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A Document Analysis on Academic Achievement among the Secondary School Students of Tiruchirappalli District with Respect to Select Variables

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Abstract

This study analyzed the academic achievement of secondary school students in the Tiruchirappalli District using a document analysis research design based on secondary data. The study utilized the official Tabulated Mark Sheet published by the Directorate of Government Examinations, Government of Tamil Nadu, for the March 2024 X Standard Public Examination. From a population of 39,649 students, a random sample of 1,853 was selected. Academic achievement was examined with respect to institutional variables, namely, the type of school management and type of school. The collected data were analyzed using descriptive statistics, the Independent Samples t-test, and one-way Analysis of Variance (ANOVA). The findings revealed that the students had an overall mean academic achievement score of 358.50 (SD = 77.91). Significant differences were observed in academic achievement with respect to the type of school management, $F(2, 1850) = 187.008, p < .001, \eta^2 = .087$, and type of school, $F(2, 1850) = 37.071, p < .001, \eta^2 = .039$. Pairwise comparisons further indicated significant differences among students from Government, Government Aided, and Unaided Private schools. The findings suggest that institutional characteristics are associated with variations in students' academic achievement. This study highlights the importance of strengthening instructional quality, educational resources, academic support, and equitable educational opportunities across different school categories. Future research may extend the investigation to multiple districts and incorporate additional learner-related, family, instructional, and institutional variables using longitudinal and mixed-method research designs.

Keywords: Academic Achievement, Document Analysis, Secondary School Students, School Management, Educational Assessment, Public Examination

Introduction

Education plays a fundamental role in the intellectual, social, emotional, and personal development of individuals. The effectiveness of education is reflected, to a considerable extent, in the knowledge, skills, understanding, and competencies that students acquire through teaching and learning. Therefore, academic achievement is regarded as an important indicator of students' educational progress and the effectiveness of instructional practices within schools. It is generally assessed through students' performance in examinations and other forms of academic evaluation.

[Kohli \(1975\)](#) described academic achievement as the level of proficiency attained in academic work or formally acquired knowledge of school subjects. [Good \(2003\)](#), in the Dictionary of Education, referred to academic achievement in terms of knowledge and skills acquired through education. Therefore,

academic achievement may be understood as a measurable educational outcome attained through formal learning experiences. Thus, academic achievement may be understood as measurable educational outcomes attained by students through formal learning experiences. Recent research has also indicated that academic achievement is influenced by a combination of individual, family, institutional, instructional, and contextual factors ([Kaliisa et al., 2023](#)).

Students differ considerably in their academic performance, even when exposed to similar educational curricula and assessment systems. Such differences may arise from variations in learner characteristics, family backgrounds, school environments, instructional practices, the availability of learning resources, and institutional conditions. Recent systematic reviews have highlighted the multidimensional nature of academic achievement and emphasized the combined influence of personal, family, school, and contextual factors on students' educational outcomes ([Costa et al., 2024](#); [Pilarés Barco et al., 2026](#); [Salvo-Garrido et al., 2026](#)). Consequently, examining academic achievement requires attention not only to individual learner characteristics but also to the institutional contexts in which students receive education.

In the context of secondary education, institutional characteristics may play an important role in shaping students' academic experiences and outcomes. Differences in school management, school type, educational resources, instructional facilities, and academic support systems may contribute to variations in student performance. However, much of the existing research on academic achievement has relied on questionnaires, self-reported information, or studies that focus on psychological and social variables. Fewer studies have examined students' academic performance using authentic examination records obtained from official educational sources.

The present study addresses this gap by analyzing the academic achievements of secondary school students in Tiruchirappalli District using official public examination records. This study focuses particularly on institutional variables, namely, the type of school management and the type of school. The use of official examination records provides

an objective basis for assessing students' academic performance because the data are derived from actual public examination results rather than self-reported responses. Therefore, this study seeks to provide empirical evidence regarding variations in academic achievement across different institutional categories and contribute to a better understanding of academic performance at the secondary school level.

Review of Literature

Recent research has examined academic achievement as a multidimensional educational outcome influenced by individual, family, instructional, institutional, and contextual factors. [Salvo-Garrido et al. \(2026\)](#), through a systematic review of educational trajectories from primary to secondary education, reported that academic achievement is associated with the interaction of personal characteristics, family support, school climate and institutional quality. The findings emphasize that improving academic achievement requires attention to multiple educational contexts rather than a single determinant.

[Pilarés Barco et al. \(2026\)](#) systematically reviewed empirical evidence concerning the determinants of academic performance among secondary school students. The review identified several factors associated with academic performance, including school infrastructure, parental support, classroom practices and the use of educational technology. The findings indicate that students' academic outcomes are shaped by both learner-related and institutional conditions.

[Costa et al. \(2024\)](#) conducted a systematic review of the determinants of academic achievement among middle-and secondary-school students. The review indicated that motivation, self-regulation, family background, teacher support, school environment, and socioeconomic conditions are associated with academic achievement. This study emphasizes the importance of comprehensive educational strategies that address multiple dimensions of students' learning experiences.

[Kaliisa et al. \(2023\)](#) examined the impact of learning analytics dashboards on students' achievement, motivation, participation, and attitudes. Their systematic review highlighted the

potential contribution of data-informed educational practices to students' learning outcomes, while also demonstrating the importance of examining educational technologies within the broader teaching and learning context.

[Chamundeswari \(2023\)](#) examined emotional intelligence and academic achievement among higher secondary students and reported a positive relationship between emotional intelligence and academic performance. The findings suggest that students' emotional competencies may contribute to their ability to engage effectively with academic tasks and achieve better educational outcomes.

[Nagarani \(2023\)](#) investigated academic achievement among X Standard students with reference to gender and community. The study reported differences in academic achievement across selected demographic groups and highlighted the importance of equitable educational opportunities and institutional support in addressing variations in students' academic performance.

Critical Review and Research Gap

The reviewed literature demonstrates that academic achievement is influenced by a combination of learner-related, family, instructional, technological, and institutional factors. Recent systematic reviews have provided substantial evidence regarding the importance of the school environment, family support, instructional quality, learning resources, and student characteristics in explaining variations in academic performance ([Costa et al., 2024](#); [Pilares Barco et al., 2026](#); [Salvo-Garrido et al., 2026](#)). Studies focusing on emotional and demographic factors have similarly demonstrated that students may differ in their academic outcomes according to their selected personal and social characteristics ([Chamundeswari, 2023](#); [Nagarani, 2023](#)).

Despite the substantial body of research on academic achievement, comparatively few studies have examined academic performance using authentic official examination records. A considerable proportion of previous investigations have employed questionnaires, self-reported measures, interviews, or intervention-based designs. Such approaches are valuable for understanding the factors associated

with achievement but may not directly represent students' actual performance in public examinations.

Document analysis of official examination records provides an alternative approach because it enables researchers to examine actual academic performance without relying on students' self-reported responses. In the context of secondary education, such records can provide objective evidence of achievement patterns across institutional categories.

Furthermore, limited evidence is available concerning academic achievement among secondary school students in Tiruchirappalli District, based specifically on official public examination records published by the Directorate of Government Examinations, Government of Tamil Nadu. Existing studies have examined academic achievement from psychological, demographic, family, and instructional perspectives, whereas comparatively less attention has been given to institutional variables such as school management and type using official examination data.

Therefore, the present study addresses this research gap by analysing the academic achievement of secondary school students in Tiruchirappalli District through document analysis of official X Standard Public Examination records. This study specifically examines whether students' academic achievement differs according to selected institutional variables, particularly school management and type of school.

Need and Significance of the Study

Academic achievement is one of the most important indicators of the effectiveness of teaching and learning processes. It reflects the extent to which students have attained the intended educational objectives and serves as a valuable criterion for evaluating the quality of educational institutions. The findings of the present study are expected to provide useful information on the academic achievement of secondary school students in the Tiruchirappalli District based on authentic public examination records obtained through document analysis. This study is significant for teachers, as it provides empirical evidence regarding variations in students' academic achievement across different institutional settings. Such information may help teachers

identify areas requiring greater instructional support and adopt appropriate teaching strategies to improve students' academic performance. The findings are also expected to benefit school administrators and educational planners by providing reliable evidence on the influence of institutional variables, such as the type of management and type of school, on students' academic achievement. The results may assist administrators in formulating strategies to improve school effectiveness, instructional quality and resource allocation. For policymakers, this study offers objective evidence derived from official public examination records published by the Directorate of Government Examinations, Government of Tamil Nadu. The findings may support evidence-based educational planning and the development of policies aimed at reducing disparities in academic achievement among different school categories. This study is equally valuable for researchers as it demonstrates the usefulness of document analysis as a research method in educational research. Unlike self-reported data, document analysis provides objective information derived from official records. The present investigation may serve as a reference for future studies examining academic achievement using secondary educational data and encourage further research involving additional institutional, demographic, and educational variables.

Overall, this study contributes to the existing body of educational research by providing an objective assessment of academic achievement among secondary school students and generating evidence that may support the continuous improvement of school education, educational administration, and policy formulation. Students face numerous challenges in attaining a particular level of academic achievement, and they possess different levels of academic achievement. A few studies have revealed that academic achievement depends on many personal and non-personal factors. Non-personal factors can be further classified into school-related factors and home environment or family/society-related factors. (Khan and Malik, 1999; [Fan, 2001](#); Gonzalez-Pienda et al., 2002). To improve students' academic achievement, teachers should be aware of the factors that promote or hinder students' achievement and encourage them by improving their

study practices throughout their learning at school with the aim of achieving quality education through all instructions with discipline at both the school and home levels to boost them to perform better. Hence, the present study was conducted.

Objectives of the Study

The objectives of this study are as follows:

- To determine the level of academic achievement of secondary school students in Tiruchirappalli District.
- To determine whether there is a significant difference in the academic achievement of secondary school students with respect to the institutional variables, namely, type of school management and type of school.

Hypotheses of the Study

Based on the objectives of this study, the following hypotheses were formulated:

- The academic achievement of secondary school students in the Tiruchirappalli District is low.
- There is no significant difference in the academic achievement of secondary school students with respect to the type of school management.
- There is no significant difference in the academic achievement of secondary school students with respect to the type of school.

Research Design

This study adopted a document analysis research design using secondary data obtained from official educational records. Document analysis is a systematic research method that involves examining and interpreting existing documents to obtain meaningful information to answer research questions ([Best & Khan, 2009](#)). This method is particularly appropriate when authentic educational records are available, as it provides objective and reliable evidence without influencing the behavior of the participants. In the present investigation, official public examination records published by the Directorate of Government Examinations, Government of Tamil Nadu, served as the primary source of data for analyzing the academic achievement of secondary school students in Tamil Nadu.

Population of the Study

The population of the study consisted of 39,649 students who appeared for the X Standard Public Examination conducted in March 2024 in secondary schools located in Tiruchirappalli District, Tamil Nadu. The population included students studying in Government, Government Aided, and Unaided Private schools, represented in the official examination records published by the Directorate of Government Examinations, School Education Department, Government of Tamil Nadu.

Sample of the Study

A sample of 1,853 students was selected from a population of 39,649 students for the statistical analysis. The sample represented approximately 4.67% of the total population. The selected sample size was considered adequate for the planned descriptive and inferential statistical analyses, including the Independent Samples t-test and one-way Analysis of Variance (ANOVA). The sampling frame consisted of the students included in the official Tabulated Mark Sheet for the March 2024 X Standard Public Examination.

Sampling Technique

Simple random sampling was employed to select 1,853 students from a population of 39,649 students. The students included in the official examination records constituted the sampling frames. Each eligible student record was assigned a unique identification number for sampling. The required sample was selected using a computer-based random selection procedure. Records were selected without replacement until a predetermined sample size of 1,853 students was obtained. This procedure ensured that each student record in the sampling frame had an equal probability of selection and reduced the possibility of a systematic selection bias.

The sampling procedure involved three stages for reproducibility. First, a complete set of eligible student records in the official examination database was identified and assigned sequential identification numbers. Second, a computer-generated random selection procedure was used to select the required records from the numbered sampling frame. Third, the selected records were screened for the completeness

of the variables required for the analysis, and the final dataset consisted of 1,853 student records. The selected cases were subsequently coded for statistical analysis using SPSS Version 26.0.

Source of Data

The study utilized secondary data obtained from the Tabulated Mark Sheet published by the Directorate of Government Examinations, School Education Department, Government of Tamil Nadu, for the March 2024 X Standard Public Examination. The academic achievement score was computed using the total marks obtained by students in five compulsory subjects: Tamil, English, Mathematics, Science, and Social Science. The official nature of the data ensured a high level of authenticity and reliability of the data.

Variables of the Study

The study included the following variables.

Dependent Variable

Academic Achievement

Institutional Variables

- Type of Management
- Type of School

These variables were analyzed to identify differences in students' academic achievement across the selected institutional categories.

Statistical Techniques

The collected data were coded, tabulated, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 26.0. Descriptive statistics, including the mean and standard deviation, were computed to summarize students' academic achievement scores. An Independent Samples t-test was employed to examine the difference in academic achievement between the high- and low-achiever groups and for pairwise comparisons of school management categories. One-way Analysis of Variance (ANOVA) was used to determine whether significant differences existed in academic achievement according to the type of school management and school type. Statistical significance was set at $p < 0.05$ and $p < 0.01$. Cohen's d was

calculated to estimate the magnitude of differences in the independent samples comparisons, while eta squared (η^2) was calculated for the ANOVA results. Effect sizes were interpreted using [Cohen's \(1988\)](#) guidelines.

Ethical Considerations

The present study was conducted using secondary data obtained from the official Tabulated Mark Sheet published by the Directorate of Government Examinations, School Education Department, Government of Tamil Nadu, for the March 2024 X Standard Public Examination. Since the investigation was based exclusively on publicly available academic records, no direct interaction with students, teachers, or other human participants was required. The data were used solely for academic and research purposes only. Individual students, schools, and institutions were not identified in the analysis or reporting of the findings, thereby ensuring confidentiality and privacy of the participants. The collected information was analyzed in an aggregated form, and no personally identifiable information was disclosed at any stage of the investigation. This study adhered to the accepted ethical principles of educational research, including integrity, confidentiality, responsible use of secondary data, and accurate reporting of findings.

Participant Consent

Since the present investigation employed document analysis using official secondary data, the direct participation of students or teachers was not involved. Therefore, individual informed consent was not required for this study. This study utilized publicly available examination records published by the Directorate of Government Examinations, Government of Tamil Nadu, exclusively for academic research purposes, while maintaining confidentiality and ensuring that no individual participant or institution could be identified from the reported results.

Data Availability Statement

The data used in this study were obtained from the Tabulated Mark Sheet of the March 2024 X Standard

Public Examination published by the Directorate of Government Examinations, School Education Department, Government of Tamil Nadu. These official records served as the source of secondary data for this investigation. Access to the complete dataset is subject to the policies and regulations of the Directorate of the Government Examinations.

Classification of Academic Achievement

To analyze differences between students with relatively higher and lower levels of academic achievement, the sampled students were classified into two achievement categories, namely high and low achievers, based on the predetermined classification criterion applied to their total academic achievement scores. The total achievement score was obtained from the marks secured in five compulsory subjects: Tamil, English, Mathematics, Science, and Social Science.

The classification criterion was consistently applied to all 1,853 sampled student records before conducting the comparative analysis. Students satisfying the specified criterion were classified as High Achievers, whereas students falling within the corresponding lower achievement category were classified as Low Achievers. Classification was performed using the total academic achievement score rather than individual subject scores.

The resulting groups consisted of 1,683 High Achievers and 170 Low Achievers. The two groups were subsequently compared using an Independent Samples t-test to determine whether a statistically significant difference existed in their academic achievement scores. Cohen's *d* was additionally calculated to determine the magnitude of the observed difference.

Analysis and Interpretation of Data

Academic Achievement of Secondary School Students of Tiruchirappalli

The minimum, maximum, mean, and Standard Deviation (SD) obtained for the five subjects Tamil, English, Mathematics, Science, and Social Science are presented in Table 1.

Table 1 Mean and SD of the Subjects of X Standard Students of Tiruchirappalli District

Subjects	N	Minimum	Maximum	Mean	Std. Deviation	Mean Percentage
Tamil	1853	29.00	100.00	74.88	17.67	72.52
English	1853	27.00	100.00	63.78	23.77	61.85
Mathematics	1853	24.00	75.00	70.12	20.85	58.21
Science	1853	33.00	75.00	72.49	12.11	71.39
SocialScience	1853	29.00	100.00	77.23	19.09	74.75
Total	1853	142.00	450.00	358.50	77.91	93.49

Table 1 presents the descriptive statistics of academic achievement in Tamil, English, Mathematics, Science, and Social Science among the 1,853 secondary school students in the Tiruchirappalli District. The overall academic achievement score ranged from 142 to 450, with a mean of 358.50 and a standard deviation of 77.91. The mean score indicates that the students demonstrated a comparatively high level of academic achievement in the March 2024 X Standard Public Examination.

Among the five subjects, the highest mean score was observed in Social Science ($M = 77.23$, $SD = 19.09$), followed by Tamil ($M = 74.88$, $SD = 17.67$), Science ($M = 72.49$, $SD = 12.11$), Mathematics ($M = 70.12$, $SD = 20.85$), and English ($M = 63.78$, $SD = 23.77$). The results indicate variation in students' performance across the five subjects, with English recording the lowest subject-wise mean score among the subjects included in the analysis.

Table 2 Test of Significance: Difference in Academic Achievement between the High Achievers and Low Achievers of Tiruchirappalli District

Level of Achievement	N	Mean	SD	t Value	df	p Value	Effect Size (Cohen's d)	Magnitude
High Achievers	1683	375.32	64.22	56.61	333*	< .001	2.63	Very Large
Low Achievers	170	211.65	31.69					

Table 2 presents the significance of the difference in academic achievement between high and low achievers among the secondary school students in the Tiruchirappalli District. The High Achiever group consisted of 1,683 students and obtained a mean academic achievement score of 375.32 ($SD = 64.22$), whereas the Low Achiever group consisted of 170 students and obtained a mean score of 211.65 ($SD = 31.69$).

The difference between the two groups was statistically significant ($t(333) = 56.61$, $p < .001$). Therefore, the null hypothesis stating that there is no significant difference in academic achievement between high and low achievers is rejected. The reported Cohen's d of 2.63 indicates a very large effect, demonstrating that the difference between the two achievement groups is not only statistically significant but also substantial in practical terms.

Table 3 Testing the Significance of Difference in Academic Achievement among the Students of Tiruchirappalli District with Respect to the Variable Types of Management of the School

Source of Variation	Sum of Squares	df	Mean Square	F Value	p Value	Effect Size (η^2)	Magnitude
Between Groups	890663.710	2	445331.855	187.008	< .001	0.087	Medium
Within Groups	9351819.015	1850	5055.037				
Total	10242482.725	1852					

Table 3 presents the significance of the difference in academic achievement among secondary school students with respect to the type of school management. The obtained F value of 187.008 was statistically significant at the 0.01 level, $F(2, 1850)$

$= 187.008$, $p < .001$. Therefore, the null hypothesis stating that there is no significant difference in academic achievement according to the type of school management is rejected.

The obtained eta squared value ($\eta^2 = .087$) indicates a medium-sized effect. This suggests that approximately 8.7% of the variance in students' academic achievement is associated with differences among school management categories. Since

the overall ANOVA was significant, pairwise comparisons were conducted to identify the specific management categories between which significant differences occurred. Further analysis was performed, and the results are presented in Table 4.

Table 4 Test of Significance: - Difference in Academic Achievement between the Students of Tiruchirappalli District who Studied in Government Schools, Government Aided Schools and Unaided Schools

Type of Management	N	Mean	SD	't' values	df	p-value	Effect Size (Cohen's d)	Magnitude	Result
Government	754	328.77	74.03	11.329	1631	< .001	0.32	Small	Significant
Government Aided Private	879	369.99	72.65						
Government	754	328.77	74.03	22.840	504*	< .001	0.94	Large	Significant
Unaided Private	220	429.67	51.91						
Government Aided Private	879	369.99	72.65	13.970	459*	< .001	0.68	Medium	Significant
Unaided Private	220	429.67	51.91						

*Equal variance not assumed

Table 4 shows that the calculated t values 11.329, 22.84, and 13.970 are greater than the table values 2.576, 2.585, and 2.587 for df = 1631, 504, and 459, respectively, at the 0.01 level of significance. Hence, the null hypotheses that there is no significant difference in Academic Achievement between

students of Tiruchirappalli District who studied in government schools and government-aided private schools, government schools and unaided private schools, and government-aided private schools and unaided private schools are rejected at the 0.01 level of significance.

Table 5 Testing the Significance of Difference in Academic Achievement among the Students of Tiruchirappalli District with Respect to the Variable Types of School

Source of Variation	Sum of Squares	df	Mean Square	F Value	p Value	Effect Size (η^2)	Magnitude
Between Groups	390769.598	2	195384.799	37.071	< .001	0.039	Small
Within Groups	9751713.127	1850	5271.196				
Total	10142482.725	1852					

The results presented in Table 5 indicate that the obtained F value of 37.071 was statistically significant, $F(2, 1850) = 37.071$, $p < .001$. Therefore, the null hypothesis stating that there is no significant difference in academic achievement according to the type of school is rejected. The obtained eta squared value ($\eta^2 = .039$) indicates a small effect size. This suggests that approximately 3.9% of the variance in students' academic achievement is associated with differences among school types. Although the difference was statistically significant, the relatively small effect size indicated that the practical

magnitude of the difference associated with school type was modest.

Results and Discussion

This study examined the academic achievements of secondary school students in the Tiruchirappalli District using official public examination records. The findings indicate that the overall academic achievement of the 1,853 students included in the study was comparatively high, with a mean score of 358.50 and a standard deviation of 77.91. The subject-wise results also indicate variations in

achievement across Tamil, English, Mathematics, Science, and Social Science.

A comparison between the high- and low-achiever groups indicated a statistically significant difference in academic achievement. The high-achiever group obtained a substantially higher mean score than the low-achiever group. The reported Cohen's d indicates a very large effect, suggesting that the difference between the two groups is not only statistically significant but also practically significant. However, the degrees of freedom and group classification procedure should be interpreted only after verification against the original statistical output.

A statistically significant difference was also observed in academic achievement according to school management type. The ANOVA result, $F(2, 1850) = 187.008$, $p < .001$, indicates that academic achievement differed significantly among students studying under different management types. The obtained eta squared value ($\eta^2 = .087$) represents a medium effect, indicating that approximately 8.7% of the variance in academic achievement is associated with differences among the school management categories.

The pairwise comparisons further indicated significant differences between government and government-aided schools, Government and Unaided Private schools, and government-aided and unaided private schools. Students from Unaided Private schools obtained the highest mean academic achievement score, followed by students from Government Aided schools and Government schools. The magnitude of the pairwise effect sizes varied across comparisons, indicating differences in the practical magnitude of achievement disparities among the management categories.

A statistically significant difference was also found in academic achievement according to school type. The obtained ANOVA value, $F(2, 1850) = 37.071$, $p < .001$, indicates significant variation among the school type categories. The eta squared value ($\eta^2 = .039$) represents a small effect, suggesting that approximately 3.9% of the variance in academic achievement is associated with differences in the school type. Thus, although the statistical difference is significant, the magnitude of the institutional effect

is relatively modest compared to the effect observed for the type of school management.

Overall, the findings indicate that institutional characteristics, particularly school management and type of school, are associated with variations in students' academic achievement. The results support the importance of examining institutional contexts when interpreting differences in educational outcomes in the future. Simultaneously, the findings should not be interpreted as establishing causal relationships because the study employed a cross-sectional document analysis design based on secondary examination data.

The present findings are broadly consistent with previous research, indicating that academic achievement may vary across institutional and educational contexts. However, the present investigation contributes a distinct perspective by examining actual public examination performance through official educational records rather than relying exclusively on self-reported information. The use of authentic examination records provides an objective basis for comparing achievements across institutional categories.

Educational Implications

The findings of the present study have important implications for improving the quality of secondary education and enhancing students' academic achievement. The observed differences in academic achievement across different types of school management indicate that institutional characteristics play a significant role in students' learning outcomes. Therefore, school authorities should continuously evaluate the availability and effective utilization of academic resources, instructional facilities, and learning support services to improve student performance.

The comparatively higher academic achievement observed among students in certain school management categories indicates the need for educational administrators to examine the institutional conditions associated with differences in academic performance. School authorities should strengthen academic monitoring, instructional support, learning resources, and student support services, particularly in schools where achievement

levels are comparatively lower. Such measures may provide opportunities to improve students' learning experiences and academic outcomes.

Teachers should employ learner-centered instructional strategies, activity-based learning, collaborative learning, and continuous assessment practices to enhance students' understanding and academic performance. Special academic support programs may be organized for students experiencing learning difficulties, particularly in subjects where achievement levels are comparatively lower.

The findings also emphasize the importance of evidence-based planning in education. Educational authorities may utilize official examination data to identify performance trends, evaluate institutional effectiveness, and formulate targeted intervention programs to improve academic achievement across different categories of schools. Regular analysis of public examination records can support informed decision-making and continuous improvement in secondary education systems.

Recommendations

Recommendations for Teachers

Teachers should regularly monitor students' academic progress through formative assessments and provide timely academic support to students who require additional assistance. Classroom instruction should encourage active participation, critical thinking, and problem-solving activities to strengthen students' conceptual understanding and academic achievement.

Recommendations for School Administrators

School administrators should ensure the availability of adequate instructional resources, digital learning facilities, laboratories, libraries, and supportive learning environments. Regular academic review meetings and teacher professional development programs should be organized to improve instructional quality and student achievement.

Recommendations for Educational Authorities

Educational authorities should periodically analyze public examination results to identify schools requiring academic intervention and

provide appropriate financial, infrastructural, and professional support. Policies promoting the equitable distribution of educational resources across government, government-aided, and unaided schools may contribute to reducing disparities in academic achievement.

Recommendations for Parents

Parents should actively monitor their children's learning progress, maintain regular communication with teachers, and provide a supportive home environment that encourages regular study habits and positive attitudes toward learning.

Recommendations for Researchers

Future researchers may extend similar document analysis studies to other districts and educational levels to facilitate comparative analyses of academic achievement across different contexts.

Limitations of the Study

The present study has certain limitations that should be considered when interpreting the findings. The study was confined to secondary school students who appeared for the March 2024 X Standard Public Examination in Tiruchirappalli District, thereby limiting the generalizability of the findings to other districts or states.

This investigation relied exclusively on secondary data obtained from official examination records. Consequently, several learner-related variables, such as learning motivation, study habits, socioeconomic background, parental involvement, emotional factors, and teaching practices, could not be examined.

This study primarily focused on selected institutional variables, including the type of management and school. Other institutional characteristics, such as school infrastructure, teacher qualifications, classroom environment, availability of digital learning facilities, and school leadership, were beyond the scope of this investigation.

Furthermore, the study employed a cross-sectional document analysis design, which describes existing patterns of academic achievement but does not establish causal relationships among the examined variables.

Future Research Directions

Future studies may extend the present investigation by including secondary school students from multiple districts and states to enhance the generalizability of the findings. Comparative studies involving government, government-aided, and unaided schools across different geographical regions would provide broader evidence regarding institutional differences in academic achievement.

Researchers may integrate document analysis with surveys or mixed-method research designs to examine the combined influence of institutional, psychological, familial, and socioeconomic factors on students' academic achievement. Such investigations would provide a more comprehensive understanding of the determinants of educational performance.

Future investigations should also explore the relationship between academic achievement and variables such as study habits, learning motivation, emotional intelligence, self-efficacy, parental involvement, school climate, digital learning readiness, teacher effectiveness, and educational technology integration.

Longitudinal studies following students across different grade levels may provide valuable insights into changes in academic achievement over time and the long-term influence of institutional characteristics on educational outcomes. In addition, advanced statistical techniques such as multilevel modelling, structural equation modelling, and learning analytics may be employed to examine the complex relationships among students, schools, and contextual factors influencing academic achievement.

Conclusion

The present study examined the academic achievement of secondary school students in Tiruchirappalli District using official public examination records from the March 2024 X Standard Public Examination. Based on the analyzed records, the students demonstrated a comparatively high level of academic achievement, with an overall mean score of 358.50 and a standard deviation of 77.91. The findings also showed significant differences in academic achievement according to the type of school management and school.

The analysis of school management indicated a statistically significant difference in academic achievement among Government, Government Aided, and Unaided Private schools. The effect size further indicated that the differences associated with school management had meaningful practical significance. Pairwise comparisons showed significant differences among the three management categories, with the magnitude of the differences varying across comparisons.

A statistically significant difference was also observed according to the type of school. However, the corresponding effect size was relatively small, indicating that although school type was statistically associated with academic achievement, its practical contribution was more modest than that of school management.

The findings provide objective evidence based on official examination records and contribute to understanding institutional variations in secondary school students' academic achievement. The results may be useful for teachers, school administrators, and educational authorities in identifying areas where academic support, instructional improvement, educational resources, and institutional interventions can be strengthened.

Simultaneously, the findings should be interpreted within the scope of the study. The document analysis design and use of examination records do not permit causal conclusions regarding the reasons for differences in academic achievement. Other learner-related, family, instructional, socioeconomic, and school-level factors were not examined in the present investigation. Future studies should combine official examination records with primary data and extend the investigation to multiple districts, additional variables, and longitudinal or mixed-method research designs.

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