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What Matters Most to Students? An Empirical Investigation of Higher Education Effectiveness in West Bengal.

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Educational Effectiveness, Higher Education, Exploratory Factor Analysis, Student Perceptions, West Bengal, Institutional Quality

ABSTRACT

Although educational effectiveness is a multifaceted concept that is essential to national development, its determinants are still not well understood in the particular regional contexts of developing countries. This study investigates the key factors influencing educational effectiveness in higher education institutions in West Bengal, India, from the students' perspective. 282 students from different institutions were chosen through stratified random sampling and given a cross-sectional survey. Exploratory Factor Analysis (EFA) was used to analyze the data. A strong three-factor structure was discovered by the EFA: (1) Institutional Quality and Resources (e.g., curriculum, industry integration, funding); (2) Student Background and Institutional Characteristics (e.g., academic position, geographical location); and (3) Infrastructure and Technology (e.g., smartboards, institutional infrastructure). Together, these account for 64.9% of the variance. The results indicate that students, regardless of gender, institution type, or course of study, view educational effectiveness as a multi-dimensional construct. This study offers a validated framework and empirical evidence to assist policymakers and institutional leaders in improving the quality and equity of higher education in regional India.

1. INTRODUCTION

Experts agree that higher education is a key part of a country's development. It helps create human capital, improve social mobility, and boost economic growth (Tilak, 2015). The quality and effectiveness of higher education systems are being closely observed as societies start becoming more dependent on knowledge, particularly in developing nations like India, where regional differences and diverse student populations give rise to unique challenges (Agarwal, 2009).

In higher education, educational effectiveness is a multidimensional concept that shows how well an institution can help students reach their goals by providing the best possible academic, infrastructural, and socio-pedagogical conditions. Even though it is used a lot in policy and practice, the construct needs to be clearly defined so that it can be measured accurately and compared across studies (Kuh et al., 2008; Tinto, 1993).

Educational Effectiveness is grounded in several seminal theories that link institutional practices to student success. Tinto's Model of Institutional Departure (1993) posits that effectiveness hinges on academic (e.g., curriculum quality) and social (e.g., peer/faculty interactions) integration, which collectively reduce attrition. Astin's I-E-O Model (1993) frames effectiveness through inputs (e.g., student preparedness), environment (e.g., teaching methods), and outputs (e.g., graduation rates). Biggs' 3P Model (1993) emphasizes the alignment of presage (e.g., institutional resources), process (e.g., pedagogical strategies), and product (e.g., learning outcomes). Student Engagement Theory (Kuh, 2008) identifies high-impact practices (e.g., experiential learning) as effectiveness drivers. Drawing on these theories, we may define Educational Effectiveness as " the extent to which an institution's structural, pedagogical, and support systems synergistically foster student success, measured through academic achievement, employability, and holistic development.

West Bengal, a historically important educational hub in eastern India, has a wide diversity in terms of higher education institutions, including public universities, private colleges, and technical institutes, catering to students from varied socio

economic and cultural backgrounds (Chattopadhyay, 2012). In an academically diverse environment, student perceptions serve as a crucial gauge of institutional performance and service delivery (Hill et al., 2003). To boost institutional effectiveness, student satisfaction, and long-term educational outcomes, it is essential to comprehend how students perceive various factors that influence their educational experience (Harvey & Green, 1993).

Previous studies have identified several factors influencing student satisfaction and institutional excellence, such as the academic setting, faculty expertise, facilities, educational resources, career opportunities, and administrative assistance (Douglas, Douglas & Barnes, 2006; Tessema, Ready & Yu, 2012). Existing research frequently adopts a national or institutional perspective, often neglecting region-specific information. Research in West Bengal on this topic remains limited, underscoring a lack of understanding of students' expectations and priorities in the regional context.

Furthermore, the relative importance of these factors has not been extensively explored. Factor prioritization is essential in policymaking and resource allocation, especially when institutions operate under financial and infrastructural constraints (Ghosh, 2017). Additionally, demographic factors such as gender, family income, educational background, and institutional type impact how students perceive the quality and effectiveness of higher education (Kuh et al., 2006; Singh & Singh, 2020). Investigating these perceptual disparities can offer valuable insights into equity and inclusion within higher education policies.

In light of these gaps, this study is undertaken with the following objectives:
(1) To investigate and identify the key factors influencing educational effectiveness in higher education institutions in West Bengal, India, from the students' perspective.
(2) To study the basic structure of these factors and measure the extent to which they explain the construct.
(3) To provide a validated multidimensional framework that aids policymakers and institutional leaders in improving the effectiveness of higher education in regional India.

This study seeks to produce empirical evidence to assist policymakers, educational leaders, and stakeholders in improving the effectiveness, accessibility, and equity of higher education within the region.

Literature Review

2.1. Conceptualizing Educational Effectiveness

In higher education, Educational Effectiveness is a multi-dimensional construct influenced by a variety of institutional, pedagogical, and socio-economic elements. According to Tinto's (1993) model of institutional departure, effectiveness depends on both academic integration (e.g., the quality of the curriculum) and social integration (e.g., interactions with peers), which together help reduce dropout rates. Astin's (1993) Input-Environment-Output (I-E-O) framework further defines effectiveness by considering student inputs, such as their level of preparedness, the institutional environment, including teaching methods, and outputs like graduation rates. Additionally, Biggs' (1993) 3P model highlights the importance of aligning presage (resources), process (teaching methods), and product (learning outcomes). By combining these theories, we describe Educational Effectiveness as: "The degree to which an institution's structural, pedagogical, and support systems promote student success, evaluated through academic performance, employability, and overall development."

Institutional Drivers of Effectiveness

2.2.1. Curriculum and Pedagogy

A well-structured curriculum is fundamental to student learning and academic success. Biggs and Tang (2011) argue that constructive alignment, which ensures cohesion between learning objectives, teaching methods, and assessments, enhances educational outcomes. Diamond (2008) further emphasizes that curriculum design must balance theoretical knowledge and practical application to maximize student engagement and retention.

The delivery mode of education significantly impacts learning effectiveness. Means et al. (2010) found that blended learning, which combines online and face-to-face instruction, often yields better outcomes than purely online or traditional classroom settings. Garrison and Kanuka (2004) support this, asserting that blended learning fosters deeper engagement through flexible yet structured pedagogical approaches.

The student-teacher ratio influences learning experiences. Hanushek (1997) illustrates that smaller class sizes facilitate personalized instruction, which enhances academic performance. Similarly, Ehrenberg et al. (2001) confirm that institutions with high student-faculty ratios often exhibit reduced student outcomes.

Effective teaching methods play a vital role in student learning. Chickering and Gamson (1987) describe seven principles for effective teaching, which include active learning and timely feedback. Hattie's (2009) meta-analysis in Visible Learning highlights teacher clarity and formative assessment as some of the most influential teaching strategies.

2.2.2. Faculty and Resources

Faculty expertise significantly contributes to the quality of instruction. Rockoff (2004) asserts that experienced educators

play a pivotal role in enhancing student performance. Furthermore, Rivkin et al. (2005) establish that teacher effectiveness increases with years of practice, particularly in student-centered learning environments.

2.2.3. Technology and Infrastructure

The use of technology in classrooms is essential for effective teaching methods. According to Higgins et al. (2012), interactive whiteboards enhance student engagement and understanding. Tamim et al. (2011) stress the importance of integrating technology into pedagogy rather than just adopting it.

Both physical and digital institutional infrastructure support the teaching-learning process. Gifford (2002) links campus facilities to student satisfaction and retention, while Earthman (2002) shows that modernized infrastructure, like libraries and laboratories, boosts academic performance.

Student-Centric Factors

Socio-Economic Background

Socio-economic status is a significant predictor of academic achievement. Sirin (2005) demonstrates a strong correlation between family income and educational attainment. Reardon (2011) discusses how income inequality exacerbates disparities in access to and completion rates of higher education.

From an investment perspective, it has been observed that family expenditure on education impacts student success. Becker's (1993) Human Capital Theory posits that higher education expenditure by families leads to improved academic and career outcomes. Haveman and Wolfe (1995) expand on this, demonstrating that financial investment in education yields long-term socio-economic benefits.

Academic Performance

Prior academic performance serves as a significant predictor of success in higher education. Robbins et al. (2004) identify high school GPA as a crucial indicator of college readiness. Bowen et al. (2009) emphasize the importance of pre-college academic preparation in reducing attrition rates.

Relative academic standing significantly impacts both motivation and performance. According to Marsh's (1987) Big-Fish-Little-Pond Effect (BFLPE), students within highly competitive cohorts may experience a reduced self-concept despite achieving high levels of academic success. Hattie (2002) further investigates the influence of peer comparisons on academic self-perception.

Parental education plays a crucial role in shaping student aspirations. Davis-Kean (2005) connects the educational attainment of parents to their children's academic motivation and success. Sullivan (2001) presents cultural capital theory, suggesting that educated households promote academic socialization.

Geographical and Institutional Context

The location of an institution plays a crucial role in its accessibility and connection to the job market. According to Frenette (2006), universities situated in urban areas offer superior access to internships and job opportunities. Gibbons and Vignoles (2012) examine geographical differences, revealing that rural institutions often encounter more significant resource limitations compared to those in urban settings.

The type of institution, whether it is public or private, along with its governance model, impacts how resources are distributed and the outcomes achieved. Winston (1999) contrasts public and private institutions, highlighting variations in funding methods and student populations. Tierney and Hentschke (2007) explore how organizational structures influence an institution's ability to adapt and innovate.

Financial investment in higher education has a direct effect on the quality of institutions. Archibald and Feldman (2011) demonstrate a positive link between institutional funding and improvements in academic infrastructure, faculty retention, and research productivity. Johnstone (2004) further emphasizes the significance of efficient resource allocation in maintaining educational quality.

Employability and External Linkages

Graduate employability, a frequently discussed topic, serves as a crucial indicator of institutional effectiveness. Yorke and Knight (2006) contend that employability skills, such as critical thinking, communication, and adaptability, should be integrated into curricula. Rothwell et al. (2008) empirically connect curriculum design to employment prospects, highlighting the importance of career-oriented education.

Nowadays, we observe a variety of collaborations between academic institutions and industries. These partnerships enhance the educational experience and increase the employability of graduates. According to Boden and Nedeva (2010), collaborations between academia and industry help update curricula to better match the needs of the job market. Harvey (2000) supports this by showing that work-integrated learning opportunities, such as internships and industry projects, greatly enhance students' readiness for their careers.

Government policies on higher education, both nationally and regionally, significantly impact institutional governance and quality. Marginson (2016) explores the influence of global higher education policies on institutional competitiveness. Altbach et al. (2009) emphasize the importance of policy frameworks in shaping funding models, accreditation standards, and international rankings.

Therefore, based on the discussion so far, the construct can be modeled as:

Educational Effectiveness = $f(\alpha_1 F_1 + \alpha_2 F_2 + \alpha_3 F_3)$

Where:

F_1, F_2, F_3 = Latent factors

α_1, α_2, α_3 = Factor weights

The conceptual framework is depicted in Figure 1.

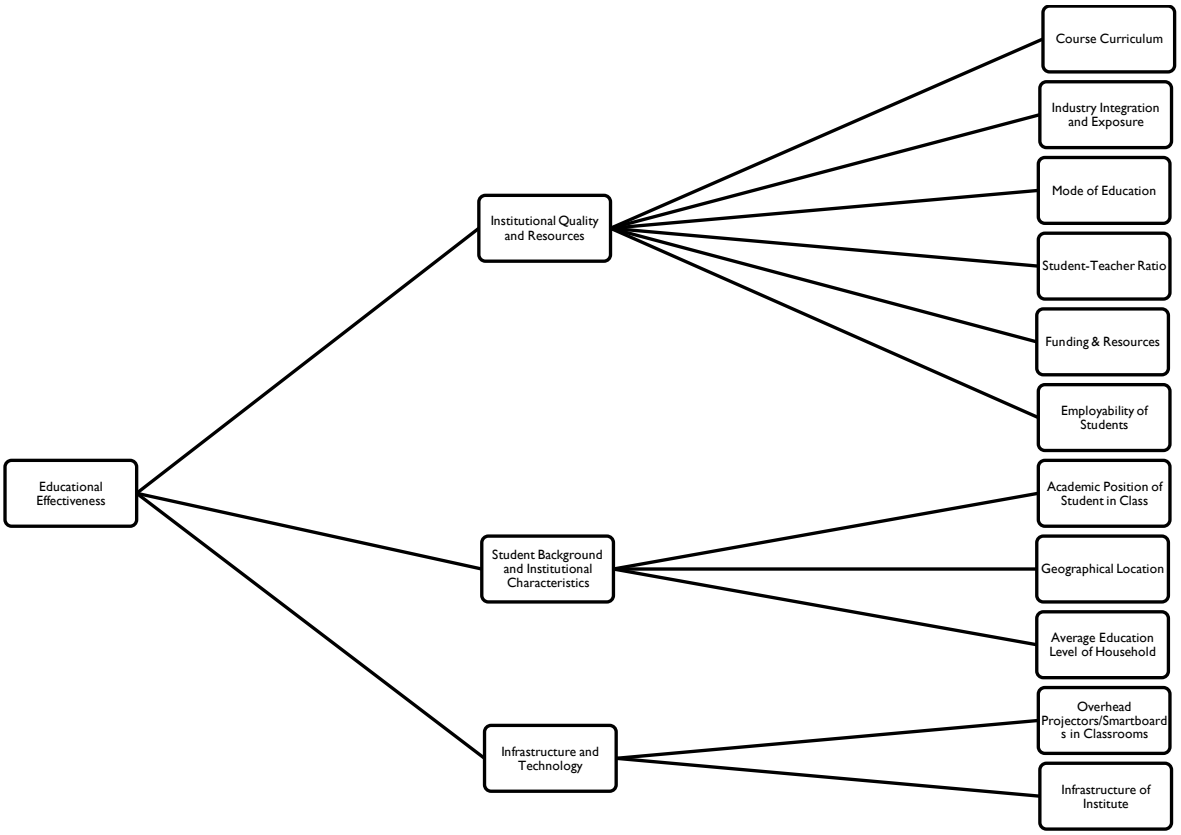


Figure 1: Conceptual Framework of this Research
Source: Authors' Own

Studies conducted at the national level frequently overlook the differences in student experiences across regions. Ghosh (2017) criticizes India's centralized policy frameworks, asserting that they fail to adequately meet the unique needs of regional institutions. Research focused on specific areas, such as West Bengal, is essential for uncovering practical insights and customizing interventions. However, despite this necessity, there is a significant lack of scholarly research on student perceptions in the state, resulting in a noticeable gap in empirical literature.

Furthermore, the prioritization of institutional attributes has been examined through factor analysis and other multivariate techniques (Hill et al., 2003; Harvey & Green, 1993). These analyses provide a means to distill a wide array of variables into fundamental dimensions that influence satisfaction and loyalty. However, there is a scarcity of studies employing these techniques in the context of Indian or West Bengal institutions.

Thus, the present study seeks to fill these gaps by examining the perceptions of college and university students in West Bengal regarding the factors that affect higher education, determining the relative importance of these factors, and investigating perceptual variations across socio-demographic categories.

Research Methodology

3.1. Research Design and Sampling Method

This study adopts a descriptive cross-sectional research design to investigate students' perceptions of higher education in West Bengal. Descriptive designs are widely used to gather quantifiable information regarding the status of a phenomenon, especially perceptions and attitudes (Kelley, Clark, Brown, & Sitzia, 2003). A stratified random sampling technique was employed to ensure representative coverage of students from various colleges and universities across different socio-demographic categories, including gender, locality (urban/rural), and institutional type. Stratified sampling is well-regarded for enhancing the precision and representativeness of survey research (Creswell & Creswell, 2018). Stratified sampling increases external validity and enhances precision in subgroup estimates (Lohr, 2010).

The final sample comprised 282 college and university students from different districts of West Bengal. This sample size exceeds the minimum threshold for factor analysis, as recommended by Hair et al. (2010), which suggests a ratio of at least 5:1 for subject-to-item analysis and this is in tune with the rule of thumb proposed by Comrey and Lee (1992), who recommend a minimum of 200 participants.

The percentage of male respondents was 43 and the percentage of female respondents was 57. In the sample, 29% of the students were from government institutions and 71% of the students were from private institutions. 57% of the students were pursuing or had completed a management degree while 43% students had a non-management degree background.

3.2. Data Collection Instrument

A structured questionnaire was used as the primary data collection instrument. It included items designed to measure perceptions regarding factors influencing the effectiveness of higher education. A 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was adopted. The Likert scale is commonly used in social science research to capture attitudinal data effectively (Joshi, Kale, Chandel, & Pal, 2015; Boone & Boone, 2012). The validity of the questionnaire was established since content validity is a critical psychometric property that ensures an instrument measures the intended construct comprehensively and accurately (Haynes et al., 1995). Expert judgment remains the gold standard for assessing content validity, as it leverages domain-specific expertise to evaluate the relevance, clarity, and representativeness of questionnaire items (Polit & Beck, 2006). Content validity was assessed by looking at a panel of 5 subject matter experts from the field of higher education rating the relevance of each item in the questionnaire. The average of all items' rating was computed to obtain the Content Validity Index. A score of 0.91 indicated a high content validity. Face validity plays a crucial role in ensuring a questionnaire appears to measure its intended construct to respondents and stakeholders, thereby enhancing engagement and perceived relevance (Streiner et al., 2015). While it does not replace empirical validity testing, strong face validity improves participant willingness and reduces survey abandonment, particularly in applied settings (Polit & Beck, 2006). Face validity of the instrument was checked by pilot testing the questionnaire with 20 target respondents. This ensured that the questions are clear and understandable. Reliability is essential for ensuring a questionnaire produces consistent and stable results over time or across items (Cronbach, 1951). Cronbach's alpha is a widely accepted measure of internal consistency reliability, with values ≥0.70 indicating acceptable reliability for research instruments (Tavakol & Dennick, 2011). To test internal consistency Cronbach's Alpha was looked at. An $\alpha = 0.82$ showed high reliability of the measuring instrument.

3.3. Analytical Techniques

To identify the key dimensions representing the construct of effectiveness in higher education, Exploratory Factor Analysis (EFA) was conducted. EFA is widely recognized for its ability to reduce data dimensionality and uncover latent constructs (Fabrigar & Wegener, 2011; Costello & Osborne, 2005). The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were used to assess the adequacy of the dataset for factor analysis. KMO values above 0.6 and a significant Bartlett's test indicate the suitability of factor analysis (Field, 2013).

Analysis and Results

The present study sought to assess the factors influencing the effectiveness of higher education in West Bengal based on students' perceptions. An exploratory factor analysis (EFA) was conducted on 18 items identified through an extensive review of literature and an initial exploratory survey. The selection of these 18 variables was guided by existing theoretical frameworks on quality in higher education and student satisfaction (Harvey & Green, 1993; Hill, Lomas, & MacGregor, 2003). Key variables included curriculum relevance, faculty quality, infrastructure, administrative support, placement services, peer interaction, availability of online resources, and financial affordability, each repeatedly recognized in prior studies as determinants of student satisfaction and institutional effectiveness (Douglas, Douglas, & Barnes, 2006; Tessema, Ready, & Yu, 2012).

Exploratory Factor Analysis (Table 1)

Factor Loadings						
	Factor					
	1	**2**	**3**			**Uniqueness**
Course Curriculum	0.877					0.02330
Industry Integration and Exposure	0.838					0.01262
Mode of Education	0.793					0.01314
Student-Teacher Ratio	0.779					0.01035
Funding & Resources	0.762					0.00732
Employability of Students	0.716					0.02271
Education Expenditure of Family	0.709					0.02193
Pedagogy of Teaching	0.708					0.00743
Government policies on Higher Education	0.708					0.00743
Teaching Experience of Faculty	0.673	0.317				0.05840
Average Income of Household	0.660					0.02697
Mean Score	0.549	0.328				-0.00121
Academic Position of Student in Class		0.847				0.01695
Geographical location of College		0.773				0.02552
Average Education Level of Household		0.686				0.05697
Having overhead projectors/smartboards in classrooms			0.511			0.01282
Previous Academic Record		0.411	0.480			0.02468
Infrastructure of Institute			0.478			0.02692
Type of Institution		0.418	0.450			0.02538
Eigenvalue	7.24	2.56	1.89			
% of Variance	40.2	14.2	10.5			
Cumulative%	40.2	54.4	64.9			

Factor Loadings

	Factor					
	1	2	3			Uniqueness

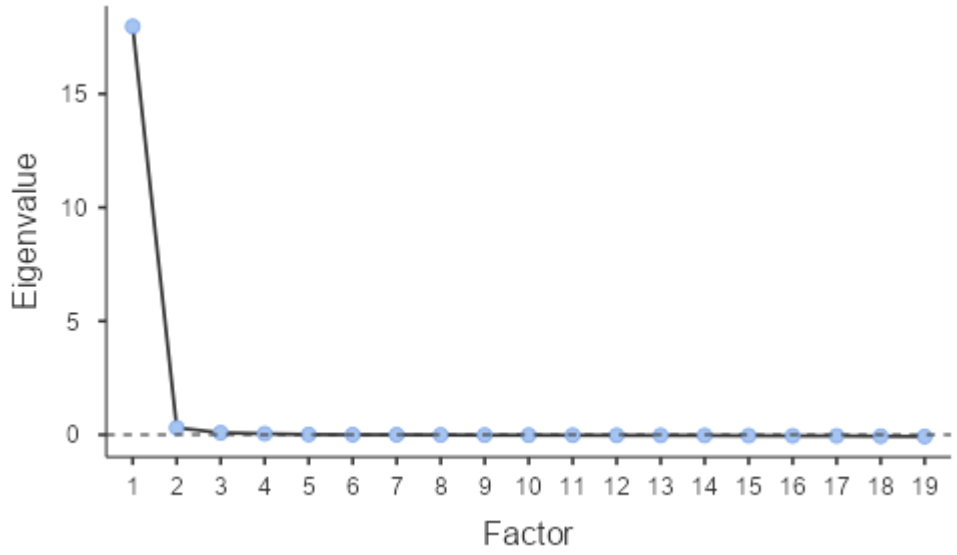
Factor Statistics (Table 2)

Inter-Factor Correlations

	1	2	3	4	5
1	—	0.836	0.809	0.231	0.0228
2		—	0.805	0.265	0.0225
3			—	0.258	0.0704
4				—	0.3039
5					—

Eigenvalues (Table 3)

Scree Plot



The adequacy of the dataset for factor analysis was confirmed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity. The KMO value was found to be 0.84, which is above the recommended threshold of 0.6, and Bartlett's test was statistically significant ($p < 0.05$), validating the factorability of the correlation matrix (Field, 2013; Hair et al., 2010). Factors were retained based on Kaiser's criterion (eigenvalue>1), examination of the scree plot, and interpretability.

The Principal Axis Factoring (PAF) extraction method with Promax rotation was employed, as oblique rotation is suitable when factors are theoretically expected to correlate (Fabrigar et al., 1999). The high inter-factor correlations (e.g., 0.836 between Factors 1 and 2) support this approach, confirming shared variance among constructs like institutional quality and

student background (Costello & Osborne, 2005).

Institutional Quality and Resources: Variables such as Course Curriculum, Industry Integration and Exposure, Funding & Resources, and Student-Teacher Ratio align with research emphasizing the role of institutional infrastructure and resource allocation in educational effectiveness (Bowen, 2013; Marginson, 2016). For instance, Bowen (2013) highlights that curriculum design and industry linkages significantly influence employability, which is reflected in the high loadings of these variables on Factor 1.

Student Background and Institutional Characteristics: Factors like Academic Position of Student in Class, Geographical Location of College, and Average Education Level of Household are supported by studies linking socio-economic status and institutional context to academic performance (Sirin, 2005; Reay et al., 2010). Sirin (2005) particularly underscores the correlation between family education levels and student achievement, justifying the inclusion of these variables.

Infrastructure and Technology: The prominence of Overhead Projectors/Smartboards and Infrastructure of Institute in Factor 3 resonates with literature advocating for technological integration in modern pedagogy (Selwyn, 2016; Kirkwood & Price, 2014). Kirkwood and Price (2014) argue that physical and digital infrastructure directly impacts teaching efficacy, validating their inclusion in the analysis.

The extracted components aligned well with conceptual categories such as academic environment, institutional support, infrastructure, and employability focus. The inter-factor correlations were high (ranging from 0.805 to 0.836), indicating shared variance among the three main factors, consistent with the use of oblique rotation. The uniqueness values for most variables were low, suggesting that the factors explain a substantial proportion of variance in the data. The scree plot supported a three-factor solution, with the elbow point at the third factor, confirming the appropriateness of retaining three factors. Factor loadings were consistent with those reported in similar studies conducted in the Indian higher education context (Agarwal, 2009; Tessema et al., 2012), providing empirical robustness to the identified dimensions.

Conclusion:

The EFA validated a three-factor structure (Institutional Quality and Resources, Student Background and Institutional Characteristics, Infrastructure and Technology), explaining a substantial portion of variance. The findings from the EFA indicate that students recognize multiple dimensions influencing higher education effectiveness, The study contributes empirical evidence supporting a multidimensional approach to educational quality enhancement in the regional context of West Bengal. Future research could investigate why certain variables like 'Government Policies' loaded on a factor primarily concerned with institutional quality, which may require qualitative exploration

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