Researchers are increasingly exploring how digital education technology can enhance teaching quality and cognitive skills, such as critical thinking and innovation. Studies show that effective use of digital tools can significantly improve students' ability to organize, utilize, and manage information, demonstrating the profound impact of digital education technology on cognitive development. (George M.J., Odgers C.L., 2015)[17]

Screen time, the duration spent using devices such as computers, tablets, smartphones, and televisions, has a significant impact on the academic performance of school students. Excessive screen time is often associated with a decline in academic performance due to several factors. (Tarus J.K., Gichoya D., Muumbo A., 2015)[18] Firstly, prolonged screen exposure can lead to physical issues such as eye strain and disrupted sleep patterns, which negatively affect concentration and learning efficiency. Secondly, it can contribute to reduced physical activity, leading to health problems that can further impede academic performance. (Zhang W., Chen M., Zhao X., Bai X., 2020)[19]

Psychologically, excessive screen time can diminish attention spans and increase anxiety, making it harder for students to engage with their studies effectively. Socially, it can reduce face-to-face interactions, crucial for developing communication and collaborative skills necessary for academic success. (Kashada A., Li H.G., Koshadah O., 2018)[20]

Despite these challenges, moderate and well-regulated screen time can be beneficial. When used effectively, digital tools can enhance learning by providing interactive and engaging educational content, facilitating personalized learning experiences, and enabling access to a vast array of resources and information. The key is balancing screen time with other activities and ensuring that it is used purposefully to support educational goals. (Hwang G.J., Fu Q.K., 2020)[21]

Health organizations, including the American Academy of Pediatrics (AAP), the World Health Organization (WHO), the Pediatric Society, and the Indian Government, have issued guidelines to help manage screen time. (Heckman J.J., Stixrud J., Urzua S., 2006)[22] These guidelines recommend limits on daily screen use and encourage balanced activities to promote physical, cognitive, and social development. By adhering to these recommendations, parents and educators can help mitigate the negative impacts of screen time and enhance its positive effects on students' academic performance and overall well-being. (Van Laar E., van Deursen A.J.A.M., van Dijk J.A.G.M., de Haan J., 2017)[23]

Research Gap

Despite growing concerns about the impact of screen time on children's academic performance, there remains a significant research gap in understanding the specific correlation between screen time duration and school performance among primary school children in Rajasthan, India. Existing studies have largely focused on Western contexts, leaving a void in regional data that accounts for cultural, socioeconomic, and educational differences prevalent in Indian settings. (Van Laar E., Van Deursen A.J.A.M., Van Dijk J.A.G.M., de Haan J., 2019)[24]

Furthermore, while the adverse physical, psychological, and social effects of excessive screen time have been well-documented, there is limited research that delves into how these factors interact with

academic performance in the Indian context. Specifically, comprehensive studies that measure not only overall academic performance but also performance in distinct subjects like mathematics, science, and language are sparse. (Wang Q., Myers M.D., Sundaram D., 2013)[25]

Another critical gap is the lack of longitudinal studies that track the long-term effects of screen time on academic performance and cognitive development. Most existing research is cross-sectional, providing only a snapshot rather than a detailed progression of how screen time impacts learning outcomes over time. (Bennett S., Maton K., Kervin L., 2008)[26]

Additionally, there is a need to explore the mediating factors that might influence this relationship, such as the type of screen content consumed, parental involvement, and the use of screen time for educational purposes versus entertainment. This nuanced understanding is crucial for developing targeted interventions and guidelines. (Ruiz J.G., Mintzer M.J., Leipzig R.M., 2006)[27]

Addressing these gaps requires methodologically rigorous studies with larger, diverse sample sizes that reflect the demographic and socioeconomic variability of primary school children in Rajasthan. By filling these research gaps, we can better understand the implications of screen time and develop effective strategies to enhance educational outcomes in this region. (Damascena S.C.C., Santos K.C.B., Lopes G.S.G., Gontijo P.V.C., Paiva M.V.S., Lima M.E.S., Alves J.M.F., 2019)[28]

Research Objectives and Hypothesis

- **To Investigate the Correlation between Screen Time Duration and Academic Performance among Primary School Children in Rajasthan, India.**

  This objective aims to examine how the amount of time spent on screens affects the overall academic performance of primary school children. This includes analyzing performance in specific subjects such as mathematics, science, and language to identify if certain areas are more affected by screen time than others.

- **To Identify the Mediating Factors Influencing the Relationship between Screen Time and School Performance**

  This objective seeks to explore various factors that may mediate the relationship between screen time and academic performance. These factors include the type of screen content (educational vs. entertainment), parental involvement, socioeconomic status, and the child's use of screen time for educational purposes. Understanding these mediating factors will provide a nuanced view of how screen time impacts academic outcomes and help in developing targeted interventions.

The above stated objectives are statically examined to address the following research hypothesis:

Hypothesis 1

Null Hypothesis (H0): There is no significant correlation between screen time duration and academic performance among primary school children in Rajasthan, India.

Alternative Hypothesis (H1): There is a significant correlation between screen time duration and academic performance among primary school children in Rajasthan, India.

Hypothesis 2

Null Hypothesis (H0): The relationship between screen time duration and academic performance among primary school children is not influenced by mediating factors such as the type of screen content, parental involvement, socioeconomic status, and educational purpose of screen time.

Alternative Hypothesis (H1): The relationship between screen time duration and academic performance among primary school children is influenced by mediating factors such as the type of screen content, parental involvement, socioeconomic status, and educational purpose of screen time.

Research Methods

This cross-sectional observational study was conducted among 134 primary school children in Jaipur, Rajasthan, India, over a period of three months from October 2023 to December 2023. The inclusion criteria comprised primary school children whose parents consented to participate. Exclusion criteria encompassed children with physical disabilities, developmental delays, intellectual disabilities, learning disabilities, behavioral problems, visual impairments, hearing impairments, those on long-term medications, and those with chronic or acute illnesses. Following informed consent, data on screen time usage were gathered from parents, while details regarding school performance were obtained from

teachers using a pre-designed questionnaire. Demographic information of the children was also collected. The socioeconomic status was assessed using a modified Kuppusamy's socioeconomic status scale. Parents reported the duration of screen time on a typical school day and during holidays, from which the average screen time per day over a week was calculated. Teachers categorized children's overall academic performance as poor, average, or good based on their performance in the last three tests, forming the composite academic performance. Additionally, teachers assessed each child's performance in Mathematics, Science, and Language as poor, average, or good based on their performance in the same tests.

The collected data underwent analysis using appropriate statistical methods employing SPSS 25 software. Statistical significance was determined at a 5% level (p-value < 0.05).

Results

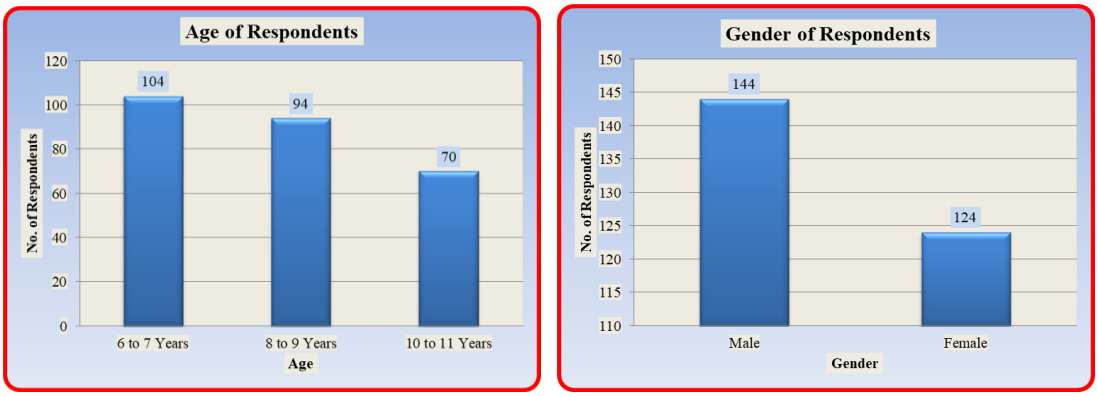
The study cohort comprised 144 (53.7%) male and 124 (46.3%) female children. Among them, 104 (38.8%) were aged 6 to 7 years, 94 (35.1%) were aged 8 to 9 years, and 70 (26.1%) were aged 10 to 11 years. The demographic distribution according to the Modified Kuppusamy Socioeconomic Status scale and family type is presented in Table 1.

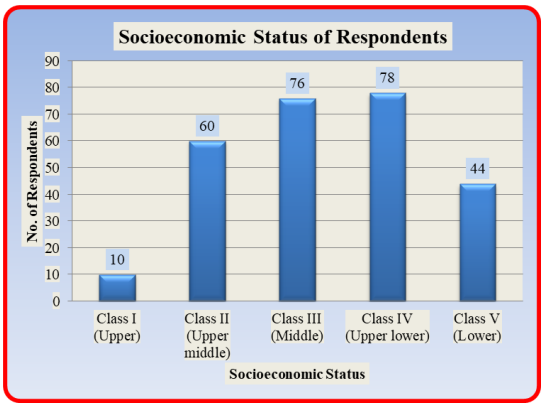
Table 1 displays the demographic profile of the study population based on parents' education and occupation.

Table 1: Demographic profile of the study population (based on age, gender, socioeconomic status and family type)

Age group	6 to 7 Years	104 (38.8%)
	8 to 9 Years	94 (35.1%)
	10 to 11 Years	70 (26.1%)
Gender	Male	144 (53.7%)
	Female	124 (46.3%)
Socioeconomic Status	Class I (Upper)	10 (3.7%)
	Class II (Upper middle)	60 (22.4%)
	Class III (Middle)	76 (28.4%)
	Class IV (Upper lower)	78 (29.1%)
	Class V (Lower)	44 (16.4%)
Family Type	Joint Family	166 (61.9%)
	Nuclear Family	102 (38.1%)

Figure 1: Demographic profile of the study population (based on age, gender, socioeconomic status and family type)





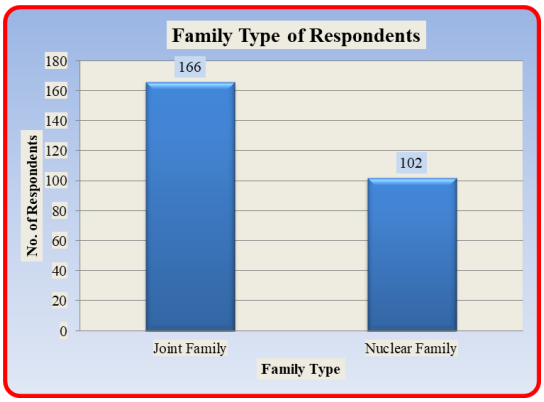


Table 2: Demographic Profile of the Study Population (Based on Parent's Occupation and Education)

Parent's Occupation	**Father**	**Mother**
Home maker	0 (0%)	128 (47.8%)
Unskilled/ semiskilled	42 (15.7%)	16 (5.9%)
Skilled	70 (26.1%)	10 (3.7%)
Clerical/shop owner/farm	20 (7.5%)	16 (5.9%)
Semi professional	66 (24.6%)	42 (15.8%)
Professional		
Parent's Education	70 (26.1%)	56 (20.9%)
Illiterate	0 (0%)	0 (0%)
Primary	26 (9.7%)	42 (15.7%)
Middle/High School	58 (21.6%)	54 (20.2%)
Higher Secondary	50 (18.7%)	62 (23.1%)
Graduate	64 (23.9%)	56 (20.9%)
Professional	70 (26.1%)	54 (20.1%)

The majority of children (56.7%) reported an average daily screen time of over 120 minutes, followed by 61 to 120 minutes (29.1%) and less than or equal to 60 minutes (14.2%) (Figure 2). Table 3 illustrates the distribution of screen time duration across different age groups.

Based on composite academic performance, 46 (17.2%) were classified as having poor academic performance, 142 (52.9%) as average, and 80 (29.9%) as good academic performance. Figure 1 depicts the distribution of composite academic performance by gender.

Table 3: Screen Time Duration and Age

Age	**Average screen time per day**			
	≤60 minutes	**61-120 minutes**	**>120 minutes**	**Total**
6 to 7 years	22 (21.2%)	28 (26.9%)	54 (51.9%)	104
8 to 9 years	8 (8.5%)	26 (27.7%)	60 (63.8%)	94
10 to 11 years	8 (11.4%)	24 (34.3%)	38 (54.3%)	70
Total	38 (14.2%)	78 (29.1%)	152 (56.7%)	268
Chi Square	3.5662	p value	0.038788	Significant

The distribution of composite academic performance across different age groups of students is visually represented in Figure 2. This figure provides a comprehensive view of how academic performance varies among students of varying ages. By examining this distribution, one can discern any trends or patterns in academic achievement among different age groups, which may offer insights into factors influencing performance at different stages of development.

Figure 3 provides a visual representation of how composite academic performance varies across different levels of screen time duration within the study group. The x-axis represents the different categories of screen time duration, while the y-axis represents the frequency or distribution of students across these categories. Each bar or segment in the figure corresponds to the proportion of students falling within a specific screen time duration range and their respective composite academic performance categories.

The statistical analysis conducted on this data set revealed a Chi Square value of 3.5662 and a corresponding p-value of 0.037885. Since the p-value is less than the significance level of 0.05, it indicates that there is a statistically significant correlation between screen time duration and composite academic performance in the study group. In other words, the differences in academic performance observed across various levels of screen time duration are considered statistically significant; suggesting that screen time duration have a significant impact on overall academic performance among the students in this study.

Figure 2: Distribution based on Screen Time Duration

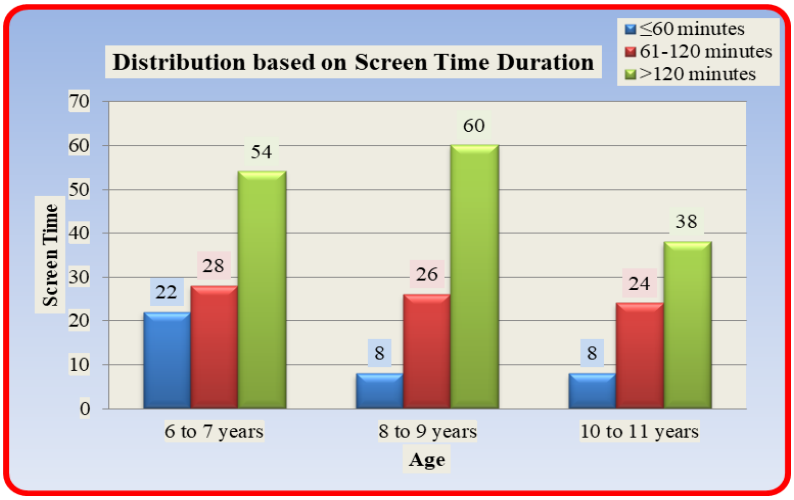


Table 4 presents the distribution of academic performance in mathematics categorized by different levels of screen time duration. Each cell in the table represents the frequency or count of students falling into a specific combination of screen time duration and academic performance in mathematics.

The statistical analysis conducted on this data set revealed a Chi Square value of 0.8681 and a corresponding p-value of 0.02415. Since the p-value is less the significance level of 0.05, it indicates that there is a statistically significant correlation between screen time duration and academic performance in mathematics among the students. This suggests that the differences in academic performance observed across various levels of screen time duration in mathematics are statistically significant; implying that screen time duration have a significantly influence academic performance in this subject for the students in this study.

Table 4: Screen time duration and Academic Performance (Mathematics)

Screen time duration	Academic Performance (Mathematics)			
	Poor	Average	Good	Total
≤60 minutes	10 (26.3%)	16 (42.1%)	12 (31.6%)	38
61-120 minutes	16 (20.5%)	42 (53.8%)	20 (25.7)	78
>120 minutes	30 (19.7%)	80 (52.6%)	42 (27.7%)	152
Total	56 (20.8%)	138 (51.5%)	74 (27.7%)	268
Chi Square	0.8681	p value	0.2415	Significant

Figure 3: Screen time duration and Academic Performance (Mathematics)

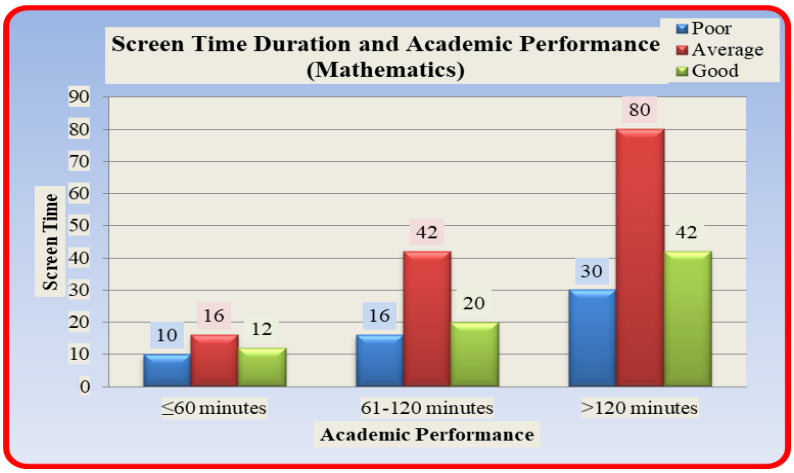


Table 5 provides a breakdown of the distribution of academic performance in science across different categories of screen time duration. Each cell in the table represents the frequency or count of students falling into a specific combination of screen time duration and academic performance in science.

The statistical analysis conducted on this dataset yielded a Chi Square value of 3.8325 and a corresponding p-value of 0.04291. Since the p-value is less than the significance level of 0.05, it indicates that there is a statistically significant correlation between screen time duration and academic performance in science among the students. This implies that the variations in academic performance observed across different levels of screen time duration in science are statistically significant. Therefore, the data suggests that screen time duration may have a significant influence on academic performance in science for the students in this study.

Table 5: Screen Time Duration and Academic Performance (Science)

Screen time duration	Academic Performance (Science)			
	Poor	Average	Good	Total
≤60 minutes	10 (26.3%)	16 (42.1%)	12 (31.6%)	38
61-120 minutes	10 (12.8%)	40 (51.3%)	28 (35.9%)	78
>120 minutes	22 (14.4%)	92 (60.6%)	38 (25%)	152
Total	42 (15.7%)	148 (55.2%)	78 (29.1%)	268
Chi Square	3.8325	p value	0.04291	Significant

Figure 4: Screen Time Duration and Academic Performance (Science)

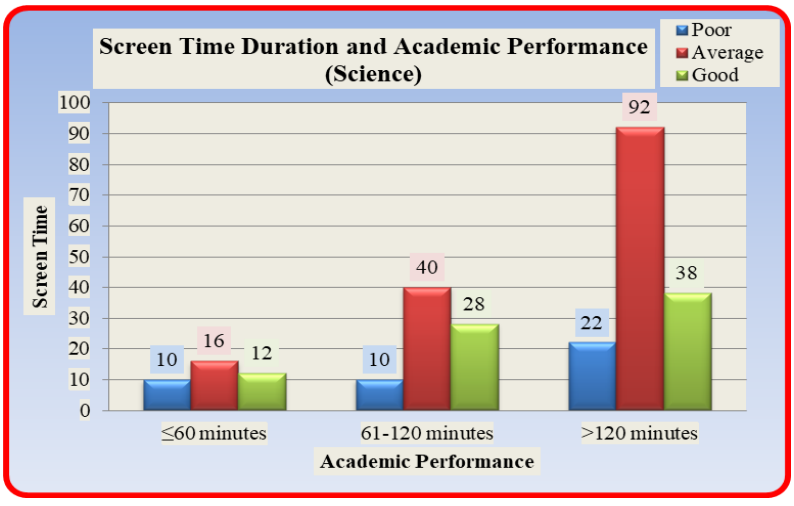


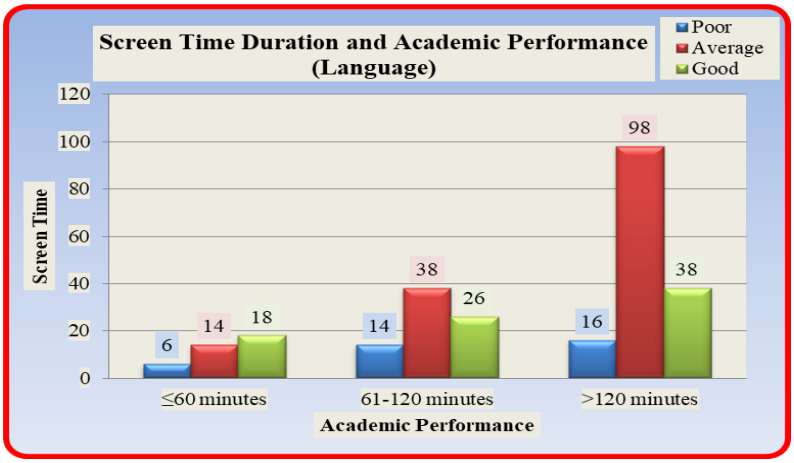
Table 6 presents the distribution of academic performance in Language across various levels of screen time duration. Each cell in the table represents the frequency or count of students falling into a specific combination of screen time duration and academic performance in Language.

The statistical analysis conducted on this dataset revealed a Chi Square value of 6.3592 and a corresponding p-value of 0.017387. Since the p-value is less than the significance level of 0.05, it indicates that there is a statistically significant correlation between screen time duration and academic performance in Language among the students. This suggests that the differences in academic performance observed across different levels of screen time duration in Language are statistically significant. Therefore, based on this data, screen time duration may have significantly impact academic performance in Language for the students in this study.

Table 6: Screen Time Duration and Academic Performance (Language)

Screen time duration	Academic Performance (Language)			
	Poor	Average	Good	Total
≤60 minutes	6 (15.7%)	14 (36.8%)	18 (47.5%)	38
61-120 minutes	14 (17.9%)	38 (48.7%)	26 (33.4%)	78
>120 minutes	16 (10.5%)	98 (64.5%)	38 (25%)	152
Total	36 (13.5%)	150 (55.9%)	82 (30.6%)	268
Chi Square	6.3592	p value	0.017387	Significant

Figure 5: Screen Time Duration and Academic Performance (Language)



Conclusion

In this study, we set out to investigate the correlation between screen time duration and academic performance among primary school children in Rajasthan, India, and to identify the mediating factors influencing this relationship. Through rigorous analysis and the application of the chi-square test, we have arrived at significant findings that shed light on the impact of screen time on academic outcomes. (Silveira M.S., Cogo A.L.P., 2017)[29]

Our first objective aimed to examine the correlation between screen time duration and academic performance. The chi-square test results revealed a statistically significant relationship between these variables, accepting the alternative hypothesis. This finding underscores the importance of considering screen time habits when assessing academic performance among primary school children in Rajasthan. (Sayaf A.M., Alamri M.M., Alqahtani M.A., Alrahmi W.M., 2022)[30]

Furthermore, our second objective sought to identify mediating factors influencing the relationship between screen time and academic performance. While the chi-square test does not directly address mediating factors, the significant correlation we observed suggests the need for further investigation into these factors. Future research should explore variables such as the type of screen content, parental involvement, socioeconomic status, and educational purpose of screen time to gain a deeper understanding of their influence on academic outcomes. (Tondeur J., Hermans R., van Braak J., Valcke M. 2008)[31]

Overall, our study contributes valuable insights into the complex interplay between screen time and academic performance among primary school children in Rajasthan, India. By recognizing the impact of screen time and understanding the mediating factors at play, educators, policymakers, and parents can develop informed strategies to promote healthy screen habits and optimize academic success for children in this region. (Pozo J.I., Pérez Echeverria M.P., Cabellos B., Sanchez D.L., 2021)[32]

Accepting the alternate hypothesis in our study signifies that there is a significant relationship between screen time duration and academic performance among primary school children in Rajasthan, India. This outcome indicates that screen time habits do indeed influence academic outcomes, highlighting the importance of considering screen-related factors in educational settings. (Meng C., 2021)[33]

By accepting the alternate hypothesis, we acknowledge that the observed relationship between screen time and academic performance is not merely due to chance but reflects a genuine association between these variables. This finding underscores the need for educators, policymakers, and parents to address screen time habits as part of efforts to promote positive academic outcomes for children. (Hunter J.E., 1986)[34]

Furthermore, accepting the alternate hypothesis does not imply a causal relationship between screen time and academic performance. While our study demonstrates a significant correlation, further research is needed to explore the underlying mechanisms and potential causal pathways involved. This includes investigating mediating factors such as the type of screen content, parental involvement, socioeconomic status, and educational purpose of screen time. (Peter J., Valkenburg P.M., 2006)[35]

In conclusion, accepting the alternate hypothesis in our study provides valuable insights into the complex relationship between screen time and academic performance among primary school children in Rajasthan, India. It underscores the importance of continued research and informed interventions to support healthy screen habits and optimize educational outcomes for children in today's digital age. (Hashemi S.S., Cederlund K., 2017)[36]

Scope for Further Research Study

Future studies could investigate the effects of screen time on cognitive processes such as memory, attention, executive functions, and problem-solving skills. Understanding how screen time affects these cognitive domains is crucial for gaining insights into its broader impact on children's learning and development.

Moreover, longitudinal studies tracking children over extended periods would be valuable for assessing the long-term consequences of screen time exposure on cognitive development and educational outcomes into adolescence and adulthood. By examining how screen time habits established in childhood may shape educational trajectories and career prospects in the long run, researchers can better understand the enduring effects of screen time on educational achievement.

Additionally, it would be beneficial for future research to explore potential moderating factors that may influence the relationship between screen time and learning outcomes, such as the content and context of screen use, individual differences in susceptibility to screen effects, and socio-cultural factors.

Overall, while this study contributes valuable insights into the relationship between screen time duration and academic performance among primary school children, further research is warranted to comprehensively understand the multifaceted effects of screen time on children's learning and development across various cognitive and educational domains. This will ultimately inform evidence-based guidelines and interventions aimed at promoting healthy screen habits and optimizing children's educational outcomes.

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