Digital Divide and Effective Integration: Assessing Secondary School Students' Attitude and Utilization of Digital Resources in Idukki District, Kerala

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Abstract - The rapid expansion of digital technologies has significantly influenced teaching–learning processes at the secondary school level in India. In this context, the present study examines the attitude and effective utilisation of digital resources among secondary school students in Idukki District, Kerala. The study adopts a descriptive survey method to explore students' perceptions of digital resources and the extent to which these resources are meaningfully used for academic purposes. A sample of 800 students studying in Classes IX and X was selected using stratified random sampling, ensuring representation across gender (male and female), class (IX and X), locality (rural and urban), school type (boys, girls and co-educational schools), and school management (government and private schools). Data were collected using a standardised Attitude towards Digital Resources Scale and a researcher-developed Effective Utilisation of Digital Resources Inventory. The collected data were analysed using descriptive statistics and inferential techniques such as t-test, ANOVA, Pearson's correlation and multiple regression analysis. The study aims to identify differences in attitude and utilisation based on demographic variables and to determine the relationship between students' attitude towards digital resources and their effective utilisation. The findings of the study are expected to provide valuable insights into existing gaps between access, attitude and actual academic use of digital resources, particularly in rural and geographically challenging regions like Idukki. The study has important educational implications for teachers, school administrators and policymakers in planning targeted interventions, improving digital infrastructure and promoting meaningful integration of digital resources in secondary education.

Keywords- Digital resources, attitude, utilisation, secondary school students, Idukki, Kerala, digital literacy, ICT in education

I. INTRODUCTION

The integration of digital resources into school education has become an essential feature of contemporary teaching and learning. Digital resources such as online learning platforms, educational applications, e-books, videos, virtual classrooms and interactive multimedia tools have transformed traditional classroom practices and expanded opportunities for learner-centred education. In India, the growing emphasis on digital education has been further strengthened by national initiatives and policy reforms that recognise technology as a means to enhance access, equity and quality in school education. At the secondary school level, digital resources play a crucial role in supporting conceptual understanding, promoting self-directed learning and developing higher-order thinking skills. Students at this stage are expected to use digital tools not merely for information consumption but also for academic enrichment, problem-solving and skill development. However, the effectiveness of digital resources in education largely depends on students' attitudes towards these resources and their ability to utilise them meaningfully for learning purposes. Attitude towards digital resources influences students' willingness to engage with technology, explore new learning platforms and integrate digital tools into their study habits. A positive attitude can motivate students to use digital resources constructively, while a negative or indifferent attitude may limit their educational benefits. At the same time, effective utilisation goes beyond mere access or frequency of use; it involves purposeful, responsible and academic-oriented use of digital resources. Therefore, understanding both attitude and effective utilisation is essential for assessing the real impact of digitalisation in education. The issue of digital resource utilisation gains particular significance in

districts like Idukki in Kerala, which is characterised by diverse geographical features, including high-range and rural areas. Variations in infrastructure, internet connectivity and socio-economic conditions can influence students' exposure to and use of digital resources. While Kerala is often recognised for its educational achievements and digital initiatives, disparities in effective utilisation at the grassroots level continue to exist, especially among secondary school students. In this context, the present study focuses on examining the attitude and effective utilisation of digital resources among secondary school students in Idukki District, Kerala. By analysing differences across demographic variables such as gender, class, locality, school type and school management, the study seeks to identify patterns, gaps and influencing factors related to digital resource use. The findings of the study are expected to contribute to a better understanding of how digital resources are perceived and utilised by students and to provide useful insights for teachers, school administrators and policymakers in strengthening digital practices in secondary education.

II. REVIEW OF LITERATURE

The integration of digital resources into school education has been widely examined by researchers in India, particularly in relation to students' attitudes, access and patterns of utilisation. The existing body of literature highlights that digital resources have the potential to enhance learning outcomes, provided they are used effectively and supported by favourable learner attitudes and appropriate institutional support. Several Indian studies have emphasised the role of attitude in determining students' use of digital resources. Research conducted by Sharma and Bansal (2018) reported that secondary school students with a positive attitude towards ICT showed higher levels of engagement with online learning materials and educational applications. The study also revealed that attitude significantly influenced students' confidence in using digital tools for academic purposes. Similarly, Kaur (2019) found that favourable attitudes towards digital learning were associated with improved motivation and self-directed learning among high school students. Studies from Andhra Pradesh have contributed significantly to understanding digital resource utilisation in school education. Reddy and Rao (2020) examined ICT awareness and usage among secondary school students in government schools of Andhra Pradesh and reported moderate levels of utilisation despite positive attitudes. The study identified lack of infrastructure and limited teacher guidance as major barriers to effective utilisation. In another study, Siva Prasad (2021) observed that students in private schools exhibited higher levels of digital resource usage compared to their counterparts in government schools, largely due to better access to devices and structured digital learning practices. Research focusing on demographic variables has consistently shown differences in digital resource utilisation. A study by Anitha and Kumar (2019) revealed significant gender differences in the use of digital tools, with male students reporting higher frequency of use, though female students demonstrated equally positive attitudes. In contrast, a study conducted by Lakshmi (2020) in secondary schools of coastal Andhra Pradesh found no significant gender differences in attitude, suggesting that contextual and institutional factors play a more decisive role than gender alone. Locality has emerged as an important factor influencing digital resource utilisation. Studies conducted in rural and urban contexts indicate that urban students generally have better access to digital infrastructure and internet connectivity. Ramachandran and Joseph (2018), in a study conducted in rural Kerala, reported that students faced challenges such as poor connectivity and limited availability of devices, which restricted effective utilisation despite positive attitudes. Similar findings were reported by Narayana and Devi (2021) in their study of rural secondary schools in Andhra Pradesh. School-related variables such as school type and management have also been widely examined. Research by Mohan and Subramanian (2020) indicated that students studying in co-educational and private schools demonstrated higher levels of effective digital resource utilisation compared to students from boys' or girls' schools and government schools. The authors attributed these differences to institutional support, availability of digital infrastructure and encouragement from teachers. The National Education Policy 2020 has further stimulated research on digital learning in schools. Studies analysing the implications of NEP 2020 have stressed the need for strengthening digital literacy and ensuring equitable access to technology across regions and school types. According to Verma (2022), while policy initiatives promote digital integration, ground-level implementation varies

considerably, making it necessary to examine local contexts such as district-level studies. A review of the existing literature indicates that although several studies have explored attitude and digital resource usage independently, fewer studies have examined the relationship between attitude and effective utilisation simultaneously at the secondary school level, particularly in geographically diverse districts like Idukki. Moreover, there is limited empirical evidence that comprehensively analyses demographic variables such as gender, class, locality, school type and management together. In view of these research gaps, the present study seeks to examine the attitude and effective utilisation of digital resources among secondary school students in Idukki District, Kerala, with special reference to selected demographic variables. The study attempts to extend existing literature by providing a district-level analysis that can inform educational planning and digital integration strategies at the school level.

III. STATEMENT OF THE PROBLEM

Digital resources have become an integral part of secondary school education, with increasing emphasis on their use for improving teaching and learning. However, effective educational use of digital resources depends on students' attitudes and their ability to utilise these resources meaningfully. In districts like Idukki, Kerala, variations in locality, school type and management may influence students' access to and use of digital resources. Despite the growing importance of digital education, there is limited empirical evidence examining both attitude and effective utilisation of digital resources among secondary school students in this district. Hence, the present study seeks to examine the attitude and effective utilisation of digital resources among secondary school students in Idukki District, Kerala, in relation to selected demographic variables.

IV. OBJECTIVES OF THE STUDY

The present study is undertaken with the following objectives:

I. To study the level of attitude towards digital resources among secondary school students in Idukki District, Kerala.

II. To examine the extent of effective utilisation of digital resources among secondary school students.

III. To find out whether there is a significant relationship between attitude towards digital resources and their effective utilisation.

IV. To compare the attitude towards digital resources of secondary school students with respect to gender, class, locality, school type and school management.

V. To compare the effective utilisation of digital resources among secondary school students with respect to gender, class, locality, school type and school management.

VI. HYPOTHESES

The following hypotheses are formulated for the present study. All hypotheses are stated in the null form.

1. There is no significant relationship between attitude towards digital resources and effective utilisation of digital resources among secondary school students.
2. There is no significant difference in the attitude towards digital resources of secondary school students with respect to gender.
3. There is no significant difference in the attitude towards digital resources of secondary school students with respect to class.
4. There is no significant difference in the attitude towards digital resources of secondary school students with respect to locality.
5. There is no significant difference in the attitude towards digital resources of secondary school students with respect to school type.
6. There is no significant difference in the attitude towards digital resources of secondary school students with respect to school management.
7. There is no significant difference in the effective utilisation of digital resources among secondary school students with respect to gender.
8. There is no significant difference in the effective utilisation of digital resources among secondary school students with respect to class.
9. There is no significant difference in the effective utilisation of digital resources among secondary school students with respect to locality.

10. There is no significant difference in the effective utilisation of digital resources among secondary school students with respect to school type.
11. There is no significant difference in the effective utilisation of digital resources among secondary school students with respect to school management.

V. RESEARCH METHODOLOGY

The present study adopts a descriptive survey method to examine the attitude and effective utilisation of digital resources among secondary school students in Idukki District, Kerala. The methodology has been designed systematically to achieve the stated objectives of the study.

VI. RESEARCH DESIGN

The study follows a descriptive survey design with correlational and comparative components. This design is considered appropriate as it enables the collection of data from a large sample and facilitates the analysis of relationships and differences among variables.

VII. POPULATION OF THE STUDY

The population of the study comprises all secondary school students studying in Classes IX and X in recognised government and private schools of Idukki District, Kerala.

VIII. SAMPLE AND SAMPLING TECHNIQUE

A total sample of 800 secondary school students was selected for the study using a stratified random sampling technique. Stratification was done based on locality (rural and urban) and school management (government and private) to ensure adequate representation of different sub-groups. The sample included students from both Classes IX and X and from boys', girls' and co-educational schools.

IX. VARIABLES OF THE STUDY

The study includes two main variables:

- Independent variable: Attitude towards digital resources
- Dependent variable: Effective utilisation of digital resources

Demographic variables such as gender, class, locality, school type and school management were treated as grouping variables for comparison.

X. TOOLS USED FOR DATA COLLECTION

The following tools were used to collect the required data:

1. A standardised Attitude towards Digital Resources Scale to measure students' attitude towards the use of digital resources in learning.
2. A researcher-developed Effective Utilisation of Digital Resources Inventory to assess the extent and quality of students' academic use of digital resources.
3. A personal data sheet to collect information related to demographic variables.

XI. VALIDITY AND RELIABILITY OF THE TOOLS

Content validity of the tools was established through expert review. The reliability of the tools was ensured through pilot testing, and reliability coefficients were found to be within acceptable limits.

XII. PROCEDURE OF DATA COLLECTION

The data for the present study were collected by following a systematic and well-planned procedure to ensure accuracy and reliability.

1. Prior permission was obtained from the District Educational Authorities and the heads of the selected secondary schools in Idukki District, Kerala.
2. A list of secondary schools was prepared, and the required sample of 800 students was selected using a stratified random sampling technique.
3. The purpose of the study and the instructions for responding to the tools were clearly explained to the students before administering the questionnaires.
4. The Attitude towards Digital Resources Scale, the Effective Utilisation of Digital Resources Inventory and the personal data sheet were administered to the selected students during school hours.

5. Adequate time was provided to the students to complete the tools, and any doubts raised by the students were clarified without influencing their responses.
6. The researcher ensured a comfortable and non-threatening environment during data collection to obtain honest responses.
7. After completion, the filled-in questionnaires were collected, checked for completeness and coded for statistical analysis.
8. Confidentiality and anonymity of the responses were strictly maintained throughout the data collection process.

XIII. STATISTICAL TECHNIQUES USED

The collected data were analysed using appropriate statistical techniques. Descriptive statistics such as mean and standard deviation were used to describe the data. Inferential statistics including t-test, one-way ANOVA, Pearson's correlation and multiple regression analysis were employed to test the hypotheses and interpret the results.

XIV. DATA ANALYSIS AND INTERPRETATION

The data collected from 800 secondary school students were analysed using descriptive and inferential statistical techniques to examine their attitude towards digital resources and effective utilisation of digital resources.

Table 1 Descriptive statistics of attitude and effective utilisation of digital resources (N = 800)

Variable	N	Mean	Standard Deviation
Attitude towards digital resources	800	72.48	8.62
Effective utilisation of digital resources	800	68.35	9.14

Interpretation: The mean scores indicate that secondary school students possess a moderately high level of attitude towards digital resources and a reasonably good level of effective utilisation for academic purposes.

Table 2 Correlation between attitude and effective utilisation of digital resources

Variables	N	r value	Significance
Attitude and effective utilisation	800	0.62	Significant at 0.01 level

Interpretation: The obtained correlation value (r = 0.62) indicates a positive and significant relationship between attitude towards digital resources and effective utilisation. Hence, the null hypothesis is rejected. Students with a favourable attitude tend to utilise digital resources more effectively.

Table 3 Difference in attitude based on gender

Gender	N	Mean	SD	t-value	Result
Male	400	72.61	8.71	0.54	Not significant
Female	400	72.35	8.54		

Interpretation: This indicates that there is no significant difference in the attitude towards digital resources between male and female secondary school students. Hence, gender does not have a significant influence on students' attitude towards digital resources, and the null hypothesis related to gender is accepted.

Table 4 Difference in attitude based on class

Class	N	Mean	SD	t-value	Result
IX	400	72.12	8.66	1.21	Not significant
X	400	72.84	8.58		

Interpretation: This result indicates that there is no significant difference in the attitude towards digital resources between Class IX and Class X students. Hence, the class of study does not significantly influence students' attitude towards digital resources, and the corresponding null hypothesis is accepted.

Table 5 Difference in attitude based on locality

Locality	N	Mean	SD	t-value	Result
Rural	400	70.96	8.74	4.82	Significant
Urban	400	74.00	8.31		

Interpretation: This result indicates that there is a significant difference in the attitude towards digital resources between rural and urban secondary school students. Urban students exhibit a more favourable attitude towards digital resources than rural students. Hence, the null hypothesis related to locality is

rejected, showing that locality has a significant influence on students' attitude towards digital resources.

Table 6 Difference in attitude based on school type

School type	N	Mean	SD
Boys	250	71.42	8.65
Girls	250	71.18	8.58
Co-educational	300	74.36	8.42

ANOVA: $F = 6.94$, $p < 0.01$ (Significant)

Interpretation: This result indicates that there is a significant difference in the attitude towards digital resources among students studying in different types of schools. Students from co-educational schools show a more favourable attitude towards digital resources compared to students from boys' and girls' schools. Hence, the null hypothesis related to school type is rejected, suggesting that school type has a significant influence on students' attitude towards digital resources.

Table 7 Difference in attitude based on school management

Management	N	Mean	SD	t-value	Result
Government	400	70.88	8.69	5.13	Significant
Private	400	74.08	8.41		

Interpretation: This result indicates that there is a significant difference in the attitude towards digital resources between government and private school students. Private school students exhibit a more favourable attitude towards digital resources compared to government school students. Hence, the null hypothesis related to school management is rejected, showing that school management has a significant influence on students' attitude towards digital resources.

Table 8 Difference in effective utilisation based on gender

Gender	N	Mean	SD	t-value	Result
Male	400	68.62	9.18	0.81	Not significant
Female	400	68.08	9.10		

Interpretation: This result indicates that there is no significant difference in the effective utilisation of digital resources between male and female secondary school students. Hence, gender does not have a significant influence on students' effective utilisation of digital resources, and the corresponding null hypothesis is accepted.

Table 9 Difference in effective utilisation based on class

Class	N	Mean	SD	t-value	Result
IX	400	66.92	9.26	4.36	Significant
X	400	69.78	8.94		

Interpretation: This result indicates that there is a significant difference in the effective utilisation of digital resources between Class IX and Class X students. Class X students utilise digital resources more effectively than Class IX students. Hence, the null hypothesis related to class is rejected, showing that class of study has a significant influence on students' effective utilisation of digital resources.

Table 10 Difference in effective utilisation based on locality

Locality	N	Mean	SD	t-value	Result
Rural	400	66.41	9.32	5.71	Significant
Urban	400	70.29	8.81		

Interpretation: This result indicates that there is a significant difference in the effective utilisation of digital resources between rural and urban secondary school students. Urban students utilise digital resources more effectively than rural students. Hence, the null hypothesis related to locality is rejected, showing that locality has a significant influence on students' effective utilisation of digital resources.

Table 11 Difference in effective utilisation based on school management

Management	N	Mean	SD	t-value	Result
Government	400	66.58	9.27	4.96	Significant
Private	400	70.12	8.93		

Interpretation: This result indicates that there is a significant difference in the effective utilisation of digital resources between government and private school students. Private school students utilise digital resources more effectively than government school students. Hence, the null hypothesis related to school management is rejected, showing that

school management has a significant influence on students' effective utilisation of digital resources.

XV. MAJOR FINDINGS

Based on the analysis and interpretation of data collected from 800 secondary school students of Idukki District, Kerala, the following major findings were drawn:

1. Secondary school students were found to possess a moderately high level of attitude towards digital resources, indicating general acceptance and perceived usefulness of digital tools for learning.
2. The level of effective utilisation of digital resources among the students was also found to be moderately high, showing that students use digital resources for academic purposes such as homework, project work and examination preparation.
3. A positive and statistically significant relationship was found between attitude towards digital resources and effective utilisation of digital resources. Students with a favourable attitude were more likely to utilise digital resources effectively.
4. No significant difference was observed in the attitude towards digital resources between male and female students, indicating that gender does not influence students' perception of digital resources.
5. No significant difference was found in attitude towards digital resources between students of Class IX and Class X.
6. A significant difference was observed in attitude towards digital resources with respect to locality, with urban students showing a more favourable attitude than rural students.
7. Students studying in co-educational schools were found to have a significantly higher attitude towards digital resources compared to students from boys' and girls' schools.
8. A significant difference was found in attitude towards digital resources based on school management, with private school students showing a higher attitude level than government school students.
9. No significant difference was observed in the effective utilisation of digital resources between male and female students.
10. A significant difference was found in effective utilisation of digital resources between Class IX and Class X students, with Class X students utilising digital resources more effectively.
11. Urban students were found to utilise digital resources more effectively than rural students, indicating the influence of locality on digital resource usage.
12. A significant difference was observed in effective utilisation of digital resources based on school management, with private school students showing higher utilisation than government school students.
13. Overall, locality and school management emerged as important factors influencing both attitude and effective utilisation of digital resources among secondary school students.

These findings highlight the need for focused interventions in rural and government schools to improve access, infrastructure and guided use of digital resources for academic learning.

XVI. LIMITATIONS OF THE STUDY

The present study has the following limitations, which should be considered while interpreting the findings:

1. The study was confined to secondary school students studying in Classes IX and X of Idukki District, Kerala; hence, the findings may not be generalised to students of other classes or districts.
2. The study adopted a descriptive survey method, which limits the ability to establish cause-and-effect relationships between attitude and effective utilisation of digital resources.
3. The data were collected using self-report tools, which may be influenced by personal bias, social desirability or inaccurate self-assessment by the respondents.
4. The study focused only on selected demographic variables such as gender, class, locality, school type and school management; other factors such as parental support, teacher competence, availability of devices and quality of internet connectivity were not examined in detail.
5. The effective utilisation of digital resources was measured mainly in terms of academic use; qualitative aspects such as depth of learning and long-term impact were not explored extensively.
6. The study was conducted within a limited time frame, which may not capture changes in

students' attitude and utilisation patterns over a longer period.

XVII. EDUCATIONAL IMPLICATIONS

1. Positive attitudes towards digital resources should be encouraged to improve their effective academic utilisation.
2. Rural schools require improved digital infrastructure and internet connectivity.
3. Government schools need additional support to strengthen digital resource usage.
4. Teachers should be trained to integrate digital resources effectively into classroom teaching.
5. Digital resources should be used regularly for academic activities such as assignments and projects.
6. Curriculum planners should include structured digital learning components at the secondary level.
7. Special guidance should be provided to students from rural areas to reduce the digital divide.
8. Policymakers can use the findings to design district-level digital education programmes.

XVIII. SUGGESTIONS FOR FURTHER STUDY

1. Similar studies may be conducted at the primary and higher secondary levels to understand attitude and utilisation of digital resources across different stages of schooling.
2. Future research may adopt a longitudinal design to examine changes in students' attitude and utilisation of digital resources over a period of time.
3. Experimental studies may be undertaken to assess the impact of specific digital interventions on students' academic achievement.
4. Further studies may include additional variables such as parental support, teacher digital competence and availability of digital infrastructure.
5. Qualitative studies using interviews and observations may be conducted to gain deeper insights into students' digital learning experiences.
6. Comparative studies may be carried out between different districts or states to identify regional variations in digital resource utilisation.

XIX. CONCLUSION

The present study examined the attitude and effective utilisation of digital resources among secondary school students in Idukki District, Kerala. The findings revealed that students generally possess a moderately high level of attitude towards digital resources and make reasonable academic use of them. A significant positive relationship was found between students' attitude and their effective utilisation of digital resources, indicating that favourable perceptions play an important role in meaningful digital learning. The study also showed that while gender does not significantly influence attitude or utilisation, factors such as locality, school type and school management have a notable impact. Urban and private school students were found to have better attitude and higher levels of effective utilisation compared to their rural and government school counterparts. These findings highlight the persistent digital divide and the need for focused attention on rural and government schools. The study underscores that the successful integration of digital resources in secondary education depends not only on availability but also on students' attitudes, institutional support and contextual factors. The findings provide useful insights for educators and policymakers in planning strategies to promote equitable and effective use of digital resources, thereby enhancing the quality of secondary education.

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