

Research Paper

Analyzing the Challenges and Opportunities Faced by Polytechnic College Students in Chennai District: Strategies for Strengthening Technical Education

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ABSTRACT

Purpose of the Research: Majority of the students are opting only for the degree-based courses even though the courses in Polytechnic colleges also provide various opportunities to improvise their skill-based career and even there are lots of job opportunities available in their polytechnic colleges. Due to lack of awareness among the students, they are not opting for the skill-based courses and polytechnic colleges. The main significance of this study is to understand the student perspective for reason for joining the college, to identify the infrastructure of the polytechnic colleges and also understand the placement and internship opportunities provided inside the polytechnic colleges. **Methodology:** This study is a descriptive and exploratory in nature and questionnaire is used as tools for data collection. The stratified method is used for collecting the data in government college in Chennai region. **Findings:** From the findings and discussion, the major result found that, among the respondents only 10.5% of the students joined polytechnic colleges with their own interest. **Implications:** Bringing awareness about the polytechnic course would bring long-term benefits in terms of systemic changes amongst students in improving career choices.

Keywords: Polytechnic education, Skill-based learning, Student enrolment, Career awareness. Descriptive research, Exploratory research, Stratified sampling

Polytechnic colleges are a cornerstone of India's technical education system, producing a significant portion of the country's middle-level workforce. Often referred to as "hidden champions," these institutions equip students with technical skills for various industries. However, despite the valuable opportunities they provide, polytechnic students face challenges that can impede their academic progress. A study conducted in Chennai district by Rathode & Singh (2015) sheds light on the specific hardships encountered by polytechnic students. One of the major concerns is the lack of adequate resources, including libraries, laboratories, and workshops (Rathode & Singh, 2015; Saravanan). This deficiency hinders students' practical learning experiences, which are crucial for technical fields (statement of the problem). Another challenge identified in the literature is the shortage of qualified and experienced faculty. This can lead to a decline in the quality of education

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Received: July 30, 2024; Revision Received: September 23, 2024; Accepted: September 27, 2024

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received by polytechnic students (Rathode & Singh, 2015). Furthermore, the curriculum often neglects essential soft skills like communication, teamwork, and leadership. While polytechnic programs emphasize technical expertise, employers increasingly seek well-rounded graduates with strong communication and collaboration abilities (Bee et al., n.d.). The financial burden of education can also be a barrier, particularly for students from underprivileged backgrounds. Although polytechnic education is more affordable than engineering degrees, it can still pose a significant financial strain on many families.

Polytechnic Education in India

Polytechnic colleges play a crucial role in India's technical education system. Often referred to as the "hidden champions," they produce a significant portion of the country's mid-level workforce, particularly in the manufacturing sector. Polytechnic graduates fill supervisory roles like Team Lead and are valued for their practical skills and theoretical knowledge (MHRD, 2018). The government actively supports polytechnics, recognizing their importance in vocational education and training (VET). The number of institutions has steadily increased to meet the growing demand for skilled workers (MHRD, 2018). There are currently 3,239 government and 2,300 private polytechnic colleges in India, with some specializing in rural development or women's education. Despite their contributions, polytechnics face challenges in attracting students. While they offer a well-rounded education with a balance between theory and practical training, they are often not seen as prestigious as other higher education options. Polytechnic institutions offer diploma programs in various engineering fields, including mechanical, electrical, civil, and computer engineering (DOTE, n.d.). These three-year programs consist of six semesters, with each semester lasting 15 weeks (DOTE, n.d.). There are also part-time and sandwich programs that incorporate practical training semesters. A unique feature of the system is the Multi Point Entry and Credit System, which allows students from different academic backgrounds (10th standard, ITI diploma, or 12th standard) to enter the program at various points. This system provides flexibility and caters to diverse student needs (DOTE, n.d.).

Opportunities Offered by Polytechnic Education

Despite the challenges, polytechnic education offers a plethora of opportunities for students. Polytechnic programs encompass a diverse range of fields, including mechanical, electrical, civil, and computer engineering, catering to the needs of various industries (DOTE, n.d.). These programs equip graduates with the necessary technical knowledge and skills to pursue successful careers in their chosen fields. A distinct advantage of polytechnic education is its emphasis on practical training and exposure to real-world scenarios. Many institutions have industry tie-ups, enabling students to gain valuable hands-on experience through internships and apprenticeships. This practical training experience enhances their employability and prepares them for the job market. The reviewed literature highlights several areas for improvement within India's VET system, including infrastructure, faculty quality, and soft skills training (Sharma & Nagendra, 2016; Rathode & Singh, 2015; Verma, 2017). However, a gap exists in research specifically exploring the reasons why students choose polytechnic education over other higher education options. Studies by Reddy et al. (2017) provide insights into motivations for vocational programs in general, but a deeper understanding of the factors influencing students' decisions regarding polytechnics is needed. This research aims to bridge this identified gap by investigating the factors that motivate students to pursue polytechnic education in India. By understanding these motivations, policymakers and educators can develop strategies to improve the attractiveness of polytechnic colleges and address the challenges they face. This can contribute to a more robust VET system in India, producing a skilled workforce that aligns

with industry demands and bolsters the country's economic development. To gain a comprehensive understanding of the student selection process across the entire VET system, it would be beneficial to include data from private polytechnic colleges in the proposed research.

RESEARCH METHODOLOGY

The researcher collected the primary data by adopting the questionnaire as a tool from the respondents and secondary data were collected from the various journals, articles, newspapers, books and websites. The printed items of 34 items were given to the Polytechnic students of government polytechnic college in Chennai. Stratified sampling was adopted to collect the data and 72 samples were collected from three government polytechnic college in Chennai. Frequency analysis, descriptive analysis, Chi-square multiple cross factor analysis was adopted for the framed objective for analysis and interpretations. Interpretations were done through collected and tabulated data.

Analysis and Interpretations

The analysis of student data (61.3%) reveals a strong correlation between socioeconomic background and choosing polytechnic education in India. Aligning with World Bank's findings from 2018, a significant portion (46.7%) have fathers in daily wage jobs, and 36% of fathers have no income. This data reinforces the link between lower socioeconomic backgrounds and analysis of student data reveals a unique profile of students entering polytechnic programs in India. A large portion, 80%, are first-generation college students, echoing research by Sharma & Nagendra (2016) who highlight polytechnics as a crucial pathway for those from families without a college background. Nearly half (46%) come from government schools, suggesting polytechnics provide opportunities beyond private institutions. While the overall pass rate for the 12th grade exam is impressive (77.4%), a concerning gender disparity emerges with a higher male failure rate (41.37%). This finding aligns with the need for further research, as identified in the statement of the problem (1.3). The average score (332.14 out of 600) and the fact that nearly half the students scored between 200 and 300 in 10th grade (out of 500) suggest academic performance might influence their choice. This resonates with research by Agrawal (2019) who explores the perception of vocational education as an alternative for those with lower academic scores. Interestingly, only 10.6% cited personal interest as a motivator, while practicality reigns supreme. A significant portion (26.6%) were driven by lower 12th-grade scores, and 20% were drawn to the program's reputation for quicker employment opportunities, aligning with the statement of the problem (1.3) highlighting the job-oriented focus of polytechnics. In conclusion, the data paints a picture of a diverse student body with varied academic backgrounds and practical aspirations seeking success through polytechnic education. Further research could delve deeper into the reasons behind lower scores and explore how polytechnics can better address the needs of students from different academic performance levels. While a commendable 72% of polytechnic students felt their colleges encouraged internships, a disconnect emerged – over half (53.3%) had not participated in any, echoing challenges identified in existing research (e.g., limited industry partnerships). Similarly, although 84% reported having lab facilities, a concerning 32% found them unusable, highlighting a potential resource gap like those discussed by Rathode & Singh (2015). Interestingly, 69.3% participated in industrial visits, suggesting a positive trend in practical exposure, yet only 44% reported attending expert talks, revealing a potential missed opportunity. Career aspirations were diverse, with the largest groups aiming for government jobs (32%) and general employment (29.3%), followed by further education (17.3%). This underscores the need for comprehensive career guidance, aligning with the program's focus

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on preparing students for various paths (statement of the problem, 1.3). Overall, the study offers valuable insights for polytechnic institutions. By addressing these areas, they can bridge the gap between available resources and their effective utilization, ultimately enhancing student experiences and career outcomes.

Distribution of the respondents about the dependent on the college for your placement

Tests	Value	Df	Asyp. Sig	Odds ratio	95% Confidence interval	
Pearson Chi Square	5.2337	1	0.0222	0.2982	0.1031	0.8624

Since the p-value (0.02) is lower than the significance level (5%), we reject the null hypothesis (H₀) of no association. This suggests that the observed data is unlikely to have occurred by chance. Therefore, we can accept the alternative hypothesis (H₁) that there is a significant association between respondents and their dependency on the college's placement services. The results show a statistically significant connection between the students surveyed (respondents) and their reliance on the college to help them find jobs after graduation. This could indicate that a large portion of the students depend on the college's placement services or resources for securing employment.

Suggestions

A study revealed that a low percentage of students (10.5%) actively choose polytechnic education, suggesting a lack of awareness about its benefits. This contrasts with countries like Germany and Finland, where strong career guidance programs and collaboration with industries have fostered high awareness of VET (Vocational Education and Training) programs. This translates to strong economies and low youth unemployment.

Research by the European Centre for the Development of Vocational Training (CEDEFOP) emphasizes the importance of clear career pathways and employer involvement in VET programs. Successful economies like Germany and Finland showcase the positive impact of VET when students understand its value and programs are aligned with industry needs.

To address this disparity, can implement similar strategies. Integrate information about polytechnic courses and career opportunities into school guidance programs. Partner with industries to showcase job prospects and offer internship programs. Share success stories of polytechnic graduates to inspire future students. By raising awareness and highlighting the clear career paths and practical skills focus of polytechnic education, your country can empower students and contribute to a skilled workforce that fuels economic growth.

Skill-based polytechnic education stands out in today's job market. Unlike traditional academic programs, it equips graduates with the specific technical skills that industries crave. This translates directly to higher employability, as graduates are well-prepared to hit the ground running in fields like manufacturing, construction, and engineering. To further enhance this advantage, partnerships with these industries, a strategy employed by powerhouses like Germany and South Korea, ensure programs are constantly updated to meet evolving needs (as evidenced by World Bank research). This close collaboration isn't just beneficial for graduates; it fuels economic growth. By creating a skilled workforce that's not only employable but also prepared to innovate, these partnerships empower industries to thrive, ultimately contributing significantly to the national economy

CONCLUSION

According to TNSDC skill plays major role in bringing the gap between the industry and institutions, polytechnic college provide skill-oriented courses but according to the study only 10.5% of the students opined that they joined polytechnic with their own interest. so career awareness should be providing to the school students about the various polytechnic courses and its career opportunities to the school children.

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Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Saranraj, K. & SelvaPranambika, P. (2024). Cognitive Emotion Regulation in Medical and Non-Medical Students- A Comparative Study. *International Journal of Indian Psychology*, 12(3), 2682-2688. DIP:18.01.259.20241203, DOI:10.25215/1203.259

ANNEXURE

Income of the Father

Income	Frequency	Percentage
Below Rs.5000	20	26.7
Not earning	27	36
Rs.10,000 to Rs.15,000	7	9.3
Rs.15,000 to Rs.20,000	4	5.3
Rs.20,000 and above	2	2.7
Rs.5000 to Rs.10,000	15	20
Total	75	100

Mother Occupation and Income

Mothers Occupation	Mothers Income on monthly basis					
	Below Rs.5000	Not earning	Rs.10,000 to Rs.15,000	Rs.15,000 to Rs.20,000	Rs.5000 to Rs.10,000	Total
1. Daily wages	13	12	0	0	5	30
2. Agriculture/Farming	3	1	0	0	0	4
3. Government employee	1	0	0	0	0	1
4. Not going for any job	2	19	0	0	0	21
5. others	2	8	4	2	3	19
Total	21	40	4	2	8	75

Multiway Cross Table: Gender, have you cleared your 12th exam

Gender	Have you cleared your 12 th exam		
	1. Yes	2. No	Total
Female	41	5	46
Male	17	12	29
Total	58	17	75

Counts

Are you a first-year graduate

No	Yes
15	60

Gender

Gender	Mark secured in class 10th					Total
	100-150	150-200	200-300	300-400	400-500	
Female	1	1	31	10	3	46
Male	0	2	5	11	11	29
Total	1	3	36	21	14	75

School type_

School type_	Frequency	Percent	Cum Percent
Government	46	61.333	61.333
Government aided	16	21.333	82.667
Private	13	17.333	100

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Content	Due to own interest	Financial issue	Latel entry to BE/B.Tech	Low mark	Quick employability	Suggestion by friends and families	Total
After 10th	6	3	5	4	2	2	22
After 12th	2	11	9	16	13	2	53
Total	8	14	14	20	15	4	75

Internship	Yes	No
Have you gone for any internship?	35	40
Is your college encouraging internship opportunities?	54	21

Internship details

Gender	Count	Have you gone for any internship?		
		No	Yes	Total
Female	Count	20	26	46
	Expected Count	25	21	46
Male	Count	20	9	29
	Expected Count	15	14	29
Total	Count	40	35	75
	Expected Count	40	35	75

Tests	Value	Df	Asyp. Sig	Odds ratio	95% Confidence interval	
Pearson Chi Square	4.6423	1	0.0312	0.3462	0.1300	0.9215

Lab facility

Lab facility	Yes	No
Did your college have lab facilities for a course?	63	12
If yes, whether your lab is in usable format?	51	24

Industrial Visit

Content	Frequency	Percent
No	23	30.7
Yes	52	69.3
Total	75	100

Expert Talk

Content	Frequency	Percent
No	33	44
Yes	42	56
Total	75	100