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Does School Resources Impact School Adjustment and Academic Achievement? A Study of Higher Secondary School Students in India

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ABSTRACT: School resources are generally expected to contribute to students' learning and their adjustment to the school environment. The evidence from developing countries remains limited and inconclusive, particularly at the higher secondary stage in India. The present study examined whether school resources predict school adjustment and academic achievement among Grade 11 students and compared students studying in CBSE- and UP Board-affiliated schools through survey method. Simple linear regression and independent-samples *t*-tests were used for analysis. Findings indicated that school resources did not significantly predict academic achievement in either the UP Board (p = .951) and CBSE (p = .606), and similarly did not significantly predict institutional adjustment (p = .073 and .220, respectively). The regression models explained less than 2.2% of the variance in academic achievement. No significant differences were found between CBSE and UP Board students in school resources, $t(298) = 0.80$, p = .425, or academic achievement, $t(298) = 0.40$, p = .687. However, a significant difference was observed in school adjustment, $t(298) = 2.64$, p = .009, d = .30. The findings suggest that resource availability alone may not determine student outcomes; effective utilisation, teaching practices, and school climate and other psychosocial factors may be more influential.

1. INTRODUCTION

The question of whether the inputs a school gives, lead to gains in student outcomes is one of the most debated in the economics and psychology of education. In India the policy has been based on the assumption that they do: the Right of Children to Free and Compulsory Education Act (Government of India, 2009) lays out standards for the provision of school buildings, classrooms, libraries, and playgrounds while the 2020 National Education Policy (Ministry of Education, 2020) again stresses the importance of provided infrastructure such as labs and even the use of technology at the secondary level. Given the amount of public and private expenditure that is used on these inputs, it is imperative to determine whether students benefit from them. The higher secondary stage (Grades 11 and 12) also deserves special mentions. This is a period of transition when most adolescents join 'more specialized, exam-based courses, often in a different school and establish academic and career paths, which are more difficult to change' (Eccles et al. 1993: 75). A student's adjustment to the school environmentthe curriculum requirements, the rules of conduct, peers, and teachersall because of this become school-level educational outcomes and long-term process outcomes, as it can determine a student's future continuity of achievement (Eccles et al., 1993). In India, the higher secondary schools are governed in the main by just two systems of widely different scale and structure: Central Board of Secondary Education (CBSE) and State boards like the Uttar Pradesh Board of

Secondary Education. Though such systems differ in governance, curriculum orientation and resourcing patterns, empirical data comparing their students on resource-related outcomes are limited.

Theoretical structure

The approach rests on three interrelated themes. First, the educational production function perspective sees resources as inputs to the process of learning that, plus other student and family attributes, produce achievement outcomes like test scores (Hanushek, 1986, 2003). This approach suggests that resources should be positively related to achievement, but operationalizations of the resourceachievement association have yielded mixed findings in previous research. Second, Bronfenbrenner' ecological systems approach describes the student as nested within other settings, of which the school may be a proximal microsystem; physically and instructionaly salient characteristics of this microsystem should influence development relatively quickly and through everyday interactions, not automatically (Bronfenbrenner, 1979). Third, stageenvironment fit models (Eccles & Midgley, 1989; Eccles et al., 1993) maintain that adolescents achieve and remain motivated to some degree when schools provide an environment consistent with their developmental needs. Equally relevant work (Ryan & Deci, 2000) examining the importance of social supports for competence, autonomy, and relatedness indicates that school resources should be linked to engagement and achievement, but only when resources are constructively accessible and used.

Conceptual Framework of the Study

The conceptual framework is shown in Figure 1. School resources-operationalized as physical infrastructure, classroom facilities, library resources, laboratory facilities, information and communication technology (ICT), sports facilities, and teaching-learning materials-are treated as the independent variable. Institutional adjustment (academic activities, school discipline, interpersonal relationships, and institutional functioning) and academic achievement (Grade 10 board examination percentage) are the dependent variables. The relationships are examined separately within each board, and the two boards are then compared on all three variables.

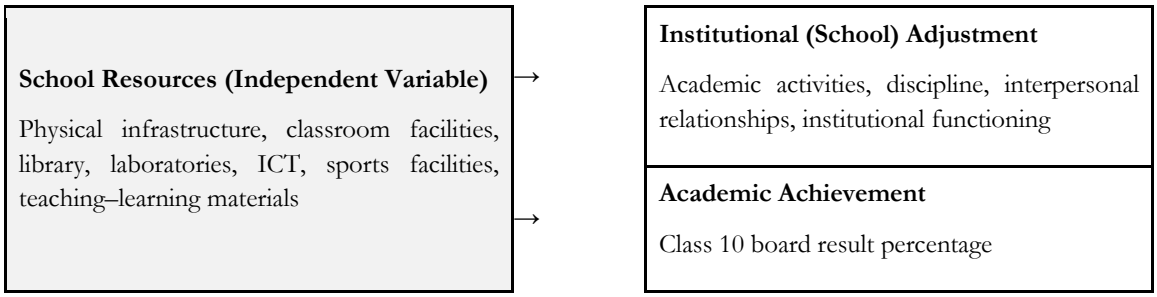


Figure 1: Conceptual Framework of the Study

Note. Relationships were tested separately for students of the Central Board of Secondary Education (CBSE; n = 150) and the Uttar Pradesh Board (UP Board; n = 150), and the two boards were compared on all three variables.

Review of Related Literature

Besides these early findings on the relation between inputs and achievement, the first large cross-sectional study indicated that input measures such as class size explained small proportions of variance in achievement after controlling for family background (Coleman et al., 1966). Later reviews also failed to establish a general connection between inputs and achievement (Hanushek, 1986, 2003). Using meta-analysis to understand the same literature, Greenwald et al. (1996) showed that resources measures are linked to achievement, but the size of the relationship was not negligible and was to be expected. Socioeconomic status also remains one of the most powerful correlates of achievement and that means may be an alternative cause of a school-level effect (Sirin, 2005). Similar pieces of research on Indian secondary students also indicated that digital resources have both advantages and disadvantages for studying behaviour: internet access, for example, affords access to a wider range of resources, but long hours is positively related to distraction and lower performance (Rajput & Chaudhary, 2025).

Research on the physical environment is consistent with this finding. Meta-analyses of research on the school building have consistently shown relationships between school facilities and achievement (Earthman, 2004), and features of the built environment, like lighting, physical spaces, and organization, have been related to performance (Tanner, 2000). In a recent study, Uline and Tschannen-Moran (2008) found that the quality of the school's physical environment affected achievement indirectly by influencing school climate, suggesting that the physical environment may improve student performance by shaping the quality of their experience in school. Research on school climate also characterizes the physical environment as one aspect of the physical components of the school, which is one of the ways in which the institution overall can be experienced by students (Wang & Degol, 2016), and features of the school context have been tied to adolescent mental health (Anderman, 2002).

Evidence from developing countries is more ambiguous. A meta-analysis of studies published from 1990 to 2010 concluded that the impact of common inputs was heterogeneous and robust evidence was scarce (Glewwe et al., 2013). A second review found that inputs generally increase learning only when they induce changes in pedagogy, incentives, or accountability (Glewwe & Muralidharan, 2016). Experimental work in Indian primary schools explains why: a computer-assisted learning and focused remedial teaching increased scores, while the impact of an input varied with the way it was used (Banerjee et al., 2007). In sub-Saharan Africa Still there have been reports of significant associations between school inputs and achievements (Lee & Zuze, 2011).

There is widespread use of large public investments in physical facilities in secondaries across many countries, including India, based on the belief that resources lead to better student experiences and outcomes. The un-tested assumption here is that the relationship between resources and student experiences and achievement is similar at the higher secondary level in India. Empirical evidence on the relationship between resources and adjustment and achievement, and whether state and CBSE (Central Board of Secondary Education) schools differ for these outcomes, can provide information to school administrators and the government about whether such investments in infrastructure should be enough, or whether complementary investments in teaching quality and school processes and student support are also needed. The current study brings some answers, based on data from a district in Uttar Pradesh, India's most populated State.

Objectives of the Study

1. To examine the effect of school resources on the academic achievement of UP Board higher secondary students.

2. To examine the effect of school resources on the academic achievement of CBSE higher secondary students.

3. To examine the effect of school resources on the institutional adjustment of UP Board higher secondary students.

4. To examine the effect of school resources on the institutional adjustment of CBSE higher secondary students.

5. To compare the school resources available in CBSE and UP Board schools.

6. To compare the academic achievement of CBSE and UP Board students.

7. To compare the institutional adjustment of CBSE and UP Board students.

1.7 Hypotheses

The following null hypotheses were tested at the .05 level of significance.

H_{01}: School resources have no significant effect on the academic achievement of UP Board students.

H_{02}: School resources have no significant effect on the academic achievement of CBSE students.

H_{03}: School resources have no significant effect on the institutional adjustment of UP Board students.

H_{04}: School resources have no significant effect on the institutional adjustment of CBSE students.

H_{05}: There is no significant difference between CBSE and UP Board schools in the resources available, with sub-hypotheses $H_{05\cdot1}$ (academic achievement) $H_{05\cdot2}$ (institutional adjustment) of no significant difference between the two boards' students.

2. METHODOLOGY

The study employed a cross-sectional survey design. This design was appropriate because it permits the collection of quantitative data from a large group of respondents and the examination of relationships between variables under natural educational conditions, without manipulation. The population comprised all students enrolled in Grade 11 in CBSE-affiliated and Uttar Pradesh Board higher secondary schools in Bijnor district, Uttar Pradesh, during the period of data collection. A sample of 300 students was drawn, comprising 150 CBSE and 150 UP Board students (Table 1), so that each board was equally represented in comparative analyses. Sample technique was stratified random sampling from 30 schools 15 schools affiliated from CBSE and 15 from UP Board with 150 participants from each board. Regression analyses had 80% power at $\alpha = .05$ to detect a correlation of approximately $r = .22$ (Cohen, 1988), so smaller effects could not be reliably detected.

Table 1: Distribution of the Sample by Board

Board	n	%
CBSE	150	50.0
UP Board	150	50.0
Total	300	100.0

Note. CBSE = Central Board of Secondary Education; UP Board = Uttar Pradesh Board of Secondary Education.

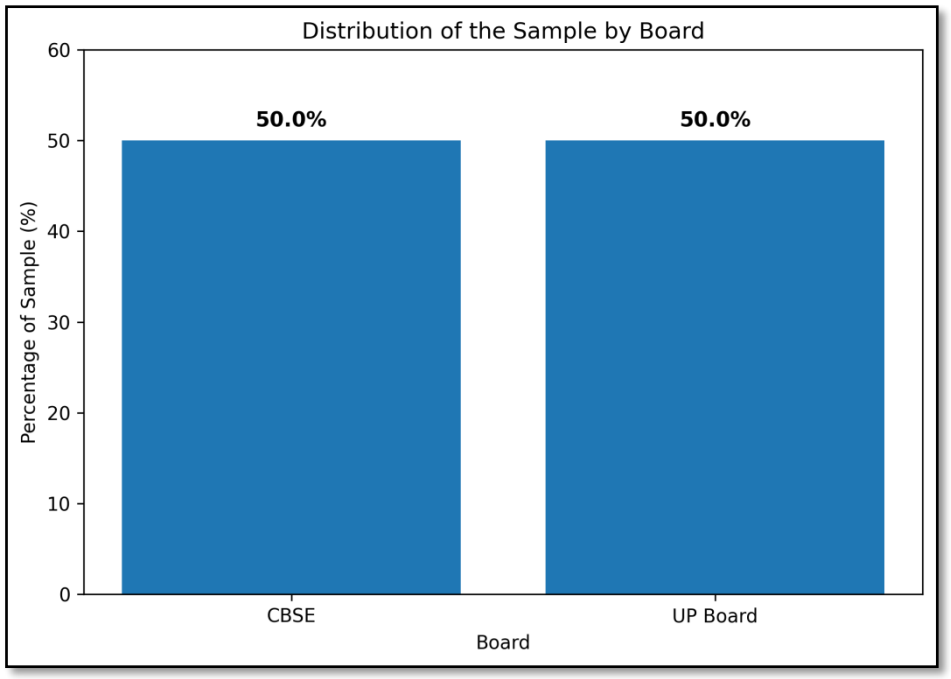


Figure 2

2.1 Data collection Tools

Academic resources: A self-developed School Resources Checklist was prepared by the researcher to assess the availability and adequacy of resources in the selected higher secondary schools. The checklist covered eight dimensions of school resources: physical infrastructure, classroom facilities, library resources, laboratory facilities, information and communication technology (ICT), sports facilities, teaching-learning materials, and other educational amenities. The tool was found to be reliable and valid, with a reliability coefficient of 0.80, a content validity of 0.81, and a criterion validity of 0.86. ***Institutional adjustment:*** of higher secondary students was measured using the Institutional Adjustment Scale developed by A. K. P. Sinha and R. P. Singh (Revised, 2012). The standardized scale assesses students' adjustment to different aspects of the school

environment, including academic activities, school discipline, interpersonal relationships, and institutional functioning. The reliability of the scale, as reported in the manual, was established by the test-retest method (r = 0.75 to 0.85). The validity coefficient of the scale was reported as 0.83, indicating that the scale is a reliable and valid instrument for the present study. To assess the *academic achievement* of the students, their 10th class *board examination results* were considered. The marks obtained by the students in their respective board examinations were used as an objective indicator of academic achievement. Academic Achievement: to measure academic achievement researcher use 10th class board marks percentage of both boards' students.

Means and standard deviations described the distribution of scores. Simple linear regression, conducted separately for each board, estimated the effect of school resources on institutional adjustment and on academic achievement, and the unstandardized (B) and standardised (β) coefficients, standard errors, R^2, adjusted R^2, and F statistics are reported. Independent-samples t tests compared the two boards on school resources, academic achievement, and institutional adjustment, and Cohen's (1988) d was computed as an effect size. All tests were two-tailed at $\alpha = .05$.

3. RESULTS

3.1 Effect of School Resources on Academic Achievement

Table 2 summarises the regression analyses. For UP Board students, school resources did not predict academic achievement, $B = 0.005$, $SE = 0.078$, $\beta = .006$, $R^2 = .000$, adjusted $R^2 = -.007$, $F(1, 148) = 0.004$, $p = .951$. The result was similarly non-significant for CBSE students, $B = -0.035$, $SE = 0.067$, $\beta = -.042$, $R^2 = .002$, adjusted $R^2 = -.005$, $F(1, 148) = 0.267$, $p = .606$. Because p exceeded .05 in both models, H_{01} and H_{02} were retained.

3.2 Effect of School Resources on Institutional Adjustment

For UP Board students, school resources accounted for 2.2% of the variance in institutional adjustment, $B = 0.145$, $SE = 0.080$, $\beta = .147$, adjusted $R^2 = .015$, $F(1, 148) = 3.266$, $p = .073$. The coefficient was positive but did not reach significance. For CBSE students, the relationship was negative and negligible, $B = -0.085$, $SE = 0.069$, $\beta = -.101$, $R^2 = .010$, adjusted $R^2 = .003$, $F(1, 148) = 1.520$, $p = .220$. Accordingly, H_{03} and H_{04} were retained.

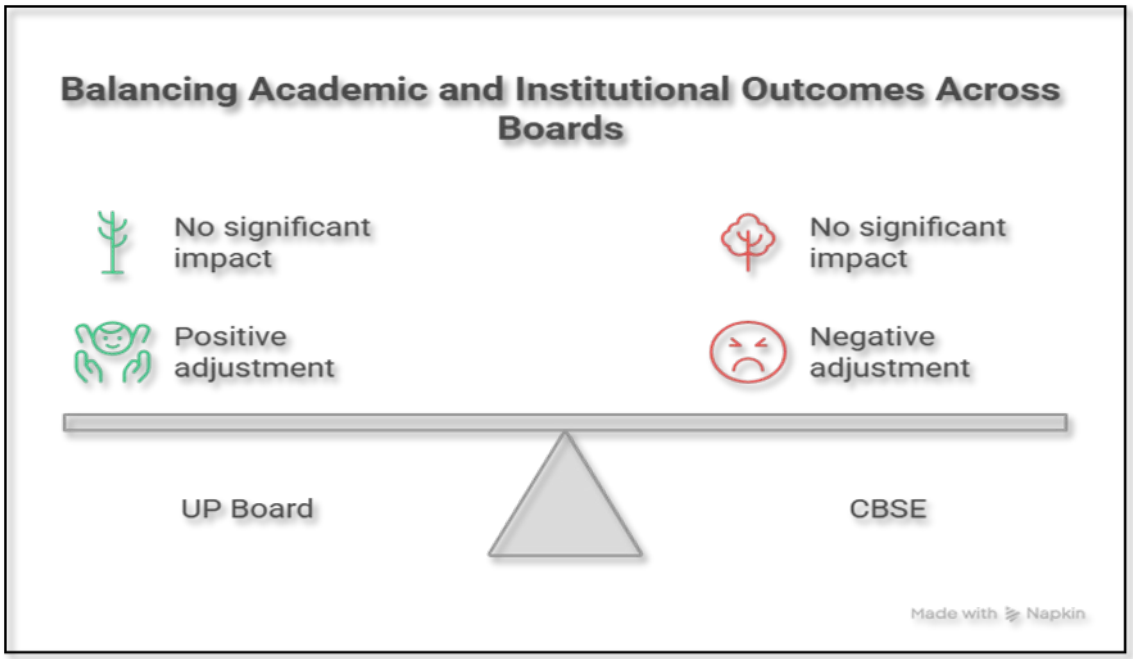


Figure 4 showing balance between academic and academic achievement in CBSE board and UP Board.

Table 2: Simple Linear Regression of Academic Achievement and Institutional Adjustment on School Resources, by Board

Outcome	Board	B	SE	β	R^2	Adj. R^2	F(1, 148)	p
Academic achievement	UP Board	.005	.078	.006	.000	−.007	0.004	.951
Academic achievement	CBSE	−.035	.067	−.042	.002	−.005	0.267	.606
Institutional adjustment	UP Board	.145	.080	.147	.022	.015	3.266	.073
Institutional adjustment	CBSE	−.085	.069	−.101	.010	.003	1.520	.220

Note. $N = 150$ per board. B = unstandardised coefficient; SE = standard error of B; β = standardised coefficient. For simple regression, $R = |\beta|$. No coefficient was statistically significant at $p < .05$.

Figure 4 showing neither academic achievement nor institutional adjustment showed a significant relationship with school resources for either board, as indicating in this figure, but a positive association for UP board and a negative association for CBSE across both outcomes.

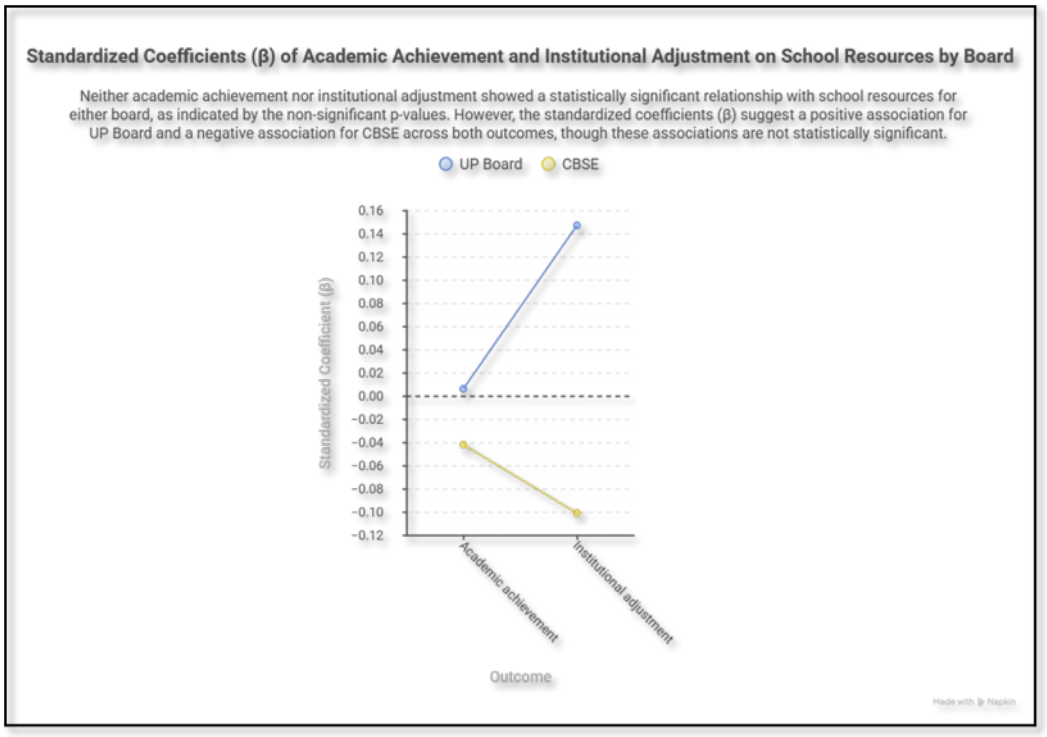


Figure 4 standardized coefficients of academic achievement and institutional adjustment

3.3 Comparison of CBSE and UP Board Schools

Table 3 presents the board comparisons. The two boards did not differ significantly in the school resources available, $t(298) = 0.80$, $p = .425$, $d = 0.09$, so H_{05} was retained. Nor did they differ in academic achievement, $t(298) = 0.40$, $p = .687$, $d = 0.05$, so $H_{05\cdot1}$ was retained. By contrast, institutional adjustment scores differed significantly between boards, $t(298) = 2.64$, $p = .009$: UP Board students ($M = 29.97$, $SD = 8.37$) scored higher than CBSE students ($M = 27.60$, $SD = 7.14$), a small effect ($d = 0.30$). $H_{05\cdot2}$ was therefore rejected.

Table 3: Independent-Samples t Tests Comparing CBSE and UP Board Students

Variable	Board	n	M	SD	t(298)	p	d
School resources	CBSE	150	37.63	8.45	0.80	.425	0.09
	UP Board	150	36.85	8.48			
Academic achievement (%)	CBSE	150	56.10	6.94	0.40	.687	0.05
	UP Board	150	56.45	8.03			
Institutional adjustment	CBSE	150	27.60	7.14	2.64	.009	0.30
	UP Board	150	29.97	8.37			

Note. d = Cohen's d computed from the reported means and standard deviations using the pooled standard deviation (absolute values). Critical t (df = 298, α = .05, two-tailed) ≈ 1.97.

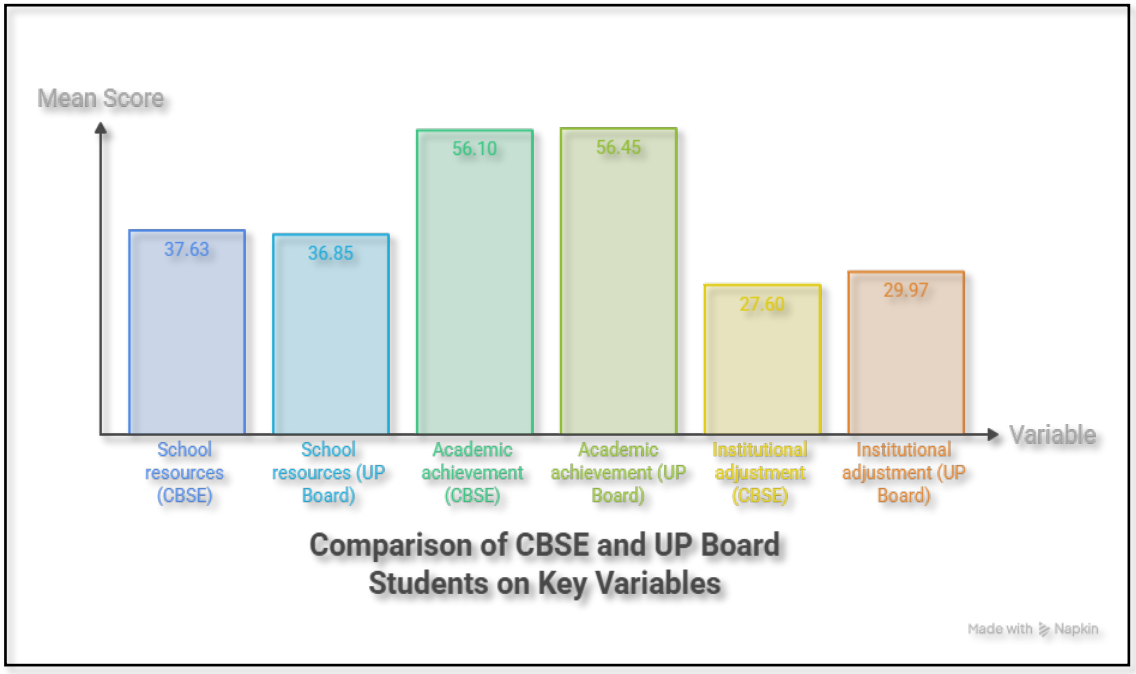


Figure 5 showing a comparison between CBSE and UP board students on Key Variables

4. DISCUSSION

4.1 Findings

The main result is the lack of a significant relationship between school resources and either outcome. In all four models the resources accounted for the largest proportion (at most 2.2%) of the variance, and in three of the four models the standardised coefficient was less than |.11|. The most noteworthy association between the variables was the positive direction and positive correlation between resources and adjustment among UP Board students (β = .147, p = .073), however, this association was not statistically significant and should not be considered as evidence of either effect or none at the current size of this sample (Wasserstein & Lazar, 2016). The two boards opposite (on the left and right) are small in comparison to the standard errors, and should not be interpreted substantively.

This finding is consistent with the long history of literature that generally finds low or mixed correlations between measures of school inputs and outcomes (e.g. Coleman et al., 1966) and with research on the developing country evidence which finds

mixed effects (e.g. Glewwe et al., 2013). They also align with the notion that inputs have an effect on learning primarily when they influence classroom dynamics (Banerjee et al., 2007; Glewwe & Muralidharan, 2016). A checklist documents the presence or absence of a laboratory or library, not necessarily whether students are using it, how well teachers are using it, nor how students are using it. Theoretically, resources are a distal aspect of the ecological microsystem and their impact on adjustment may be mediated by climate, teacher–learner relationships, and perceived support (Uline & Tschannen-Moran, 2008; Wang & Degol, 2016) variables that were not measured in the present design. The results are less congruent with the results from studies that found large resource effects (Greenwald et al., 1996; Lee & Zuze, 2011), but it is difficult to compare the findings due to the different contexts, baseline provision of resources, and measurement in these studies.

In the sampled schools, the lack of differences in resources and achievement in CBSE and UP Board implies that the facilities provided are broadly similar, and that students from the two boards have similar achievement at Grade 10. The much higher adjustment by UP Board students also does not seem to be due to differences in resources, as the two boards were equivalent. Alternative explanations not covered by the present data include variations in academic pressure and competitiveness, class size, cultural and linguistic closeness of State Board schools to students' community, and student selection into the State Board schools. This effect was not strong (d = 0.30) and needs to be replicated in other studies before definite conclusions can be drawn.

4.2 Educational Implications

The results highlight the need to not assume that increased infrastructure will lead to better adjustment or achievement at the higher secondary level. Education authorities are thus able to combine resource provision with measures to ensure utilisation such as teacher training to use laboratories, libraries and ICT in teaching, provision of regular access for students and monitoring of utilisation beyond mere provision. In CBSE schools, school leaders could have been interested in the discovery that CBSE students were less satisfied than those from State Board schools regarding their adjustment at the Grade 11 transition by improving orientation, counselling and peer-support programmes. Lastly, a resource audit that is in line with the Right to Education Act and National Education Policy 2020 should be supported by indicators for school climate and student experience.

4.3 Limitations

The results are limited by the following. This was a cross sectional and correlational design; therefore, do not use causal language. Limited generalizability due to data being from a single district. The resource checklist was developed by the researcher and reflects availability and/or adequate and not the use or quality of instruction. Prior attainment, typically gained in another school than the one that resources were evaluated at, and the fact that grade 10 results are not strictly comparable to board examinations, as these may be from different boards, reduces the logical connection between the resources and achievement. The analyses were bivariate without considering other potentially confounding and moderating factors, such as socioeconomic status, gender, stream, school type, and teacher quality (Sirin, 2005). Lastly, because of the limited number of students in each model (150), small effects could not be identified (Button et al., 2013), and self-reported adjustment might be prone to response bias.

4.4 Further Research Suggestions

Future studies might (a) involve multi-level modelling with students nested in schools and incorporate socioeconomic and demographic covariates; (b) measure the use of resources rather than simply their availability; (c) use a longitudinal design that tracks students over the course of their transition from Grade 10 to 11 and employs achievement measures at the time of the transition; (d) include a qualitative component of study, using classroom observation or interviews with students to understand the reasons for students' varied reports of adjustment at different boards; and (e) expand sampling to include additional districts, urban and rural schools, and other boards.

4.5 Conclusion

This study revealed that there was no significant difference between the predictors of institutional adjustment and predictors of academic achievement in terms of school resources (availability and adequacy) for CBSE and UP Board students in higher secondary education of Bijnor district, while there were differences between the two boards in terms of institutional adjustment in favour of UP Board students and academic achievement in favour of CBSE students but differences were not significant. The results do not imply that resources are unimportant, they indicate that availability is a poor lever, and that the

way the resources are used in a supportive school climate will be more important than how they are used. When policy is linked to pedagogy, infrastructure usage and student support, it seems to be more in line with this evidence, than investment on infrastructure alone.

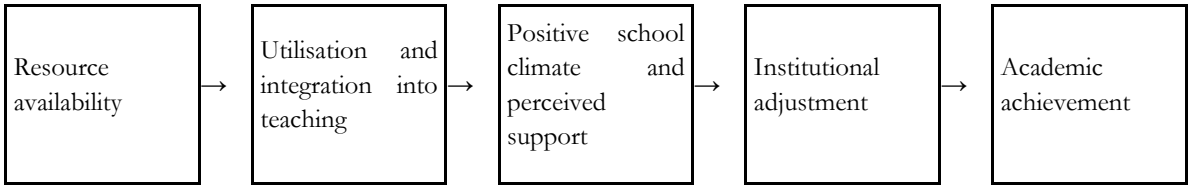


Figure 6: Proposed (Untested) Mechanism Linking School Resources to Student Outcomes

Note. The pathway is derived from the theoretical framework and prior literature; it was not tested in the present study.

Contribution:

[1]Preeti Bharadwaj collected data, drafted this research paper and submitted as per the instruction of journal

[2]Rubi Rajput, review the paper and make some necessary .

Competing interests: *We have no competing interest.*

Ethics declaration: Not applicable

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