

HIGHER EDUCATION IN INDIAN PUNJAB: EVALUATING ITS STATUS AND KEY ISSUES

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ABSTRACT

This study explores the growth of higher education institutes, student enrollment, and faculty growth in Indian Punjab during the post-reform period by analysing secondary data and calculating the Compound Annual Growth Rate (CAGR). The findings reveal a significant rise in higher education institutions and student enrollments, particularly in professional and technical programs. However, employability of faculty has not increased with the growth in student enrollment, especially in technical and medical courses, which has affected the overall quality of education. The study recommends that there is need to increase the public expenditure, provide financial incentives to the marginalised sections especially in technical/professional courses for their better participation, monitor the performance of the private colleges and their fee structure, and teachers' recruitments on regular basis to improve the quality and higher education standards in Punjab.

Keywords: Higher Education, Privatisation, Educational Institutes, Student Enrollment, Teachers Growth.

Introduction

Higher education is essential to face the challenges of globalisation as it imparts the required skills and knowledge. The major challenges of globalisation and knowledge society include the appropriate use of knowledge, research, and development for the progress of agriculture and industry; efficiently managing the marketing of agricultural and industrial products across the country and the globe; value addition by a variety of services in agricultural and food products; management of various services professionally such as education, health, electricity, water, gas, sanitation transport and communication services, distributional services, law and order, management of state institutions and national security, etc. Research and development enhances knowledge to innovate new techniques in production (GOP, 2005). Moreover, it helps in reducing poverty and inequality, provides better employability, enhances earnings, and helps in promoting social mobility. It is essential for inclusive growth, which the Indian Planning Commission has set as a goal for its eleventh five-year plan (2007–2012). It promotes the long-run sustainable development of the country and its importance was empirically recognised by T.W. Schultz and Gerry Becker in terms of human capital (Schultz, 1961; Becker, 1964).

Accessibility and affordability both are important in educational services. The neo-liberal introduced in India in 1991 led to the privatisation of the major sectors of the economy including

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education, more particularly higher education. Consequently, private institutes in higher education have increasing to fulfill the unmet higher education demand by the government sector. Although, privatisation helps in reducing the distance between the student's residence and educational institutions by extending education facilities in rural and semi-urban areas, reducing the government's financial burden, and meeting the demand for highly demanded courses (engineering and medicine). It also leads to increase the cost of education as it is unaffordable for poor and middle-income groups (Ravi, 2015). Whereas public spending on education was compressed during post-reform period i.e. it was 4.1 percent of GDP in 1989-90 (Joshi, 2006) which reduced to 2.9 percent of GDP in 2020-21. In the 2022-23 budget estimates, expenditure on education remains at 2.9 percent of GDP. (Economic Survey of India, 2022-2023). However, it has much below 6 percent of GDP as recommended by the Education Commission in 1966 and subsequently in National Education Policy 1986 and 1992 (Chakrabarti and Joglekar, 2006). Furthermore, the government does not allocate the 1.5 percent of GDP that the Kothari Commission and the Central Advisory Board of Education recommended for higher education. One of the reasons for this is the shift in government resources from higher to primary education for the universalisation of primary education (Rani, 2008) which might affect the development of higher education.

Regarding the state of higher education in Punjab, there were initially three universities: Panjab University (PU) in Chandigarh (established in 1948), Punjabi University in Patiala (established in 1962), and Guru Nanak Dev University (GNDU) in Amritsar (established in 1969), along with 84 affiliated colleges during the 1966-67 period when Punjab was reorganised. These universities offered both general as well as professional education. In the agricultural sector, Punjab Agricultural University (PAU) in Ludhiana was established in 1962. Subsequently, to advance technical and medical education, Punjab Technical University (PTU) in Jalandhar was founded in 1997, followed by Baba Farid University of Health Sciences (BFUHS) in Faridkot in 1998. After that several new universities were established, including Rajiv Gandhi National University of Law in Patiala in 2006, Guru Angad Dev Veterinary and Animal Science University in Ludhiana in 2006, and Thapar University in Patiala, which attained deemed university status in 2000. Lovely Professional University (LPU) in Jalandhar was founded in 2005 under the Private University Act of 2000. In 2007, the National Institute of Pharmaceutical Education and Research was established in SAS Nagar, Mohali, and Sant Longowal Institute of Engineering and Technology (SLIET) in Longowal was granted deemed university status. The Indian government also established the Central University of Punjab in Bathinda in 2009 to provide high-quality education.

Currently, Punjab has 34 universities, comprising 10 state public universities, 15 state private universities, six institutes of national importance, two deemed universities (one private and one aided), and one central university (AISHE, 2020-21). Therefore, it is crucial to examine the impact of privatisation on the growth of higher education institutions, student enrollment, and faculty development in Punjab.

Section I: Review of Literature

Ghuman et al. (2006) in their project report revealed that low percentage of students from rural areas in state universities of Punjab. Further, the highest percentage of rural students has enrolled in Punjabi University, Patiala i.e. 8.16 percent, followed by PAU (4.73 percent), GNDU (3.01 percent), and PU (2.20 percent). However, the percentage of rural students is higher in regional centers associated with respective universities. Moreover, the highest proportions of rural students in universities are those who came from better-off sections i.e. their parents are educated, economically well, and belonged to upper social groups. Ghuman et al. (2008) in their other project report on rural students enrolled in professional education in Punjab found that only 3.71 percent of students, out of the total student enrollment in all universities, have belonged to rural areas. This percentage is highest in BFUHS due to the highest enrollment of rural students in BSC Nursing and the lowest in Thapper University, Patiala. Further, the majority of rural students belonged to well-off and educated families and associated with upper social groups. Whereas a very small percentage of rural students came from marginalised sections and it might be due to higher fees and funds. Brar et al. (2008) estimated the recurring costs among colleges, providing general education in Punjab. It was found that the share of teachers' salaries and administration costs dominated the total recurring cost. Moreover, per unit recurring cost was strongly connected with salary, the strength of teaching and administration staff, the number of students in colleges, and the teacher-student ratio. In terms of college efficiency, private unaided colleges had the highest level of efficiency, followed by government and aided colleges. Rani (2008) in her study found that privatisation of higher education began in the 1980s and accelerated in the 1990s in many forms with the introduction of reforms. Further, its effect has been seen in school education as well which accentuates inequality. Kalia (2010) analysed the cost of higher professional education and also

examined the education financing practices followed in Punjab by conducting a primary survey of colleges under PTU and BFUHS during 2006-07. It was found that professional education expanded sharply during 1991-2005 and the private sector controlled the majority of this growth. As far as unit cost was concerned, teachers' costs dominated the total recurring cost in selected universities and total recurring cost dominated the total institutional cost. The majority of funding for the sampled institutions came from fees and funds made by students enrolled in all courses and parents paid for about 83 percent of each student's education. Similar findings were reported in another study in Punjab on technical education by taking 300 colleges under PTU by Kaur (2015) during the session 2011-12. Recurring cost constituted the highest in total institutional cost in which the share of teachers cost highest in total recurring cost and building in case of non-recurring cost of sampled institutions. Furthermore, 91 percent of students' education was financed by their parents in form of fees and funds given to the institution, making private costs per student the highest. Sharma and Mehra (2014) showed expansion, witnessed in higher education institutions from 1990 to 2014 more particularly after 2004 in Punjab. It has been observed without appropriate improvement in infrastructure facilities including faculty employment. Shergil et al. (2018) highlight the prevailing inequalities in the education structure in Punjab by conducting a primary survey in 2013 in one village Sekha, located in Ludhiana. The value of mean years of schooling, expected years of schooling, and human development index have the highest registered among forward and richer households.

From the above review of literature, the effects of economic reforms on higher education have been seen from different perspectives in India. The present paper tries to study the growth in the institutions of higher education, student enrollment in higher education institutions (HEIs) and teachers' growth in HEIs in Punjab in the post-reform period.

Data and Methodology

For the present study, secondary sources of data have been used including various issues of Statistical Abstract of Punjab, All India Survey on Higher Education (AISHE) and existing published project reports. The Statistical Abstract of Punjab provides information on the number of recognised HEIs, students enrolled in HEIs, and teachers in recognised HEIs. It also provides the above information by type of college and course. The AISHE began in 2010–11 and it is a comprehensive repository of data about higher education in India. It provides state-wise information in almost every dimension.

For the analysis, the Compound Annual Growth Rate (CAGR) has been calculated using an exponential regression model to estimate growth in the number of recognised HEIs, student enrollment in HEIs courses, and teachers in HEIs. The following formula has been used for the calculation of CAGR:

$$\text{CAGR} = (\text{Antilog} \beta - 1) \times 100$$

The time is divided into three parts i.e. 1990-2000, 2000-2010, and 2010-2020 for which CAGR will be calculated.

The study is classified into four parts. The first section covers the review of literature, objectives, and methodology. The second section discusses the growth of recognised HEIs by type of management and course. The third section explains the enrollment of students in HEIs by type of college and course attending. The last section highlights the growth of the number of teachers in HEIs in Punjab.

Results and Discussions

Section II: Growth of Number of Recognised Institutions in Punjab

The growth of higher education institutes (HEIs) is crucial to meet the increasing demand for higher education in Punjab. Punjab, with a literacy rate of 75.84 percent as per 2011 census, is one of India's more developed states, which naturally leads to a higher demand for educational opportunities, especially at the tertiary level. Though, institutes of higher education are increasing, their growth is happening in which sector-private or public, is a matter to investigate.

The universities in Punjab rises from three in 1990 to six in 2010, and then saw rapid growth, reaching 32 by 2020. In terms of colleges, most are concentrated in arts, science, commerce, and home science (Colleges of general education). Technical colleges have seen significant growth, rising from three in 1990 to 103 by 2020. In contrast, the number of medical colleges has remained relatively stable, increasing from five in 1990 to eight in 2010, before declining to five by 2020. Teacher training colleges grew from 18 in 1990 to 185 in 2010 but decreased to 157 by 2020 (Appendix Table 1).

Table 1 highlights the CAGR of recognised HEIs in Punjab over three periods: 1990-2000, 2000-2010, and 2010-2020. It reveals that universities grew slowly until 2010, but from 2010 to 2020,

they saw the highest growth, with a CAGR of 11.9 percent. Colleges of arts, science, commerce, and home science in Punjab increased at a steady rate of 1.7 percent during the 1990s and 2000s, accelerating to 4.6 percent afterward. Technical education institutions saw sharp growth of around 20 percent in the first two decades of reforms. Although data from 2014-2016 is missing, the CAGR from 2017-2020 indicates stable growth. This stability may be due to increased student migration abroad, affecting the Gross Enrollment Ratio (GER) in higher education. The number of medical colleges in Punjab grew slowly during the first two decades of reforms, with an increase in growth observed in the last decade. Teacher training colleges expanded rapidly from 2000 to 2010, with a growth rate of 28.7 percent, but experienced a decline, becoming negative in the last decade.

Table 1: CAGR of Recognised Educational Institutes of Higher Education in Punjab

| Type of institutes | 1990-2000 | 2000-2010 | 2010-2020 |
|--|-----------|-----------|-----------|
| University | 5.6 | 2.1 | 11.9 |
| Arts, science, commerce, and home science colleges | 1.8 | 1.7 | 4.6 |
| Engineering, technology, and architecture colleges | 20.3 | 20.4 | 0.0* |
| Medical colleges(Allopathic only) | 3.9 | 2.6 | -8.2* |
| Teachers training colleges (B.ed) | 1.6 | 28.7 | -0.6 |

Source: Calculated from various issues of Statistical Abstract of Punjab.

Note: * indicates the number of engineering, technology, and architecture college data is not available for 2014, 2015, and 2016. So CAGR is calculated from 2017-2020. And the number of medical colleges' data is not available for 2012, and 2013. So CAGR is calculated from the year 2014 to 2020.

Overall, while most HEIs have grown over time, medical and teachers training colleges saw declines between 2010 and 2020. However, the highest growth has registered among colleges of engineering, technology, architecture, and teacher training during post-reform period.

Further, to assess the degree of privatisation in Punjab's higher education, universities and colleges are categorised by management type. AISHE data in Table 2 shows that state private universities had the highest CAGR at 18.3 percent from 2010-11 to 2020-21. In contrast, state public universities grew at just 1.6 percent, which is even lower than the growth of institutes of national importance, recorded at 3.3 percent during the same period.

Table 2: Type-wise Number of Universities in Punjab

| Type of university | No. of Universities | | Percentage change from 2010-11 to 2020-21 | CAGR 2010-11 to 2020-21 |
|----------------------------------|---------------------|---------|---|-------------------------|
| | 2010-11 | 2020-21 | | |
| Central university | 1 | 1 | 0.0 | 0.0 |
| Institute of National Importance | 4 | 6 | 50.0 | 3.3 |
| State Public university | 7 | 10 | 42.9 | 1.6 |
| State private university | 3 | 15 | 400.0 | 18.3 |
| Deemed university-Government | 0 | 1 | - | - |
| Deemed university-Private | 1 | 1 | 0.0 | 0.0 |
| Total | 17 | 34 | 100 | 7.3 |

Source: Calculated from various issues of AISHE

Moreover, Punjab has only one central university, along with one government and one private deemed universities, all of which have shown consistent growth over time. This indicates that private universities have experienced rapid expansion in recent years in Punjab.

Table 3 displays the distribution of recognised colleges in Punjab by type of college and management from 1970-71 to 2006-07. The data shows that government colleges in the field of general education increases at a slow pace as compared to private (aided and unaided) colleges during this period and majority of colleges that provide general education belonging to the private sector. In teacher training, government colleges remained few, with just four in 2006-07, while private colleges grew slowly until 1998-99, then rapidly increased from 17 in 1998-99 to 120 in 2005-06. For technical and medical colleges, private institutions saw sharp growth, especially after 1998-99, becoming the dominant share of total colleges, while government colleges showed little increase. Similarly, colleges in management, computer science, and law are overwhelmingly private, comprising nearly 90 percent of such institutions. The data underscores that private colleges have seen the most significant growth in technical and professional education, while also dominating general education.

Table 3: Distribution of Recognised Colleges in Punjab by Type of College and Management

| Years → Type of management → Type of college ↓ | 1970-71 | | | 1998-99 | | | 2006-07 | | | |
|--|------------|--------------------------|-------|------------|--------------------------|-------|------------|---------------|-----------------|-------|
| | Government | Private aided or unaided | Total | Government | Private aided or unaided | Total | Government | Private aided | Private unaided | Total |
| Arts, science, commerce, and home science | 21 | 93 | 114 | 48 | 158 | 206 | 52 | 125 | 55 | 232 |
| Teachers' training (b.ed/m.ed) | 3 | 14 | 17 | 3 | 17 | 20 | 4 | 15 | 105 | 124 |
| Engineering, architecture, and pharmacy | 1 | 1 | 2 | 4 | 14 | 18 | 6 | 2 | 58 | 66 |
| Medical, dental, ayurvedic, homeopathic and nursing | 2 | 2 | 4 | 6 | 21 | 27 | 10 | - | 45 | 55 |
| Management/computer science/law | NA | NA | NA | NA | NA | NA | 6 | 1 | 40 | 46 |
| Total | 27 | 110 | 137 | 61 | 210 | 271 | 78 | 143 | 303 | 524 |

Source: Ghuman et al.

The aforementioned data makes it evident that the private sector has experienced the most substantial growth in teacher training colleges and institutions for engineering, technology, and architecture in post reform period. Recent AISHE data in Table 4 further shows that the private aided colleges are seen the highest growth from 2010-11 to 2020-21, followed by private unaided and government colleges. In total, private colleges (aided and unaided) grew at a faster rate of 15.0 percent compared to government colleges, which grew at 13.0 percent during this period in Punjab. The studies conducted by Kalia (2010) and Kaur (2015) reveal that private institutes providing higher technical/professional education have generated large surplus as per unit cost of these education institutes was low compared with their receipt because they treated education as a commercial good (Kaur, 2015; Kalia, 2010). This will accentuate the exclusion of those students who belonged to the marginalised segments of society such as students of backward and scheduled castes, agricultural workers having no land, marginal and small farmers, small shopkeepers, etc. from acquiring higher education (Ghuman et al. 2006).

Table 4: Number of Private and Government Colleges in Punjab and their CAGR

| Year → Type of college ↓ | No of colleges | | Percentage change from 2010-11 to 2020-21 | CAGR from 2010-11 to 2020-21 |
|-----------------------------|----------------|---------|---|------------------------------|
| | 2010-11 | 2020-21 | | |
| Private un-aided | 169 | 650 | 284.61 | 14.0 |
| Private aided | 16 | 181 | 1031.25 | 20.8 |
| Private total | 185 | 831 | 349.19 | 15.0 |
| Government | 47 | 199 | 323.40 | 13.0 |
| Total | 232 | 1030 | 343.96 | 14.5 |

Source: Various issues of AISHE

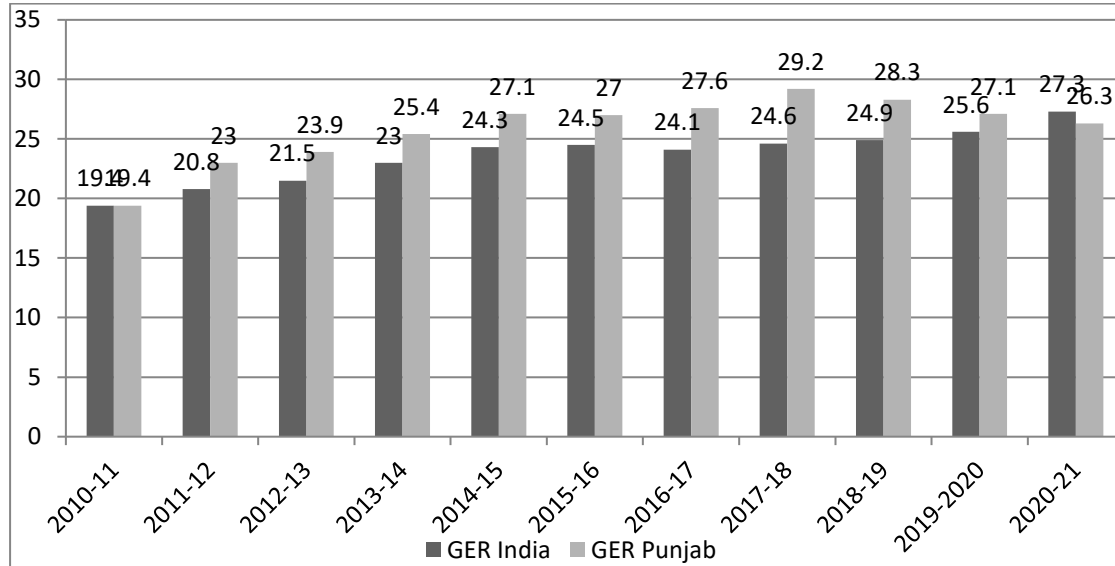
Moreover, public expenditure growth on education has declined i.e. it was 6.6 percent in the pre-reform period (1985-86 to 1991-92) which fell to 4.3 percent in the post-reform period (1991-92 to 2004-05) in Punjab as a result of neoliberal policies adopted in 1991 in India (Sethi AS and Kaur B, 2014). Further, slow growth has been witnessed in education budgets both in per capita and real terms from 1980 to 2022 and it is less than the required level (Brar, 2022). Overall, a rise in higher education demand results in the proliferation of private institutions when public institutions are failed to expand at the required pace. This trend can be observed in Punjab, where private colleges and universities have grown significantly over the past decade.

Section 2: Growth in Student Enrollment in Higher Education Institutions in Punjab

Student enrollment reflects the country's human development, and without boosting the Gross Enrollment Ratio (GER) in higher education, the demographic dividend cannot be fully utilised. GER is the proportion of students enrolled in Higher Education Institutions (HEIs) to the total population aged 18–23. Over the past decade, Punjab's Gross Enrollment Ratio (GER) in higher education is generally higher than the national average, as shown in Figure 1. Punjab's GER peaked in 2017-18 in Punjab,

before beginning to decline. Meanwhile, India's GER has steadily increased each year, surpassing Punjab in 2020-21. The decline in Punjab's GER over the last three years may be due to the increasing number of students migrating abroad for education.

Figure 1: GER in Higher Education in India and Punjab



Source: Various issues of AISHE

Further, course-wise student enrollment in higher education reflects their preferences in the post-reform period. Undergraduate (UG) courses have consistently dominated the total student enrollment, with the highest numbers in general education courses like Bachelor of Arts, Science, and Commerce. However, student enrollment growth has been more pronounced in technical and professional courses, such as Bachelor of Engineering, Architecture, MBBS, and Bachelor of Education. At the postgraduation (PG) level, the majority of students are pursuing Master of Arts, which is followed by Master of Science and Master of Commerce. Research enrollment has steadily increased, with Ph.D. enrollments rising from 148 in 1990 to 8978 in 2020. However, M.Phil enrollment has shown a fluctuating trend, starting with 618 students in 1990, dropping to 69 in 2000, then increasing to 307 in 2010, and reaching 622 in 2020 (Table A2).

Table 5 represents course-wise CAGR of student enrollment in HEIs in Punjab across three periods: 1990-2000, 2000-2010, and 2010-2020. In the research field, student enrollments in Ph.D. have been growing steadily, with a rate exceeding 19.0 percent, particularly after 2000. Enrollment in the Master of Philosophy (M.Phil) program was negative from 1990 to 2000, but then surged in the following decade (2000-2010) and grew at 6.8 percent in the last decade (2010-2020). In postgraduate (PG) courses, the highest growth has been in the Master of Commerce, while the Master of Science saw its peak growth of 17.8 percent from 2000 to 2010, slowing to 9.7 percent afterward. The Master of Arts experienced the lowest growth from 2000 to 2010, but then increased at 9.1 percent during 2010-2020, indicating a shift in student preference toward commerce and science over arts, particularly after 2000.

In case of undergraduate (UG) general courses, the Bachelor of Commerce saw the highest growth, with some fluctuations, while the Bachelor of Arts had the lowest growth, especially after 2000. This suggests that students are less inclined to pursue arts, possibly due to fewer job prospects in that field. For UG technical courses, the highest growth was observed in engineering and architecture programs, and it may be due to higher future job probability in these fields. Enrollment in Bachelor of Education programs also grew significantly, at a rate of 10.2 percent during 2010-2020. Conversely, student enrollment in medical colleges declined during the second decade of reforms (2000-2010), likely due to a decrease in the number of medical colleges and their limited intake capacity. However, enrollment surged by 68.8 percent over the past six years. Overall, students' enrollments are increasing sharply in professional courses such as engineering, architecture and medical courses during post reform period.

Table 5: CAGR in Student Enrollment in Punjab

| Course Type | 1990-2000 | 2000-2010 | 2010-2020 |
|------------------|-----------|-----------|-----------|
| Ph.D. | 7.1 | 19.2 | 19.3 |
| M.Phil | -29.8 | 20.1 | 6.8 |
| M.A | 8.7 | 3.1 | 9.1 |
| Msc | 6.3 | 17.8 | 9.7 |
| M.com | 20.7 | 6.8 | 20.2 |
| BA/BA (Hons) | 7.2 | -0.8 | 3.9 |
| Bsc/Bsc (Hons) | 4.6 | 2.8 | 11.1 |
| B.com | 10.1 | 2.1 | 7.8 |
| BE/B.arch/B.tech | 19.8 | 15.8 | 99.4* |
| MBBS | 1.0 | -0.5 | 68.8* |
| B.ed | 1.2 | 8.1 | 10.2 |

Source: Calculated from various issues of Statistical Abstract of Punjab

Note: * indicates the number of students in BE/B.arch/B.tech (in engineering, technology, and architecture colleges) data is not available for 2012, 2013, 2014, and 2015. So CAGR is calculated from 2016-2020. And data for medical students (MBBS) is not available for 2012 and 2013. So CAGR is calculated from 2014-2020.

Table 6 indicates that student enrollment grew the most in private aided colleges, followed by private unaided and government colleges from 2010-11 to 2020-21. According to the AISHE report 2020-21, the average student enrollment per college is highest in private unaided colleges (871), followed by government colleges (723) and private aided colleges (311). This suggests a stronger student preference for private colleges, possibly due to the limited availability of government colleges or the greater accessibility of private colleges, particularly in semi-rural or rural areas. The study by Choudhary and Kumar (2021) revealed the rise in the higher education cost with the entry of the private sector by conducting student survey in Orissa. It highlights that students attending private colleges have incurred more expenditure as compared to students enrolled in public institution.

Table 6: Enrollment of Students in Private and Government Colleges in Punjab

| Type of college | Enrollment of Students | | Percentage change from 2010-11 to 2020-21 | CAGR from 2010-11 to 2020-21 |
|------------------|------------------------|---------|---|------------------------------|
| | 2010-11 | 2020-21 | | |
| Private un-aided | 83079 | 201868 | 142.98 | 8.6 |
| Private aided | 17599 | 157664 | 795.87 | 17.2 |
| Private total | 100678 | 359532 | 257.11 | 11.2 |
| Government | 67193 | 143790 | 113.99 | 6.6 |
| Total | 167871 | 503322 | 199.82 | 9.7 |

Source: Various issues of AISHE

Section 3: Growth of Number of Teachers in Higher Education Institutions in Punjab

Teachers are important in imparting quality education and their growth becomes imperative as student enrollment is growing at a sharp rate after economic reforms, as seen in the previous section. Moreover, the course-wise and post-wise growth of teachers will help us to understand the effects of neo-liberal policies on teachers' growth at regular and temporary basis.

Table 7 presents the CAGR of the number of teachers in HEIs in Punjab. The data reveals that universities have seen the highest growth of teachers, particularly in the last decade of reforms, with a growth rate of 21.7 percent. In arts, science, commerce, and home science colleges, teacher growth was slow during the first two decades of reforms, but significantly increased to 9.7 percent from 2010 to 2020. Teachers in engineering colleges experienced rapid growth from 1990 to 2010, but their numbers have declined at a negative rate over the past five years. However, more precise estimates would be possible if data from 2012 to 2015 had there. In medical colleges, the growth rate of teachers remained steady at 2.3 percent during the first two decades (1990-2010), but declined by -3.8 percent in the last six years, likely due to a reduction in the medical colleges' numbers in Punjab. In B.Ed. colleges, teacher growth rises from 4.3 percent in 1990-2000 to 4.9 percent in 2000-2010, and then surged to 16.8 percent in the last decade. It highlights that the growth in teaching faculty has not kept pace with the increase in student enrollment, particularly in medical and technical colleges despite a sharp rise in student numbers in these courses. This imbalance could negatively impact the teacher-student ratio and the quality of education in HEIs.

Table 7: CAGR of Number of Teachers (Working Group) by Type of Institution in Punjab

| Type of institutes | 1990-2000 | 2000-2010 | 2010-2020 |
|--|-----------|-----------|-----------|
| University | 2.6 | 5.1 | 21.7 |
| Arts, science, commerce, and home science colleges | 1.8 | 0.3 | 9.7 |
| Engineering, technology, and architecture colleges | 16.7 | 17.3 | -1.3* |
| Medical colleges (Allopathic only) | 2.4 | 2.3 | -3.8* |
| Teachers training colleges (B.ed) | 4.3 | 4.9 | 16.8 |

Source: Calculated from various issues of Statistical Abstract of Punjab

Note: * indicates the number of teachers in engineering, technology, and architecture colleges' data is not available for 2012, 2013, 2014, and 2015. So CAGR is calculated from 2016-2020. Data for medical teachers is not available for 2012 and 2013. So CAGR is calculated from 2014-2020.

Further, the post-wise growth rate of teachers in HEIs will give a picture of the nature of teachers' recruitment in HEIs in Punjab as shown in table 8. The CAGR was calculated for three periods: 2010-11 to 2014-15, 2015-16 to 2020-21, and 2010-11 to 2020-21. The data reveals that the growth rate has been relatively high across all teaching categories, exceeding 10 percent in most cases, except for visiting professors between 2010-11 and 2014-15. The most significant growth was seen among demonstrators/tutors, who accounted for 42.2 percent of the total growth, followed by temporary teachers (38.6 percent), professors (17.3 percent), assistant professors (14 percent), and associate professors (11.5 percent). Overall, the teaching staff grew at a rate of 17.0 percent.

In the next phase, from 2015-16 to 2020-21, the overall growth of teachers has shown concerning trends, with a negative growth rate of -0.9 percent. Professors and assistant professors grew at a very slow pace, at 1.4 percent and 0.6 percent, respectively, while all other teaching categories experienced negative growth. The most significant decline was in temporary teachers, who saw a decrease of -16.8 percent, followed by associate professors at -3.3 percent and demonstrators/tutors at -2.4 percent. Visiting teachers increased at a slower rate of 3.8 percent compared to the previous phase.

The data clearly shows that teacher growth was relatively strong in the first phase (2010-11 to 2014-15) but declined in the second phase (2015-16 to 2020-21). The most significant growth was observed among tutors and temporary teachers, indicating an increase in temporary staffing in HEIs during the first phase. Although their growth became negative in the second phase, the decline was minimal compared to the increase seen earlier. This suggests that teacher recruitment, both permanent and temporary, was inadequate during this period, which could negatively impact the student-teacher ratio and the quality of education as student enrollments continue to rise.

Table 8: CAGR of Post-wise Number of Teachers in Educational Institutions of Higher Education

| Type of post | 2010-11 to 2015-16 | 2015-16 to 2020-21 | 2010-11 to 2020-21 |
|---|--------------------|--------------------|--------------------|
| Professor and equivalent | 17.3 | 1.4 | 6.8 |
| Reader/Associate Professor and equivalent | 11.5 | -3.3 | -1.4 |
| Lecturer/Assistant Professor and equivalent | 14.0 | 0.6 | 5.3 |
| Demonstrator/tutor | 42.2 | -2.4 | 15.4 |
| Temporary teachers | 38.6 | -16.8 | -2.6 |
| All teachers | 17.0 | -0.9 | 4.9 |
| Visiting Teachers | 8.5 | 3.8 | 3.8 |

Source: Various issues of AISHE

Further, the situation of 46 government colleges in Punjab in terms of availability of teachers has been seen from the following table 9. It reveals that the percentage share of contractual teachers was high, ranging from 56 percent to 70 percent between 2015 and 2020. It is observed that the state government has not recruited regular teachers to fill up these vacant sanctioned posts in 46 government colleges in Punjab and still 14 percent of posts are vacant. This has adversely affected the student-teacher ratio, which was 47:1 in 2019-20, significantly higher than the prescribed limit of 20:1. This highlights the rise of temporary staffing in government colleges due to the lack of regular recruitment in Punjab's general education sector.

Overall, the data clearly shows the mismatch between student enrollment and teachers' recruitment that will hamper the quality of higher education institutes in the post reform period.

Table 9: Availability of Teachers in 46 Government Colleges in Punjab (percentage in brackets)

| Year | Sanctioned posts of teachers | Working strength of teachers | | | Vacant posts | Percentage (%) | Total enrollment in government colleges | Average student-teacher ratio in government colleges w.r.t | |
|-----------|------------------------------|------------------------------|-------------|-------|--------------|----------------|---|--|---------------------------------|
| | | Regular | Contractual | Total | | | | Working strength of teachers | Sanctioned strength of teachers |
| 2015-16 | 1737 | 675 | 865 (56) | 1540 | 197 | 11 | 80313 | 52:1 | 46:1 |
| 2016-17 | 1769 | 612 | 920 (60) | 1532 | 237 | 13 | 79870 | 52:1 | 45:1 |
| 2017-18 | 1763 | 564 | 965 (63) | 1529 | 234 | 13 | 73253 | 48:1 | 42:1 |
| 2018-19 | 1786 | 543 | 989 (65) | 1532 | 254 | 14 | 71678 | 47:1 | 40:1 |
| 2019-2020 | 1788 | 435 | 1046 (70) | 1481 | 307 | 17 | 69931 | 47:1 | 39:1 |

Source: Report on the Comptroller and Audit General of India in performance audit on outcomes of Higher education in Punjab, GOP

Conclusion and Policy Recommendations

The study concludes that remarkable growth has registered in recognised higher education institutes in the post-reform period. The private universities and colleges, particularly in fields such as engineering and training of teacher where government institutions are limited, has increased sharply. Student enrollment has surged, especially in technical and professional courses, with private colleges dominating this growth. However, the growth of teaching staff has lagged behind student enrollment, particularly in technical institutes. Additionally, the reliance on temporary teaching staff due to the lack of regular recruitment may impact the quality and standards of higher education in Punjab.

The study recommends there is need to increase government expenditure on higher education in Punjab, where the private sector predominates, particularly in technical and professional fields where government institutions are scarce. Additionally, the decline in the Gross Enrollment Ratio (GER) over the past three years suggests reduced interest in higher education among youth, who may be seeking opportunities abroad due to unemployment. To address this, it is crucial to establish stronger education-industry linkages. This approach would help students secure employment in industry and simultaneously boost the GER in higher education. Furthermore, the Gross Enrollment Ratio (GER) for Scheduled Castes (SCs) in higher education was 17.5 percent in 2020-21, compared to the overall GER of 26.3 percent, highlighting their limited access to higher education. This disparity may be attributed to financial constraints faced by them due to privatization. So the government needs to provide financial incentives to the marginalised section, especially in technical/professional courses to promote equitable and accessible education in Punjab.

Further, the slow growth of teaching staff and the reliance on temporary faculty in recent years have negatively impacted the quality of education, when the student enrollments rise rapidly. According to the 2022 audit report on higher education outcomes in Punjab, 509 guest faculties were appointed in 46 government colleges in 2019-20 without meeting the minimum educational qualifications (NET/SET/SLET), prescribed by the UGC. Of these, only 95 teachers qualified for NET during their service, indicating that nearly 81 percent of the faculty did not meet the minimum qualifications. In another 38 selected colleges, only 1015 teachers out of 1,583 teaching faculty met the minimum educational qualification, meaning approximately 36 percent of the faculty lacked the required credentials. This compromises the quality of education even in government institutions. Since 2000-01, the government of Punjab has failed to recruit the necessary number of teachers, leading to a high student-teacher ratio, averaging 49:1, compared to the prescribed limit of 20:1. Thus, regular recruitment of teachers is essential to ensure quality education and improve the standards of higher education.

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Appendix

Table 1: Number of Recognised Institutions of Higher Education in Punjab

| Year | Number of University | Arts science commerce and home science colleges | Engineering technology and architecture colleges | Medical colleges (Allopathic only) | Teachers training colleges |
|------|----------------------|---|--|------------------------------------|----------------------------|
| 1990 | 3 | 171 | 3 | 5 | 18 |
| 1991 | 3 | 170 | 4 | 5 | 18 |
| 1992 | 3 | 172 | 5 | 5 | 19 |

| | | | | | |
|------|----|-----|-----|----|-----|
| 1993 | 3 | 177 | 5 | 5 | 18 |
| 1994 | 3 | 177 | 5 | 5 | 18 |
| 1995 | 3 | 177 | 5 | 5 | 18 |
| 1996 | 3 | 189 | 9 | 5 | 18 |
| 1997 | 4 | 190 | 12 | 5 | 18 |
| 1998 | 4 | 193 | 18 | 8 | 20 |
| 1999 | 5 | 196 | 17 | 8 | 21 |
| 2000 | 5 | 204 | 16 | 6 | 22 |
| 2001 | 5 | 205 | 16 | 6 | 23 |
| 2002 | 5 | 209 | 16 | 6 | 24 |
| 2003 | 5 | 209 | 16 | 6 | 23 |
| 2004 | 5 | 212 | 27 | 6 | 24 |
| 2005 | 5 | 232 | 39 | 6 | 47 |
| 2006 | 5 | 232 | 43 | 6 | 58 |
| 2007 | 5 | 232 | 44 | 7 | 115 |
| 2008 | 5 | 233 | 44 | 7 | 115 |
| 2009 | 7 | 234 | 84 | 7 | 185 |
| 2010 | 6 | 234 | 84 | 8 | 185 |
| 2011 | 10 | 238 | 84 | 8 | 185 |
| 2012 | 10 | 238 | 84 | - | 176 |
| 2013 | 12 | 240 | 84 | - | 187 |
| 2014 | 14 | 252 | - | 10 | 187 |
| 2015 | 14 | 272 | - | 10 | 188 |
| 2016 | 16 | 276 | - | 10 | 186 |
| 2017 | 16 | 276 | 103 | 9 | 186 |
| 2018 | 16 | 276 | 103 | 9 | 186 |
| 2019 | 16 | 276 | 103 | 9 | 186 |
| 2020 | 32 | 474 | 103 | 5 | 157 |

Source: Various issues of Statistical Abstract of Punjab

Table 2: Number of students enrolled in HEIs in Punjab

| Year | Ph.D. | M.Phil. | M.A | MSC | M.com | BA/BA Hons | BSC/BSC Hons | B.com/ B.Com Hons | BE/B.arch/B.Tech | MBBS | B.ed |
|------|-------|---------|-------|-------|-------|------------|--------------|-------------------|------------------|-------|-------|
| 1990 | 148 | 618 | 5291 | 1136 | 120 | 60457 | 9632 | 8669 | 2111 | 2302 | 3250 |
| 1991 | 137 | 645 | 4339 | 1140 | 146 | 68529 | 10157 | 9957 | 2245 | 2286 | 3266 |
| 1992 | 167 | 537 | 5601 | 1158 | 132 | 71709 | 9887 | 10882 | 2810 | 2316 | 3443 |
| 1993 | 170 | 552 | 6391 | 1207 | 139 | 95035 | 12049 | 13252 | 3190 | 2352 | 3111 |
| 1994 | 160 | 462 | 6165 | 1270 | 157 | 105933 | 13514 | 15330 | 3098 | 2312 | 3665 |
| 1995 | 166 | 8 | 6326 | 1565 | 305 | 108818 | 14404 | 15737 | 3284 | 2355 | 3794 |
| 1996 | 218 | 8 | 6878 | 1519 | 355 | 111070 | 14636 | 17967 | 4518 | 2362 | 3909 |
| 1997 | 289 | 50 | 8341 | 1574 | 473 | 115711 | 13488 | 19368 | 5317 | 2362 | 3568 |
| 1998 | 214 | 23 | 9247 | 1822 | 553 | 116571 | 14450 | 21097 | 8356 | 2499 | 3342 |
| 1999 | 251 | 57 | 10185 | 1863 | 527 | 119345 | 13332 | 21742 | 10034 | 2514 | 3705 |
| 2000 | 272 | 69 | 10974 | 1929 | 594 | 123255 | 15587 | 21563 | 13231 | 2513 | 3668 |
| 2001 | 162 | 87 | 9995 | 2174 | 928 | 132731 | 16745 | 20444 | 13752 | 2557 | 3803 |
| 2002 | 211 | 111 | 10337 | 2424 | 1106 | 135482 | 18778 | 18776 | 14284 | 2641 | 3839 |
| 2003 | 194 | 144 | 11319 | 3229 | 1105 | 132271 | 19708 | 17490 | 14284 | 2498 | 3871 |
| 2004 | 328 | 147 | 13217 | 4234 | 1308 | 135591 | 21453 | 16386 | 17064 | 2760 | 4185 |
| 2005 | 363 | 174 | 13511 | 4631 | 1431 | 132856 | 21289 | 17695 | 22682 | 2710 | 4816 |
| 2006 | 666 | 409 | 14116 | 5539 | 1215 | 134035 | 20476 | 17589 | 26123 | 2005 | 4816 |
| 2007 | 666 | 409 | 12738 | 7768 | 1237 | 127985 | 25980 | 22143 | 29623 | 2406 | 5987 |
| 2008 | 666 | 409 | 14108 | 7856 | 1164 | 119625 | 20254 | 21512 | 38738 | 2268 | 5140 |
| 2009 | 767 | 357 | 12671 | 7868 | 1363 | 118365 | 19995 | 23081 | 46905 | 2962 | 7856 |
| 2010 | 995 | 307 | 13910 | 8283 | 1755 | 123686 | 21401 | 25642 | 47088 | 2357 | 7856 |
| 2011 | 1305 | 334 | 15497 | 8024 | 1799 | 123814 | 25949 | 29820 | 52309 | 2992 | 14401 |
| 2012 | 1398 | 334 | 16984 | 8022 | 2186 | 137064 | 29373 | 33482 | - | - | 17149 |
| 2013 | 1315 | 411 | 21631 | 14198 | 5035 | 147219 | 44875 | 42590 | - | - | 17595 |
| 2014 | 1934 | 522 | 32293 | 14044 | 8056 | 179285 | 57522 | 49401 | - | 300 | 21340 |
| 2015 | 1811 | 603 | 32826 | 17669 | 9395 | 179594 | 64308 | 51811 | - | 2696 | 20161 |
| 2016 | 1631 | 530 | 33953 | 16679 | 8966 | 179457 | 61001 | 54082 | 10288 | 730 | 21953 |
| 2017 | 1631 | 530 | 33953 | 16679 | 8966 | 179457 | 61001 | 54082 | 10288 | 730 | 21953 |
| 2018 | 1631 | 530 | 33953 | 16679 | 8966 | 179457 | 61001 | 54082 | 10288 | 730 | 21953 |
| 2019 | 9007 | 530 | 33954 | 16679 | 8966 | 179457 | 61001 | 54082 | 10630 | 12527 | 21953 |
| 2020 | 8978 | 622 | 27768 | 20686 | 9295 | 165960 | 62118 | 55658 | 100871 | 14278 | 36981 |

Source: Various issues of Statistical Abstract of Punjab

Table 3: Number of Teachers in Recognised Institutions of Higher Education in Punjab (working strength)

| Year | University | Arts science commerce and home science colleges | Engineering technology and architecture colleges | Medical colleges Allopathic only | Teachers training colleges |
|------|------------|---|--|----------------------------------|----------------------------|
| 1990 | 622 | 6054 | 268 | 1106 | 255 |
| 1991 | 636 | 6108 | 270 | 1095 | 254 |
| 1992 | 682 | 6177 | 357 | 1090 | 266 |
| 1993 | 693 | 6358 | 366 | 1113 | 257 |
| 1994 | 751 | 6486 | 385 | 1116 | 250 |
| 1995 | 778 | 6595 | 403 | 1128 | 248 |
| 1996 | 776 | 6886 | 614 | 1112 | 243 |
| 1997 | 769 | 6871 | 790 | 1168 | 279 |
| 1998 | 747 | 7020 | 913 | 1377 | 335 |
| 1999 | 778 | 6869 | 993 | 1327 | 382 |
| 2000 | 839 | 7225 | 1074 | 1364 | 394 |
| 2001 | 811 | 7350 | 1188 | 1169 | 403 |
| 2002 | 904 | 7480 | 1286 | 1141 | 379 |
| 2003 | 720 | 7576 | 1286 | 942 | 391 |
| 2004 | 786 | 7659 | 1330 | 1008 | 394 |
| 2005 | 738 | 7613 | 1783 | 1099 | 423 |
| 2006 | 951 | 7613 | 1945 | 1051 | 430 |
| 2007 | 951 | 7425 | 2267 | 1034 | 504 |
| 2008 | 951 | 7776 | 3419 | 1237 | 526 |
| 2009 | 2240 | 7314 | 4810 | 1262 | 597 |
| 2010 | 927 | 7664 | 4853 | 1941 | 597 |
| 2011 | 1011 | 7965 | 5084 | 1967 | 1076 |
| 2012 | 1230 | 8341 | - | - | 1376 |
| 2013 | 1671 | 10258 | - | - | 1508 |
| 2014 | 1585 | 12093 | - | 1965 | 2121 |
| 2015 | 2232 | 18353 | - | 1955 | 2322 |
| 2016 | 2547 | 12952 | 9426 | 1955 | 2596 |
| 2017 | 2547 | 12952 | 9426 | 1955 | 2596 |
| 2018 | 2547 | 12952 | 9426 | 1693 | 2596 |
| 2019 | 2547 | 12952 | 9426 | 1693 | 2596 |
| 2020 | 16474 | 27221 | 8849 | 1580 | 4765 |

Source: Various issues of Statistical Abstract of Punjab

Table 4: Post-wise Number of Teachers in HEIs in Punjab

| Year | Professor and Equivalent | Associate Professor/Reader/Equivalent | Lecturer/Assistant Professor/Equivalent | Demonstrator/Tutor | Temporary Teachers | All teachers | Visiting teachers |
|-----------|--------------------------|---------------------------------------|---|--------------------|--------------------|--------------|-------------------|
| 2010-11 | 1921 | 2308 | 15850 | 904 | 1150 | 22133 | - |
| 2011-12 | 1995 | 6008 | 29785 | 1550 | 1673 | 41011 | 308 |
| 2012-13 | 2477 | 7684 | 30113 | 1749 | 2983 | 45006 | 318 |
| 2013-14 | 3426 | 7200 | 33548 | 2521 | 4487 | 51182 | 390 |
| 2014-15 | 3670 | 5392 | 33916 | 4521 | 4973 | 52472 | 388 |
| 2015-16 | 3808 | 5354 | 35932 | 5195 | 5418 | 55707 | 420 |
| 2016-17 | 3571 | 4399 | 36058 | 4907 | 1852 | 51163 | 372 |
| 2017-18 | 3225 | 3890 | 33372 | 3746 | 1702 | 46284 | 349 |
| 2018-19 | 3697 | 4301 | 37064 | 4323 | 1789 | 51575 | 401 |
| 2019-2020 | 3759 | 4268 | 37589 | 4265 | 1704 | 52072 | 487 |
| 2020-21 | 3965 | 4219 | 35666 | 4623 | 1554 | 50478 | 451 |

Source: Various issues of AISHE.

