

Assessing the Effectiveness of Sarva Shiksha Abhiyan (SSA) through Learner Perceptions of Teaching Quality: Evidence from School Children in Kerala

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ABSTRACT

Education is the fundamental right of every child which help them to become an integral part of the society, that develop civic consciousness and humanitarian feelings in the minds of children which in turn leads to the formation of a developed society. The human capital theory states that expenses incurred on education are not mere expenditure but are economic investments. Theodore W. Schultz (1961) and Gary S. Becker (1964) immensely contributed to the need for investment in human capital to be incorporated in the developmental agenda of countries. Such a long run visionary human capital development was Sarva Shiksha Abhiyan (SSA) launched in 2001 in India that upheld the universalisation of elementary education, whereby the education became a basic right for all children in the country. The scheme was an umbrella programme launched in the country that focused on quality education, better infrastructure as well as inclusive education. There are both demand side perspectives from the student point of view as well as supply side concerns from the teachers' perception. Ascertaining the fundamental goal of transmission of quality knowledge to the student community, the student feedback about the implementation of the scheme and the quality of teaching learning process that they experience should be taken into consideration. Such feedbacks are the effective mechanisms for the governments to restructure and recreate the educational programmes in accordance with the demands of the students. The present study encompasses the assessment of students about the teaching quality they experience in the schools with respect to several quality attributes. Based on the primary data collected as part of evaluating the SSA in Kerala, the paper aims to address the various quality concerns of students about education and the various factors that govern the smooth transmission of educational process from teaching community to students.

Keywords: Sarva Shiksha Abhiyan, Quality Education, Human Capital, Student Feedback, Inclusive Education.

Introduction

There is a fundamental difference between economic growth and economic development that lies in its basic methodology. While the former focuses on quantitative achievements, the latter give prominence to qualitative aspects. When the concepts like Gross National Product, Gross Domestic Product, Per Capita Income etc. find place in the calculation of economic growth, the concepts like

Human Development Indices, inequality indices etc. constitute the developmental aspects of an economy. Human capital is widely regarded as the most significant factor in constituting a modern economy (Becker, 2002). Investment in human capital is regarded as a long-term investment with lagged returns but when the returns start accumulating, that would create an enlightened development process that will ultimately result in economic growth with a multiplier effect. Education is one among the major factors that constitute human capital. Obviously, investment in education should accrue prominent place in the investment pattern of any country. In India there had been profound significance given to education right from the pre-independence era. The British policy was to educate a section of people in India and thereby create a loyal class of educated Indians. Ever since the British left the country the governments tried to formulate strategies and plans that involved widescale investment in education. A large number of plans were implemented among which "Sarva Shiksha Abhiyan" was a flagship programme. The present study focuses on the perception of students with regard to the quality of teaching by carefully analysing major attributes that reflect various aspects of teaching methods adopted by teachers in the classrooms.

Review of Literature

There is a large literature in economics that is related with human capital formation and economic development. The Human Capital Theory remains the fundamental principle of education economics, as the works of Schultz (1961) and Becker (1964) focused on the investment in human capital as direct factors influencing the economic productivity and economic growth. Improvement in the quality of labour force shall be directly turned to improved productivity was the theory supported by Denison (1962). A positive relation between education, human capital accumulation and future earnings was established by Mincer (1974). Amartya Sen's capability approach (1999) widely discuss the positive possibilities that will occur if the focus shifts from material aspects to basic human needs and wants. Lucas (1988) widely studied the relation between human capital investment and economic growth which was complemented by Romer (1990) who extensively studied the interconnection between the elementary education and possible economic growth in future.

Research Objectives

The present study is based on specific objectives such as:

- To assess the perception of students about the quality of their teachers.
- To identify and examine the dominant quality of teachers as perceived by the students.
- To examine district wise differences regarding the perception of students about the quality of their teachers

Methodology

The study is exploratory and descriptive in nature. The primary data has been collected from the responses made by 250 students who were selected through multi stage random sampling methods. Three districts representing three geographical zones of the state of Kerala were selected that had the largest number of schools from the respective zones based on proportion to total population. The assessment of the student responses regarding the quality of teachers has been done with the help of statistical tools like Shapiro-Wilk test, correlation analysis, Principal Component Analysis, Two-way Anova, chi-square analysis which were helpful in the Exploratory Data Analysis.

Assessment of Perception about the Quality of Teachers

The researcher has formulated twenty-nine attributes to assess the respondents' assessment about quality of teachers. The researcher has tabulated responses from 250 respondents and has created a descriptive model to understand the nature of distribution. A bar plot illustrating the responses to the attributes over its ordinal scale value is shown in the figure 1.

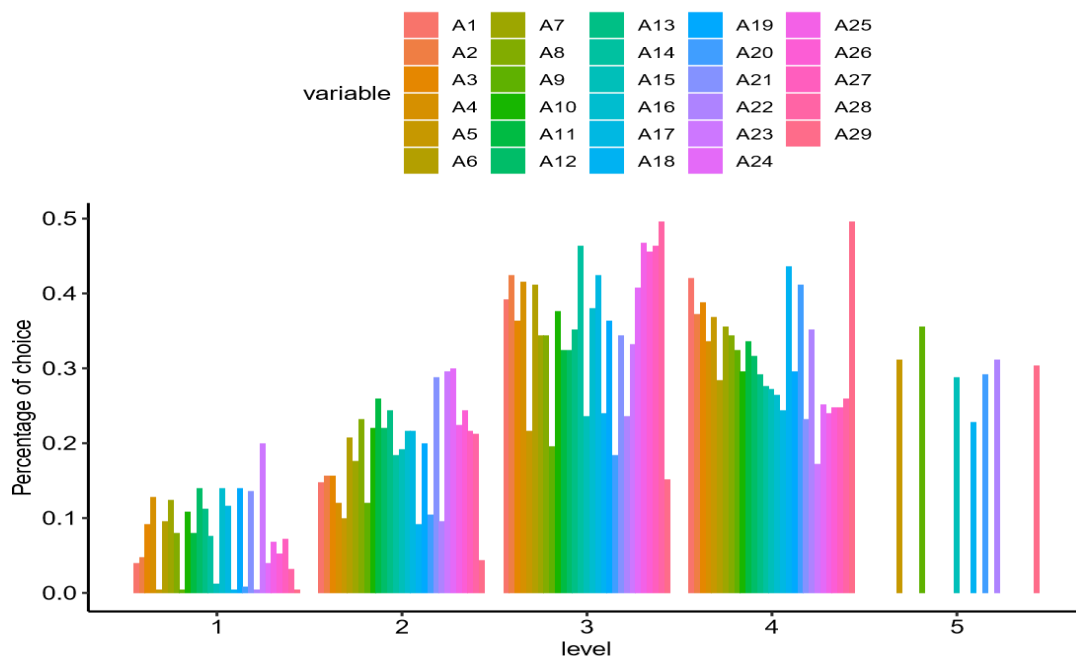


Figure 1: Distribution of Students' Perception Regarding Quality of Teachers

From the distribution plot, it is evident that distribution of attributes doesn't follow normality. Shapiro-Wilk test is used to assess the normality of all sub variables in general perception. The hypothesis are:

H₀: The variable satisfies normality

H₁: The variable does not satisfy normality

If p- value is greater than 0.05, then the null hypothesis for normality will be accepted at 5 percent significance level. Table 1 shows the results of Shapiro-Wilk test on attributes.

Table 1: Result of Shapiro-Wilk test of attributes in student's perception about teachers' quality

Code	Attributes	W value	p value
Q.5.1	Create self confidence	0.81	0.00
Q.5.2	Passionate in teaching	0.82	0.00
Q.5.3	Good academic qualifications	0.82	0.00
Q.5.4	Create interest towards learning in the minds of students	0.82	0.00
Q.5.5	The teaching methodology is very interesting to students	0.86	0.00
Q.5.6	Good communication skills	0.86	0.00
Q.5.7	Teach the contents with increased clarity	0.84	0.00
Q.5.8	Actively involve students in classroom activities	0.85	0.00
Q.5.9	Utilize teaching learning materials effectively	0.85	0.00
Q.5.10	Effectively control the classroom atmosphere	0.86	0.00
Q.5.11	Make sure that students understand the course materials properly	0.85	0.00
Q.5.12	Solving the doubts in a satisfactory manner	0.85	0.00
Q.5.13	Continuously evaluate the performance of students	0.86	0.00
Q.5.14	Conduct exams on a regular basis	0.84	0.00
Q.5.15	Able to complete the portions on time	0.87	0.00
Q.5.16	Create a positive environment in the classroom	0.86	0.00
Q.5.17	Affectionate to the problems faced by the students	0.86	0.00
Q.5.18	Treat equally the students without any element of partiality	0.87	0.00
Q.5.19	Arrange the subject portions according to syllabus	0.85	0.00

Q.5.20	Relate real life situations in teaching	0.86	0.00
Q.5.21	Efficiently arrange time to revise the portions on time	0.88	0.00
Q.5.22	Take extra effort to address the issues faced by slow learners	0.86	0.00
Q.5.23	Effectively utilize modern educational technologies and ICT	0.88	0.00
Q.5.24	Positive effect on the attitude of teachers through training	0.86	0.00
Q.5.25	Training enable the teachers to familiarise with modern educational technologies	0.85	0.00
Q.5.26	Training make teachers more approachable by the students	0.86	0.00
Q.5.27	Transact the positive elements of training programmes to students	0.85	0.00
Q.5.28	The trained teachers have a more student friendly attitude	0.84	0.00
Q.5.29	Provide opportunity to conduct co-curricular activities	0.83	0.00

Source: Survey data

Since the normality test fails in all sub variables, the researcher has decided to conduct only non-parametric test for statistical inference analysis. A correlation analysis is conducted to identify inter-relational effect of attributes in school credential perception. Result of correlation analysis is given in the Figure 2.

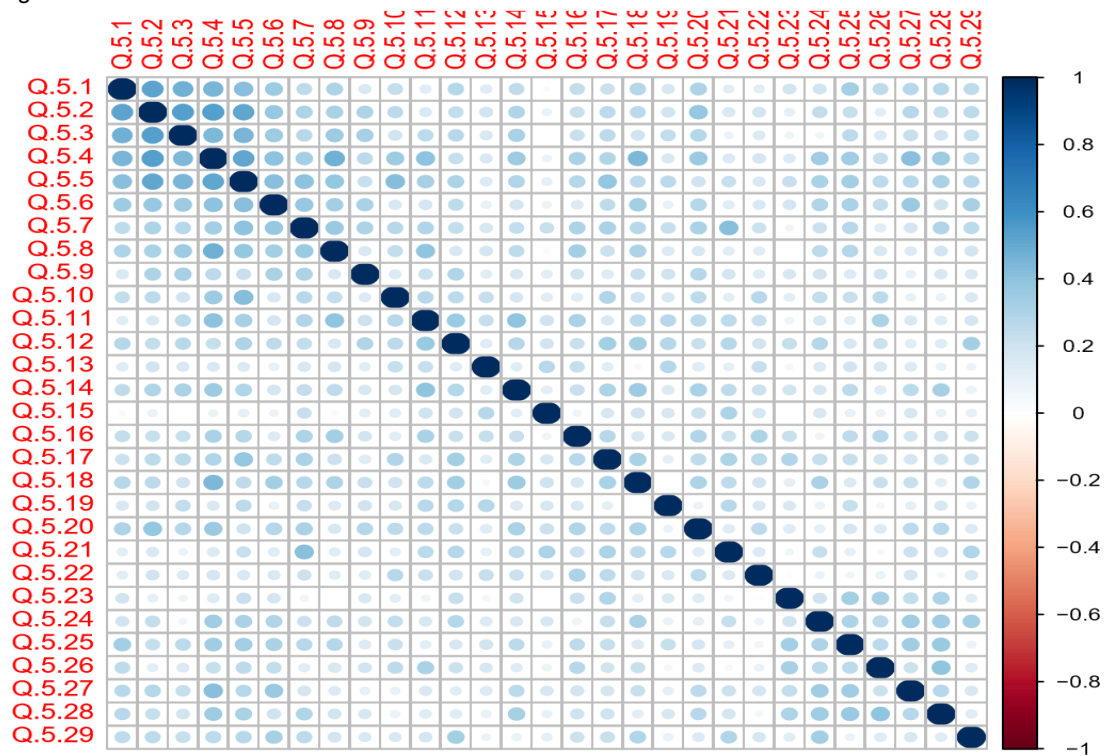


Figure 2: Correlation Coefficients of Attributes of Perception about Teachers' Quality

From the correlation plot it is clear that there is no significant positive or negative correlation between the attributes. An ensemble decision tree classification algorithm from R software is adopted to identify dominant sub variables that decide general perception level. For this purpose, the researcher has used recursive feature selection method from random forest library.

In the first stage the attributes of perception about teachers' quality are normalized, all the missing values and outliers are eliminated. A new categorical variable 'teachers' quality level' is created. This variable has three categories- low, medium and high- based on the aggregated measure of perception of respondents. A percentage analysis of credentials perception level based on the 'quality_cat' is shown in Table 2.

Table 2: Percentage of Teacher Quality Perception Levels

Category	Percentage
Low	0.256
Medium	0.508
High	0.236

Source: Survey data

The χ^2 analysis on this distribution revealed that this classification is highly significant with χ^2 value 34.472 with p-value 0.00. After the data cleaning and analysis, it is found that all the anomalies are eliminated and invalid information status is "FALSE". This will ensure consistency in model performance.

Identifying Dominating Features

The classical Machine learning algorithm 'random forest' is used to analyse predictor classifier relationships. From the distribution analysis, it is clear that the perception about teachers' quality levels are Gaussians. Using 20 cross-validation in 10 fold boot strapping, the ensemble tree fathomed with an accuracy 0.84 and specificity (ability to predict true class as true) 0.81. Only twenty-one attributes have significant contribution is deciding teachers' quality levels. The classification error is 1.9 %, 2.01% and 1.3% in Low, Medium and High level of general perceptions respectively. These rates are within 5% and are so acceptable for feature ranking. Contribution of significant attributes to the accuracy in classification to correct general information level and relative rank is shown in Table 3.

Table 3: Ranking of Attributes in Respondent's Perception about Teachers' Quality

Code	Attributes	Cumulative Accuracy	Rank
Q.5.4	Create interest towards learning in the minds of students	0.66	1
Q.5.2	Passionate in teaching	0.67	2
Q.5.10	Effectively control the classroom atmosphere	0.69	3
Q.5.17	Affectionate to the problems faced by the students	0.69	3
Q.5.5	The teaching methodology is very interesting to students	0.70	4
Q.5.1	Create self confidence	0.72	5
Q.5.11	Make sure students understand the course materials properly	0.75	6
Q.5.9	Utilize teaching learning materials effectively	0.77	7
Q.5.7	Teach the content with increased clarity	0.78	8
Q.5.3	Good academic qualifications	0.80	9
Q.5.15	Able to complete the portions on time	0.80	9
Q.5.6	Good communication skills	0.82	10
Q.5.12	Solving the doubts in a satisfactory manner	0.82	10
Q.5.8	Actively involve students in classroom activities	0.82	10
Q.5.16	Create a positive environment in the classroom	0.82	10
Q.5.23	Effectively utilize modern educational technologies and ICT	0.82	10
Q.5.22	Take extra effort to address the issues faced by slow learners	0.83	11
Q.5.18	Treat equally the students without any element of partiality	0.83	11
Q.5.20	Relate real life situations in teaching	0.84	12
Q.5.13	Continuously evaluate the performance of students	0.84	12
Q.5.14	Conduct exams on a regular basis	0.84	12

Source: Survey data

From the attribute ranking teachers create interest towards learning in the minds of students is in top rank and the teachers conduct exams on a regular basis is in the last rank.

District wise Comparison of Respondent's Perception of Teacher Quality

The students' quality perception score of teacher quality over educational sectors with respect to district is illustrated in Figure 3. From the box plot it is evident that the district-wise difference in mean index varies over educational sectors. In Malappuram district, the perception level of students about teachers' quality in aided sector shows comparatively higher variation than schools in other districts.

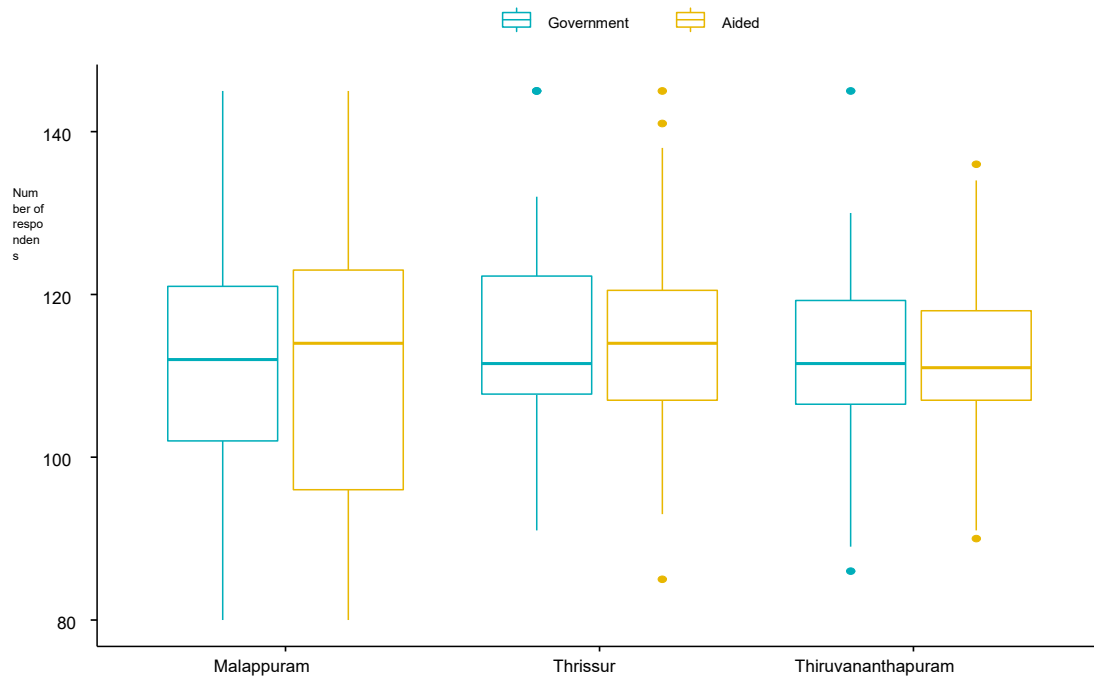


Figure 3: Box Plot showing District-wise Difference in Perception Scores of Teachers' Quality

An exploratory data analysis of perception about teachers' quality levels is given in Figure 4. It is found that in Thiruvananthapuram district number of students with high perception level is comparatively low with respect to other districts.

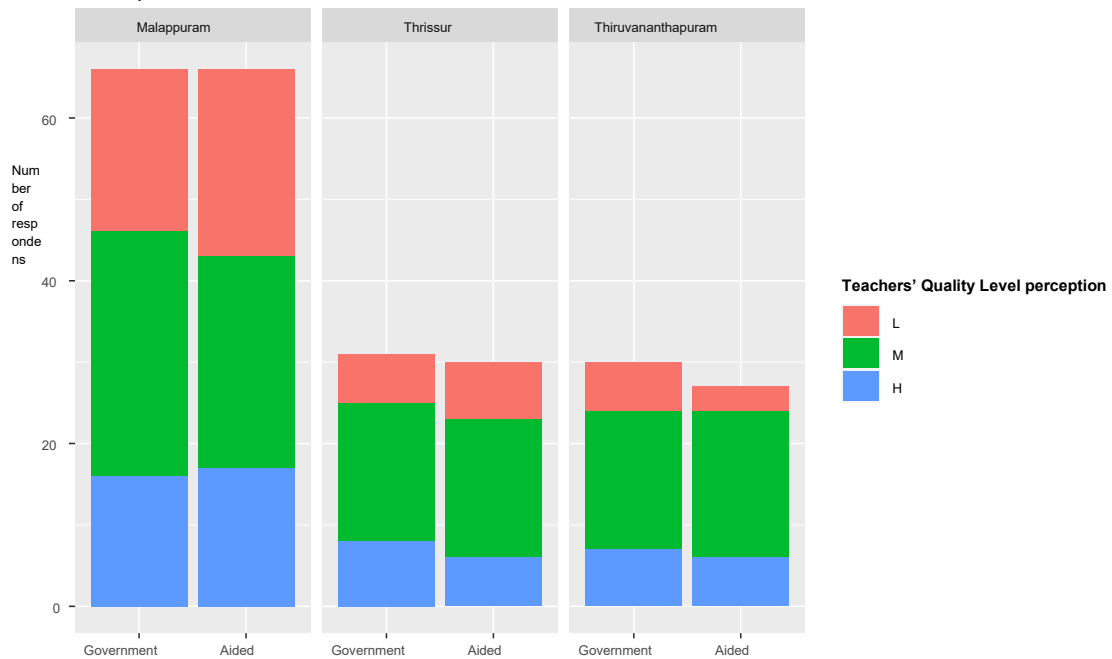


Figure 4: District-wise Distribution of Teachers' Quality Perception Levels

From the EDA, it is evident that there is no significant dependence on educational sectors with respect to district. A more statistical generalization will be done in the following section. The mean and standard deviation of quality perception index over education sectors with respect to district is given in Table 4. The following hypotheses are formulated and tested.

- H₀:** There is no significant difference in the respondent's teacher quality perception level over educational sectors with respect to district.
- H₁:** There is significant difference in the respondent's teacher quality perception level over educational sectors with respect to district.

Table 4: Distribution of mean teacher quality perception index over educational sectors with respect to district

District	Sector	Count	Mean Index	Standard Deviation
Malappuram	Government	66	111.924	13.921
	Aided	66	110.603	16.469
Thrissur	Government	31	113.972	13.271
	Aided	30	115.361	13.344
Thiruvananthapuram	Government	30	112.027	12.632
	Aided	27	112.361	10.698

Source: Survey data

Two-way analysis of variance of mean test with heterogeneity correction is used to assess the significance of difference in score. Result of this test is given in Table 5.

Table 5: Two-way analysis of variance in mean quality perception index

	Df	Sum of Squares	Mean Square	F value	p value
Educational Sector	1	0	0.26	0.001	0.971
District	2	507	253.29	1.339	0.264
Sector: District	2	83	41.35	0.219	0.804
Residuals	244	46171	189.23		

Source: Survey data

Shapiro-Wilk test is used to test normality of model residuals. The w-value is 0.989 with p-value 0.064(> 0.05). So it is reasonable to conclude that the normality of model residual is accepted at 5 percent of significance level. Hence this model can be used for further analysis and statistical inferences.

From Table 5, p-value corresponding to both district and educational sectors are not less than 0.05. There for the district wise difference in mean teachers' quality perception index is not significant at 5 percent level. Also, the interaction between district and educational sector is not significant at 5 percent significance level. So, it is reasonable to conclude that district wise difference has no significant impact on the difference in mean teachers' quality perception index with respect to educational sectors at 5 percent significance level.

Since the analysis of variance of mean test is significant, the researcher has performed a multiple pairwise comparison with Tukey Honest Significant Differences. Result of this test is given in Table 6. Since p-values of all pairs are greater than 0.05, it is reasonable to conclude that even pairwise comparison over district is not significant at 5 percent significance level.

Table 6: Pair-wise comparison of significance of difference in mean teacher quality perception index over districts

	Difference	Lower	Upper	p value
Thrissur-Malappuram	3.402	-1.551	8.356	0.239
Thiruvananthapuram-Malappuram	0.930	-4.023	5.884	0.897
Thiruvananthapuram-Thrissur	2.472	-7.878	2.934	0.528

Source: Survey data

It is reasonable to conclude that there is no significance difference in mean teachers' quality perception index over district. A pair-wise analysis confirms this observation.

Policy Recommendations

- **Continuous Professional Development of Teachers**

Teachers need to be provided with regular, need-based training programs to update their subject knowledge, pedagogical skills and classroom practices. It is important that professional development focuses on modern teaching methods, competency-based education, inclusive education and emerging educational technologies.

- **Integration of Digital Technologies and AI**

Schools should encourage the effective application of digital learning platforms, smart classrooms, educational applications and AI tools. Teachers should be trained not to use technology just as a tool, but to integrate it appropriately with classroom teaching while maintaining teacher–student interaction.

- **Promotion of Student-centred and Experiential Learning**

Teaching practices should progressively shift away from mainly lecture- and rote-learning methods to a more student-centred approach. Project work, group discussions, problem-solving, field-studies, peer learning and activity-based learning can boost student engagement, stimulate critical thought and promote experiential learning.

- **Strengthening of Teacher Performance Assessment and Feedback**

A comprehensive system of teacher evaluation should be developed using a range of indicators including classroom observation, student learning outcomes, student feedback, peer-review and professional development. The aim should be improvement rather than punishment; therefore constructive feedback and mentoring should be offered to teachers.

- **Reduction of Non-Academic Workload of Teachers**

Excessive administrative duties, data-entry requirements and other non-teaching responsibilities can take away valuable time from teachers and reduce the amount of time they can spend on lesson preparation or supporting students. It is important to limit unnecessary paperwork and provide adequate administrative support for teachers to enable them to focus on their core academic roles.

- **Development of Inclusive and Adaptive Teaching Practices**

The modern classroom is increasingly diverse in terms of students' learning abilities, socioeconomic background, languages and educational needs. Therefore teachers need to be trained in differentiated teaching strategies, remedial support mechanisms and inclusive teaching practices to ensure that each student is given adequate attention.

- **Strengthening the School–Community and Stakeholder Participatory Platform**

Teaching quality can be improved by facilitating greater co-ordination between teachers, parents, students, school management and the community. Regular parent–teacher interactions, student feedback, community learning and partnerships with higher educational institutions and external experts can enable schools to better address the changing educational and social needs of the community.

Conclusion

Aligned with the goals of Right to Education and Universal Elementary Education, India had implemented Sarva Shiksha Abhiyan which was the brainchild of the former Prime Minister Sri. Atal Bihari Vajpayee in 2001 that focused on infrastructure, retention rates, inclusivity and quality. When the achievements and rates of retention etc. can be measured directly, the aspect of quality of teaching learning process require more qualitative analysis due to its subjective aspects. The scheme was helpful in making effective inroads into the educational fabric of our nation. The present study provides an insight to the quality concerns faced by students through their preferences towards various dimensions of teaching. By assessing such preferences, the teachers can derive conclusions regarding the real effectiveness of their knowledge transmission mechanism, the content of their teaching materials, the manner in which the teaching learning process undergo, and finally the overall atmosphere of educational institutions. Sarva Shiksha Abhiyan thus continues as the most effective flagship programme in the educational sector through its new format, Samagra Shiksha Abhiyan.

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