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Student Loans in Financing Engineering Education: Some New Evidence from India

Pradeep Kumar Choudhury*
Amit Kumar#

Abstract

This paper combines the most recent secondary data and a primary survey data from Odisha to examine student loan financing of engineering education in India. We produce new evidence on the recent growth of student loans market, regional patterns in its expansion, socioeconomic inequality in access to student loans, and more importantly, students' experiences in accessing loans from commercial banks for engineering courses. We find a substantial rise in student loan accounts and the sanctioned loan amount in India during the last two decades, with significant regional variations. We also find considerable socioeconomic and institutional inequalities in access to student loans in engineering education. Suggestive evidence shows that procedures involved in availing student loans from commercial banks are quite complex, discouraging needy students from availing it to fund their education. Our findings have important policy implications for technical higher education sector, which has been experiencing not so encouraging public funding and a record growth of household costs.

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Introduction

India's higher education (HE) sector endured a massive expansion in post-1990s, making it as one of the largest higher education systems globally. In 2021-22, 43.3 million students are enrolled in 1,168 universities, 45, 473 colleges and 12,002 stand-alone institutions (MoE, 2024). Intriguingly, within HE, the growth of professional higher education (courses like engineering, medicine, management and law) during the past three decades has been most impressive (Khare, 2014; MoE, 2024). For example, in 2021-22, about 11.8 per cent of the total higher education enrolments were in engineering courses, and this share was 7.2 per cent in 2005 and less than 5 per cent in 1990 (MoE, 2024; Tilak & Choudhury, 2021). Indian higher education sector has experienced considerable growth of the private players after 1990s, particularly in technical and professional higher education courses (Varghese, 2015; Tilak, 2018, 2024; Varghese & Panigrahi, 2022). In 2017-18, engineering courses accounted for 86.5 per cent of enrolment in the private sector, while the corresponding figure was 81.6 per cent in management programs (NSO, 2020). The increased private sector participation in engineering education has resulted in a noticeable increase in household costs. The annual average household expenditure on engineering education in India, for example, was ₹70,575 in 2017-18, which accounts for 46.7 per cent of the total annual household consumption expenditure. The share of spending on course fee (including tuition fee, exam fee and development fee) to total household spending on engineering education was 73.8 per cent, while it was 26.2 per cent on non-fee items like books, stationery, and transportation (NSO, 2020). Overall, India has experienced an appreciable expansion of private-led technical and professional higher education sector, with significant increase in household costs. Interestingly, Varghese (2015) argues that the massification of higher education in India is a market-mediated process, which is facilitated mostly through private institutions and financed by households.

The policies and practices of higher education funding in India have changed visibly in recent years. For instance, colleges and universities, which used to be funded by the state with limited contributions from the non-state sectors such as students and their families, voluntary donations, and institutional endowments; are being shifted to neoliberal models of funding (Tilak & Choudhury, 2022), and performance-based funding being the latest alternative (Khare et al., 2022). Many higher education institutions in India rely on student fees for their funding, which has resulted in a substantial rise in household expenditure on technical and professional higher education.

Loan financing of higher education is not a new phenomenon in India. The National Loan Scholarship Scheme (NLSS) was introduced in 1963 to help students from economically weaker sections (EWS) and other disadvantaged groups to access higher education, and this scheme was abandoned in the late 1980s because of low recovery rates. With the introduction of restructured student loans scheme in the mid-1990s, it was popularised as an important funding method for costly higher and technical education. In fact, several committees in the 1990s recommended increasing access to student loans to meet the escalating household costs of higher education, particularly the technical and professional courses. For example, the Punnayya Committee Report (UGC, 1993) and the Swaminathan Committee Report (AICTE, 1994) recommended revitalising student loans scheme in India to fund higher education. Likewise, the Ambani-Birla Committee (GOI, 2000) advised the user-pay principle in higher education and recommended supporting students from

economically and socially disadvantaged groups through student loans. The tenth (mid-term appraisal document) and eleventh five-year plan also stressed attracting students from underprivileged backgrounds to higher education by providing financial support through student loans (NUEPA, 2008). Following these recommendations, student loan schemes started operating strongly in scheduled commercial banks in India, which expanded considerably over time.

Student loan is an important funding mechanism for higher education worldwide, yet it remains unclear how the socioeconomic positions of students matter in accessing student loans, specifically in developing countries that have experienced considerable private sector involvement in higher education. We find limited studies that examine the recent growth of the student loans market in India using the latest data. Also, only a few studies have analysed the student loan financing of engineering education, a costly course to pursue in India. Studies unfolding the complexities students face while accessing student loans, particularly those who belong to socially and economically backward communities, are sparse in the literature. This paper combines the most recent secondary data and a primary survey data from Odisha, an eastern state of India, to examine the recent growth of student loans market, regional patterns in its expansion, socioeconomic inequality in accessing student loans for engineering education, and more importantly, students' experiences in accessing loans from commercial banks.

The paper is organised as follows. The next section provides an overview of the existing literature on loan financing of higher education. Section III describes our data. Section IV discusses the results and findings of the secondary data analysis. Using primary student survey data, section V presents evidence on students' experiences in accessing loans from commercial banks in financing engineering education in Odisha. We conclude in section VI by discussing the suggestions for future research and policy implications.

Loan Financing of Higher Education: What Do We Know So Far?

Currently operating in several countries, student loans scheme has emerged as one of the important alternative sources of financing higher education globally. It has been advocated as an innovative financing method that reduces the financial burden of funding higher education on the state and improves access to higher education (Woodhall, 1987, 1992; Johnstone, 2005). Also, financing through student loans helps students pay their fees and relieves their parents and general taxpayers of the financial burden in accessing higher education (Ziderman, 2002; Narayana, 2005). Many studies have argued in favour of and against student loans by comparing them with other methods of financing such as grants, deregulation of fees, graduate tax, education vouchers, and tax financing (Woodhall, 1989; Tilak & Varghese, 1991; Mathew, 1996; Tilak, 1992, 2007; Chattopadhyay, 2015). It is argued that increased private sector participation and escalating costs have made it difficult for socially and economically disadvantaged students to pursue higher education, and student loans is considered an important channel to fund their higher education.

However, the experience of many developing and developed countries indicates serious weaknesses associated with student loans, as discussed in several studies (Millett, 2003; Tilak, 1992, 2007; Panigrahi, 2022). For example, households feel that educational loans taken for a girl child would be an extra burden for them in addition to the dowry they pay at the time of her marriage. The situation worsens in a patriarchal society such as India, where

dowry is a worryingly pervasive phenomenon. Moreover, it is found that loans would put psychological pressure on students during their studies which deters them from attending classes regularly, impacting the quality of learning, especially for first-generation learners (Millett, 2003; Tilak, 2007). Tilak (1992 & 1999) has discussed that access to loans is guided more by ability to repay (mortgages, security, and collateral) than by the educational merit or the economic need of the borrower. Thus, student loan tends to restrict (rather than enabling) in accessing higher education for economically weaker students (Tilak, 2007). A recent study by Panigrahi (2022), in the context of Odisha, finds that though student loan aims to ensure access to higher education for needy students, practices exercised by commercial banks deter these students in accessing it. Commercial banks give significant weightage to the economically well-off applicants while sanctioning loans, as they might repay the loans timely.

While much research has focussed on the problems related to the student loan system in India, some studies have discussed the benefits of student loans in higher education, including the increase in student enrolment, reduction of dropout, and improvement in equity (Melguizo *et al.*, 2016; Mateos-González & Wakeling 2020; Black *et al.*, 2020). A few studies (Puttaswamaiah, 2010; Rani, 2016; Panigrahi, 2022) have found that with the increasing costs of higher education, student loans schemes are gaining prominence in funding, particularly for costly courses like engineering and medicine in India. Rani (2016) finds that number of education loan accounts rose from 0.11 million in 2000-01 to 2.59 million in 2013-14, and the amount of loan increased from ₹ 10,280 million to ₹ 7,02,820 million in this period.

Until recently, the literature on student loans financing of higher education in India focuses in mapping its expansion and highlighting its merits and demerits. Studies examining the socioeconomic inequalities in access to student loans and the difficulties students face in processing student loans applications and the issues associated with its repayment are limited. Similarly, studies focussing on engineering education, a costly discipline in higher education, are sparse in India, except a recent study by Tilak, 2020. Given the absence of new and updated research on loan financing of technical and professional higher education in India, this study examines the recent growth of student loans market, regional patterns in its expansion, and the socioeconomic inequality in accessing student loans in engineering education. We also discuss the procedural difficulties students face while availing loans from commercial banks.

A Note on Data

This paper uses the most recent secondary data and a primary survey data from Odisha to examine the student loans in financing engineering education in India.

Secondary data sources

(a) The *statistical tables relating to banks in India* (from 2004-05 to 2020-21) is published by the Reserve Bank of India (RBI), India's central bank and regulatory body of commercial banks. This dataset provides information on the number of active education loan accounts in India and the outstanding loan amount by commercial banks and states. This data is used to analyse the growth of student loan accounts and outstanding amount and its regional distribution.

(b) Unit-level data from the 75th education round (*Household Social Consumption: Education)* of the *National Statistical Office* (NSO), Ministry of Statistics and Programme Implementation, Government of India, was collected between July 2017 and June 2018. This is a nationally representative household survey data which includes a sample of 1,13,757 households (64,519 rural and 49,238 urban households). More importantly, starting from this round, information is collected on the sources of funding education for the currently enrolled students, and 'educational loan' is listed as a source. By restricting the sample to students accessing higher education, we analysed the socioeconomic inequality in access to educational loans in higher education.
(c) Data on student enrolment in higher education is taken from publications by the Ministry of Human Resource and Development, and Ministry of Education (MoE), Government of India. This data is used to relate the student loan figures with the growth of higher education in India.

Primary survey

While the secondary data provides an overview of the recent growth of student loans market, regional patterns in its expansion, socioeconomic inequality in access to student loans in India; the primary survey aims to understand students' experiences, particularly the procedural difficulties in availing student loans from commercial banks in engineering education. The primary survey was conducted in four districts (Keonjhar, Bhadrak, Khordha, and Balasore) of Odisha, covering a sample of 588 final-year students pursuing BTech courses in 10 undergraduate engineering colleges. Of the 92 undergraduate engineering colleges offering B.Tech in Odisha in 2021-22, 84 are privately managed. The share of private engineering institutions in Odisha is 91.3 per cent, and the share of students enrolled in these institutions is 89.1 per cent in 2021-22 (AICTE, 2023). Interestingly, Khordha district alone has 58 engineering colleges (one government, two government-aided, and 55 private). There are five colleges (all private) in Balasore, one private college in Bhadrak, and one government college in Keonjhar. Of the 65 colleges from these four districts, ten (eight private and two government) were included in the survey — five from Khordha, three from Balasore and one each from Bhadrak and Keonjhar districts.

While the selection of the sample districts was purposive, colleges and students were chosen randomly. Selection of colleges for the survey was done through stratified random sampling where the strata were management type, i.e., government or private. Details of sampled colleges included in the study are given in Table A1 in the appendix. Of the total students surveyed (i.e., 588), 130 students (22.6 per cent) were from government institutions, and 458 students (77.4 per cent) were from private institutions (Table 1). Two-thirds of students were from traditional departments of study (mechanical, civil, and electrical engineering), and the remaining one-third were from IT-related departments such as computer science and engineering, electronics and communication engineering, and information technology. About one-third of students were female — their share accounting for 40 per cent in government institutions and 29 per cent in private institutions. Around 15 per cent of students were from Scheduled Castes and Scheduled Tribes, 30 per cent from Other Backward Classes (OBC), and 55 per cent from upper castes.

A student questionnaire was administered to collect information on socioeconomic profile of the students, their academic background, college details, household expenditure on engineering education, and information on student loans. Additionally, to analyse the

procedural difficulties of availing student loans, in-depth interviews with 40 students were conducted, comprising a few who have either applied for student loans or received loans for their course. The main focus of the interview was to understand the information asymmetry existing in the student loans market and the procedural difficulties students face in accessing student loans from commercial banks.

TABLE 1

Sampled Students by Type of Institution Across Gender, Caste, Religion and Location

Institution Type	*Gender*		*Caste*			*Residence*		*Total*
	Male	*Female*	*SC/ST*	*OBC*	*Gen*	*Rural*	*Urban*	
Govt.	78	52	21	27	82	59	71	130
	(60.0)	(40.0)	(16.1)	(20.8)	(63.1)	(45.4)	(54.6)	(22.6)
Private	324	134	69	150	239	299	159	458
	(70.7)	(29.3)	(15.1)	(32.8)	(52.1)	(65.3)	(34.7)	(77.4)
Total	402	186	90	177	321	358	230	588
	(68.3)	(31.6)	(15.3)	(30.1)	(54.6)	(60.9)	(39.1)	(100)

Source: Author's calculation from the survey data
Note: Figures in the parentheses are the percentage share of students.

The findings of the study are discussed in two sections. First, using secondary data, we analyse the growth of the student loans market in India, and the gender and socioeconomic inequality in accessing student loans in higher education in India. Second, the primary survey data was used to discuss the socioeconomic and institutional inequalities in student loan applications, profile of those who received loans, and the detail of loan amount received for engineering education in Odisha. In addition, we discuss the experiences of engineering students on information asymmetry in the student loan market and the procedural difficulties they face in accessing loans, using the information collected from an in-depth interview of 40 students.

Growth of Student Loans in India

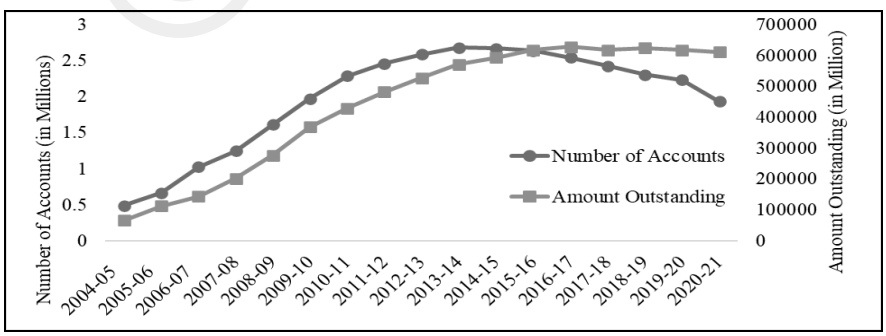
We find substantial growth in student loan accounts and the sanctioned loan amount during the last one and half decades. Between 2004–05 and 2020–21, the number of student loan accounts rose by about four times, from 0.49 million to 1.94 million (see Figure 1). Also, the outstanding loan amount marked a significant increase, about nine times, i.e., from ₹66,940 million to ₹61,2130 million. However, there was a steady growth of both loan accounts and loan amount till 2014-15, declined afterwards, and a sharp fall in the number of accounts was observed after 2014-15. The annual average growth rate of student loan accounts was 53.7 per cent during 2006-07, and it started declining afterwards. In 2020-21, there was a sharp fall of 13 per cent in student loan accounts, the highest in 15 years. It is important to find out the reasons for the decline in both the loan accounts and the

sanctioned loan amount, specifically to look at whether this decline is due to the supply or demand side factors. While we do not have adequate data to examine this in this paper, some recent studies in India find that there has been a declining demand for student loans due to the gloomy career prospects of graduates, particularly in technical higher education (Rani, 2016; Tilak and Choudhury, 2021; Panigrahi, 2022). It becomes difficult for graduates to pay the loan amount as their earnings are low, even if they get a job. In fact, studies find increased Non-Performing Assets (NPA) in education loans in commercial banks due to high non-repayment rates (Chitra, 2019).

Secondary data on the growth and patterns of student loans in engineering education is unavailable in India. However, we found an interesting study by Tilak (2020), which looked at the socioeconomic and institutional profile of students who received loans and the factors determining students' decision to avail loans. This study uses a large-scale survey covering about 7,000 students from 48 engineering colleges in four states — Delhi, Maharashtra, Karnataka and Tamil Nadu. The study finds that around 10.3 per cent of the total engineering students received educational loans, with slight inter-institutional differences — 11.2 per cent of students attending private engineering institutions availed loans compared to 8.4 per cent in government institutions (ibid: 206)). Similarly, this share was higher for the students attending traditional engineering disciplines such as mechanical, civil and electrical engineering (11.2 per cent) than those enrolled in Modern/IT-related courses like computer science, electronics and communication and information technology (9.9 percent). The average loan amount received by the engineering graduates was reported to be ₹80,290, with institutional and subject-wise differences. Interestingly, access to education loans and the average amount received also vary by socioeconomic profile of the students. For example, the share of students from low-income households who received education loans is 15.7 percent compared to only 2.9 percent of their high-income counterparts. However, the loan amount received was higher for rich applicants (₹1,08,330) than their poor counterparts (₹61,510). Tilak (2020) study reveals a few interesting socioeconomic patterns in access to student loans for engineering education, and it is important to unpack this story with more research.

FIGURE 1

Growth of Student Loan Accounts and Outstanding Amount in India



Source: Author's estimation from statistical tables relating to Banks in India, Reserve Bank of India

Student loan accounts increased at a compound annual average growth rate of 10.6 per cent between 2004-05 and 2020-21, and the corresponding growth rate of the outstanding loan amount was 15.9 per cent in this period (see Table 2). Moreover, the growth rate of student enrolment in higher education was 7.5 per cent between 2004-05 and 2020-21. The sanctioned loan amount per student has increased from ₹5,137 to ₹16,037 in this period, with a growth rate of 7.9 per cent. Data also reveal that the proportion of loan accounts to student enrolment increased from 3.8 per cent in 2004-05 to 5.8 per cent in 2019-20. In 2009-10, this share was the highest (9.5 per cent). Overall, the evidence suggests an appreciable growth of student loans in India since 2004-05.

TABLE 2

Growth of Student Loans in India

	Number of Accounts (in million)	*Growth Rate (Accounts)*	*Amount Outstanding (in million)*	*Growth Rate (Amount)*	*Higher Education Enrolment (in million)*	*Per-Student Amount*	*A/c Share to Enrolment*
2004-05	0.49	---	66940	---	13.03	5137	3.76
2005-06	0.67	36.55	112960	68.75	14.32	7887	4.67
2006-07	1.03	53.54	143910	27.39	15.55	9253	6.6
2007-08	1.25	21.52	202580	40.77	17.21	11771	7.25
2008-09	1.61	29.38	277470	36.96	18.50	14998	8.72
2009-10	1.97	22.23	369240	33.07	20.74	17803	9.51
2010-11	2.29	16.01	429930	16.44	27.50	15634	8.32
2011-12	2.46	7.71	482200	12.16	29.18	16523	8.44
2012-13	2.59	5.11	527390	9.37	30.15	17491	8.59
2013-14	2.68	3.53	571640	8.39	32.34	17678	8.29
2014-15	2.67	-0.37	593360	3.8	34.21	17344	7.81
2015-16	2.63	-1.3	618310	4.2	34.58	17878	7.62
2016-17	2.55	-3.39	628540	1.65	35.71	17603	7.13
2017-18	2.43	-4.7	617730	-1.72	36.64	16858	6.62
2018-19	2.31	-4.93	624560	1.11	37.40	16700	6.17
2019-20	2.23	-3.2	618020	-1.05	38.54	16037	5.8
CAGR	10.65	---	15.97	---	7.5	7.89	---

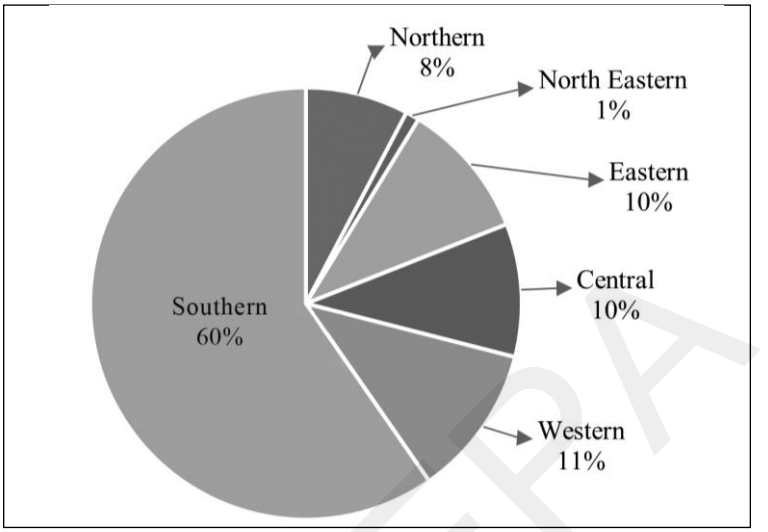
Source: Author's estimation from Reserve Bank of India and Ministry of Education, Government of India data.

Do regional variations exist in the growth of the student loans market in India? This is an important question to explore as regional imbalances in expanding professional higher education remain a major concern in India. In 2021-22, for example, southern region (including Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu, and Puducherry) alone holds almost 37.4 per cent of India's HEIs offering courses in medicine, engineering, law & management. In contrast, ten states and two union territories from the eastern and northern regions (Bihar, Jharkhand, Odisha, West Bengal, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttarakhand, Uttar Pradesh, Delhi, and Chandigarh) have about 30 per cent of such institutions. Similarly, less than two per cent of professional HEIs are situated in the eight northeastern states – including Assam, Manipur, Meghalaya, Sikkim, and Tripura (AISHE, 2024). We find that the southern region (Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu, and Puducherry), with 21 per cent of India's total population, alone has about 60 per cent of total student loan accounts in India (see Figure 2). Student loan accounts in the southern region increased from 0.29 million in 2004-05 to 1.15 million in 2020-21, an annual average growth rate of 8.9 per cent. On the other hand, ten states and two union territories from the eastern and northern regions, accounting for 45.3 per cent of India's population, have only about 18 per cent of the country's total student loan accounts. That is, we find a direct association between the availability of professional HEIs and the loan accounts in different regions in India.

We find significant state-wise variations in student loan accounts and outstanding loan amount in 2020-21. Tamil Nadu registered the highest number of student loan accounts (0.55 million) and the outstanding loan amount (₹1,27,570 million) in the country (see Figure 3). Of the total loan accounts in India, the share of Tamil Nadu alone was 28.5 per cent in 2020-21 (Figure 4). Southern and western states like Kerala, Maharashtra, Karnataka, and Andhra Pradesh also have a significant number of loan accounts. For instance, Kerala has 0.29 million student loan accounts (Figure 3), and its share in total loan accounts is 15.2 per cent (Figure 4). However, states/UTs such as Chandigarh, Goa, Puducherry, and Himachal Pradesh are at the bottom in both student loan accounts and outstanding loan amount. Between 2004-05 and 2020-21, a few eastern states like Bihar, and Jharkhand registered significant growth in loan accounts and loan amount, while the growth rate of northern states like Delhi, Punjab and Uttar Pradesh was considerably low. In Odisha, the loan account has increased by 3.67 times (from 9,762 to 35,839) between 2004-05 and 2020-21. Further, the loan amount outstanding was ₹1,180 million in 2004-05, which increased to ₹13,126 million in 2020-21. In this period, the annual average growth rate of the loan account and outstanding loan amount were 8.5 per cent and 16.2 per cent, respectively, in Odisha. Overall, we find considerable regional and state variations in the growth of student loan accounts and sanctioned loan amount between 2004-05 and 2020-21, and more research is needed to unpack the story better.

FIGURE 2

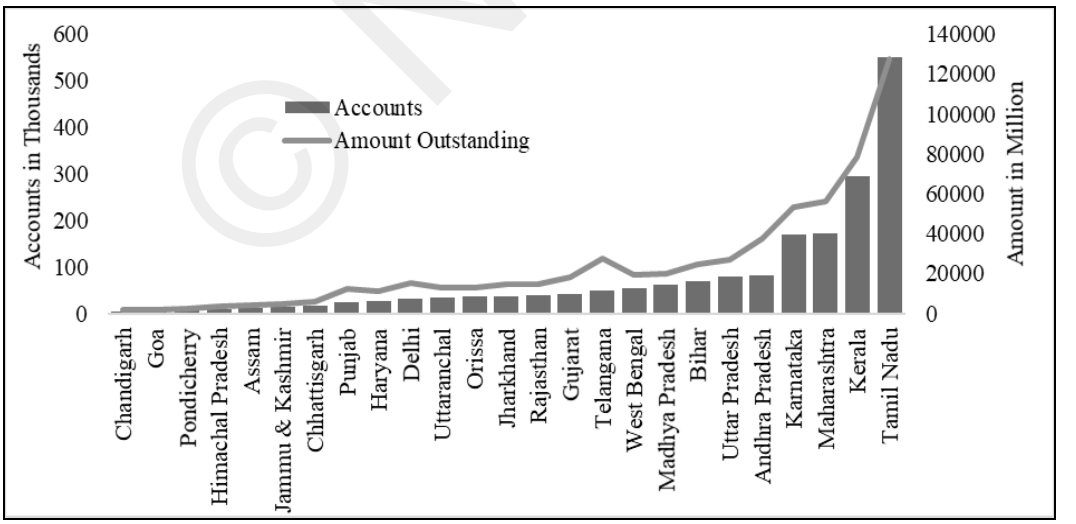
Region-Wise Share of Student Loan Accounts in India, 2020-21



Source: Author's estimation from statistical tables relating to Banks in India, Reserve Bank of India

FIGURE 3

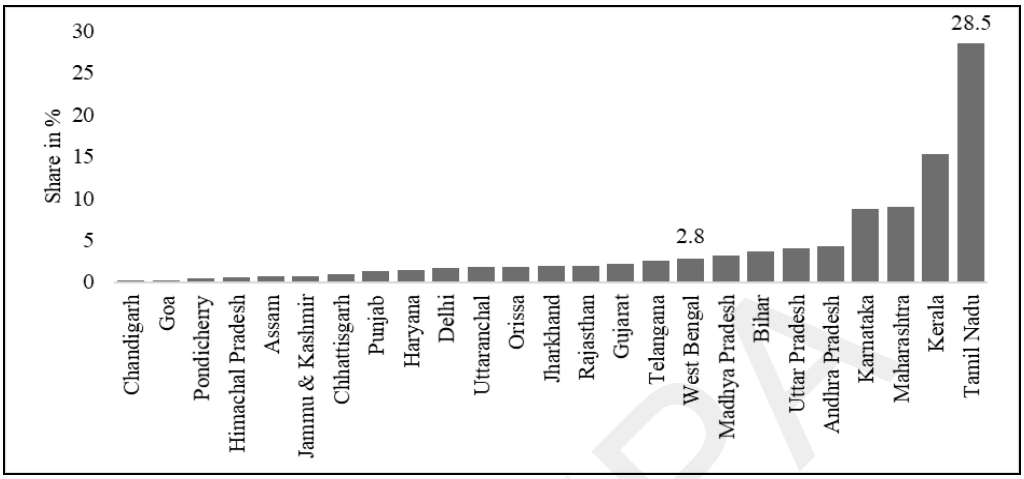
Student Loan Account and Loan Amount by Major States, 2020-21



Source: Author's estimation from statistical tables relating to Banks in India, Reserve Bank of India

FIGURE 4

Major State-Wise Share of Student Loan Accounts in India, 2020-21

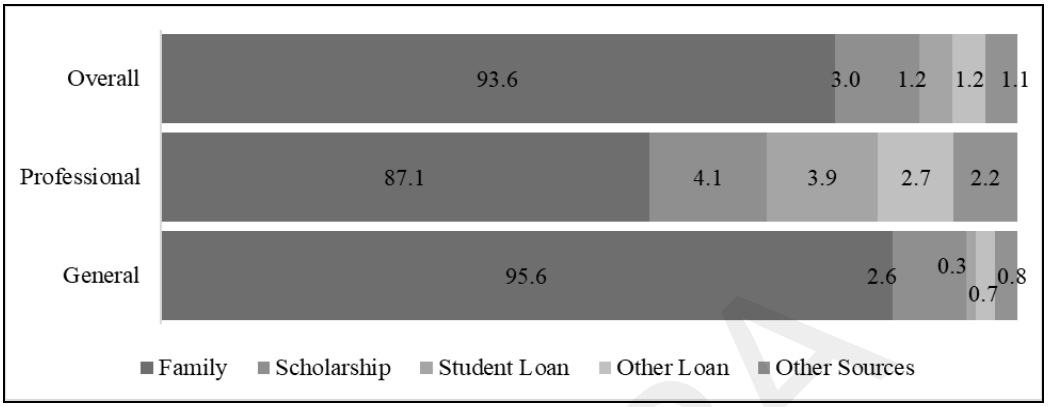


Source: Author's estimation from statistical tables relating to Banks in India, Reserve Bank of India

In NSO 75th round education data (conducted in 2017-18), funding sources for students enrolled in HEIs were reported. The funding sources listed in the survey were – earnings of the student, other household members, erstwhile household members, gifts from friends/relatives, scholarships from educational institutions, scholarships from government, scholarships from charitable and other organisations, *educational loan*, other loans, and others. To get a broader picture of how higher education courses are funded by students, we combined funding sources into five major groups – family (includes student earnings, support from household members, and gifts from friends/relatives), scholarship, student loans, other loans, and other sources. We find that a significant share of students (93.6 per cent) funded their higher education through family support, followed by scholarships (3 per cent), student loans (1.2 per cent), other loans (1.2 per cent), and other sources (1.1 per cent) (see Figure 5). These funding sources vary between those pursuing general and professional higher education courses. For instance, a relatively higher share of graduates pursuing professional courses (medicine, engineering, agriculture, law, management, education, chartered accountancy, IT/computer) (3.9 per cent) funded their higher education through student loans than those who pursued general HE courses (science, commerce, humanities and social sciences) (0.3 per cent). Additionally, looking at the loan funding of higher education for different courses reveals some interesting insights. In 2017-18, the highest share of students availing student loans was in engineering (6.1 per cent), followed by medicine (4.6 per cent) and management courses (3.8 per cent) (see Figure 6). However, the share of graduates availing student loans in general HE courses was negligible. For instance, only 0.1 per cent and 0.3 per cent of the students pursuing humanities and commerce courses availed student loans, respectively. Interestingly, students pursuing engineering education have availed student loans the most among all courses in higher education.

FIGURE 5

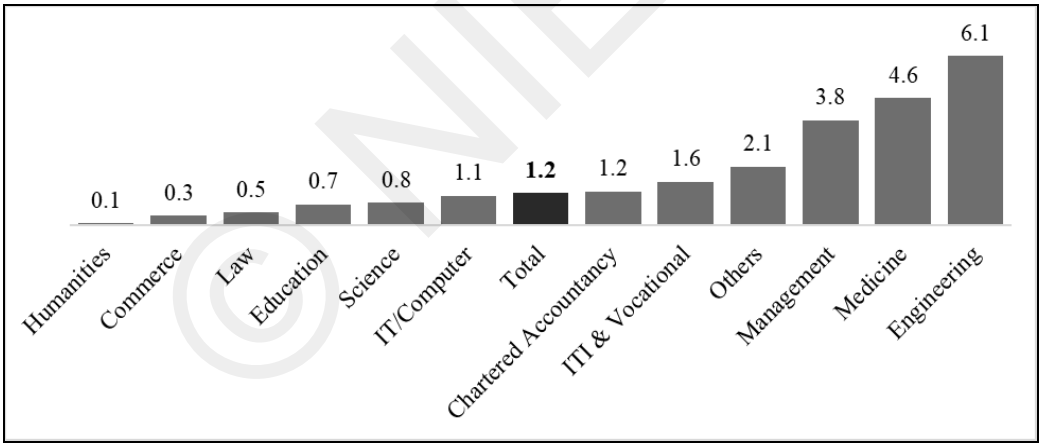
Source of Funding the Expenditure on Higher Education in India



Source: Author's estimation from NSO 75th round unit-level data, 2017-18

FIGURE 6

Share of Students Availing Student Loans in Different Courses in Higher Education in India



Source: Author's estimation from NSO 75th round unit-level data, 2017-18

We find considerable gender and socioeconomic inequality in accessing student loans in India, in both general and professional higher education. For instance, more male students in professional courses availed student loans (5.5 per cent) compared to their female counterparts (4.8 per cent) (see Table 3). Distribution of student loans for different caste groups reveals an interesting pattern – fewer shares of ST and SC students in overall higher education have availed student loans than OBC and UC students, but this is not the case for professional courses. We also find that about 5.6 per cent of students in PHE from rural areas

availed student loans, which is slightly higher than those from urban areas. The share of students accessing student loans also varies widely by institution type. Around 6.3 per cent of the students enrolled in private professional HE institutions are getting student loans, which is considerably higher than those studying in government institutions (1.7 per cent). This gap may be due to a substantial inter-institutional fee gap, which is relatively high in private institutions that compels students to access student loans. Choudhury and Kumar (2022b), using the latest NSO data, find that private unaided institutions charge ₹62.2 thousand as tuition fee for professional courses, considerably higher than the tuition fee charged by government institutions (₹32.5 thousand). More importantly, 5.4 per cent of students from the highest consumption quintile (Q5), the richest households, avail student loans, while this share is 3.7 per cent for the lowest consumption quintile (Q1), the poorest households. While the NSO data showed the inequality in access to student loans in numbers, analysis from the primary survey in Odisha tells the story better, specifically with a discussion on inequalities in students experiences in availing student loans from commercial banks for engineering education, which is discussed in the following section.

TABLE 3

Share of Students Availing Student Loans in Higher Education in India (2017-18)

		Overall Higher Education	*Professional Courses*
Gender	Female	1.37	4.82
	Male	1.67	5.51
	ST	0.30	1.94
Caste	SC	1.00	4.85
	OBC	2.04	6.64
	UC	1.39	4.23
Religion	Hindu	1.60	5.46
	Muslim	0.77	3.62
	Others	2.01	4.60
Native Location	Rural	0.91	5.62
	Urban	2.34	5.04
Consumption Quintile	Q1 (Poorest)	0.37	3.68
	Q5 (Richest)	2.49	5.35
Institution Type	Government	0.26	1.74
	Private	2.64	6.32
Total		**1.55**	**5.24**

Source: Compiled by the research scholar from NSO 75th round unit-level data, 2017-18

Student Loans in Financing Engineering Education in Odisha

Of the total respondents, only 17 per cent of students applied for educational loans. More importantly, less than 30 per cent of students who applied for student loans were successful in their loan applications (Table 2). Why have a significantly small number of students applied for loans, even if they need to pay a substantial amount (₹1.20 lakh per annum that accounts 30 per cent of the annual average family income) for their course? Why were only 30 per cent of the student loan applicants granted loans? These are some of the leading questions that are discussed in this section.

The findings of the study are discussed in two parts. Part I has focussed on analysing the socioeconomic inequalities in access to student loans for engineering education – both in terms of those who applied for it and who got it. Part II discusses students' experiences in accessing loans from commercial banks, with a focus on the information asymmetry and procedural difficulties.

Part I: Access to Student Loans

The socioeconomic and institutional profile of engineering students who applied for student loans in Odisha vary significantly. For instance, around three-fourth of students who applied for student loans are from private engineering institutions (Table 4). Of the total students from government colleges, 15.7 per cent have applied for loans, while this figure is 20 per cent for private college-going students, more students enrolled in private engineering colleges opted for loans as compared to government colleges. The inter-institutional fee gap may drive this, as private colleges charge significantly higher fee for engineering courses than government colleges. It is evident that a student's socioeconomic profile plays a critical role in accessing student loans in India. Of the total students who applied for student loans, three-fourths were male (column share, Table 4); within male students, nearly 20 per cent applied for student loans, and the corresponding figure for females was 13 per cent (row share, Table 4). Similarly, of the 588 students surveyed, around 61 per cent from rural areas applied for loans, and this share is 38.3 per cent in urban areas. As expected, share of students who applied for loans decreases with increased family income. While around 34 per cent of applicants were from lower-income households, the corresponding figure was only 20 per cent for higher-income families.[1] Usually, it is viewed that students from well-off families can spend money from their own funds and, hence, may not require loans.

[1] Household's economic status was classified into four based on the annual family income reported by the students in the survey. These are lower (annual family income of less than ₹1,20,00), lower-middle (annual family income of in the range of ₹1,20,001 to ₹3,00,000), middle (annual family income in the range of ₹3,00,001 to ₹6,00,000), and higher (annual family income of more than ₹6,00,000).

TABLE 4

Access to Student Loans by Socioeconomic & Institutional Factors

	% Applied Loan		*% Granted Loan****		*Average Loan Amount (for the entire course)*
	*(Row)**	*(Column)***	*(Row)**	*(Column)***	*(in ₹)*
Gender					
Male	18.4	75.5	32.4	82.8	106648
Female	12.9	24.5	20.8	17.2	47312
Social Group					
SC/ST	15.6	14.3	7.1	3.5	54224
OBC	18.6	33.7	33.3	37.9	114256
UC	15.9	52.0	33.3	58.6	82768
Location					
Rural	26.8	61.2	23.3	38.3	82816
Urban	16.5	38.8	39.5	61.7	95760
Type of Institution					
Government	15.7	26.5	34.6	31.0	114952
Private	20.0	73.5	17.8	69.0	80192
Discipline of Study					
Traditional	17.7	70.4	21.7	45.3	67568
IT-Related	14.7	29.6	48.3	54.7	127880
Economic Status					
Lower	23.6	33.7	21.2	24.1	68456
Lower-middle	18.4	23.5	30.4	24.1	69800
Upper-middle	14.7	22.5	36.4	27.6	98800
Higher	12.1	20.4	35.0	24.1	127264
Total	**16.7**	**100**	**29.6**	**100**	**87880**

Source: Author's calculation from the primary survey data in Odisha

Notes: *=Row percentage is out of the total respective population of a variable.

**=Column percentage is out of total loan applications.

***=The percentage of students granted loans is out of those who applied.

Students who had applied for loans were asked an additional question, i.e., whether they were granted student loans. Findings indicate that less than one-third of students who applied for student loans were granted loans. Interestingly, only 22 per cent of total applicants from traditional departments (mechanical, civil, electrical) got loans, while this share is 48 per cent for IT-related courses. Preference of commercial banks to give loans for IT graduates (studying computer science, electronics and communication, and information technology) could be associated with the employment prospects of graduates, thereby timely repayment of loans, driven by the expansion of the IT sector, which has been visible in the last two decades in India. Likewise, more engineering graduates from government

colleges got loans (34.6 per cent) than their private counterparts (17.8 per cent), which can be linked to the difference in the quality of education imparted in these two types of institutions which is closely linked to students' employability. Thus, even when more students from private colleges are applying for loans, commercial banks refrain from sanctioning loans to them.

Substantial variation is observed between male and female students who have received loans (32.4 per cent vs 20.8 per cent). It is widely argued that loans work as a "negative dowry" in India and have adverse effects on the enrolment of girls in higher education (Tilak 2007, 2020). In a patriarchal society such as India, there is a pro-male bias in family investment in education, particularly in costly technical higher education (Choudhury and Kumar, 2022a, 2022b). As expected, many students who got loans were from upper caste (59 per cent), followed by OBC (38 per cent) and SC/ST (3.5 per cent). The fact that more students from upper-middle and higher-income households received loans (36 per cent and 35 per cent, respectively) as compared to lower- and lower-middle-class households (21 per cent and 30 per cent, respectively); reveals that the existing student loan schemes do not justify its primary objective of giving greater access to higher education to students from low-income households.

How much money have engineering students received from commercial banks as loans in Odisha? How is it linked with the socioeconomic and institutional profile of the students? On average, engineering graduates in Odisha have received ₹87,880 as loans during their program of study, which covers less than 20 per cent of their total expenses for the course, which is ₹473.6 thousand for four years. Here, we discuss the socioeconomic and institutional variations in receiving loan amount by students. We find that the annual average loan amount received by government institutions is higher (₹114.9 thousand) than those enrolled in private engineering colleges (₹82.7 thousand). It is widely observed that commercial banks prefer to lend more money to the students of government HEIs as they get better employment opportunities after completing the course and, therefore, repay the loan timely. Likewise, a student pursuing IT-related courses (computer science, IT, electronics, and communication engineering) has received almost double the loan amount than a student pursuing a traditional course (civil, mechanical, and electrical engineering), i.e., ₹127.8 thousand and ₹67.5 thousand, respectively. The survey results show a pro-male bias in providing loan amounts by the commercial banks – the annual average amount of loan received by a male student (₹106.6 thousand) is more than two times as compared to a female student, which is ₹47.3 thousand. The amount of loans received by students of different social groups also varies significantly. Students from upper castes and OBCs are granted 1.5 times and 2.1 times more loan amount than SC/ST students. Adhikari (2016) argues that banks facilitate student loans for rich and upper-caste students, not benefiting SCs because of insufficient collateral. Loan amounts received by students are expected to be negatively associated with their family income, i.e., poor students require relatively more loans to finance their education than their affluent counterparts. However, our results find that banks have provided higher amounts of loans to rich students (Table 2), which is in line with the findings of Rani (2016).

Therefore, in both cases (granting of a loan and the amount paid), it is evident that commercial banks exercise discriminatory practices in giving student loans based on socioeconomic and institutional position of a student. Though more needy students apply for loans, they are discouraged by commercial banks even if they face financial hardship to fund

their education. The next part of this section discusses the problems students face in availing loans from commercial banks and the suggestions they have made to make the system effective. Additionally, the information collected from the students on sources of awareness on loans, major problems faced by students while availing loans, and reasons for the rejection of their loan applications through student questionnaire are included in the discussion. The information collected from 40 students through an intensive interview forms the major source of this discussion. Since available studies on student loans in India have focused on the inequality in accessing loans by socioeconomic background of the students, analysis in this part would unfold inequalities in experiences of students, least said in the student loans literature.

Part II: Understanding Students' Experiences in Accessing Student Loans

In the survey, engineering students were asked to report four important sets of information to understand their experiences in accessing student loans: (a) reasons for not applying for student loans, (b) sources of information about student loans, (c) reasons for the rejection of student loans applications, and (d) major issues faced by students in availing student loans. Interestingly, the three most important factors mentioned by the students for not applying student loans are — lack of awareness about the scheme, tedious documentation process, and lack of collateral. Among the students who have applied for loans, the major source of information was 'parents or relatives' (31 per cent), followed by teachers or college staff (27 per cent) and internet/television (17 per cent) (Figure 7). The initiative of an institution-bank tie-up to make students aware of student loans is ineffective in several engineering colleges included in the survey. A respondent studying in a private college said:

> I learned about student loans in my fourth year, and then I applied for a loan, which the bank rejected as they do not grant loans to final-year students. Therefore, we should get the required information on student loan schemes timely so that needy students can use such facilities to finance their education.

Around 20 per cent of respondents cited tedious documentation procedure as the reason for not applying for student loans. When we asked about specific difficulties, a student participant thus responded:

> I did not apply for student loans because of the time-consuming documentation process. The waiting period between submitting the application and sanctioning the loan is prolonged. After listening to the experiences of my friends and seniors in my college, I was discouraged from applying for a loan. If the documentation process is made easier with a short sanctioning period, it would be convenient for a student to secure a loan.

In another case, a female respondent from a rural area decided not to avail student loan after experiencing some tussle with bank staff during the application process. Describing her plight, she mentioned:

> The 'Bank A' is a reputed bank in our area,[2] but their staff are not friendly/professional. When I initially approached the branch to apply for a student

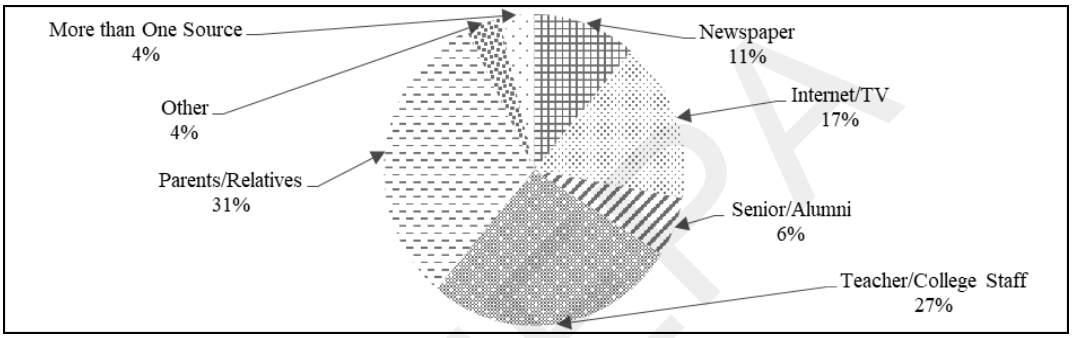
[2] The Original name of the bank is changed to maintain anonymity.

loan, the staff asked me to arrange the required documents and come back the following week. However, when I arrived on the mentioned date, the staff kept postponing it. After experiencing this, I had no other option but to opt out.

These experiences reveal how availing of a loan can become a daunting task for students because of the tedious process and the need for so many documents by commercial banks. Several students withdrew their loan applications during the process due to the difficulties they faced.

FIGURE 7

Sources of Information for Student Loans



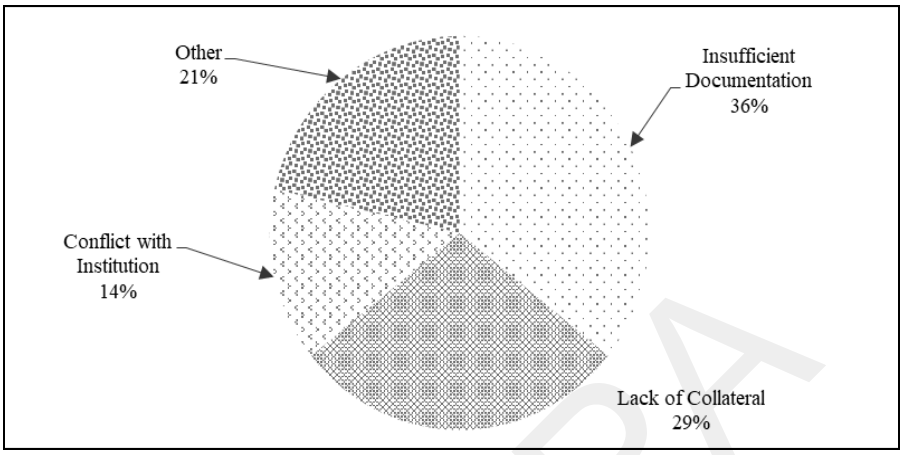
Source: Author's calculation from the primary survey data in Odisha

Why was your loan application rejected? This question was asked to the students who had applied for loans, but the bank rejected their application. The most cited reason for rejection was insufficient documentation (36 per cent), followed by a lack of collateral (29 per cent) and conflict with the institution (14 per cent) (Figure 8). However, students repeatedly expressed the discriminatory practices of sanctioning loans by commercial banks (prefer students from rich and upper caste households) and do not benefit students from socioeconomically disadvantaged groups. In this context, a lower-caste student enrolled in a private engineering college said:

> Banks should not ask for any collateral in granting student loans. I enrolled in a private engineering college with the expectation of getting student loan from commercial banks to pay my fees. But I failed to get the loan as I could not arrange collateral. My family is facing hardship in paying my fees, and there is ahigh chance that I will be dropped out of the course.

FIGURE 8

Reasons for the Rejection of Student Loan Applications



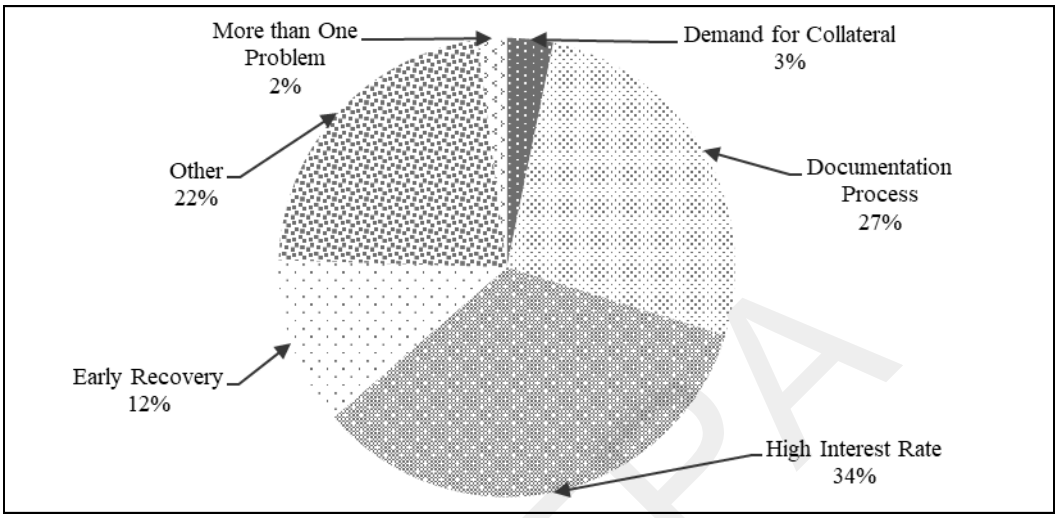
Source: Author's calculation from the primary survey data in Odisha

More than one-third of the students found high interest rates to be a major issue in availing of student loans (Figure 9). The documentation process was another major challenge for students. A few other issues students face include demand for collateral, early recovery etc. In addition, parental income, education, and occupation were found to determine banks' decision to grant student loans. As experienced by graduates, banks prefer to grant loans to those students whose parents have a high income, good mortgage value, and government jobs. A respondent said:

> My loan application was unsuccessful as my parents do not have a government job, and banks recognise this as a problem of non-repayment in the future. Even though I produced all my credentials to the bank, they did not offer me a loan; to continue my studies, my parents got some private loans from relatives with high interest rates.

FIGURE 9

Major Issues Faced by Students in Availing Loans



Source: Author's calculation from the primary survey data in Odisha

Once the loan is sanctioned, students face problems such as stress, the burden of repayment, academic performance pressure, and job expectations. Sharing the anxiety, a female student who has got a loan mentioned that:

> Given the gloomy labour market for engineering graduates, I am worried about repaying my loan after completing the course. However, the bank demands for timely repayment of the loan, and charges high interest rates after the given time limit, which worsens the situation. Thinking about the repayment of loan hamper my study as well.

Thus, the pressure of securing a job after studies becomes much more pronounced among the students who availed loans. These problems can translate into mental health issues and emotional problems among the students. Given the uncertainties of the labour market, it becomes difficult for students to repay the loan after completing the course. Usually, commercial banks consider student loans to be a business despite the government's good intentions of introducing this funding mechanism (*Times of India*, 2012; Adhikari, 2016).

Conclusion

This paper combines the most recent secondary data and a primary survey data from Odisha to examine the student loan financing of engineering education in India. The study discusses the recent growth of student loans market, regional patterns in its expansion, and the socioeconomic inequality in accessing student loans for engineering education in India. Additionally, we also discuss students' experiences in accessing loans from commercial

banks for engineering courses. We find a notable increase in both the sanctioned loan amount and student loan accounts in the last two decades, albeit with significant regional differences. Data also reflects considerable socioeconomic and institutional inequalities in access to student loans for engineering education. Suggestive evidence shows that procedures involved in availing student loans are pretty complex, discouraging needy students from availing it, even if several of them have limited resources to fund their education.

Findings of this study open many interesting directions for future research to unfold many more complexities in student loans market in India. Examining the student loan market for other costly disciplines, such as medicine and management, from a comparative perspective is interesting, as this study focuses on engineering education. Similarly, future research should explore bankers' perspectives on student loans to understand the issue from the supply side, as most studies have primarily focussed on demand-side aspects, including this one. Also, a comparative analysis of academic and labour market outcomes of students who have availed and not availed loans would be an interesting contribution to the literature. Our findings have important policy implications for technical higher education sector in India, which has been experiencing not-so-encouraging public funding and a phenomenon of growth in household costs, and intriguingly, the National Education Policy 2020 aims to ensuring equitable access to quality education to all students, particularly to the backward communities. The suggestive evidence of the study raises serious policy, planning and implementation concerns of the student loans scheme in India.

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Appendix

TABLE A-1

Undergraduate Engineering Colleges Included in the Study

	College Name	*District*	*Year of Establishment*	*Type*	*Sample*
1.	College of Engineering and Technology	Khordha	1981	Govt.	30
2.	Modern College of Engineering	Khordha	2008	Pvt.	29
3.	Odisha College of Engineering	Khordha	1986	Pvt.	30
4.	Trident Academy of Technology	Khordha	2009	Pvt.	72
5.	NM College of Engineering and Technology	Khordha	2004	Pvt.	15
6.	Government College of Engineering	Keonjhar	2006	Govt.	91
7.	Bhadrak Institute of Engineering and Technology	Bhadrak	1997	Pvt.	54
8.	Balasore College of Engineering and Technology	Balasore	2001	Pvt.	100
9.	Satyasai Engineering College	Balasore	1999	Pvt.	50
10.	Srinex College of Engineering	Balasore	1998	Pvt.	117
	Total				**588**

Source: Compiled from the field survey data

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Steering Architecture Curricula towards National Education Policy 2020: A Transformative Pedagogical Approach

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Abstract

This paper presents evidence of a new transformative pedagogy, referred to as Project Based Learning (PBL), to serve as an effective tool for aligning of NEP 2020 with architecture education in the Indian scenario. The findings established through the research are the need of the hour as higher education institutions (HEI) and the Council of Architecture (CoA), the prime body governing architecture education, are poised towards policy and curriculum level changes. An innovative and robust alternative curriculum design, implementation and evaluation system is needed which can usher into the change. Further, in the current scenario, assessment tools for studio pedagogy in the Indian system of architecture education are problematic and not programmatic, which poses a challenge for seamless integration of NEP 2020. The paper addresses the identified issues through the method of Action Research whereby 3 cycles of Course Level PBL (CLPBL) are conducted in two institutions offering architecture education in the state of Karnataka, India, over a three year period. The evaluation of the CLPBL cohorts in terms of learning outcomes and scores is completed after the studio concluded. This is compared with the performance of over 300 students of the non-PBL cohorts of previous years. A mixed method approach using quantitative and qualitative data is used to analyse the results. By mapping some key indicators of learning, parameters and variables, it is established that the student centric pedagogical tool of PBL aligns with and meet the expectations of graduate attributes prescribed through NEP 2020 as well as the Council of Architecture. In conclusion, the paper discusses policy level and curricula interventions for architecture education that better address the gap between theory, research, and practice and aligns with the NEP and CoA recommendations of the future.

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Introduction

India has a history rich in architecture of the past, recorded and documented from the period pertaining to the architecture of the river valley civilisations, Buddhist, Indian and Islamic architecture. The early architecture education was through the master craftsmen, a system of canons and guilds, referred in ancient text as Silpas and Senis. In this method, the artisans relied on imbibing the craft from their masters by working with them for decades as an apprentice and eventually were allowed to independently supervise new projects (Dhanorkar, 2017). Learning happened in Gurukuls, with an experiential, sensorial approach that was hands on and promoted holistic learning in close supervision of the master. The education included training in geometry, drawing, measurements, music, dance and yoga to understand stability and balance. The inference drawn was that it was a system of master and apprenticeship that based the knowledge transfer through experiential learning and learning through multiple intelligences that we can now relate to the constructivist theories, although these theories were formulated only as late as the 20th century.

Towards the middle of the 19th century, the British Raj focussed on institutions of higher education, and the first universities at Calcutta, Madras and Bombay were set up in 1857, followed by Allahabad University in 1887 (Mahendra & Gokhale, 2016). Formal architectural education in India started as late as 1913 with the establishment of the Sir J. J. School in Mumbai. The curriculum was based on the Beaux Arts method of Paris from 1816, with emphasis on drafting and construction knowledge leaning towards Classicism. The Delhi school was established in 1941, followed by the Bengal school in 1949 led by Joseph Allen Stein, an American architect, who did extensive work in India in the period following independence (Chakraborty, 2015). The curriculum followed the British system, with a combination of the 'Atelier' or master apprentice system, and a strong focus on draughtsmanship and knowledge on building technology. The mandate was to produce graduates who could draught, carry forward the ideas of the international architect and supervise the projects to completion.

In the current day practice in India, all higher education institutions (HEI's) continue to come under the purview of the UGC which determines minimum standards for teaching, examination, and research, while technical education comes under the purview of AICTE (All India Council for Technical Education set up in 1987). Architecture Education comes under the purview of the Council of Architecture (COA, 1972). The COA has control over eligibility of students entering the 5-year undergraduate B Arch programme through the qualifying examination National Aptitude Test for Architecture (NATA) and gives guidelines for the teaching-learning process, curriculum, and distribution of courses over the 5-year programme. The 1983 norms had a revision in 2020 with a broader and better vision for future graduates passing from the programme, with further policy level changes suggested recently in 2022 and 2023. The Canberra accord of 2008 has set guidelines for the eligibility for universal accreditation to practice as a professional architect. This has vested more responsibility on the universities imparting the education according to their vision, mission, and guiding philosophies (Chakrabarty & Singh, 2023). Architecture education today has evolved considerably in terms of methods of course delivery and evaluation owing to technological advances (Vriddhi, 2016). It is now seen as an interdisciplinary science and borrows its pedagogy from the domains of art, social sciences, and technology. The recommended distribution of credits in the proposed CoA reforms ensures that architecture

education should move away from rote learning of theory courses and move towards better employability, interdisciplinarity and entrepreneurship.

TABLE 1

Suggested Distribution of Programme Credits for B Arch, COA, 2020

Professional core courses	*Building science and applied engineering*	*Elective and open elective*	*Skill enhancement*	*Professional ability enhancement courses*
50%: Courses suggested	*20%: Courses suggested*	*15%: Courses suggested*	*5%: Courses suggested*	*10%: Courses suggested*
Architectural design, dissertation, history and critical theory, graphics, housing, carpentry, and model making	Building construction, structural design, building services, environmental lab, material testing lab, surveying, climatology	Advanced theory of design, vernacular architecture, urban design, landscape design, Interior, product, graphic design	Communication skills, computer-based courses, foreign language, entrepreneurship	Internship, professional practice, ethics, research methodology, project management

A recent yet crucial development that impacts this research is the initiative of the Ministry of Human Resource and Development (MHRD), recently reverting to being referred to as Ministry of Education (MoE), which proposed the National Education Policy in 2020 (NEP). This policy was formulated to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Its main objectives are to revamp the higher education system and create world class multidisciplinary higher education institutions, increase Gross enrolment rate (GER) to at least 50 per cent by 2035, revamp curriculum, pedagogy, assessment and student support to move away from rote learning towards hands-on and experiential learning, establish a National Research Foundation (NRF) to grant competitive funding to seed, grow and facilitate research. From the above table stating the credit distribution for the 5-year B Arch programme, we can see that it leans heavily towards theoretical content and less towards skill enhancement, problem solving and critical thinking, thus failing to align with the mandate specified in the NEP, 2020

Review of Literature

The research involves interpreting the recommendations of the NEP 2020 in the realm of architecture education and establishing project based learning (PBL) as the vehicle that takes one towards the goal. The National Education Policy 2020 (NEP) has defined the graduate attributes that HEI must work towards attaining at the completion of an undergraduate education in an institution of higher learning offering technical and professional courses (Nayak, 2023). Fundamental knowhow, application, experimentation, and identify and solve problems, design, modern tool usage, communication, teamwork, environment sustainability, contemporary issues, and motivation towards lifelong learning are listed as desirable attributes. Further, the directive is to work towards development of

the creative potential and cognitive capacities. These include both — the 'foundational capacities' of literacy and numeracy and 'higher-order ' cognitive capacities, such as critical thinking and problem solving and social, ethical, and emotional capacities and dispositions (Nayak, 2023). In short, the policy recommends moving away from rote learning and teacher driven pedagogy to a 'learning by doing', student centric approach that will once again make our graduates competent in critical thinking and problem solving (Salama, 2008).

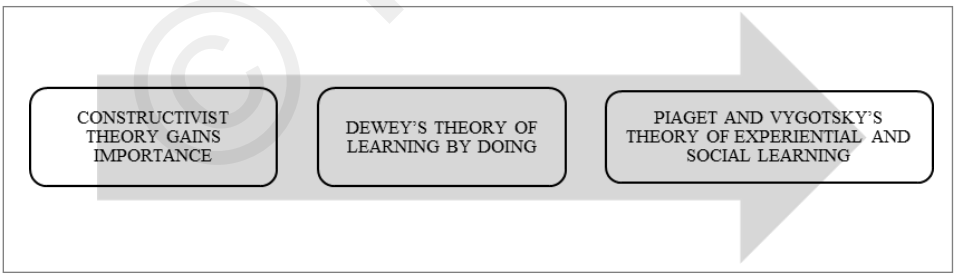
PBL-Implemented Models

PBL is seen as a model that adopts the student-centric approach and encompasses all the different learning theories stated above. It has been successfully implemented in the University DELFT, Netherlands, in the School of Architecture (Banerjee & Graaff, 1996). PBL was implemented earlier in engineering education and in medical schools as all learning is through problem and diagnosis in such disciplines (Savery *et al*, 2001). PBL focusses mainly on 3 domains of learning, namely Cognitive, Content and Social learning (Shinde & Kolmos, 2011). PBL method can be replicated across multiple disciplines and Aalborg model and Macmaster models are seen as prototypes. Studies evaluating success of PBL across varied disciplines is a more recent phenomenon, occurring between 2006 and 2021. Architecture and structural engineering, social work studies, textile designing, computer software education are some of the disciplines that are moving towards PBL in higher education.

In the Figure 1A below, we observe the various educational philosophies of learning that have shaped technical education too, in terms of framing the Washington accord and Canberra accord. John Dewey, Piaget, and Vygotsky's theories of learning being some among them. The Figure 1B below highlights the timeline of problem or project based learning and the various disciplines that have embraced the method.

FIGURE 1A

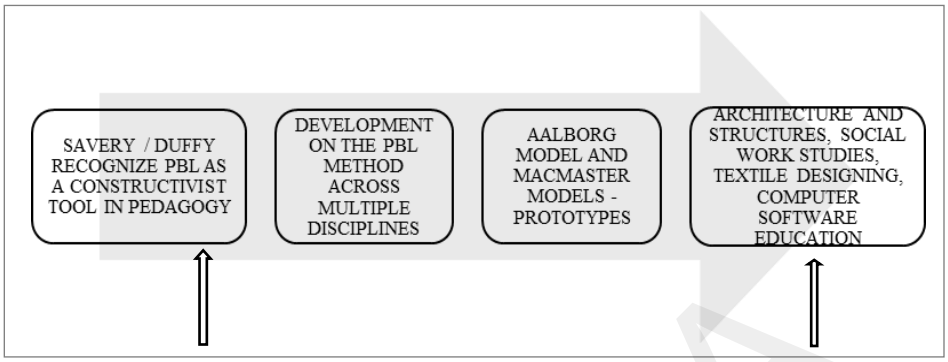
Educationist Philosophers 1950-1970s



Source: Authors

FIGURE 1B

PBL as a Pedagogical Tool 1995-2006



Source: Authors

APPLICATION ACROSS VARIED DISCIPLINES 2006-2020

Tracing the need for transformative education in the global West, a similar need was felt for a complete and drastic change in architecture education to move away from master and apprentice approach of studios, leaving no scope for real world problem solving (Boyer, 1996). The Boyer and Mitgang report called for better curriculum integration between the schools and the profession and was instrumental in bringing about a new approach in leading Institutes offering architecture education in the United States. The overarching principle of PBL involves problem solving in small groups, where the teacher assumes the role of a facilitator and allows for students to formulate the project or problem by the method of identifying contextual issues that need solving. This is done through primary research and taking stakeholder feedback that propels them towards real world solutions. There is a need for a new theory in studio practices that negates effects of current practices, namely a process-oriented design studio teaching model (Salama, 2008).

Assessment in PBL

Assessment is a crucial part of any curriculum design as it drives learning and checks if learning is aligned with educational objectives (Abdalla & Gaffar, 2011). The McMaster University model of Triple Jump was found to be very effective in engineering education. While it cannot be directly applied for studio pedagogy, it gives a broad outline on how to implement the PBL model and ways to adapt for the architecture design studio. It also gives clarity on methods which can again be suited for the architecture studio for quantitative assessment of learning. There have been vast improvements in PBL assessment methods, and the move has already happened towards “Competency” based assessment as opposed to standardised testing of the initial days (Schuwirth & Van der Vleuten, 2011). Programmatic assessment whereby no single assessment is considered a data point, but rather a system of triangulated assessment is recommended in the future. In terms of the architecture PBL studio, this could be several data points of formative assessments like (i) Student Reflective journals (ii) peer feedback (iii) Internal faculty coordinator feedback (iv) Domain

knowledge testing through spot tests (v) Time based solution exercises (time problem) (vi) level of self-directed learning, and so on with a pre-determined weighted average instead of relying only on the external jury as a summative assessment (Shinde, 2014). This method will also align with the NEP recommendation towards 'Constructive alignment' in assessment policy.

Challenges in PBL Pedagogy

While much of the research points towards PBL as a successful tool that promotes active learning, is student centric, aides critical thinking and works well with ill-structured problems (Hmelo-Silver & Barrows, 2006), it is important to examine issues and problems faced with Project based learning. While active learning and critical thinking is successfully achieved in PBL methods, traditional lecturing is seen as important, and students score high on domain specific knowledge by the lecturing method (Fischer & Hänze, 2019). This can be overcome by a mediation model where lecture component needs to be incorporated into the curriculum. While examining the role of the teacher in the ever-changing technology driven knowledge economy, the 'Human Factor' is very much an essential part of the constructivist theory of learning and the teacher's role is beside the student in dissemination of knowledge and not as a 'Facilitator' who remains in the background (Woo & Laxman, 2013). From these two studies, it can be concluded that 'domain specific knowledge' that is gained through taught theory courses may be compromised to an extent in PBL and should be addressed while planning the action research.

PBL is not a solution that can be applied to all disciplines without its own challenges. In architecture, students' learning process in studio-based learning (SBL) is largely dependent on (i) The problem (ii) The supervision style (Bejder *et al*, 2017). Mitigating measures to overcome imbalances include giving discipline specific PBL training to teachers prior to curriculum modifications, assign senior teachers as role models that help improve supervision styles and imbibe best practices. Scaffolding PBL learning onto senior years rather than stopping it at an introductory level course will help students identify problems in their project brief better.

With PBL, student behaviour is largely dependent on self-motivation and study habits can affect learning (Dolmans *et al*, 2011). In terms of facilitator behaviour, tutors need to be regular, systematic, familiar with PBL methods in curriculum, cautious with giving more information than necessary, and must not lack in confidence in students' ability. With respect to resources and workload, ideal group size is suggested to be 6 to 8. Hence institutions may require more resource persons and training. Improper student to facilitator ratio, imbalance in workload, spending more time researching irrelevant information and promptness in giving feedback affects learning. Further, dysfunctional groups, personality issues within groups, uneven participation, domination by one individual, lack of social skills can affect learning.

Drivers of Change

From examining the aims and objectives of different government bodies governing technical higher education in India, the approach is to move away from the traditional didactic lecture-based learning to a more solution-oriented learning for its graduates across

professional courses, including STEM and architecture. The new initiatives 'Make in India', 'Digital India', and Smart Cities Mission, are looking for Indian minds to find innovative solutions (Sen D, 2016). The Indian universities in turn are supporting by creating incubation centres and actively engaging in Industry collaboration to make their graduates more employable. The environment and ecosystem support PBL as a student centric curriculum model that aligns with India's higher education vision.

In critically evaluating the literature, moving towards an active, student centric learning like PBL for a subjective curriculum such as architecture is seen as advantageous in the Indian context. The existing studio pedagogy fails to prepare graduates for the real world, does not foster critical thinking, collaborative learning, research, ability to work in teams and assessments are inherent with problems due to the subjective nature of the programme. Although there are drawbacks with PBL in terms of theoretical knowledge gain in students and issues with group dynamics and delivery, in a discipline like architecture, it can be surmounted with a few corrective measures (Frijns & E De Graaff, 1993). The principles and philosophy of the PBL method are completely aligned with the attributes prescribed in the NEP 2020 as it accommodates students of different learning styles and backgrounds in enriched classroom environments (Nayak, 2023). The defined course learning outcomes can be well integrated into the project formulation. Assessment methods can be diverse and suited to fit student competencies and skills. Finally, the problem solution can be curated towards the creation of products and services.

Aim, Objectives & Scope

The aim of the paper is to synthesise the PBL methodology and pedagogy with the desired outcomes of NEP 2020 as a process driven tool to achieve the desired deep learning outcomes in the architecture design studio. The objectives can be stated as follows

i) To derive the key indicators of deep learning for an architecture studio through the implemented CLPBL studio cycles and map them to the NEP policy

ii) To establish PBL as an effective tool in studio delivery that ensures active learning and shifts the focus from the teacher to the student.

iii) To identify curriculum gaps and new courses that align with NEP, 2020 and CoA's education policy that can fulfil defined graduate attributes

The scope of the paper is limited to describing project-based learning (PBL) methodology in architecture design studio and presenting evidence of its alignment with recommendations in National Education Policy (NEP), 2020. It does not investigate other educationist theories or methods that might have similarities with PBL. The detailed implementation process of the studio using PBL method, and the quantitative and qualitative data collated are beyond the purview of this paper.

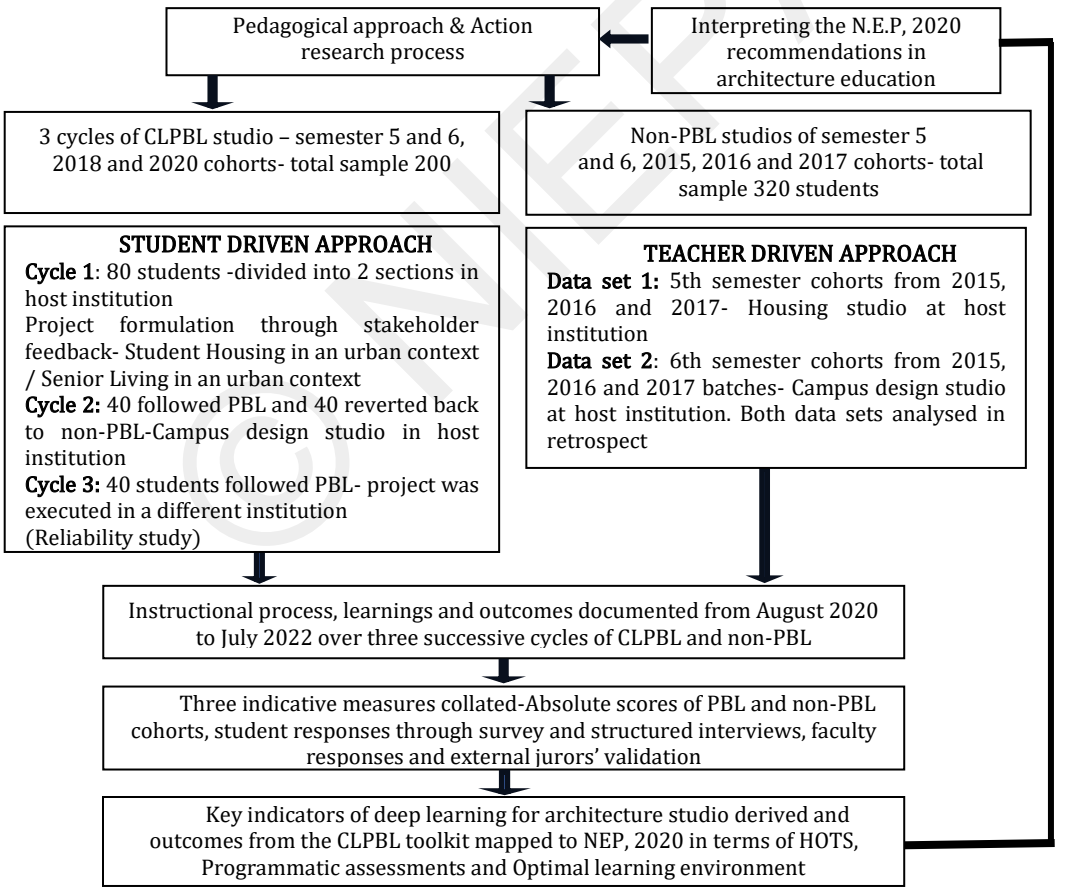
Methodology

This research examines project-based learning as a pedagogical approach within the context of architectural education, taking cues from the first utilisation of problem-based learning in medical education due to its emphasis on problem-solving (Hmelo-Silver & Barrows, 2006). The rationale for this research is to study the effects of application of the

PBL methodology into the Design Studio for architecture education, promoting dynamic learning among Indian students that aligns with the recommendations of the NEP, 2020. From the literature studied, it was evident that in the Indian context PBL was gaining ground as an effective method in engineering education. Several institutions had adopted PBL at the course level and presented the student experiences and learnings. However, there was no evidence of PBL being adopted either at curriculum level or course level in architecture institutions at national level. As stated earlier, the council of architecture specifies minimum standard of education for institutions offering B. Arch and suggests a broad framework of curriculum and credits. The selection of courses and teaching and learning processes are left to be determined by the university offering the programme. REVA University was a private university in the state of Karnataka. The university has several faculties and disciplines: Faculty of Engineering, Faculty of Law, Faculty of Arts and Humanities, and Faculty of Architecture, where the researcher had been associated over 7 years as a teaching faculty.

FIGURE 2

Methodology of the Action Research



Source: Authors*, 2021*

Host Institution CLPBL: Implementation Cycles 1 and 2

The researchers chose to design and implement a bottom-up model of PBL, referred to as the Course Level PBL (CLPBL) in REVA University, a private university in Bengaluru, Karnataka. The curriculum followed was dynamic and innovative, approved by an independent Board of Studies, with revisions and changes incorporated every year. This made it receptive to trying a new pedagogical approach at the third-year level, since technical courses like building construction, structures, building services, climatology are already reinforced as content and applying the learning at third year level will be expected from students.

Reliability Study Implementation CLPBL- Cycle 3

The first two cycles of CLPBL were completed in the academic year 2020-21, for semesters 5 and 6 with the same cohorts. The third cycle of CLPBL for semester 5 students, as a reliability study, was completed in 2022-23, after incorporating the learnings from the earlier cycles. This was conducted at an institution affiliated to the State University, Visvesvaraya Technical University (VTU).

Action Research Method

The method adopted was that of Action Research wherein the researchers implemented the PBL pedagogy and observed the results across three studio cycles. Many educators have viewed reflective practice as a crucial component of teaching and teacher professional development, and action research is another form of practice that addresses this characteristic of teaching, and professional development (Nijhawan, 2017). With the constructed knowledge because of the action research, it is possible to improve the participants' practices and report the findings to add to existing body of knowledge (Kemmis, 2009). Action research when adopted for architecture educational studies allows for the process to be dynamic by integrating research, practice and reflections as observed through the progress of the studio. The efficacy of action research depends on active involvement from all the players involved. It is an iterative and cyclic process, and each cycle has planning, action, observation and reflection.

Traditional (Non-PBL) Studio Pedagogy: The earlier cohorts of 2015, 2016 and 2017 had experienced a teacher led studio pedagogy, wherein (i) Project brief was defined by faculty coordinators; (ii) Stakeholder feedback in issue identification was ignored; (iii) Scale of project was large, and individual design responses were superficial, lacking display of concurrent learning across courses; (iv) Domain knowledge development through special lectures were limited and design responses mimicked the precedent studies.

CLPBL Studio Pedagogy: In contrast, the CLPBL studio for 2018 cohorts was planned as an active, experiential and inquiry based learning wherein (i) Students have greater control and ownership of the design challenge and each group creates a unique design brief using critical thinking and cognitive abilities; (ii) Real world problems that are relatable, clubbed with stakeholder feedback gives credibility to issues with over 150 primary survey responses that validated the findings in the research; (iii) Social learning is enhanced through working in

groups and differentiated learning can be achieved as scope of work is diverse; (iv) Cognitive abilities are utilised to resolve issues through self-directed learning domain knowledge is enhanced due to expert talks.

The Course Level PBL (CLPBL- cycle 1) was implemented for a cohort size of 80 students at the fifth semester level at a private university in Karnataka. The project was to design a shared student living community and a senior living community at two different sites. The CLPBL Cycle 2 was also conducted at the sixth semester level for the same cohort. The project was to design a campus for design disciplines. The reliability study was conducted at a different university to test the findings from action research cycles 1 and 2. Here the cohort size was about 40 and the project was to design a cultural community centre.

Student structured interviews, faculty structured interviews, questionnaire surveys and peer grading surveys were the various ways the data were collected. This was then compared with non-PBL cohorts who had completed fifth and sixth semesters previously. Three indicators were established after the first two CLPBL cycles, which was validated in the third cycle. These were *(a) Absolute scores of each member in the cohort (b) Student responses through surveys and interviews (c) Faculty and juror's responses on the CLPBL methodology and results achieved.*

Results and Findings

The scores achieved by Non-PBL and PBL cohorts were plotted and analysed and visualised through a box and whisker plot using R programming and the readings are shown in the tables below

TABLE 2

Absolute Scores Non-PBL and PBL Cohorts Cycle 1

Cohort	*Range*	*Median value*	*Upper quartile*	*Lower quartile*
2015- Non-PBL	56-80	70	71	65
2016 Non-PBL	41-85	68	74	60
2017 Non-PBL	37-86	65	74	58
2018- PBL	43-87	70	78	63

Source: University results, 2021

TABLE 3

Absolute Scores Non-PBL and PBL Cohorts Cycle 2

Cohort	*Range*	*Median value*	*Upper quartile*	*Lower quartile*
2015-Non-PBL	37-82	61	65	53
2016-Non-PBL	48-77	66	70	61
2017-Non-PBL	43-81	60	66	56
2018 -Non-PBL(CONTROL)	49-81	68	73	60
2018-PBL (TREATMENT)	51-84	71	79	64

Source: University results, 2021

TABLE 4

Reliability Study Absolute Scores Non-PBL and PBL Cycle 3

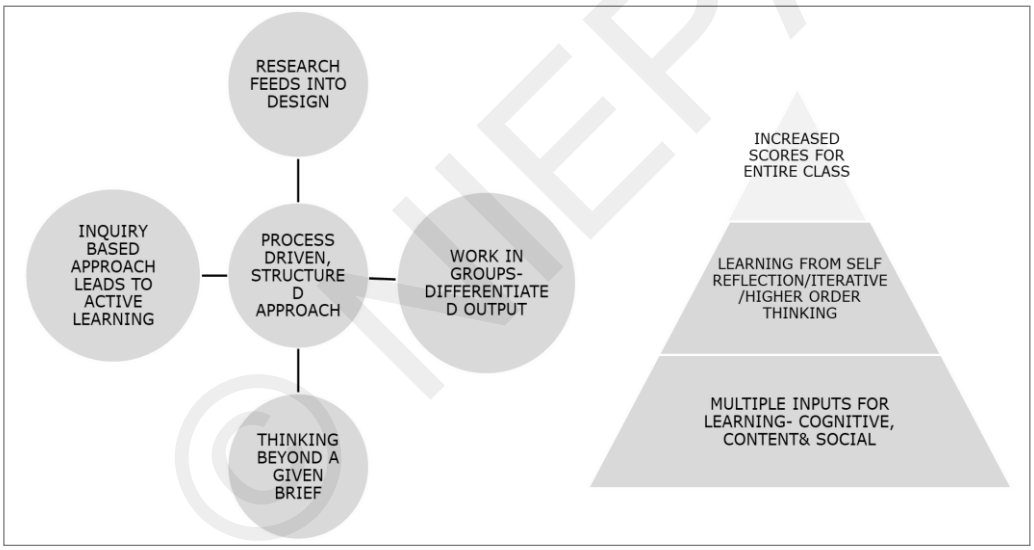
Cohort	*Range*	*Median value*	*Upper quartile*	*Lower quartile*
2018- Non-PBL	60-125	77	112	73
2019 Non-PBL	60-118	92	100	80
2020- PBL	77-125	100	120	87

Source: University results, 2022

It is evident that PBL cohorts have achieved better median value, and the lower and upper quartiles are higher. Several factors contributed to the high scores of the cohorts that followed PBL method. The factors are explained in the figure below.

FIGURE 3

Graphical Representation of Factors That Resulted in Enhanced Scores



Source: Authors, 2022

The student responses based on structured interviews and questionnaires helped to derive the following key indicators (KI) for deep learning, synthesised from the 3 CLPBL cycles completed and documented through the action research. Deep learning indices DL1 to DL5 was extracted from the action, observation and reflection stages after completion of CLPBL cycles 1 and 2 and the same was validated through CLPBL cycle 3.

TABLE 5

Identifying Key Indicators of Deep Learning

Indicator	*Process of Mapping through PBL Pedagogy*
Learning to transfer DL1	Evaluating concurrent learning of other relevant courses that feed into the Design studio
Critical thinking-DL2	Critically analysing case studies and site before arriving at a crafted spatial programme and design brief unique to each PBL group
Communicating-DL3	Creating the narrative, Presentation drawings, models, walkthrough
Motivation, joy & purpose in learning-DL4	Solving real world problems rooted in context
Demonstrate the learning-DL5	Use Domain knowledge gained through lectures and facilitators

Source: Authors, 2022

TABLE 6

Qualitative Data Computed from 3 CLPBL Cycles

Input data	*Response Indicator Reliability Study CLPBL cycle 3*	*Response Indicator CLPBL Cycles 1 & 2*
Depth of recall & concept details-DL1	78% responses recalled details on site, regulations &concept to great detail	75% responses recalled details on site, regulations & concept to great detail
Deep learning indices-DL 2,3,4	Critical thinking, communicating, motivation, joy & purpose in learning	Learning to transfer, communicating, motivation, joy & purpose in learning
Reflection on learning-DL5	90% scored at top of 5 point scale	86% scored at top of 7 point scale
Learnings due to group work-DL5	Improved problem solving, design thinking, communication, software skills, listening & team management	Improved problem solving, creative potential, multiple solutions, communication, software skills
Unique learning in the PBL studio-DL5, DL2	Not competing as individuals but group, analytical & problem solving	Competing as a group, developing unique project brief, solution closest to real world projects

Source: Authors, 2023

The analysis of grades, juror remarks and survey responses also gave insight into the key parameters that define the PBL method for architecture studio and the variables that affect the learning outcomes.

TABLE 7

Parameters and Identified Variables in PBL Studio

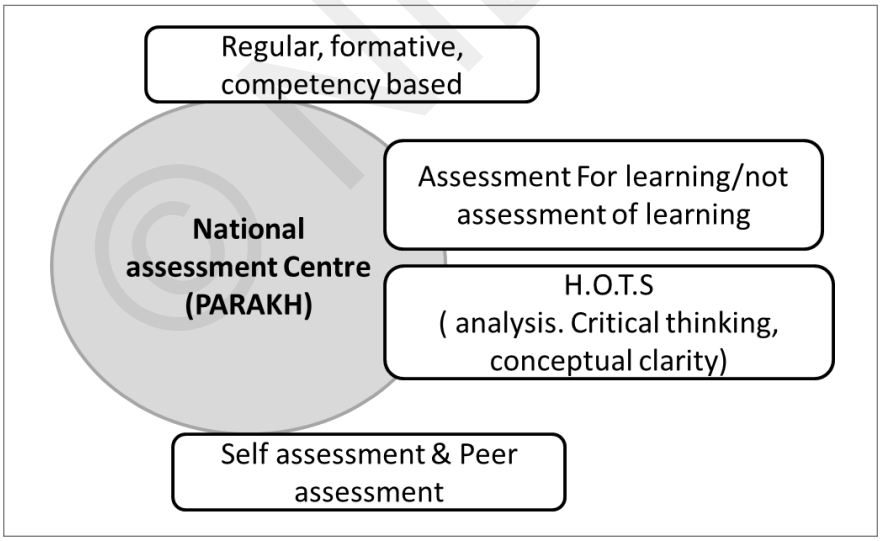
PBL Pedagogy Key Parameters	*PBL Pedagogy Variables*
Work in small groups with leader and a scribe	Inherent cognitive skills- different for each student in the group
Problem identification using Stakeholder feedback	Nature and complexity of the problem – Can vary with each studio according to context
Real world problems rooted in context	Group dynamics and leadership
Significant level of Self-directed learning (SDL)	Duration for resolving the problem
Studio Facilitator guides learning, as opposed to teacher led learning	Experience and adaptability of Studio facilitator
Demonstrating the learning to domain experts through workable solutions	Learning environment- Offline/blended/online

Source: Authors, 2022

The NEP 2020 has given clarity on the quality of higher education in India and assessment changes that are required in the future approach to higher education.

FIGURE 4

NEP Recommended Assessment Reforms for Course Level Evaluation



Source: Authors, 2022

When the assessments that were designed and carried out in the three CLPBL were mapped to the NEP recommendations, 92 percent were successfully achieved in the implemented PBL model.

TABLE 8

Assessment Reforms Prescribed in NEP Mapped to PBL

Reforms in NEP for Assessments	*Programmatic Assessment Achieved in PBL Studios*	*Mapping*
Regular, formative and competency based	Formative evaluation based on milestones reached. Differentiated grading among groups. Competencies achieved given weightage. Summative assessment by external jury for establishing validation. Multiple data points like drawings, reflective journals, brochure design, models	96%
Assessment for learning - not assessment of learning	Problem statement defined by student groups unique to each focus theme and solutions matched real world context. Assessment was for the process of learning and demonstrating the learning outcomes, not the end solution	92%
Test for HOTS (Critical thinking, analysis, and conceptual thinking)	Research feeding into design, critical analysis of site and context to define problem, conceptual clarity derived from focus theme was assessed as part of formative, with 30% weightage	96%
Self-assessment and Peer assessment	Peer assessment within groups by members at mid semester and end semester through surveys. Peer assessment given 15% weightage in formative stage	85%

Source: Authors, 2023

Optimal Learning Environments and Support for Students as per NEP

The NEP has further thrown light on another aspect that affects learning, being the learning environment that is created. Curricula systems such as CBCS, FFCS and OBE while addressing some of the recommendations, do not fully address the issues with creating conducive learning environment, especially with the complicated nature of architecture curriculum. Among the many recommendations, the following were achieved through the CLPBL studio. Further, the responses from the student survey pointed to a preference for PBL due to the high level of self-directed learning (SDL) and less dependency on teacher led learning.

TABLE 9

Linking Inferences from CLPBL Studio to NEP 2020 Recommendation

NEP, 2020 Recommendations		*CLPBL Inferences*
Optimal Learning Environment	Quality classroom transactions are required between student and teacher	Independent discussion spaces within the studio/ break out rooms in online phase, 1:3 studio facilitator to student ratio within each group, each discussion documented for further learning in online phase
	Criterion based grading system with programmatic assessment	Process driven and programmatic studio pedagogy of PBL with Rubrics of assessment to reduce subjectivity & ensure transparency, multiple data points- Primary survey, precedent studies, peer assessment, skills and competencies, time-based assessments, presentation drawings, 3D models, brochure
	Innovation in curriculum & pedagogy	Empathy mapping, competencies and ability mapping before formulation of project brief, student led / self-directed learning, concurrent courses embedded in CLPBL studio,
	Flexibility in choice based credit structure	Choice of studio- based on project preference & choice of studio facilitators

Source: Authors, 2023

Discussion and Scope for Future Research

The introduction stated that architecture curriculum in India was designed to produce draftspersons who could produce drawings and supervise the designs that came from the architects from England. This left little room for creativity and original thought which led to an architectural style that did not belong, nor resonate with the rich history and culture of India. With the advent of computers, architecture underwent a sea change as manual drafting and visualisation was replaced by software. While practices quickly adapted to the change, educational institutions were slow to adopt and embrace the change and curriculum remained stagnate. The last wave of change, with advanced software that integrates structural design, architectural design, building services (MEP), 3D visualisation all in one interface has made the stand-alone architectural practice almost obsolete. Design offices are now a team of architects, structural designers, MEP consultants, interior experts, communication designers and energy modelling experts. Architecture education must tackle this change immediately and this research positions project-based learning (PBL) as the vehicle that can carry the change towards a future where NEP 2020 recommendations and CoA policy changes can be aligned to deliver a new curriculum structure. Cross-cutting of courses is needed from engineering, coding, humanities, law into the curriculum to make the education multi-disciplinary. Options for banking of credits and exiting the course at

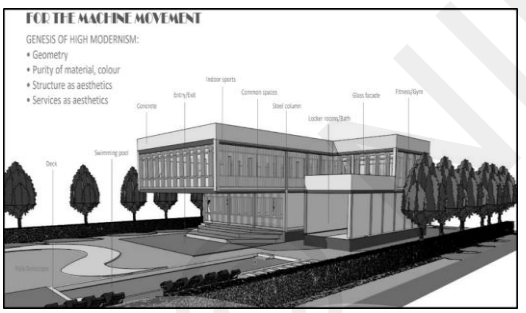
multiple junctures must be incorporated to accommodate varied learning speeds, while simultaneously addressing graduate attributes defined, such as employability, entrepreneurship, research abilities and lifelong learning (Shareef & Farivarsadri, 2020). Private universities can be in the forefront of ushering these changes in curriculum design in architecture education and this research on project-based learning (PBL) as a tool that achieves these attributes can be taken up on a larger platform across India

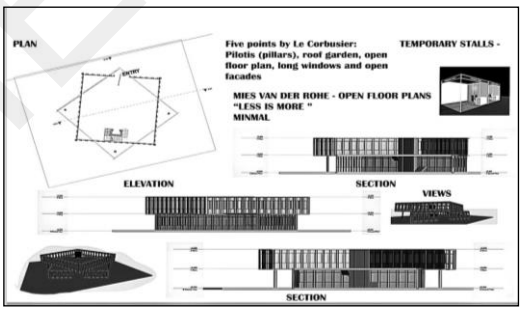
Curricula Revisions and Changes in the Course Delivery Model as per NEP 2020

By embedding the lecture modules of concurrent courses that support and scaffold into the architecture design studio, an application-based approach of the PBL method is easily achieved, thereby leading to deep learning. This was validated in the student responses from the CLPBL cycles where learning from structures, building services, climatology, energy efficiency, contemporary architecture reflected in the design solutions and focus study themes.

FIGURES 5-6

The images are Representation from the CLPBL Studios Where Concurrent Learning from Supporting Courses Routes Back into the Studio Output



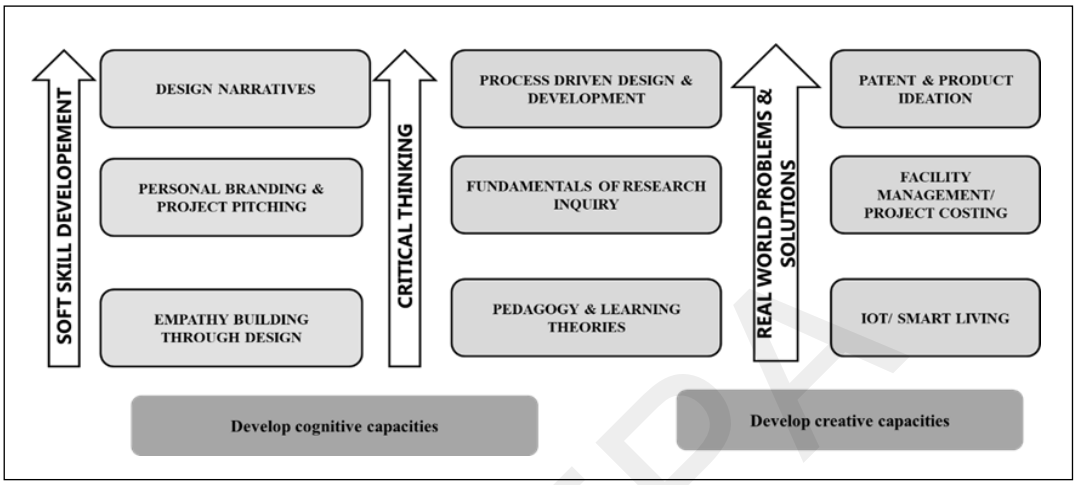


Source: Authors, 2023

The research and findings from the CLPBL, faculty, jurors and student responses from the action research also point to new courses that can be developed and offered in tandem to meet the graduate attributes as per NEP 2020 and the Canberra accord. These courses are trans-disciplinary in nature and allows for higher employability of architecture graduates. Careers in real estate development, project management, business development, design thinking, content writing and many more such opportunities can be accessible to students with exposure to these curated courses in the third, fourth and final years of study. They will fit into the 3 verticals of soft skill development, critical thinking and issue-based problems and solutions as mandated by the NEP.

FIGURE 7

Proposed New Courses to Substantiate PBL Studio and Align with NEP



Source: Authors, 2023

Fully Integrated PBL Curriculum

Academicians and practitioners perceive the PBL pedagogy as a tool that achieves deep learning seen from structured interviews and the training workshop conducted by researchers. Group assessment challenges faced in studio pedagogy cannot be an impediment as new assessment methods recommended in NEP support formative, competency based, peer and self-assessment which exist in PBL pedagogy.

i. Evaluation parameters in terms of multiple data points, are in accordance with the PBL method in the form of report, facilitator rubric assessment, jury or reflective journal.

ii. Existing and new Universities and schools offering architecture education, who wish to adopt NEP as an integrated curriculum can embrace PBL as a process-oriented design studio tool which leads to active, experiential, and inquiry-based education.

iii. The initial course level model PBL (CLPBL) implementation can be replicated in theory courses and eventually guide future research on fully redesigned PBL curriculum models in India. Assessment methods tested in the CLPBL studio for grading group work can be adapted to match university requirements.

In conclusion, three crucial documents are examined and the findings from the CLPBL cycles using the transformative pedagogy of PBL are mapped to establish the following links explained in the table below. The first document is the National Education Policy, 2020 with sections pertaining to higher education. The second document is the Perspective plan for growth for architectural education by the Council of architecture released in August 2020. The third is the Interim Report on Education Reforms to align with NEP, released by the council of architecture in January 2023.

TABLE 10

Linking NEP 2020 with PBL Findings towards Policy Changes

National Education Policy, 2020 (Sections pertaining to higher education)	*Findings from Current PBL Design Studio Established through the CLPBL Cycles*	*Future Policy Alignment of NEP and CoA (with fully integrated PBL curriculum)*
Section 10: Institutional restructuring and consolidation- Institutions shall become multi-disciplinary	PBL method for architecture education recommends new trans and multi-disciplinary courses in the curriculum (Figure 7)	Will align with Council of Architecture (CoA) recommendation for institutions to add and expand programmes to include arts, technology and sciences
Section 11: Towards a more holistic and multidisciplinary education- STEAM instead of STEM	PBL method provides a canvas for creative expression and critical thinking, learning by doing with potential to develop creative capacities and cognitive capacities	Aligns with CoA's educational reforms document, 2023
Section 11.9: Flexibility to carve 3 / 4 or 5 years of study as per students' aspirations	PBL method equips students with real world problems, embeds relevant domain knowledge, skills and competencies while planning the learning canvas, hence exiting at any point of the study will ensure employability	Aligns with CoA's draft future perspectives for architecture education **Section 6.5** with B.Sc.(architecture), B.Arch. (with license to practice) or M.Arch. for the degree to be awarded as per years of study
Section 12: Optimal learning environment and student support- curriculum innovation, assessment reforms, classroom environments	As already explained in Tables 8 and 9	Aligns with CoA's recommendation to create an IDP (Institutional development plan) mentored and monitored by INI that specifies assessment policies
Section 13.3 & 13.4: Motivated, energised and capable faculty	PBL method gives adequate opportunities to interact due to 1: 3 facilitators to student ratio in small groups, freedom in choosing the pedagogical tools, faculty were equally involved in the primary research and sought industry collaborations to enhance domain knowledge development among the students	Aligns with CoA's educational reforms where faculty will be categorised into teaching stream, research or practice which will keep them motivated and engaged

Contd…

Section 17.4 & 17.8: Developing a research mindset to solve societal issues	In PBL the formulation of the project brief stems from research and understanding real world issues that designers can provide solutions to.	CoA's perspective plan recommends thrust area of research by collaborating with Government, especially in housing and public infrastructure projects. Embedded PBL curriculum can accommodate for live research projects with funding/grants
Section 18.6 & 18.7: GEC and PSSB (CoA shall function as a professional standard setting body under the general education council.	PBL method aligns with achieving prescribed graduate attributes including employability and entrepreneurship. This will make it easier for the graduate to clear the licensing exam	Role of CoA shall be to award license to practice to the architecture graduate. The approved IDP's shall become self-monitoring in terms of quality and standard of education
Section 20.6: collaboration with industry and HEI to drive research and innovation	Proposed curriculum changes in Figure 7 suggest possibilities to include these knowledge domains in year 4 and year 5 of the programme with solutions directed to achieve patents and products	CoA's future recommendation calls for curriculum changes **(Section 6.3)** to include energy efficient design, UI& UX design, green building, AI, AR &VR to increase employability

Source: https://www.education.gov.in/nep/about-nep
https://coa.gov.in/app/myauth/notification/COA_Perspective_Plan_on_Architectural Education.pdf
https://coa.gov.in/app/myauth/report/COA%20Circular%20on%20Education%20Reforms%20-%2009.01.23%20(2).pdf
(Adapted by authors to align with PBL findings, 2023)

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Classroom Assessment Practices of Secondary School Teachers in Delhi

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Abstract

This study aims to examine the classroom assessment practices, competencies, and attitudes of teachers in Delhi, India. The researcher has adopted a survey method with simple random sampling techniques to select the sample. 184 teachers participated; three self-constructed tools were employed in the research. According to the study, teachers assess their students once a week and are interested in using written tests and short answer type questions at a higher level. Teachers look for a deep understanding of the subject matter and surface knowledge during student evaluation. The test lasts between fifteen to thirty minutes; the results are given back to the students less than a week after completion. The teachers discuss the mistakes made by students and provide feedback on their answer sheets. The study's findings indicate that teachers have a positive attitude toward classroom assessment practices. However, their attitudes vary depending on the type of school, locality, district, teaching subject, age, highest education, and length of teaching experience. Additionally, their attitudes are unaffected by their assessment training. The most crucial factors in classroom assessment procedures are competency in individual assessment, utilisation of assessment data, feedback, innovative assessment methods, and inclusive grading. The study recommends the use of non-traditional assessment methods in the classroom; external assessments and teacher-based assessments to be balanced and supports PARAKH, a national-level apex body on classroom assessment and educational evaluation, to regulate the assessment system in India.

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Introduction

Assessing students is a means of determining their knowledge, comprehension, and abilities. It is a long-term, multifaceted activity that aims to evaluate the calibre of a student's work or any programme. The quality of student learning is directly linked to the level of assessments which teachers use in classrooms. An assessment can be classified as external and internal. The awarding organisation specifies the tasks, assignments, and question papers for external assessments. These are subsequently completed, following predetermined guidelines, and the awarding organisation marks or renders the assessment decisions (DfE, 2015). An external assessment is something standardised, generally created by an external organisation or Board of Examinations. These examinations are held at the end of the year. Internal assessments are done via assignments, practicals, project work, dissertations, etc. It entails producing and gathering proof of a learner's acquisition of information and abilities, then assessing that proof considering established standards. In an internal assessment, the tutor and the student collaborate to evaluate the learning and illustrate aspects of the progress which are not typically evaluated in external assessment. When a student's work is evaluated by a body other than the institution, it's known as an external assessment. When educational institutions assess their work, it's known as internal assessment.

Formative assessment is used to improve teaching-learning processes continually (David *et al*, 2006). Portfolios and open-book exams can be utilised for this. In this spirit, educators utilise tests, quizzes, and portfolio evaluations to keep track of students' development and adjust each student's unique instructional plan. On the contrary, summative assessment is the evaluation after an instructional activity. Both students and teachers get more involved with student-centred assessment strategies like self-assessments, peer assessments, rubrics and portfolios. Teaching in a system of continuous assessment might be much more difficult. The portfolio is a student-centred, collaborative, and authentic assessment (Apple & Shimo, 2004). Anecdotal records are succinct yet important accounts of children's actions and behaviour during unplanned situations that would not otherwise be recorded. Peer assessment and self-assessment encourage learning through regular feedback, emphasising the process and not just the product.

Various education commissions and committees, like the "Radhakrishnan Commission" in India (1948–1949), envisaged that exams are "the most pervasive evil of our educational system," and educationists advocated doing away with them completely. According to the Mudaliar Commission 1952, examinations today discourage experimentation, promote dreary monotony, impede appropriate subject treatment, and undermine effective teaching strategies. The Kothari Commission (1964–1966) advised conducting thorough internal assessments regularly. Such assessments must be comprehensive, evaluating not only the areas of the student's development that the external examination measures but also their character traits, interests, and attitudes that the examination is unable to measure. Unit tests have been in use ever since the NPE 1968 recommended continuous comprehensive evaluation (CCE) instead of term- or year-end exams. The NPE 1986 and the POA 1992 both state that the evaluation method should include all educational experiences in both academic and non-academic domains. National Curriculum Framework 2005 recommends that CCE be recognised in order to reduce stress on the children. The RTE Act of 2009 guarantees that children's knowledge is developed and that learning is done in a child-centred way.

The National Educational Policy (2020) seeks to assess higher-order abilities, including analysis, critical thinking, and conceptual clarity, while also fostering student learning and development. The focus of learning assessments needs to change in order to simply include the comprehension of fundamental ideas and information, as well as higher-order skills like application, analysis, and critical thinking.

Significance of the Study

Understanding the evaluation methods used in the classroom by the teachers facilitates decision-making regarding the learning objectives of the pupils. The findings might provide insightful information about the competencies, procedures, and standards for careful classroom assessments used by educators in Delhi and other regions of India. The conclusions of the research can be used to make decisions such as evaluating the effectiveness of classroom assessment practices. It may put a body of knowledge to the existing assessment theories and practices in the education system in Delhi.

Objectives

The research aims to examine the frequency of student assessments, the variety of assessment methods used, teachers' views and attitudes towards assessment, and their competencies related to these practices.

Research Questions

(1) What are the classroom assessment practices and methods taken up by the teachers?
(2) Which competencies are important for teachers to assess students in the classroom?
(3) Do factors like the type, locality, district of the school, subjects taught, age, highest qualification, teaching experience of teachers and training influence teachers' attitudes towards classroom assessment practices?

Methodology

The survey research design was adopted because the sampled elements and the variables in the study were simply being observed without making any attempt to control them. The population included in the study was all the teachers teaching in government and private schools under CBSE in the eight districts of Delhi. Keeping the given nature of the research, the researcher used a simple random sampling method. The list of all secondary school teachers working in Delhi was collected. From the list, a computer-generated random list was prepared as a sample of the study. A total of 184 teachers from all districts of Delhi were selected, comprising 129 government teachers (70.1%) and 55 Private teachers (29.9%) concerning the type of school. In terms of locality of the school, 89.1% of urban school teachers and 10.9% of rural school teachers constituted the sample.

Three self-constructed tools were used in the study: Tool-1) Questionnaire for teachers on assessment practices in the classroom. Tool-2) Teachers' Attitude Scale on classroom assessment practices and Tool-3) Teachers' Competencies Assessment Scale.

Tool-1 consisted of closed-ended items on different aspects of classroom assessment practices such as the frequency of assessment, methods and type of questions used for assessment, targets, duration, time taken to return the results, correction of the errors made by students, and feedback. Tool-2 was a five-point Likert scale with two parts for general and particular perceptions. The general perceptions consisted of 9 statements and the specific perceptions consisted of 13 statements. In this scale, the responses to the attitude scale are coded as 5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, and 1 = strongly disagree for positive items; the code was reversed for negative items. Tool-3 was a three-point scale designed to measure teachers' self-perceived competencies and skills on assessment ranging from 1 to 3. (1 = not at all skilled, 2 = moderately skilled, and 3 = very skilled). The purpose of this scale was to measure the teachers' competencies and skills in various areas like planning and construction of the tests, use of different methods, assigning grades, and feedback. This tool consisted of 27 items, anchored with three alternatives, coded as 1 = not skilled 2 = moderately skilled 3 = highly skilled for all the items.

In order to establish the validity of the tools, the drafts of all the tools were given to some experts, and according to their suggestions, the items were modified accordingly. The content validity of the tools was thus established. The reliability of the tools can be expressed as the degree of consistency by the coefficient of correlation. Using SPSS, the researcher applied Cronbach's alpha approach to determine the instruments' reliability. The questionnaire, attitude scale, and competency tools all have Cronbach's alpha scores of 0.710, 0.712, and 0.887, respectively. It can be seen that in statistics, reliability values are higher than the standard value of 0.70, so all the items in these tools are reliable. The researcher administered data collection tools to the teachers after receiving permission from the head teachers to carry out the study. Before the researcher started the data collection, the aim of the study was thoroughly conveyed to the respondents. The inquiry was conducted anonymously to increase secrecy and dependability.

Data Analysis and Study Results

Result-1: Teachers' Frequency of Student Assessment at the Secondary Level

Teachers are required to indicate the frequency of assessing the students. Findings related to the teachers' responses are displayed in Table 1.

TABLE 1

Frequency of Teachers' Assessment of Students at the Secondary Level by the Type of the School

S. No.	*Frequency of Assessment*	*Frequency*
1	Once Every Month	47(25.5%)
2	Once Every 2 Weeks	54(29.3%)
3	Once Every Week	69(37.5%)
4	Once Every Three Months	14(7.6%)

Table 1 reveals that 25.5% of total teachers assess their students once every month, 29.3% of teachers once every two weeks, 37.5% of teachers once every week, and 7.6% of total teachers once every three months.

Result-2: Teachers' Use of Various Methods in Assessing Students' Learning

Teachers need to specify the degree to which they employ specific methods for assessment. Table 2 displays the results.

TABLE 2

Use of Various Methods in Assessing Students Learning

S. No.	*Various Methods for Assessing Students Learning*	*Never*	*Sometimes*	*Often*	*Always*	*Mean*	*SD*
1	Oral presentation	4.3	25.5	45.1	25	2.91	.821
2	Written tests	1.1	25.5	44.6	28.8	3.01	.768
3	Reflective journal	21.2	56.5	19	3.3	2.04	.730
4	Face-to-face discussion	7.1	22.8	38.6	31.5	2.95	.910
5	Self-assessment	13.6	39.7	34.8	12.0	2.45	.873
6	Peer assessment	21.7	38.6	28.3	11.4	2.29	.935
7	Assignment/ Project work	4.3	36.4	46.7	12.5	2.67	.748
8	Portfolio	19.0	47.8	18.5	15.2	2.30	.948
9	Rubrics	21.2	44.6	30.40	3.8	2.17	.802

Table 2 reveals that 45.1% of teachers often use the oral presentation method to assess their students, while 25.5% use it sometimes, 25.0% always use it, and only 4.3% never use the oral presentation method to assess their students. 44.6% of teachers often use written test methods to assess their students, while 25.5% sometimes use, 28.8% always use and only 1.1% never use written test methods to assess their students. 19.0% of teachers often use reflective journal methods to assess their students, while 56.5% sometimes use, 3.3% always use and only 21.2% never use reflective journal methods to assess their students. 38.6% of teachers often use face-to-face discussion methods to assess their students, while 39.7% sometimes, 12.0% always and only 7.1% never use face-to-face discussion methods to assess their students. 34.8% of teachers often use the self-assessment method to assess their students. While 39.7% sometimes, 12.0% always and only 13.6% never use the self-assessment method to assess their students, 28.3% of teachers often use the peer assessment method to assess their students while 38.6% sometimes, 11.4% always, and 21.7% never use the peer assessment method to assess their students; 46.7% of teachers often use individual assignment/project work method to assess their students while 36.4% sometimes, 12.5% always and 4.3% never use individual assignment/project work method to assess their students; 18.5% of teachers often use individual portfolio method to assess their students while 47.3% sometimes, 15.2% always and 19.0% never use portfolio method

to assess their students; 30.4% of teachers often use rubrics to assess their students while 44.6% sometimes, 3.8% always and 21.2% never use rubrics to assess their students. Table 2 also shows that teachers use written tests (Mean = 3.01) at a high level. Other methods, such as face-to-face discussions, oral presentations, assignment/project work, self-assessments, portfolios, peer assessments, rubrics, and reflective journals, are being used by the teachers moderately.

Result-3: Teachers' Views on Different Aspects of Classroom Assessment

Teachers are requested to respond on various topics of assessment procedures in the classroom. Table 3 presents the data pertaining to teachers' responses on various components of classroom assessment.

TABLE 3

Teachers' Responses on Various Aspects of Classroom Assessment

S.No.	*Aspect*	*Categories*	*Frequency*
1	Kind of questions used for assessment	MCQ	32 (17.4%)
		Short answer	113(61.4%)
		Essay	16(8.7%)
		True-false	5(2.7%)
		Other	18(9.8%)
2	Targets to be achieved	Deep understanding	25(13.6%)
		Surface knowledge	29(15.8%)
		Both	130(70.7%)
3	Informing students about the purpose of the testing	Yes	98 (53.3%)
		No	28(15.2%)
		Sometimes	58(31.5%)
4	Duration of the test	15- 30 minutes	119 (64.7%)
		30 - 60 minutes	50(27.2%)
		1 - 2 hours	09(4.9%)
		More Than 2 hours	06(3.3%)
5	Time taken to return the test results	less than a week	125 (67.9%)
		Within 2 weeks	51(27.7%)
		after 2 weeks	8(4.3%)
6	Discussing the errors with students	Yes	118 (64.1%)
		No	41(22.3%)
		sometimes	25(13.6%)

Contd…

7	Disclosure of Scoring Rubrics	Yes	79(42.9%)
		No	64(34.8%)
		sometimes	41(22.3%)
8	Writing feedback on students' answer sheets	Yes	129 (70.1%)
		No	31(16.8%)
		sometimes	24(13.0%)
9	Type of feedback given by teachers	Reward/ Punishment	28(15.2%)
		Descriptive	156(84.8%)
10	Purpose of Administering Assessment	Identify strengths and weakness	84 (45.7%)
		Predicting performance on final Exams	15(8.2%)
		Identify students who need remedial Work	60(32.6%)
		Assigning grades	13(7.1%)
		To categorise students	8(4.3%)
		To instil discipline and order	4(2.2%)
11	Barriers to providing feedback	Yes	41(22.3%)
		No	143(77.7%)

Table 3 reveals that 17.4% of teachers use multiple choice questions for testing, 61.4% of teachers use short answer questions, 8.7% of teachers use essay-type questions, 2.7% of teachers use true-false questions, and 9.8% of teachers use other types of questions for testing. Deep learning entails developing concepts further, seeing patterns, using information, and abilities creatively, and critically analysing claims and supporting data. While it hasn't been proven that effective evaluation techniques may promote deep learning on their own (Atherton, 2005), the results indicate that 13.6% of the teachers aim to assess students' deep conceptual understanding whereas 15.8% focus only on students' surface knowledge. However, 70.7% of teachers seek out their students' both superficial and deep subject understanding.

The results indicate that 53.3% of total teachers inform students about the purpose of assessment, 15.2% of teachers do not inform them, 31.5% of teachers do so sometimes only, 64.7% of teachers keep the duration of the test for assessment between fifteen to thirty minutes, 27.2% of teachers keep it thirty to sixty minutes, 4.9% of teachers keep it one to two hours, and 3.3% of teachers keep it more than two hours; 67.9% of teachers return the test results in less than a week after completion of test, 27.7% need two weeks to do so, and 4.35% take more than two weeks to do so; 64.1% of teachers discuss the errors made by students in test papers when they give them back to students, while 22.3% of teachers do not discuss the errors made by students. Table 3 also reveals that 13.65% of teachers discuss the errors made by students in test papers when they give them back to students; 42.9% of

Delhi's teachers disclose the scoring rubrics for assessment to students, while 34.8% do not. The results also show that 22.3% of teachers disclose scoring rubrics to students sometimes only; 70.1% of teachers write feedback on the student's answer sheets, 16.8% do not, and 13.0% sometimes do that; 84.8% of Delhi teachers give descriptive feedback describing students' errors and showing how they could improve, but 15.2% of Delhi teachers write rewarding or punishing feedback.

Several purposes may be served by administering assessments, including identifying students' strengths and shortcomings and predicting their performance on final exams. Results show that 45.7% of teachers administer assessments to identify the strengths and weakness of students, 8.2% of teachers to predict student performance on the final examinations, 32.6% of teachers identify students who need remedial work, 7.1% to assign grades for administrative reasons, 4.3% to categorise students according to their academic performances and 2.2% to install discipline and order; 22.3% of Delhi's teachers find barriers that prevent them from providing feedback, quick results, or conducting remedial work; 77.7% of teachers do not find such barriers.

Result-4: Teachers' Attitude on Classroom Assessment Practices

The attitude towards classroom assessment among teachers is assessed with the help of the Teachers' Attitude Scale on Classroom Assessment. As such, the data concerning the different items in the tool is analysed. Table 4 presents the findings as follows.

TABLE 4

Teachers' Responses on Attitude Scale (In percentage)

S. No.	*Statement*	*SDA*	*DA*	*UD*	*A*	*SA*
1	Classroom assessments aim to determine student grades.	6.5	48.9	13.0	25.0	6.5
2	Personnel feedback improves student learning more than assigning grades.	6.0	13.0	19.0	21.2	40.8
3	Classroom assessments make my teaching effective.	4.3	16.3	15.8	44.0	19.6
4	The purpose of the assessment is to hold students accountable for their education.	3.8	10.3	20.7	36.4	28.8
5	Paper-pencil tests are more effective than task-based Activities	8.2	25.0	25.0	39.7	2.2
6	Summative assessment is more effective than formative Assessment	14.7	28.3	19.6	32.1	5.4
7	An examination paper item covers all the aspects in terms of curriculum objective	8.2	29.3	19.6	35.9	7.1
8	Student performance should be checked by annual Examination.	11.4	12.5	25.0	26.6	24.5
9	Teachers should apply alternative approaches to assess learning outcomes	3.3	12.0	15.2	7.3	22.3

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10	Finishing the X and XII syllabus at the earliest opportunity will allow for the most revision time.	31.5	37.5	10.3	16.8	3.8
11	Ranking of students in summative assessment help teacher to find high achievers to help them to be toppers	17.4	40.8	19.0	15.2	7.6
12	Schools try to finish the syllabi of X and XII in only the first half of the year or even in IX or XI	12.0	29.9	14.1	38.6	5.4
13	Extra classes of main subjects can be taken in sports and yoga periods	10.9	29.3	14.7	37.5	7.6
14	I like to use open-book tests often for assessment	11.4	31.5	20.1	28.3	8.7
15	Teachers benefit from having students explain why they chose the answers they did.	6.0	8.7	17.4	53.8	14.1
16	Qualitative judgements of achievement and areas requiring attention are part of assessment these days	2.7	16.8	25.0	46.7	8.7
17	The progress card indicates general observations on health and nutrition	3.3	34.2	10.9	39.1	12.5
18	Assessment should be based more on summative tests and examinations	18.5	21.7	16.3	39.1	4.3
19	Adequate remuneration is offered to teachers to ensure better quality and consistency in evaluation	8.7	21.2	21.7	34.8	13.6
20	The progress card indicates information and advice for the parents	6.5	19.6	13.6	48.4	12.0
21	Current evaluation procedures do not evaluate a learner's creativity.	17.4	35.9	25.0	14.1	7.6
22	Assessments based on projects and hands-on experiences are not feasible	7.6	21.2	20.1	38.6	12.5

Note: SDA = strongly disagree, DA = disagree, UD = undecided, A = agree, and SA = strongly agree

Table 4 indicates that 48.9% of teachers disagree with the idea that the main purpose of classroom evaluation is to assign grades; instead, 62% of teachers' prioritise providing individualised feedback to students over assigning grades. Furthermore, 64% believe that the key objective of classroom assessment is to assess the effectiveness of teaching methods. Additionally, 55% of teachers think that classroom assessments should ensure students are accountable for their own learning, 42% of teachers favour towards the paper-pencil tests being more effective than task-based activities, 43% of teachers do not favour the view that summative assessment is more effective than formative assessment, 43% of teachers favour the statement that an examination paper item covers all aspects in terms of curriculum objectives and 51% of teachers favour the statement that student performance should be checked by annual examination. It is clear from Table 4 that 30% of teachers favour the

statement that teachers should apply alternative approaches to assess learning outcomes, and 69% of teachers do not favour the statement that syllabi of X and XII must be finished as early as possible to get maximum time for revision, 58% of teachers do not favour the statement that ranking students in summative assessment helps teachers to find high achievers to help them to be toppers, 44% of teachers favour the statement that schools try to finish the syllabus of X and XII during the first half of the year or even in IX or XI.

The same Table 4 also reveals that 43% of teachers favour the statement that extra classes of main subjects can be taken in sports and yoga periods, 67% of educators agree with the claim that it is a regular practice and an aid to teachers to clarify why students answered the way they did, 55% of teachers favour the statement that qualitative judgments of achievement and areas require attention are part of the assessment, 52% of teachers favour the statement that the progress card indicates general observations on health and nutrition, 42% of teachers do not favour the statement that assessment should be based more on summative tests and examinations, 48% of teachers favour the statement that adequate remuneration is offered to teachers to ensure better quality and consistency in evaluation, 60% of teachers favour the statement that the progress card indicates information and advice for parents, 52% of teachers disagree with current assessment practices, that do not gauge student's originality and 50% of teachers believe that the assessment based on projects, and hands-on experiences is not feasible.

Result-5: Comparison of Teachers' Attitude towards Classroom Assessment in Relation to the Categories of Demographic Variables

To ascertain the comparison of categories with respect to teachers' demographic characteristics on their attitude towards the utilisation of classroom assessment procedures in teaching, an independent sample t-test or one-way ANOVA (F-test) was performed. Below are the results in Table 5.

TABLE 5

Mean, Standard Deviation, t-Value/F-Value of Teachers' Responses towards the Use of Classroom Assessment Practices

S. No.	*Demographic Variable*	*Categories*	*N*	*Mean*	*Standard Deviation*	*t-Value/ F-Value*	*p-Value*
1	Type of the school	Government	129	70.00	0.695	1.956**	0.005
		Private	55	67.53	1.044		
2	Locality	Rural	20	72.70	6.546	2.078*	0.039
		Urban	164	68.84	7.978		
3	District	New Delhi	3	70.67	7.234	10.46**	0.000
		North Delhi	5	69.20	4.382		
		North West Delhi	80	70.86	8.390		
		West Delhi	30	71.10	6.294		
		South West Delhi	14	70.79	5.147		
		South Delhi	9	77.33	2.646		

Contd...

		North East Delhi	14	68.07	3.025		
		East Delhi	29	60.14	4.919		
4	Teaching Subject	Languages	45	71.84	7.716		
		Maths	21	63.62	10.590		
		Science	41	70.17	6.789	4.604**	0.001
		Social Science	47	69.45	6.858		
		Commerce & Others	30	67.80	7.227		
5	Age	< 30 Years	58	66.78	9.706		
		31 - 40 Years	58	69.00	6.921	4.206**	0.007
		41 -50 Years	50	71.32	6.766		
		> 50 Years	18	72.39	4.604		
6	Highest Qualification	UG	45	65.67	7.468		
		PG	120	69.82	7.706	9.555**	0.000
		M.Phil. / Ph. D.	19	74.26	6.830		
7	Teaching Experience	Less than 10 Years	119	67.98	8.362		
		10 to 20 Years	26	73.04	7.507	5.35**	0.006
		More than 20 Years	39	70.64	5.513		
8	Teachers' Training	Trained	98	69.69	7.769	0.792#	0.430
		Untrained	86	68.77	8.087		

Note: * significant at 0.05 level,
** significant at 0.01 level,
# not significant.

According to Table 5, private teachers have a mean score of 67.53 while government teachers have a mean score of 70. In comparison, the SD values for the opinion of government and private teachers about the employment of classroom assessment procedures in instruction are 0.69 and 1.04, respectively. The t-value of 1.956 from the t-test findings shows that it is significant at 0.01 level ($p < 0.01$). Hence, the type of school differs according to the attitude of teachers towards the use of classroom assessment practices. So, the formulated null hypothesis is rejected. Therefore, it can be stated that there is a significant difference in the attitude of government and private teachers towards the use of classroom assessment practices in teaching.

The mean score of rural teachers is 72.70, and the mean score of urban teachers is 68.84. In contrast, SD values are 6.54 and 7.97, respectively, for both rural and urban teachers towards the use of classroom assessment practices in teaching. The t-test result with a value of 2.078, significant at $p \leq 0.05$, reveals a significant difference in teachers' attitudes towards classroom assessment practices based on school locality. Thus, the null hypothesis is rejected, confirming that attitudes towards these practices differ notably between rural and urban teachers.

The district difference of the participants results in significant differences. Table 5 indicates that there is a statistical difference among the groups: New Delhi group

(M = 70.67, SD = 7.234, South Delhi group (M = 77.33, SD = 2.646), North Delhi (M = 69.20, SD = 4.382), South West Delhi (M = 70.79, SD = 5.147), North East Delhi (M = 68.07, SD = 3.025), East Delhi (M = 60.14, SD = 4.919. It can be seen that North West Delhi (M = 70.86, SD = 8.390), has higher mean scores than the other age groups. Since p value (0.000) is below the 0.05 cutoff, the null hypothesis is rejected at the 0.05 significance level. The one-way ANOVA yields significant differences among the district groups. As a result, the attitudes of educators varied greatly from one another towards the use of classroom assessment practices in teaching among the teachers of district, New Delhi**,** North Delhi, North West Delhi, West Delhi, South West Delhi, South Delhi, North East Delhi, and East Delhi. The participants' varying subjects led to notable variations, and language teachers (M = 71.84, SD = 7.716) had higher mean scores than the other teachers of Mathematics (M = 63.62, SD = 10.590), Science (M = 41, SD = 6.789) and Commerce & others (M = 67.80, SD = 7.227). The results of the analysis give p-value = .001. Since the p-value is below 0.01, the null hypothesis is rejected at the 0.01 significance level. The one-way ANOVA analysis reveals significant differences among the subject groups of teachers, indicating that teachers' attitudes toward the use of classroom assessment techniques vary considerably across different teaching subjects.

The analysis shows that age differences among participants lead to significant variations. According to Table 5, the 31-40 years old group (M = 69, SD = 6.921) has similar scores to the 41-50 years old group (M = 50, SD = 6.766). In contrast, the group below 30 years of age (M = 66.78, SD = 9.706) exhibits higher mean scores compared to the other age categories. A one-way ANOVA was conducted to compare the categories of teachers' age in relation to teachers' attitudes towards classroom assessment practices. The analysis produced a p-value of 0.007, which is below 0.01, leading to the rejection of the null hypothesis. This indicates that there are significant differences in attitudes towards classroom assessment practices across different age groups. It is seen that the difference in the highest qualification of the participants results in significant differences. Our data also indicate the scores of the UG old group (M = 65.67, SD = 7.468, and the PG group (M = 69.82, SD = 7.706). The MPhil /PhD group (M = 74.26, SD = 6.830), as it is seen, has higher mean scores than the other groups. The results of the analysis give p-value = .001. Since the p-value is less than 0.01, the null hypothesis is rejected at the 0.01 level of significance. The analysis of the one-way ANOVA yields significant differences among the highest qualification groups. Teachers' attitudes towards classroom assessment practices vary significantly with their highest qualification and teaching experience, with notable differences among those with less than 10 years, 10-20 years, and over 20 years of experience ($p < 0.01$). However, there is no significant difference in attitudes based on the type of training received, as the p-value is 0.430, indicating no impact of training on attitudes towards classroom assessment techniques.

Result-6: Underlying Assessment Competencies of the Teachers in Delhi Schools

Factor analysis is applied to study the underlying assessment competencies of the teachers. To find the adequacy and appropriateness of the data, the KMO and Bartlett's tests are applied, and the results are significant for factor analysis. The data results are shown in Table 6(a), and the factor analysis on the tool of teachers' skills and competencies on assessment is shown in Table 6(b). The Scree-plot on Eigen-values is shown in Figure 1.

TABLE 6(a)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		*0.765*
Bartlett's Test of Sphericity	Approx. Chi-Square	2418.094
	Df	351
	Sig.	.000

Table 6 (a) shows that the values on the KMO test and Bartletts' test, 0.765 and 2418.09, respectively, indicate the significant adequacy of the data.

FIGURE 1

Scree plot on Eigen values

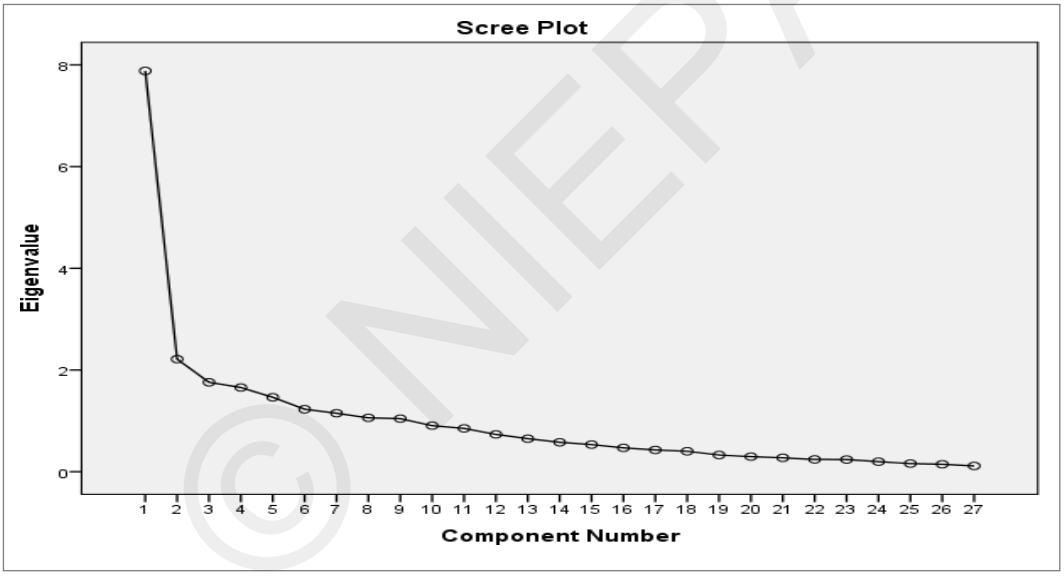

TABLE 6(b)

Factor Analysis on Tool-3: Teacher's Skills & Competencies on Assessment

S. No.	*Eigen Value*	*Factor Name*	*Variables*	*% of Variance Explained*	*Loading*
1.	7.881	Individual Assessment Competency	Plan how and when to provide feedback Identify learning objectives and assessment criteria Assessing individual student participation in whole class lesson Encourage every student to ask questions Writing multiple-choice questions	10.759	.704 .616 .611 .600 .448
2.	2.214	Competency to develop a good test	Assessment of problem-solving skills Assessing specific course objectives Planning lessons based on assessment results Assessing class improvement using assessment results Rewriting a test using item analysis	10.568	.711 .686 .683 .604 .476
3.	1.758	Competency to give feedback	writing true false questions Fairly assigning grades to all students Ensuring that the test sufficiently covers the content covered in class Communicating classroom assessment results to others Providing written feedback comments along with grades	9.966	.743 .657 .633 .529 .457
4.	1.656	Innovative assessment methods	Using peer assessment for students' assessment Using Portfolio assessment Conducting item analysis for teacher-made tests Developing rubrics for objectively grading students' assignments	9.477	.781 .730 .625 .451
5.	1.463	Competency in inclusive grading	Including students' efforts in the computation of grades Incorporating student growth into the grading formula Creating organised grading guidelines Calculating variability for teacher tests	9.048	.799 .717 .577 .429

Table 6(b) shows that five significant assessment competencies were identified. The details are as follows.

(1) *Individual Assessment Competency:* It can be viewed as a competency that is demonstrated by the propensity to establish learning objectives, provide necessary feedback, evaluate students' engagement, and encourage students to ask questions and use multiple-choice questions (Eigen value = 7.881, Variance explained = 10.75 %).

(2) *Competency to use assessment results:* It may be seen as a competency that is shown by the inclination to plan courses or assess how well students are progressing based on assessment findings. Proficiency in problem-solving skills assessment, course objective assessment, and item analysis test revision is a prerequisite for teachers who can effectively use assessment data to organise lessons and measure classroom improvement (Eigen value = 2.214, Variance explained = 10.568 %).

(3) *Competency to give feedback:* It can be seen as a competency that is exhibited by the capacity to assign grades to students fairly, develop a comprehensive exam-covering curriculum, provide written feedback for grades, and communicate the results of classroom assessments to others. Teachers competent in this area also have good competency in writing true and false questions (Eigen value = 1.758, Variance explained = 9.966 %).

(4) *Innovative assessment methods:* One could consider it a skill that is reflected in the tendency to use peer assessment, portfolio assessment, conducting item analysis, and developing rubrics for objectively grading students' assignments. (Eigen value = 1.656, Variance explained = 9.477 %).

(5) *Competency in inclusive grading:* This can be viewed as a capability demonstrated by the propensity to factor in student efforts when calculating grades. This includes improving students' grading computation skills, creating organised grading processes, and factoring in variability for teacher-created assessments. (Eigen value = 1.463, Variance explained = 9.04 %).

Discussion and Conclusions

Classroom assessment practices are a crucial aspect of classroom teaching. The study reveals that teachers from Delhi are interested in assessing the students once every week, using written tests at a high level, use of other methods of oral presentation, face-to-face discussion methods, project work methods, reflective journal methods; self-assessment methods, peer assessment methods, individual portfolio methods, and rubrics are at a moderate level. The results of Forsido's study (2019) indicate that the use of reflective journals, portfolios and rubrics for assessment is low alignment with the study. Gronlund and Edward (2006) highlighted that traditional assessment practices primarily engage students in low-level thinking, which has a limited impact on their academic development. The use of non-traditional methods improves good student-teacher relationships (Ahmed, 2015; Nagaraju & Nagaraju, 2015). The study shows that teachers use short-answer questions in their classroom assessment rather than other types to understand the levels of concepts and surface knowledge of the students. Every type of question has its objectives and importance, and teachers inform the students about the purpose of testing; they use an average time of 15 to 30 minutes for taking written tests, return the answer scripts in less than a week time, and discuss the errors with the students and descriptively write feedback on the scripts. They do not disclose the scoring rubrics to the students. According to the study, they have not expressed any barriers in classroom assessment. On the contrary, the study by Ravindran (2013) reveals the problems in assessing students are a large number of classes, irregularity of students, lack of resources, and level of

involvement. The study indicates 42% of teachers favour paper-and-pencil tests, and 47% of teachers favour summative assessment over formative assessment. Only 30% of teachers apply alternative approaches, and 50% believe project-based assessments are not feasible. The reliance on traditional classroom assessment practices may be due to insufficient knowledge and skills, inadequate training, limited access to online resources, and a lack of professional forums for teachers to exchange experiences.

The study reveals that the training received by the teachers does not affect classroom assessment. A specific training or orientation programme for teachers on classroom assessment practices is recommended. However, the difference is found in their attitude about their age, type of school, locality, district, teaching subject, highest qualification and teaching experience. It can be concluded that the teachers working in government schools, rural areas, district of south Delhi, language teachers, qualified with MPhil/PhD, 10 to 20 years teaching experience had a high level of attitude towards classroom practices when compared to their counterparts. Teachers of government schools, rural areas, South Delhi, language, highly qualified and have 10 to 20 years of teaching experience might have more knowledge, and experience on assessment practices, put into practice assessment methods, hence they have a higher attitude than others. A highly qualified teacher can effectively transfer knowledge to students since they have extensive knowledge of it. It is not enough that they merely have a positive attitude towards assessment practices unless they do not undertake concrete actions to implement them in the classroom. Schoenfield (1992) found that while teachers generally have positive attitudes towards assessment, they often fail to implement it effectively or to the appropriate extent. It can be understood that if teachers try to put into practice different assessment methods in the classroom, their attitude towards assessment will be increased. So, it can be said that teachers try different assessment methods to be put into practice so that students' learning can be improved. The study results indicate that teachers are competent in assessing the students with individual care, but they have low competencies in using innovative methods. This may lead to low quality in students learning. According to NCF-2005, teachers should have the competencies to use all methods to improve students' performance. In addition to this, teachers must be encouraged to take innovative assessment practices and be aware of the use of technology in assessment. There is a need for a system of proper assessment facilities to be developed after taking into various considerations such as the subject taught levels of assessment, medium of assessment skills to be assessed, and competencies of teachers available in the system.

Recommendations

As NCF-2005 and NEP 2020, India mentioned, teachers are advised to assess the students regularly using different non-traditional methods. It is necessary to enhance the skills of using these methods in classroom assessment otherwise our country may not promote 21st-century learning (Price *et al*, 2011). It is recommended that the teachers should be competent and use innovative methods of assessment. Teachers should be encouraged to use essay-type, multiple choice-type questions in assessment along with short-type questions to develop critical thinking and reflective thinking. Offering easy access to online resources and creating professional forums for teachers can enhance their development and improve assessment practices. The government should develop an action plan to implement assessment frameworks in secondary schools irrespective of locality, type

of school, district, subject of the teachers, and qualifications of the teachers and take measures to develop a highly positive attitude among the teachers to bring quality in assessment practices. Policymakers should keep in mind the factors as drawn in the study in developing plans or frameworks for assessment. There is a need for governance and implementation of the policy that includes training teachers through refresher courses on assessment methods. The study supports the establishment of the PARAKH as a national-level apex body on classroom assessment and educational evaluation to regulate the assessment system, train the teachers on innovative assessment practices, and implement educational policies.

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Unveiling the Influence of Peer Interactions on Learning Experiences: Insights from IIT Undergraduates

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Abstract

The global learning crisis in higher education is drawing significant attention. Concerns are being raised about the quality of student learning in reputed institutions. Despite being in resource-rich environments and taught by competent faculty, students in these institutions often struggle to engage effectively in the learning process. Students enrolling in fully residential undergraduate programmes face many challenges necessitating adaptation to a novel learning milieu. Additionally, they are compelled to cultivate social relationships with their co-residents, thus navigating the complexities of communal living. In this case, peers become an integral part of students' lives. The study's objective was to get in depth on students' perception of learning and examine the influence of peer interaction on students' learning experience. The researcher has employed the mixed-method approach for the case study for the Indian Institute of Technology, Delhi (IITD). Participant observation, semi-structured interviews of twenty-five students, and a survey questionnaire were used to collect details of the profiles of respondents and the data for the attitudes and opinions of students about the influence of peer interaction on them. Conventional content analysis has been used to analyse the data collected from interviews using Atlas.ti. The data from the questionnaire were analysed using Excel. The findings suggest that for students, learning has a very broad meaning, which does not confine to academic or professional learning but also includes the different skill sets needed for psychological well-being and social support from society. Additionally, results show that students found peer learning very helpful for learning. Students reported that their motivation and interest go up with enhanced skills valuable in their professional development although negative peer interaction poses challenges as well. The primary objective of the education system is to ensure quality learning. This study reveals that positive peer interaction is crucial for

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quality learning experiences among higher education students. Higher education institutions must not only promote collaborative peer learning but also provide an emotionally safe environment to every student. This can be achieved through fostering non-hierarchical and non-discriminatory cultural values within the institution.

Introduction

The quality of learning of a student can't be ensured even when that student is studying in a reputable institution that is resourceful, has competent faculty, and is regulated efficiently in terms of management and governance. The concern of ensuring quality learning of higher education students is not only the case of 'developing' countries such as India but also strong arguments have been made by Keeling (2011), Hersh (2005, 2011) and Marrow (2005) for 'developed' as the USA in order to prioritise and focus on student-centred learning with the supportive educational environment to foster quality learning to meet diverse needs of 21st century society. To ensure the quality learning of higher education students, student engagement in the learning process is a fundamental component. Since the whole education system works primarily to help students learn useful knowledge for society, students' perceptions and experiences play a very significant role, and for whom, ideally, the whole education system should work. First, we can begin with understanding what it means to learn for higher education students. So, the first research question by the author is how students identify that they are learning?

Moving further, Hopwood (2022) importantly argues that peer interaction is intricately connected to student engagement with learning materials and outcomes. When students are admitted to graduation after completion of higher secondary education, the changes they find in their graduation life are quite different and sometimes challenging in comparison to their prior experience of schooling. It becomes challenging for students to transform to new changes, especially those enrolling in fully residential graduation courses. They have to adjust and adapt to the new learning environment and cultivate social relationships with the co-residents they have started living with. In this regard, they need to navigate the complexities of communal living. For students, their peers become an essential part of their lives, and they have a huge influence on them. Moreover, as we know that the influence of peer interaction contributes to shaping student's learning behaviour and social skills. Here, the question arises of how peer interaction influences students' learning experiences? is the second research question of this study. By keeping these two research questions in mind, this study focusses on the meaning of learning perceived by students, the peer interactions and their influence on students' learning experiences in higher education. The objective of the research study is to understand the meaning of learning perceived by students and to examine the influence of peer interactions on students' learning experiences in the context of higher education.

The findings from the research are creating a discourse that peer interaction is essential for ensuring students' engagement in the learning process, which enhances quality learning. There is a need to find new ways to provide students with opportunities and institutional encouragement for peer learning. Further, the paper discusses the theoretical underpinnings and research methods used in the study, followed by findings and discussion, and conclusion of the study, respectively.

Theoretical Underpinnings through the Literature

Student Engagement and Quality Learning in Higher Education: The whole higher education system exists for one thing: ideally, students can ultimately learn and contribute to society positively. For quality assurance in higher education, student engagement is crucial to consider. The strongest argument comes from Caotes (2005) for students to learn the right kind of engagement, which is essential despite the fact that they are studying in reputable institutions which are well-resourced with impressive teachers who teach the right content. Further, he convincingly argues that even if the institution is regulated efficiently in management and governance terms. While talking about the right kind of engagement of students, Caotes (2005) recognised the importance of the concept of "Quality of Effort" by Pace,1979, which implies that students are to challenge themselves to learn and interact with new ideas and practices. Additionally, it is essential to work on organisational, communication, and reflective skills, as all of these factors can help students learn. Moreover, it will shape the vital part of learning they will take from the education process of higher education institutes.

If we want to ensure quality learning among higher education students, first, we need to understand student engagement. Student engagement has been explicitly studied by many researchers for more than two decades. There have been diverse explanations of student engagement, beginning from confining student engagement to student involvement in a learning process to calling student engagement a "multidimensional construct" or meta construct. Clearly, student engagement refers to how much students are connected to their classes, institutions, and each other. Here, Alexson and Arend (2011) aptly argue that we should not confine student engagement to student involvement in a learning process, but we should also look at the factors that affect student engagement in a particular type of learning process. They further go beyond the limited understanding of student engagement and suggest that students and institutions are responsible for quality learning where students' efforts are essential to grow their knowledge and skills, and institutions' efforts to provide a feasible environment to facilitate student learning become crucial. Interestingly, they suggest that it is essential to research the interaction between engagement and learning.

In the policy brief by Olson and Peterson (2015), the definition of student engagement author finds appropriate to describe student engagement appropriately as follows:

> …the concept of "student engagement" is predicated on the belief that learning improves when students are inquisitive, interested, or inspired, and that learning tends to suffer when students are bored, dispassionate, disaffected, or otherwise "disengaged." Stronger student engagement or improved student engagement are common instructional objectives expressed by educators.

Collaco (2017) discusses student engagement in higher education along these lines. Enjoyment, enthusiasm, reading for the pleasure of learning itself, and reading more that is required about a subject were described as elements of student engagement. Although the author agrees with the argument of Collaco (2017), he finds it very limited in the context of higher education as it does not take collaborative activities for learning into consideration, for which reading is not the only significant component. Furthermore, Bryson and Hand (2007) attracted considerable attention by suggesting that the engagement of students at different levels lies from disengaged to an engaged continuum and also different degrees of

engagement can be experienced by the same student. The author finds it convincing and relevant for understanding student engagement in the context of higher education.

Astin's theory of involvement emphasises the role of students in fostering a supportive learning environment, which ultimately contributes to students' overall development and success in higher education (Burch *et al*, 2015; Ncube, 2020; Xhomara & Papa-Gusho, 2023). Interestingly, Kuh's engagement model further expands the involvement theory as it undermines the responsibility of educational institutions for constructing an engaging learning environment. Kuh's engagement model focusses on the responsibility of higher educational institutions to create an engaging learning environment which improves student learning and development (Jackson *et al*, 2013; Tovar, nd) The commonality between Astin's theory of involvement and Kuh's model of engagement is the conception that the investment done by students in their experience in higher education, specifically with their peers and faculty, is profitable in the form of student learning. This conception is pivotal to both engagement as well as to involvement.

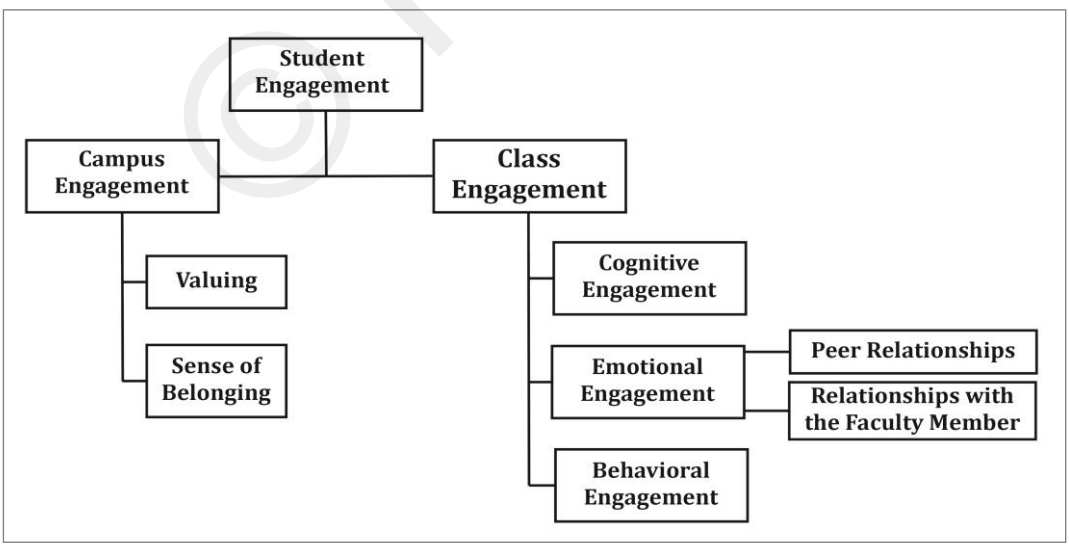
Yil (2014) has successfully identified the significant relationship between student engagement and student academic achievement. Yil (2014) utilised the definition given by Gunuc and Kuzu (2015):

> ….. the quality and quantity of students' psychological, cognitive, emotional and behavioural reactions to the learning process as well as to in-class/out-of-class academic and social activities to achieve successful learning outcomes….. for the purpose of explaining student's engagement.

Yil (2014) gives the following figure for student engagement in the context of higher education.

FIGURE 1

Student Engagement Structure



source: Yil (2014)

The above figure suggests that the dimensions of cognitive engagement, behavioural engagement, and a sense of belonging have a significant relationship with the academic achievement and engagement of the students. However, the author disagrees with Yil (2014) on putting peer relationships in only emotional engagement. Peer relationships clearly and directly impact not only the sense of belonging but also cognitive, emotional and behavioural engagement. Here, the author could have used 'learning engagement' in place of class engagement as it is a very restricted concept in terms of learning inside the classroom.

As we have understood from the above discussion, a student's experience with peers is essential to understand, and peer interaction is one of the crucial components of student engagement. Our higher education system aims to fulfil its objective, which is quality learning.

Peer Interaction and Students' Learning

One of students' greatest concerns in transitioning to higher education is whether they will make friends and "fit in." In creating learning-friendly conditions for students in higher education, we must also consider the opportunity students have to forge meaningful friendships and build a sense of belonging in a new community (Quinlan, 1992). It seems reasonable that Quinlan (1992) suggests relationships with peers are a major relationship among students in higher education. She further says that peer relations are an important aspect of students' college experience because students' interactions with peers mediate a number of key educational outcomes, including changes in values and attitudes. Brooks' study revealed that compared to the friendships students had experienced previously, university friendships were believed to be closer, based on a deeper knowledge of others, more mature and 'serious', and more equal (Brooks, 2007).

Further, in the case of fully residential courses, we ask students to move away from their families and home communities, and we expect them to learn new rules of discourse and engage with new value frameworks. Social constructivist perspectives on learning provide reasons why student interactions are important to cognition and learning. Quinlan (1992) strongly argues that the sense of belonging is a basic human drive. In fact, it is the strong need to belong within a society that causes us to obey the unwritten emotional rules of that society discussed. We reap social rewards when we behave in socially acceptable ways and suffer shame, embarrassment, and reprobation when we do not. As humans, we are social creatures, and we suffer when we are isolated from others. Strong social networks are fundamental to our health and well-being; humans have evolved to value them accordingly.

The students in higher education get space in campus life, which provides opportunities to learn, experience and experiment with new ways of life in social terms. It can be a challenge as well as an opportunity for students. Many times, educational practices are alienating in nature in higher education institutions. Nortvig, Peterson, and Balle (2018) perceptively argue that a student's learning identity can be shaped negatively if there is a lack of response from peers or moderation by teachers. The reason behind it is that students may feel isolated from and peripheral to academic groups. Furthermore, students may encounter neutral or positive interactions, but it is found that students also experience negative interactions related to diversity. Negative diversity interactions may have a relation to cognitive development (Roksaa *et al*, 2017). Sabharwal and Malish (2018) aptly recognise

that peer group formation can be a challenge or be confined to social hierarchy, stigma, and traditional values.

The opportunity to learn from each other and the encouragement to students to make peer interaction a relevant component of learning can be evaluated by students to evaluate student-student interaction. The research has shown that the greater the student-student interaction, the greater the perceived learning experience quality, and it has a positive impact on learning outcomes. Student-student interaction may happen in the classroom and beyond through modern or traditional methods. This encourages students to achieve greater cognitive levels, and it supports the discovery of personal meaning for learning. Through this method, students acquire a greater understanding of knowledge and become committed to learning (Costaa, Cardosob, Limac, Ferreirad, Abrantese, 2014). Pedagogical interaction, such as student-student interaction or teacher-student interaction, can be among several other factors that can help us understand the learning outcomes. For creating effective learning environments for students, pedagogical interaction may improve their learning outcomes (Costaa, Cardosob, Limac, Ferrirad, Abrantese, 2014).

Hay, Hodgkinson, Peltier and Drago (2004) suggested that pedagogical interaction has been proposed as one of the significant parts of any learning experience. Interestingly, Hargreaves (1979) noticed that empathy among students and empathy between teachers and students is one of the essential factors in accomplishing an efficient interactional environment. It is also relevant to promote meaningful learning and allow the development of an attitude of trust, openness and security.

Peer-to-peer collaboration can be helpful in increasing student resilience. This can be done by facilitating students' academic and social integration or sense of belonging and connection. Peer-assisted learning's objectives are to assist students in developing the skills needed for being successful professionals, promote understanding of the content of the course, adopt deep learning approaches for students and increase student autonomy while encouraging collaborative working and learning (Carver, 2011). In the case of online learning, which is the reality of today's world, peer-to-peer learning leads to satisfaction among students. Nortvig, Peterson, and Balle (2018) aptly argue that to make online learning effective, social interaction and networked learning with peers need to be embodied. For example, giving access to information is not enough, but it also supports self-reflection through networked learning.

Research Methods Used in the Study

Researchers have used a mixed-method approach to study the meaning of learning perceived by higher education students, peer interaction and its influence on the learning experience of students. Here, the subjective experience of students is the centre of the research. The researcher focusses on the social constructivist approach, which implies knowledge is viable not only personally but also in social contexts, while reality is viewed as a constructive process embedded in socio-cultural practices. Researchers believe that the constructivist paradigm predominantly uses qualitative methods (Glesne & Peshkin, 1992). The rationale behind choosing this approach is to explore and capture discursive details of students' perception of learning, peer interaction, and the influences of peer interaction on students' learning experiences.

The focus is on the contextual knowledge of peer interaction and learning experiences of students at the Indian Institute of Technology, Delhi, which is an institution of national importance under the "Institute of Technology (Amendment)Act,1963"[1] declared by the Indian state in 1963.

The study aims to understand students' learning experiences at a prestigious, resourceful higher education institution with competent faculty and efficient management. It focusses on educational settings with possibilities of high peer interaction, making a fully residential course ideal. IIT Delhi is an excellent case study due to its international recognition (QS Subject Ranking for Engineering and Technology 2021: 54),[2] national ranking (NIRF Engineering 2021: 2),[3] and its location in Delhi, which offers a robust educational ecosystem. Srivastava and Dhamija (2022) highlight Delhi's holistic institutional environment, making IITD an ideal place for optimal student learning experiences.

Data collection has been done through purposive sampling. The research focussed on a small number of cases of technical undergraduates studying at the Indian Institute of Technology, Delhi. The researcher found the concurrent strategy of inquiry (Creswell, 2009) as the best fit for the study as it fulfils the aim of the study to provide analysis of not only students' perspectives and experiences but also their perception of the influences of peers on their learning. Data were collected on the campus of IIT Delhi through non-participant observation, semi-structured interviews and questionnaires, which were given and filled by technical undergraduates, i.e. students pursuing Bachelor of Technology (B. Tech now onwards). The researcher collected both forms of data, i.e. qualitative, to explore the meaning of learning and experience of students on peer learning and quantitative, to assess the positive influences of peer interaction. The researcher collected data through a survey of 63 students, which included questions related to the profile of students and a five-point Likert scale for assessing the perception of students on peer influence. Simultaneously, the researcher interviewed 25 students who agreed to be interviewed.

Qualitative data were analysed using conventional content analysis on Atlas. It includes a three-stage process, which is the constitution of parts, transforming implicit meaning in data into explicit meaning and articulating the structure of experience and interpretations, respectively. Quantitative data were analysed in Excel using the basic methods of percentage and summation. With the methodology used, the researcher not only led to an understanding of the student's perception of learning but also got into depth about the influences of peer interaction on the learning experiences of students, which provided rich knowledge on the influences of peers on students.

1 Source: https://academics.iitd.ac.in/
2 https://ioe.iitd.ac.in/
3 https://ioe.iitd.ac.in/

TABLE 1

Profile of Respondents

Gender		*Native Place*				*Language*			*Year of B.Tech Course of Respondents*				*Category*				*Religion*					
M= Male		*NI=North India*				*E=English or*			*I- First Year*				*Gen- General*				*H- Hindu*					
		SI=South India							*II- Second Year*				*OBC- Other Backward Classes*				*J- Jain*					
		EI=East India				*H= Hindi*			*III- Third Year*								*M- Muslim*					
F= Female		*WI=West India*				*O=Other*			*IV- Fourth Year*				*SC- Scheduled Caste*				*B- Buddhist*					
													ST- Scheduled Tribe				*S-Sikh*					
																	O-Other					
M	F	NI	SI	EI	WI	E	H	O	I	II	III	IV	Gen	OBC	SC	ST	H	J	M	B	S	O
42	21	27	9	8	19	60	58	3	17	15	16	15	39	13	8	3	50	7	2	1	1	2
Total		63				63			63				63				63					

Before moving further, here is the profile of the respondents (shown in Table 1 here), as this may help us to get an idea about the students who participated in the study. Among the total participants in the questionnaire, which examined the perception of students on positive influence on peer interaction, the age of the respondents was between 17 and 23. Highest number of respondents are from Rajasthan (10) followed by Uttar Pradesh (9) and Bihar (6). Delhi, Madhya Pradesh and Maharashtra have 5 each, Haryana, Punjab and Gujarat have 4 each, Odisha and Jharkhand have 1-1 each. Students from all 11 courses[4] of B Tech which are offered in IITD has participated. The composition of the year of graduation students was approximately the same from each year of graduation. Out of the total respondents, 60 students knew the English language, and 58 students knew Hindi. Students from different states know their regional languages as well. The highest number of students who responded were from the Hindu religion, followed by Jains.

Findings and Discussion

Student's Perception of Learning and their Experience of Peer Interaction: On the completion of senior secondary education, students enrol in the best higher education institutions after competing at the national level; in this study, IITD for B Tech course through the Joint Entrance Exam (JEE). They initially believe they will excel but often struggle to engage effectively in studies and campus life. Facing challenges, they turn to peers for support in tackling educational challenges as well as for adapting to new social and cultural environments, which ultimately influence their learning journey.

The findings are divided into four sections; section one is students' perception of learning, where we will talk about what students define as learning. Section two is about students' experience of the navigation between learning alone and with peers. Section three

4 Chemical Eng., Biochemical Eng. and Biotechnology, Mathematics and Computing, Civil Eng., Computer Science and Engineering, Electrical Engineering, Electrical Engineering (Power), Engineering Physics, Mechanical Engineering, Production and Industrial Engineering, Textile Technology (source: iitd.ac.in website)

is about positive influence of peer interaction on student's experience. Section four is about negative aspects of peer interaction. Overall, we will explore the learning experiences of higher education students and influence of peer interactions, from students' emic views.

Section I: Student's Perception of Learning

This section explores students' perceptions of learning, including how they distinguish between learning and non-learning in the context of academics, social skills, and career development.

Students perceive learning as essential for career growth and professional development, viewing it as a dynamic process facilitating the acquisition of knowledge and skills. They stress the importance of gaining a comprehensive understanding of subjects and applying acquired skills to solve future problems. Some students view learning broadly, considering any interaction that enhances their understanding of life and subjects, whether formal or informal.

One of the examples of this wide understanding of learning can be seen in the following statements of a student.

> *Everything that I do, everything, every skill that I have tried to take up from anywhere, any random place that might be because of my curiosity, because of just my curiosity or something that has forced me to do something and want to do, but it has always help me in the long run. I would consider anything new as learning.*

A high Cumulative Grade Point Average (CGPA) doesn't always indicate significant learning: Students differentiate between learning and achieving a good CGPA. Learning, to them, involves acquiring knowledge, gaining a rich understanding, and problem-solving skills. However, achieving a high CGPA often involves focussing solely on prescribed course topics, neglecting exploration topics of Interest, curiosity and extracurricular activities. This can be understood in the following words of a student:

> *What we are centred on is learning we know how to comprehend, just we learn a lot from each other. The fact that we want to learn, our motive is to learn, not to get marks in the end. We were fine getting average or above the average.*

Students find that focussing on their desired career path, aligned with long-term personal goals like entrepreneurship or research or high-paying jobs in their field of Interest, sometimes leads them to neglect certain subjects. This may result in lower scores in assessments and exams, negatively impacting their overall CGPA. One of the students expressed it in the following compelling words:

> *The rest of us, like we (the Batch), know now, even if we write one or two things wrong in an exam, our concepts are clear, and we don't care. We are just happy with learning something new.*

On campus, students have numerous opportunities for learning through extracurricular activities like sports, dance, and stage performances, as well as joining clubs or societies aligned with their interests. They believe these activities indirectly contribute to their learning by improving their emotional well-being and happiness and helping them to learn to work collaboratively.

Section II: Students' Experience of Navigation between Learning Alone and with Peers

After entering the B Tech programme at IITD through the competitive Joint Entrance Exam (JEE), students initially stick to their habit of studying alone, reminiscent of their approach during JEE preparation in school. However, they encounter challenging academic requirements at IITD, realising that solitary study is not effective. Struggling with performance in continuous internal assessments and exams during the first semester, they acknowledge their insufficient individualistic learning. Reflecting on a tough first semester, they recognise the limitations of studying alone and begin collaborating to meet the high academic demands.

Typically, when facing straightforward tasks, students study independently initially before seeking peers' assistance for doubt clarification. They understand that expecting others to teach them everything from scratch is unrealistic. However, when studying topics of personal Interest, they enjoy discussing with peers who share their enthusiasm and exchanging ideas mutually.

In the later years of their degree, students encounter situations where they must study alone due to different course selections. Although initially challenging, they gradually become accustomed to solitary study and find other supportive peers to aid their learning journey.

Not all students prefer learning alone, especially when facing difficulties in exams, projects, or extracurricular activities. Some students struggle to study independently once they become accustomed to learning with peers. Typically, students in their early semesters of under graduation, like the first semester, tend to study alone, but this doesn't mean they don't interact with peers. Collaborative studying may feel new and unfamiliar to them.

Studying alone allows students to work at their own pace without external pressures. They can take breaks whenever needed and indulge in other activities like watching videos or listening to music. However, some find studying with peers distracting and prefer the focus of solitary study. On the other hand, collaborative learning enhances understanding, extends study duration, and aids in tackling complex topics.

One student shared her experience of studying with peers and studying alone:

While studying alone, there could be times you feel sleepy, not feeling like studying. That happens lots of times, so while working with peers, they are studying, and we are also studying. The number of hours of study can increase with peers, while it may be reduced alone. If I am studying alone, then if I am not getting something, I have to search for other resources on the internet or some lectures, and I also have to understand some things. With peers, they could help immediately, and they could explain things in an easier way.

Students, particularly those in their first year, need to build up a new social network from scratch. As educators, we can create environments that help students to build these important peer relationships. We can do so through living-learning environments that offer opportunities for students to discuss what they are learning informally with students from diverse backgrounds who bring different perspectives to bear on key questions. We can create learning communities within our classrooms by dividing students into smaller groups and giving them meaningful tasks that require them to share their knowledge and learn from

each other. These work groups help students meet others and feel a sense of belonging in the particular classes they are attending, thereby reducing attrition (Quinlan, 1992).

Section III: Positive Influences of Peer Interaction on Students' Learning Experience

Students benefit from positive peer interaction in two main ways: first is social and emotional support, and second is acquiring skills beneficial for their careers. The author identified a total of fifteen factors (five for social and emotional support and ten for career-related skills) as positive influences of peer interaction.

To present the results, Table 1 aggregates the factors from each category under 'Positive Influence of Peer Interaction.' Students' responses are divided into three categories: positive, neutral, and negative, reflecting their perceptions of the various factors' influence.

TABLE 1

Positive Influence of Peer Interaction, Aggregated

Positive Influence of Peer Interaction			
	Opinion of Students		
Category I: Social and Psychological Support to Students	**Positive**	**Neutral**	**Negative**
Increased Confidence	87.30%	9.52%	3.17%
sense of Belongingness	80.95%	12.69%	4.76%
Helped me working in collaboration with peers	80.95%	15.87%	1.58%
Good Understanding of different culture	84.12%	14.28%	1.58%
Enhanced the belief on my ability to learn	71.42%	25.39%	3.17%
Category II: Support for Professional Learning and Career			
Improved Verbal Communication Skills	92.06%	4.76%	3.17%
Improved Written Skills	39.68%	44.44%	12.69%
Result-Helped me working with productivity	69.84%	25.39%	3.17%
Felt Supportive for Learning	73.01%	1.58%	25.39%
Learned about career goals and opportunities	82.53%	15.87%	1.58%
Identified the self-interest on career	61.90%	33.33%	4.76%
Found classroom lectures interesting after peer interaction	65.07%	20.63%	11.11%
Become more active in learning process	80.95%	12.69%	4.76%
Learned about new ways of learning	76.19%	23.80%	0%
Enhanced the critical thinking.	84.12%	15.87%	0%

Source: Field Work data analyzed by the author

As a whole picture, all fifteen factors have positive influences on peer interaction and the student's learning experience. You can see that improved verbal communication skills (92.06 per cent) are a highly influential factor in positive peer interaction, followed by increased confidence (87.30 per cent). In addition to that, enhanced critical thinking

(84.12 per cent), a good understanding of different cultures (84.12 per cent), learned about career goals and opportunities (82.53 per cent) were also rated as influential by students. Further, becoming more active in the learning process (80.95 per cent) helped me work in collaboration with peers, and a sense of belongingness (80.95 per cent) is equally influential. When we moved further, then learned about new ways of learning (76.19 per cent), felt supportive of learning (73.01 per cent) and enhanced the belief in the ability to learn (71.42 per cent), are rated less in comparison to the earlier mentioned factors. Helped working with productivity (69.84 per cent), found classroom lectures interesting after peer interaction (65.07 per cent) and identified the self-interest in a career (61.90 per cent) are less than 60 per cent but have a significant influence. Lastly, students reported improved written skills (39.68 per cent) as the least influential of positive peer interaction.

We will explore each factor to understand students' experiences based on interviews with 25 B Tech students from the IITD.

Category I: Social and Psychological Support to Students

In this category, students perceive the importance of peer interaction when they receive help during a crisis, gain motivation for studying, adopt positive habits from peers, and establish a sense of trust to share personal challenges and experiences. Here are some statements from students illustrating social and psychological support through peer interaction:

"It helps you get out of your bad habits."
"It makes us confident, and it reduces hesitation."
"I believe that it definitely helps, but one should be positive enough to take things positively."

We will examine five factors of social and psychological support that students found beneficial for their emotional well-being and social relations. The following factors are discussed in detail.

1. *Increased Confidence:* Among the students surveyed, 87.30 per cent reported an increase in confidence through positive peer interaction. They found that interacting with peers reduced their hesitancy in communication, improved their understanding of academic content, and enhanced their overall campus experience. This boost in confidence enabled students to ask peers and teachers for clarification on doubts and facilitated networking with individuals relevant to their professional aspirations.

I lack self-confidence and always underestimate myself, but it is due to peer interaction, which gives me confidence and helps me get rid of the fear of interaction with strangers and many more things like that.

These words from students demonstrate that how much peer interaction becomes important for students living in a campus environment.

2. *Sense of Belongingness:* Students noted that forming friendships and engaging with peer residents on campus aids in adjusting to new lifestyles and embracing cultural diversity.

Some 80.95 per cent of students reported peers as a source of support, seeking their company even during individual study sessions. Peer presence often serves as motivation in challenging times, fostering feelings of support and solidarity. One student summarised this sentiment concisely.

It is very helpful, especially in times of distress when one feels demotivated and depressed; they provide mental support. It builds bond and trust in people around me, makes me emotionally stronger, and helps me become confident.

3. *Helped me work in collaboration with peers:* 80.95 per cent of students noted a shift from solitary learning to collaborative work upon entering IIT Delhi for B Tech. Living on campus necessitated collaboration for assignments, projects, and resolving doubts. Additionally, students actively participate in various extracurricular clubs and initiatives, fostering collaboration skills beyond regular coursework. This collaborative practice enables them to efficiently divide responsibilities and leverage diverse approaches to achieve common goals, enhancing the value of their work.

Students perceive academic pressure as competitive and stressful but find relief in collaborative learning with peers. Sharing the pressure fosters a healthy balance between competition and cooperation. They recognise that mere competition doesn't facilitate growth, emphasising the importance of collaborative learning for both academic and personal development. One of the students says: *"I got skills through interaction and collaboration with peers."*

4**.** *Good understanding of different cultures:* 84.12 per cent of students discovered diverse cultures through discussions with peers, learning about festivals, languages, cuisine, dance forms, attire, and rural lifestyles. This exposure reduced biases and expanded their social networks, as peers served as conduits to a wider circle of contacts. Students gained insights into unfamiliar village life and varied state cultures, fostering geographical and ethical understanding.

5. *Enhanced belief in the ability to learn:* 71.42 per cent of students attributed their enhanced belief in their learning capabilities to supportive peer groups and regular interactions. Peer interactions developed their communication skills and field-specific English proficiency. Engaging in extracurricular activities with peers boosted confidence and provided a sense of personal growth. Peer encouragement to explore new topics further reinforced their confidence in their ability to learn.

Category II: Support for Professional Learning and Career Growth

Creating an enabling environment for learning and career growth is crucial for students' success in academics and professional endeavours. Peer interaction fosters effective learning environments wherein students negotiate and question each other, leading to deeper understanding applied in various contexts like exams, competitions, placements, and discussions with peers and teachers.

We'll explore ten factors supporting professional learning and career growth, analysed individually, under the category 'Support for Professional Learning and Career Growth.'

1. *Improved verbal communication:* Initially, students struggled with peer interaction and communication but were supported by seniors to adapt to campus life and its academic demands. They organised group practice sessions for English proficiency during placements, gradually enhancing communication skills through frequent peer interactions. 92.06 per cent of students reported significant improvement in communication skills due to peer learning.

2. *Improved written skills:* While written skills are crucial for academic success, only 39.68 per cent of students believed peer interaction contributed significantly to improving writing skills, as for most B Tech students, the focus is not on improving writing skills but rather on completing assignments or projects to fulfil all the compulsory requirements.

3. Helped me work with productivity: 69.84 per cent of students noted increased productivity through peer learning. Clearing doubts immediately during study sessions and collaborative exam preparation enhanced learning speed and understanding. Peer learning proved more effective than lectures in clarifying concepts for students. As students don't feel hierarchy and fear of being judged by faculty, they get better engaged in the learning process.

4. *Felt supportive for learning:* 73.01 per cent of students reported positive experiences with peer support in academic and non-academic learning, as well as emotional support during challenging times. Peer interaction facilitated mutual teaching, clearing doubts, exploring diverse subjects and philosophies (such as Buddhism, happiness, and Taoism), extracurricular activities, and joining clubs. This not only increases motivation to engage in academic studies but also contributes to enhancing students' overall well-being, including emotional and physical well-being, and expands their horizons in understanding different subjects. One of the students conveyed this in the words as

It helps to conquer the doubts and to tackle the common doubts more efficiently.

5. *Learned about career goals and opportunities:* Students engage in discussions with peers regarding career goals, opportunities, fears, interests, and campus exposure gained through talks and conferences. They seek guidance on what to focus on, how to prepare, and who can offer support. 82.53 per cent of students acknowledged learning about career goals and opportunities from peers. One student succinctly captured this sentiment. *"It's great; you got to see what people like you are dreaming about. Got introduced to new areas of study."*

6. *Identified the self-interest in career choice:* 61.90 per cent of students credited peers with helping them identify their self-interest in career choices. Through discussions in various settings such as clubs or casual interactions, students explore topics and projects, aiding each other in recognising their passions. Detailed conversations about future aspirations facilitate self-discovery, often revealing interests during academic teachings. These interactions thrive in an environment of freedom and open discussion. One student discovered his career interest through peer learning.

> *it was in the fifth semester when I was studying properly, and my peers were unprepared. So, I sat one night before the exam, and I taught them; then I realised that teaching makes you understand well, and my Interest also lies in teaching. So, I started thinking of it as a career option. After that, I also started teaching last year*.

7. *Found classroom lectures interesting after peer interaction*: 65.07 per cent of students noted that interacting with peers about class topics enhances their understanding of lectures and fosters deeper discussions.

8. *Became more active in the learning process*: 80.95 per cent of students reported increased activity in the learning process due to peer interaction. Engaging with peers prompts deeper exploration of topics and fosters effective learning habits, such as seeking motivation and studying efficiently. Peer interaction also facilitates comfortable questioning and expands learning beyond textbooks, leading to longer study sessions before exams.

9. *Learned about new ways of learning*: 76.19 per cent of students learned alternative learning styles from their peers, such as detailed understanding from scratch, problem-solving before theory comprehension, and clear explanations from basics. They adapt these methods to academic demands and personal interests.

10. *Enhanced critical thinking*: 84.12 per cent of students credited peer interaction with enhancing critical thinking by exposing them to diverse perspectives and encouraging questioning of norms and perceptions. Discussions with peers prompt exploration of alternative solutions and challenge accepted theories and concepts. For example, gender, why people don't accept the LGBT communities, and why people are homophobic, whether we need to not always obey the things which we are supposed to obey. One student's words capture this sentiment effectively: *"They became familiar and understood multiple perspectives."*

The above results and findings support the arguments of Choi & Zhi (2021 that students' motivation and Interest go up for learning time for exams as well as when they decide to learn in groups as well as findings by Zhang & Maconochie (2022) and Austria *et al* (2013) who argues that all focus and speed increases while learning with peers. This finding is also supported by the results provided by Costaa, Cardosob, Limac, Ferreirad, Abrantese (2015) which say that peer interaction is considered one of the primary reasons for improving the learning outcomes of students and helping in creating an effective learning environment.

Additionally, peer learning has been found to empower students to develop a more responsible approach toward their education, promoting self-regulated learning (Alzaabi *et al*, 2021). Furthermore, peer learning fosters the development of essential skills such as teamwork, critical enquiry, reflection, and disciplinary communication skills (Matinde, 2019). It also encourages active participation in classes and the acquisition of a variety of competencies through interaction with other students (Bahgat & Ahmed, 2021). Students gain social and psychological support from peers, aligning with Quinlan (1992), who found peer interactions influence educational outcomes, values, attitudes, friendships, and a sense of belonging. Peer interactions enhance communication skills (Melander & Sahlstrom, 2009) and help develop workplace competencies like problem-solving, critical thinking, communication, research skills, and teamwork (Carver, 2011).

Section IV: Negative Aspects of Peer Interactions

In the intricate tapestry of student interactions, a dynamic interplay unfolds, showcasing both positive collaborations and, regrettably, negative encounters that pose challenges to meaningful connections and learning experiences. The realm of negative peer interactions, marked by unpleasant exchanges, proves to be a formidable obstacle in fostering cohesive bonds among students. Firstly, we will talk about the negative encounters of students while collaborating with peers for learning. Negative interactions often arise when one student assumes dominance, either by showcasing an exhaustive understanding of a topic or by displaying a lack of receptiveness to alternative viewpoints from their peers. The challenges extend into the realm of group assignments, where a free-rider phenomenon can disrupt the collaborative process. Some students may capitalise on the efforts of others, leading to disparities in individual contributions within pre-assigned groups. This inequity hampers and discourages the collaborative learning process. Additional challenges include the

inclination to procrastinate during group study sessions, veering off-topic discussions, and avoiding unhelpful or judgmental peers.

Moreover, the spectre of peer pressure looms large, compelling students to engage in activities contrary to their preferences. Interactions with some senior students who believe in superiority on the basis of more time spent in IITD introduce another layer of complexity constrained by professional boundaries that can hinder the open communication of junior students. A prevailing sentiment among students is that, while peer learning offers supplementary insights, sometimes it progresses at a slower pace compared to traditional solo learning if learning is not the focus of all group members; it happens when students usually don't decide the objective and timeline to complete the educational tasks.

Secondly, we will discuss the challenges which explicitly emerge due to the hierarchical societal Indian structure echoing factors broader societal dynamics but showing uniquely within the student community of IITD. One prominent factor influencing negative interactions is the socio-economic status of students, which introduces disparities in communication preferences, leading to instances where certain students feel excluded from conversations. This form of segregation mirrors societal patterns (Sabharwal & Malish, 2016).

IIT is a life-changing experience for all students, but more so for students who belong to marginalised communities of SC, ST and OBC, due to academic, socio-cultural and economic challenges. It starts when students from marginalised communities are asked their rank of JEE by their batchmates and seniors. Some of the students start judging lower-rank admissions, which are mostly through reserved seats. The judgement by peers is based on half knowledge of the concept of merit, and findings revealed that students from IITD believed in the concept of IQ (intelligence quotient) without knowing its context, and that defines their understanding of students' academic performance. Through the concept of merit, students from highly privileged socio-cultural backgrounds believed in their superiority. When students are performing very poorly in academics and don't speak good English, then alienation starts with a few peers through ignorance and minimal interaction. If students from marginalised communities don't get helpful peers and are unable to survive in academics, then many of them are forced to drop out. For instance, over the last five years, more than 3500 students have dropped out of IITs (*Indian Express*, 5 December 2023). Unfortunately, a few have chosen to end their lives and suicides by IIT students have shaken the nation time and again. In the case of a few students from marginalised communities, if they are just surviving the academics somehow, they form their own peer group, which sometimes doesn't focus on academics but on other extracurricular activities such as sports or drama, etc. If these students can get guidance from the IITD on what they are good at and enjoy the hard work in their respective activities, then these students can excel in their lives.

Recognising and addressing these challenges is crucial for a supportive peer-learning environment. It is shown from the words of a fourth year student of B. Tech: *"I am in fourth year, now imagining some courses without the help of peer sometimes seems impossible and peer interaction is most important part of my life."* Proactive measures should include fostering open communication, promoting respect, and addressing socio-economic disparities. Effective group work should ensure equitable contributions, discourage dominance, and encourage active listening. Discussions on peer pressure, mentorship programmes, and dialogue platforms can bridge gaps between students, fostering mutual

respect and understanding. The bedrock of optimal peer discussions lies in an egalitarian power dynamic, demanding mutual respect for diverse knowledge contributions.

Conclusion and Recommendations

Higher education students' perception significantly shows their rich understanding of learning. It's encompassing not just academic or professional knowledge but also lessons from others' experiences and social skills. They see learning as beneficial in the long run, involving existing skills, problem-solving, and the acquisition of new, applicable skills or concepts. These elements are essential for them to consider something as true learning. With the understanding of students' perception of learning, the researcher suggests that it is crucial to adopt a holistic approach to learning that encompasses psychological well-being and social support in addition to academic and professional development. This may involve integrating well-being and social support programmes into the education process to address the needs of students.

The navigation of higher education students is interesting, as is the difference between solo learning and peer learning. When difficulty arises in terms of challenging academic content, low motivation to learn, and time is running out to complete educational tasks or for exams, the students often feel the urge to shift to learning with peers from solo learning. Additionally, students need to have peer groups who are equally interested and with whom they can discuss their topic of curiosity in academics. As the findings show that peers strongly influence students' Interests, skill enhancement, and motivation to learn, higher education institutes should encourage and support peer learning initiatives. This may involve providing resources for the development of effective peer learning strategies and integrating peer learning programmes into the educational curriculum. Additionally, providing semi-formal spaces to students where they can learn through lots of discussion and laughter rather than following the traditional approach of 'keep silent and just listen', which usually happens inside the formal classroom setup.

It is abundantly clear that positive interactions help students to grow, and negative interaction has the potential to alienate students from the learning process. Positive peer interaction is highly essential for high student engagement in learning process for higher education students. This finding of positive and negative peer interaction is well supported by provided educational literature where it is reported that interaction with peers enhances the learning of students and helps them gain a better understanding of knowledge, and negative peer interaction can lead to isolation from learning (Nortvig, Peterson & Balle 2018; Roksaa, Kilgob, Trolianc, Pascarellad, Blaiche & Wisee, 2017; Costaa, Cardosob, Limac, Ferrierad, Abrantese, 2014). Addressing negative peer interactions requires not only developing guidelines but also establishing functional SC/ST and Women Cells, as well as offering regular classes for English and other skills essential for professional success. These interventions are crucial for mitigating the impact of negative peer interactions on students' well-being and learning experiences and are as important as integrating peer learning initiatives.

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Book Reviews

GERGEN, Kenneth J. and GILL, Sherto R. (2020): ***Beyond the Tyranny of Testing: Relational Evaluation in Education***, Oxford University Press, pp. 211, ISBN: 9780197529225 (Online), Price: ₹ 735.00

Can exams and grades truly capture the depth of a student's knowledge? Is it fair to reduce an individual's competence to a single measure? How can we shift away from the dominance of exams and grades in the evaluation process? What strategies can foster a greater appreciation for the learning journey and encourage collaboration among teachers, students, and communities in shaping a meaningful future? These are some of the questions raised by Gergen and Gill in this book, and in response they propose a paradigm shift towards *relational evaluation*, rooted in meaningful dialogue and relationships. They advocate for a departure from our current assessment-driven educational paradigm, seeking to replace it with *processes* that enrich *educational relationships* and place *"valuing"* at the core of education, serving as a catalyst for transformative change.

The book has nine chapters, and the first chapter titled "Beyond the Tyranny of Testing" sets the stage by introducing the readers to the problems with traditional assessment practices focussing on the '*factory metaphor*' and '*the reign of standardised testing.'* The second and third chapters focus on the various relational processes of education, building a theoretical foundation of relational orientation to evaluation in education. The fourth and fifth chapters deal with how relational evaluation can fit into primary and secondary education, and the next two chapters deal with how relational approaches can be used to evaluate teachers, teaching and the school systems. The last two chapters discuss how relational view of education has the potential to transform classroom, school, and our education system overall. This book review aims to provide an overview of the contents and proceeds to analyse the key themes emerging from the book and highlighting its contemporary relevance and limitations.

At the onset, there is a need to clarify what the authors mean by "evaluation" which they define by returning to its root word of *"to strengthen"* or *"to empower,"* focussing on the process of "*valuing"* or "*appreciating the value"* of something. This enables them to replace the traditional focus of assessment on students' deficiency with an emphasis on opportunities, possibilities, and potentialities for growth and well-being (p 52). "Relational evaluation" is an alternative approach to assessment, focussing on the '*processes*' of learning, sustained engagement, and the development of relationships, with the objective to enhance the learning process, inspire students to take responsibility for their own learning, and enrich the process of relating (p 54).

Gergen and Gill build their argument on two contrasting conceptions of schooling. The "*school as factory"* is set against the "*school as myriad conversation-in-motion*" (p viii).

A *factory model of schooling* uses high-stakes summative testing to measure if the system functioned properly and this measurement determines the *'value'* and *'worth'* of the system. It reflects the influence of neoliberal assumptions on education, where human activity is primarily valued in terms of its economic contributions. It highlights the negative consequences of instrumentalising education and neglecting the broader goals of education, such as nurturing relationships, promoting well-being, and fostering collaboration in building a meaningful future. Such a model privileges individuals rather than the collective, thereby generating conditions of oppressive individual accountability rather than productive responsibility. The authors propose "conversation" as an alternative to the "production metaphor" that is central to the factory model of schooling. "*Conversation-in-motion*" focusses on the dynamic and transformative nature of conversations within the educational setting, emphasising their significance in fostering meaningful relationships and promoting effective learning experiences. Relational evaluation challenges the conventional factory-style education model by advocating for increased student agency and collaboration. It recognises the complexity of students' life circumstances and their unique developmental journeys, addressing the power difference between teachers and students.

Building on John Dewey's view of education as a social process, the authors propose meaningful education depends on the flourishing of relational processes within the classroom, the school at large, the family, the community, and in the overall culture of education. They criticise the current system that fosters two types of relationships: "*generative relations*" that are positive, foster learning and collaboration; and "*degenerative relations*" characterised by conflict and negativity, hindering the learning process. The authors' emphasis on "*meaningful human relationship*" is core to their conceptualisation of education (p 7) asserting that it is within 'relationships' that we define reality, truth, and value, including the very nature of knowledge itself. Relationships also serve as the bedrock of language facilitating our active engagement in public discourse, shape our identities on personal, familial, communal, societal and global scales making them indispensable for our overall well-being. Consequently, relationships should occupy a central position in teaching, learning, administration, counselling, and parenting since these relationships ultimately determine the success or failure of our educational processes.

To demonstrate how relational evaluation would look like in everyday classrooms, the author provided various examples of relational practices from schools around the world. They include enhanced scope for listening to student voices, reflective dialogues, collaborative inquiry, documentation and archiving. Cases where schools successfully draw on student-led reviews, portfolios, records of achievement and varieties of presentations and reflections were used for entry into higher education rather than the 'mark or score' make the arguments more plausible and help the readers in visualising the scenarios.

Gergen and Gill acknowledge that it is difficult to transform an education system that is already deeply embedded in our way of life. However, as a silver lining, they discuss how school practice has three broad domains of pedagogy, curriculum and evaluation, and a change in one domain will affect the other (p127). They argue that our current tradition of educational assessment is the most critical as it "damages relationships, undermines well-being, and radically constrains the potentials for learning" (p 50), create "hierarchies of worth" (p 43) among students, and serves as an "instrument of coercion" (p 45), thus a

change in the critical element of evaluation practice hold the key to transform the whole education system.

In the context of India, the new National Education Policy (NEP) 2020 marks a notable shift in educational assessment, focussing on competency-based evaluation, higher-order skills, and holistic reporting. However, this shift in assessment and education might not be sufficient to improve the current situation. For instance, India has witnessed a gradual increase in student suicides in recent years, particularly among those preparing for the highly competitive standardised tests for medical and engineering colleges. According to the National Crime Records Bureau (NCRB) Report, from 2016 to 2021, there was a 27 per cent increase in student suicide rates and in 2021 alone, 13,089 students took their own lives, with 1,673 directly attributing *"failure in examination"* as the cause. The NEP acknowledged the burden of standardised testing and "*coaching culture*" (para 4.36), but it still introduces additional standardised assessment in grades 3, 5, and 8 (para 4.40) to track students' transitions across levels. Gergen and Gill assert that when students are reduced to mere data points, human values are pushed aside. They question the wisdom of creating an educational environment where stress and anxiety are so pervasive that the most vulnerable contemplate to rather end their lives (p 17) as can be seen with the prevalent of high suicide rate among students in India.

Through this book, the authors propose a much-needed alternative approach to educational assessment, with a promise to transform the education landscape. However, a major limitation is the absence of empirical validation, making its effectiveness at the policy and implementation stages uncertain. A critical challenge lies in persuading policymakers and parents of the merits of relational evaluation when standardised assessment is already deeply rooted. How do we deal with external accountability pressures and standardised data points in the developing countries where educational financing is still a major issue? In a highly diverse, densely populated and developing country like India, the intersection of education as a public good and education for the masses always have quality implications. In such a scenario, how do we balance the diversity and coherence of relational practices across different contexts? Will relational evaluation be able to address the issues of equity, quality, and comparability? These uncertainties will make it harder to convince leaders and policy makers who play a critical role in a publicly funded education system like in India.

On the whole, the book by Gergen and Gill challenges the conventional concept of assessment and evaluation to focus on the power of meaningful human relations and conversations. They propose the concept of a school as a broader learning community that extends beyond students, teachers, and administrators inviting the active involvement of parents, caretakers, neighbours, businesses, local government, and other stakeholders as learning partners. The proposed relational approach of education truly embodies the idea that it does take "*the whole village to raise a child*" as captured by the African proverb. This book should be an essential reading for everyone involved in the field of education.

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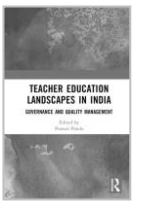

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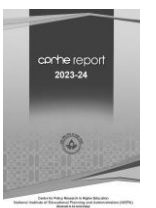

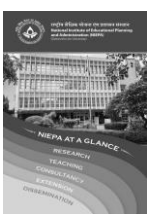

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