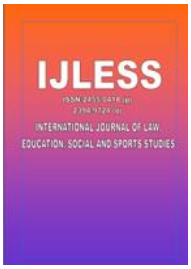
International Journal of Law, Education, Social and Sports Studies (IJLESS)
Volume: 12, Issue S1, 2025 (Special issue-1)
ISSN: 2455-0418 (Print), 2394-9724 (online)[Impact Factor: 6.0176 (ICI)]

Analysis of High School Students' Computer Knowledge in Relation to Academic Achievement

Kavitha K.R[1], Dr. Vanishree Koppad[2]
[1]Research Scholar, Department of Education, Bangalore University, Jnanabharathi, Bengaluru 560 056, Email ID: kavithasalomi6@gmail.com and
[2]Research Guide, Assistant Professor, Department of Education, Bangalore University, Jnanabharathi, Bengaluru 560 056
Email ID: vanishreebubedu@gmail.com
DOI: 10.33329/ijless.12.S1.447



ABSTRACT

The purpose of the present study is to research the association between high school students' academic achievement and computer knowledge from Bengaluru City, Karnataka, with regard to the aspects of gender and level of computer knowledge. As a result, the substantial methodology of the present study follows descriptive survey method and quantitative approach as well. In a quantitative method, the researcher collects, analyzes and interprets varied kinds of numerical data obtained from the subjects. With the help of stratified random sampling technique, the researcher selected a sample of 138 high school students belonging to Bengaluru City. Data was collected through questionnaire on 'Computer Knowledge' developed by researcher herself (2024) and for academic achievement of high school students, the investigator collected academic achievement scores from their respective schools along with personal proforma. Collected data was analyzed through applying 'r' test, 'F' test and 't' test and the level of significance was fixed at 0.05 and 0.01 confidence level. This study found that high school students' computer literacy has a significant positive correlation with the academic performance of the students. Students who have better computer skills tend to achieve better academic success. Besides, the study revealed significant disparities in academic achievement based on varied degrees of computer knowledge and students with advanced digital competencies were found to have outperformed their peers who lacked computer knowledge.

Keywords: Computer Knowledge, Academic Achievement, High School Students.

1. INTRODUCTION

The fast advancement of information and communication technology (ICT) has revolutionized many aspects of human existence, including education. Computer integration has become increasingly important in education, with students required to acquire and apply computer knowledge in a variety of academic and social contexts (Ming, 2015). The growing reliance on computers and digital tools in

education necessitates further inquiry into the impact that computer expertise plays in molding academic performance among high school pupils.

The relationship between computer literacy and academic accomplishment has been extensively researched, with conflicting findings regarding how digital competency effects learning outcomes. Some studies imply that students with more computer expertise perform better academically because they can successfully access and use online resources, participate in collaborative learning environments and improve their problem-solving abilities (Ally, 2004). Other study, however, has raised concerns about the possible negative impacts of excessive reliance on technology, including as distractions and less face-to-face contacts, which may obstruct academic progress (Rosen et al., 2013). Furthermore, gender and sum of computer knowledge are frequently mentioned as factors impacting pupils' academic achievement. Previous research has shown that boys outperform girls in terms of technical skills and computer usage (Jackson et al., 2001). However, recent changes in schooling and societal conventions have resulted in more girls using technology, raising the question of whether these gender inequalities still exist today.

The purpose of this study is to investigate the association between computer expertise and academic achievement among high school pupils. It will specifically look into whether students' computer skills competency connects with their academic performance, as well as whether there are any significant differences in academic achievement based on gender and computer knowledge levels (less, average or more levels). Understanding these dynamics can assist educators and policymakers in developing interventions that increase students' computer literacy, potentially improving their academic outcomes.

2. REVIEW OF RELATED LITERATURE

The integration of computer expertise into education has emerged as a critical component of academic success in the digital era. Research has continuously demonstrated the need of providing pupils with digital literacy in order to negotiate modern educational demands. This review brings together findings from global and Indian studies on the association between high school pupils' computer knowledge and academic achievement. The evaluation will analyze earlier research to discover patterns, contradictions and gaps, paving the path for the current work.

Holm (2024) researched the impact of digital literacy on the completion of a distance anatomy course. His research investigated the role that students' digital literacy played in regards to their achievement of educational success in the virtual environment of a classroom. The researcher's findings reveal that digital skill, knowledge in natural science before enrolling and the ability of self-assessing the process of learning were the important determinants of success in online learning. Madalli (2023) discussed the increasing need for computer education for disadvantaged children in the year 2023. He emphasized that computer literacy plays an essential role in the current process of teaching and learning. Parida (2021) examined the integration of computer education into the curriculum of secondary schools in Odisha. The outcome was that the inclusion of computers in schools heightened the technical awareness of students and aroused their interest in technologyrelated careers. Sinha et al. (2020) compared computer instruction in rural and urban schools in Jharkhand, focusing on gender inequalities. The study revealed that girls outperformed boys in computer instruction, particularly in the age group of 12 to 13 years.

Muttu (2020) explored computer awareness of secondary school pupils in Warangal. The author found that males perform better than females regarding computer skills and government school pupils possess better primary computer skills than students studying in private schools. Anjali (2020) assessed computer skills awareness among secondary students in Bihar. The study found differences based on the medium of instruction but no significant differences in gender, locality or school type.

Research gap: While the analyzed studies provide useful insights on the importance of computer literacy and technology in education, there are some gaps that require further investigation. Most studies emphasize the relevance of computer instruction in improving academic achievement, but they frequently target certain demographics, such as rural or urban pupils or educational environments, such as secondary schools in specific states. There is little study on the direct relationship between high school students' computer competence and their academic ability, especially in diverse and heterogeneous educational contexts. This gap underlines the need for a more concentrated examination into how high school students' computer knowledge connects with academic achievement. This study intends to close these gaps and contribute to a more comprehensive understanding of the relationship between computer knowledge and academic success in high school.

3. SIGNIFICANCE OF THE STUDY

The significance of this study stems from its ability to improve understanding of the relationship between high school students' computer knowledge and their academic accomplishment. As technology continues to play an increasingly crucial role in education, it is critical to investigate how students' computer abilities influence learning consequences. By investigating this relationship, the paper will provide useful insights into how digital literacy can affect academic achievement, assisting educators, policymakers and stakeholders in developing effective interventions to promote students' computer literacy. Furthermore, the study seeks to detect any substantial discrepancies in academic accomplishment depending on gender and computer skills, which could inspire focused measures for closing digital divides and ensuring fair educational opportunities. Finally, this study will contribute to the larger discussion on the integration of technology in education by emphasizing the necessity of developing computer skills as a vital determinant for academic achievement in the digital age.

4. STATEMENT OF THE PROBLEM

The purpose of this investigation is to examine the relationship between computer knowledge and academic achievement of high school students with regard to gender and computer knowledge. The topic identified for the current investigation is: "Analysis of High School Students' Computer Knowledge in Relation to Academic Achievement."

5. OBJECTIVES OF THE STUDY

i. To examine the relationship between high school students' computer knowledge and their academic achievement.

ii. To determine if there is a significant difference in academic achievement among high school students with different levels of computer knowledge (less, average & more).

iii. To investigate whether there is a significant difference in academic achievement between high school boys and girls.

6. RESEARCH HYPOTHESES

i. There is no significant relationship between academic achievement and computer knowledge of high school students.

ii. There is no significant difference in the Academic Achievement of high school students with less, average and more levels of computer knowledge.

iii. There is no significant difference in the Academic achievement of high school boys and girls

7. METHODOLOGY

The purpose of the present study is to research the association between high school students' academic achievement and computer knowledge from Bengaluru City, Karnataka, with regard to the aspects of gender and level of computer knowledge. As a result, the substantial methodology of the present study follows descriptive survey method and quantitative approach as well. In a quantitative method, the researcher collects, analyzes and interprets varied kinds of numerical data obtained from the subjects. With the help of stratified random sampling technique, the researcher selected a sample of 138 high school students belonging to Bengaluru City. Data was collected through questionnaire on 'Computer Knowledge' developed by researcher herself (2024) and for academic achievement of high school students, the investigator collected academic achievement scores from their respective schools along with personal proforma. Collected data was analyzed through applying 'r' test, 'F' test and 't' test and the level of significance was fixed at 0.05 and 0.01 confidence level.

8. ANALYSIS AND INTERPRETATION OF DATA

Table-1: presents mean, standard deviation, 'r' value and level of significance on scores between Academic Achievement and Computer Knowledge of high school students.

Variables	Mean	Standard Deviation	Obtained 'r' value	Level. of Sig.
Academic Achievement and	76.826	13.878	0.405	**
Computer Knowledge	23.297	4.845		

**Significant at 0.01 level (N=138; df=136; Table Value=0.208)

The table-1 shows that the correlation between high school students' academic achievement and computer knowledge scores are given. The obtained 'r' value of 0.405 are greater than table value 0.208 at 0.01 level which shows significant positive relationship between Academic Achievement and computer knowledge among students. Hence, the stated null hypothesis is rejected and alternative hypothesis has been formulated that "there is significant positive relationship between Academic Achievement and Computer Knowledge of high school students." It concludes that, the students who had more knowledge in computer had higher achievement in academics and vice versa.

Table-2: Shows One-Way ANOVA results related to Academic Achievement scores of high school students with different levels of computer knowledge (less, average and more).

Variable	Source of Variance	Sum of squares	Degree of Freedom	Mean Squares	'F' Value	Sig. level
Computer Knowledge	Between Groups	2906.457	2	1453.228	8.35	**
	Within Groups	23483.369	135	173.951		
	Total	26389.826	137			

'F' Table value for df 2, 135 is 4.75 at 0.01 level (**).

Table-2: One-way ANOVA result in order to distinguish the differences of significant variation in Academic Achievement of high school students as a result of differences of various levels of computer knowledge. The sum of squares and mean squares considered at 'df 2 and 135' related to Academic Achievement of high school students for between groups are 2906.457 and 1453.228 and for within groups are 23483.369 and 173.951 respectively from less, average and more levels of computer knowledge. According to the statistical applications, the obtained 'F' value of 8.35 related to Academic Achievement of high school students from different levels of computer knowledge is greater than the tabulated value 4.75 (df= 2, 135) at 0.01 level of confidence and hence, it shows statistically significant at 0.01 level. Therefore, the null hypothesis is rejected and an alternate hypothesis has been accepted that is, 'there is a significant difference in the Academic Achievement among high school students with

less, average and more levels of computer knowledge.' To determine the significant difference in the academic achievement of high school students from different levels of computer knowledge of these paired mean scores, the Scheffe's post hoc test was applied and the results are presented in table-2(a).

Table-2(a): Scheffe's Post Hoc Analysis on Academic Achievement scores of high school students with different levels of computer knowledge.

Computer Knowledge			**Mean Difference**
Less	**Average**	**More**	
68.275	78.622	-	10.347*
-	78.622	83.363	4.741
68.275	-	83.363	15.088*

*Significant at 0.05 level.

Table-2(a) gives the significant paired mean difference in the Academic Achievement among high school students with less and average & less and more levels of computer knowledge and the mean differences are 10.347 and 15.088 which are greater than the critical difference value at 0.05 level of confidence. But the Academic Achievement among high school students with average and more levels of computer knowledge and the mean difference is 4.741 which is less than the critical difference value at 0.05 level of confidence. The high school students with more knowledge in computer had higher achievement in academics followed by average and less levels of computer knowledge. The same has been graphically presented in Fig.1.

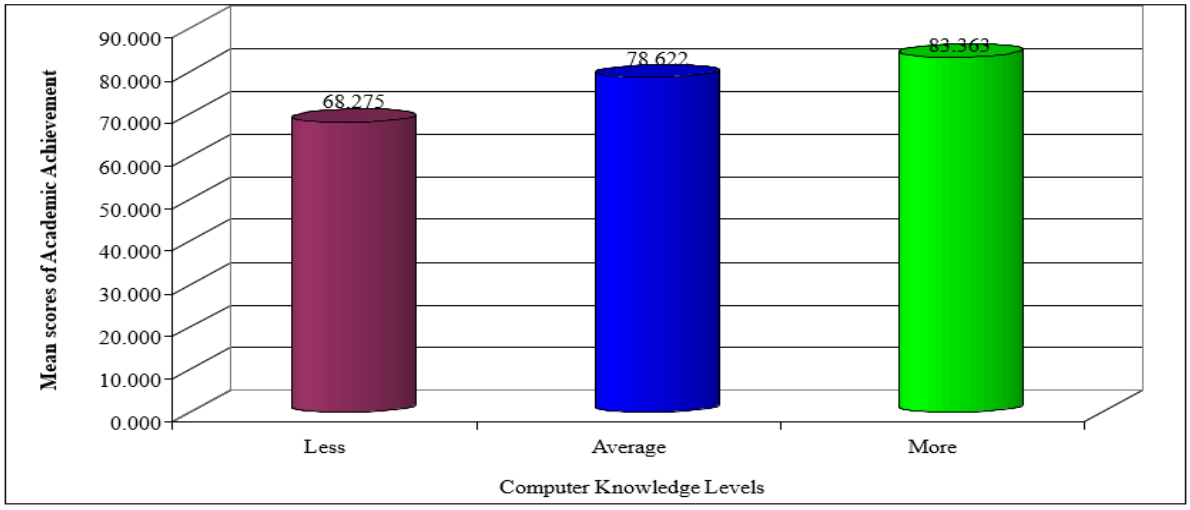


Fig. 1: Comparison of mean academic achievement scores among less, average and more levels of computer knowledge of students.

Table-3: shows Independent 't' test results related to Academic Achievement scores of high school boys and girls.

Gender	**Sample**	**Mean**	**Std. Deviation**	**'t' Value**	**Sig. level**
Boys	69	76.304	14.682	0.44	NS
Girls	69	77.347	13.113		

NSNot Significant level ('t' Table Value for N=138; df=136 is 1.98 (*)).

The following table 3 reports that the independent 't' value for Academic Achievement of high school boys and girls is found to be 0.44 which is not significant even at

0.05 level of significance. This means 'there is no significant difference in the Academic Achievement between high school boys and girls.' It was concluded that both the high school boys and girls had similar type of academic achievement. The same has been graphically presented in Fig. 2.

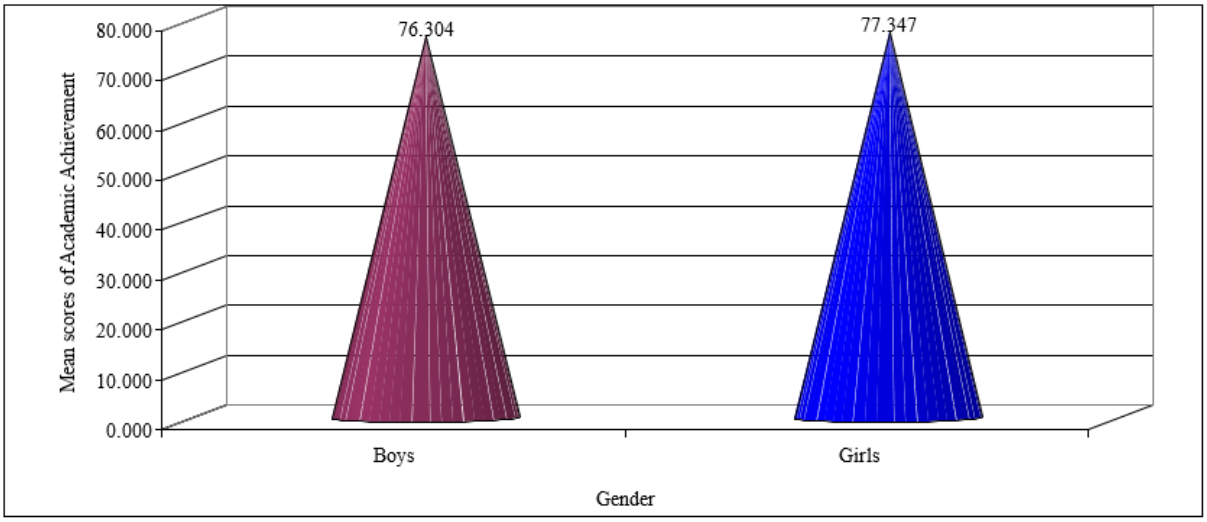


Fig. 2: Comparison of mean academic achievement scores between school boys and girls.

9. RESULTS

- There was a significant positive relationship between Academic Achievement and Computer Knowledge of high school students.
- There was a significant difference in the Academic Achievement of high school students with less, average and more levels of computer knowledge.
- There was no significant difference in the Academic Achievement of high school boys and girls.

10. DISCUSSION OF FINDINGS

The findings of this research are quite informative on the relationship between computer knowledge and academic performance. The most important finding is the high positive correlation between the computer knowledge of pupils and their academic performance. The research revealed that children with superior computer knowledge usually achieve better academic results. This finding supports a study by Holm (2024), which emphasized the need for digital skills in achieving success in e-learning environments. Parida (2021) noted that the introduction of computer education in schools boosts student engagement and interest in academics, thus strengthening the relationship between computer literacy and academic performance.

The study further showed a significant difference in academic performance depending on the level of students' computer knowledge, which was categorized into three: less, average and more. The statistical analysis revealed that students with more computer skills performed better than their peers who had lower or average computer skills. This outcome resonates with Madalli (2023), who emphasized that computer literacy is increasingly significant in education. It further shows that computer skills have become a determining factor in academic performance, especially as technology becomes more integrated into learning in everyday life.

Finally, the study examined gender differences in academic performance but found no significant differences between boys and girls. This is in sharp contrast to Sinha et al. (2020), who indicated girls outperform boys, with the gap being highest in rural areas. A possibility for the absence of this gender gap in this study might be the equal access that occurs in urban areas like Bengaluru. Anjali, 2020 also

found that there were no significant differences in computer skills between boys and girls in Bihar which indicates that gender differences in digital literacy may not be as considerable in some cases.

11. CONCLUSION

This study found that high school students' computer literacy has a significant positive correlation with the academic performance of the students. Students who have better computer skills tend to achieve better academic success. Besides, the study revealed significant disparities in academic achievement based on varied degrees of computer knowledge and students with advanced digital competencies were found to have outperformed their peers who lacked computer knowledge. Nevertheless, the study did not present a significant difference in academic performance between boys and girls; thus, gender may not have an essential impact in academic performance in specific urban settings.

12. IMPLICATIONS

Implications for the outcomes of the present research bear significant educational importance. On top of that, a strong argument for computer-based instruction to be integrated within the school curriculum can be proposed. Schools must allocate greater periods to kids to enhance digital competencies, as those happen to be strongly associated with their academic performance. Everyday teachers, through teaching, should mainstream and introduce digital literacy into children's curricula, helping in adequately equipping them in readiness for academic success or in future careers in technology-driven societies.

Training teachers in technology is essential. Teachers need to be skilled in digital technologies and processes to successfully deliver their lessons to the students. According to Anjali (2020), the technical competence of teachers significantly influences the performance of the students, which calls for professional development in this area. The teachers must not only know how to use technology but also learn how to use it meaningfully in the classroom to evoke interest and learning.

The other step should be undertaken to overcome the digital divide by ensuring all students, cutting across both gender and the socio-economic status, achieve equal opportunities to access technological facilities. Despite finding no gender-related disparities in the academic results, this research still remains paramount in ensuring that all learners, particularly those residing in rural and disadvantaged regions, are provided with computers and internet access. Bridging the digital divide will ensure that every learner has the opportunity to flourish in the digital period.

REFERENCES

[1]. Ally, M. (2004). Foundations of educational theory for online learning. In M. Ally (Ed.), Foundations of educational theory for online learning (pp. 3-31). Athabasca University Press.
[2]. Anjali (2020), Awareness of Computer Skills of secondary school Students, IJHESEM, I(I), 13-19.
[3]. Jackson, C. M., & Ervin, K. S. (2001). Computer literacy and gender differences among high school students: An exploratory study. Computers & Education, 36(3), 315-327. https://doi.org/10.1016/S0360-1315(00)00072-1
[4]. Kaul, L. (2010), Methodology of Education Research, New Delhi: Vikas Publication House Pvt., Ltd.
[5]. Madalli, Raghavendra V. (Feb., 2023), A Study on the Impact of Computer Literacy on Learning with Reference to High Schools in Karnataka, Journal of Emerging Technologies and Innovative Research, 10(2), b223-b229.
[6]. Mangal S.K. (2016), Essentials of Educational Psychology, Delhi: PHIL Learning Private Limited.
[7]. Ming, H. (2015). The effect of computer literacy on students' academic achievement. Journal of Education and Practice, 6(12), 71-79.
[8]. Muttu, Vemula (Dr.) (2020), Computer Awareness among the Secondary School

[9]. Students-A Study, International Journal of Humanities and Social Science Invention, 9(8), 11-19. www.ijhssi.org

[10]. Parida, Pramila (2021), Status of Computer Education in Secondary School on Balasore District: An Empirical Study, Journal of Emerging Technologies and Innovative Research, 8(8), b696-b701.

[11]. Rosen, L. D., Carrier, L. M., & Cheever, N. A. (2013). Facebook and texting made me do it: Media-induced task-switching and academic performance. Computers in Human Behavior, 29(3), 933-938. https://doi.org/10.1016/j.chb.2012.12.004

[12]. Simões, S., Oliveira, T., & Nunes, C. (n.d.). Influence of computers in students' academic achievement. NOVA Information Management School (NOVA IMS), Universidade Nova de Lisboa.

[13]. Sinha, Kunal; Saurabh Sambhav; Shilpi Singh; and Tripta Sinha (2020), Effectiveness of Computer Technology in Education System for Indian Students, International Journal of Advanced Science and Technology, 29(8s), 1391-1399.