



Evaluating the implementation and impact of school-based vocational education: An analysis of student perceptions in Western Region of India

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Abstract

This study examines the implementation of Technical and Vocational Education and Training (TVET) under the Samagra Shiksha programme in the Western Region of India, focusing on implementation status, infrastructure, teacher preparedness, and student motivation in alignment with the National Education Policy (NEP) 2020. A descriptive survey design was adopted. Data were collected from 927 students enrolled in 24 secondary schools across Chhattisgarh, Goa, Gujarat, Madhya Pradesh, Maharashtra, and the Union Territory of Dadra and Nagar Haveli and Daman and Diu (DNHDD). Descriptive statistical analysis assessed key dimensions of vocational education implementation. Findings reveal strong student perceptions of teacher competence (98.6% rated teachers as good or excellent) and academic improvement (96.12%). However, significant deficiencies were observed in the availability of vocational textbooks (27.70%), organisation of job fairs (36.58%), and access to on-the-job training (OJT) opportunities (54.15%). Although 78.21% of students expressed high interest in vocational learning, limited subject diversity and learning resources constrained programme effectiveness. While Samagra Shiksha has strengthened school-based vocational education, systemic gaps in learning resources, industry exposure, and practical training continue to limit its effectiveness. The study recommends competency-based assessment aligned with industry requirements, institutionalised industry partnerships for OJT, improved learning resources, and strengthened career exposure initiatives to facilitate a transition from a supply-driven to a demand-driven TVET ecosystem in India.

Keywords: Employability skills, NEP 2020, Samagra Shiksha, Student perceptions, Technical and vocational education and training, Vocational education.

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Contribution of this paper to the literature

The study evaluates implementation of vocational education in India, focusing on the Western Region, and presents findings that suggest measures to enhance future implementation and effectiveness of vocational education programs.

1. Introduction

India's demographic dividend, with around 54% of its population under age 25 and rising aspirations for meaningful livelihoods and economic stability, can be facilitated through Technical and Vocational Education and Training (TVET) as a more holistic approach.

The strategic importance of Technical and Vocational Education and Training (TVET) is paramount for India to capitalize on its substantial demographic dividend, with over 54% of the population currently under 25. The National Education Policy (NEP) 2020 facilitates this transformation, aiming to integrate vocational subjects into mainstream curricula and expose at least 50% of learners to vocational education by 2025. Efforts to bridge academic knowledge and industry-relevant skills are supported under the Samagra Shiksha framework, which promotes coordination between schools, industry partners, and skill providers.

Vocational education globally is recognized as a critical intervention that helps close the gap between education and employability by aligning academic inputs with industry-ready skills. TVET has emerged as an effective strategy for developing a skilled workforce, improving youth employability outcomes, and facilitating smoother transitions into employment.

Eichhorst, Rodríguez-Planas, Schmidl, and Zimmermann (2012) emphasized that well-structured vocational education systems facilitate smoother school-to-work transitions and contribute significantly to economic development. Mouzakitis (2010) also emphasizes the contribution of TVET curricula to human capital development and inclusive economic growth.

In India, vocational education is key to skill development and addresses job creation and workforce gaps in public employment. Goel (2010) noted that the Technical and Vocational Education and Training (TVET) system in India contributes significantly to sustainable development by preparing learners with industry-relevant competencies. Oberoi (2010) argued that restructuring vocational education is essential to equip the workforce with skills and competencies required in a rapidly changing economy. Sindhi (2013) also stressed the need to strengthen vocational education in India to bridge prevailing skill gaps and improve employability outcomes.

Multiple studies examined implementation of vocational education schemes at the school level. For example, Biswal (1992), evaluating vocationalisation at the higher secondary level in Himachal Pradesh, found that although vocational subjects expanded educational opportunities, challenges persisted with infrastructure, instructional resources and industry linkages. In a similar manner, Guru, Dhote, and Ray (1992) in their research study on the implementation of vocational education in Andhra Pradesh, they observed problems in implementations which adversely affected the functioning of these schemes. Government of Himachal Pradesh (1998) also noted differences in the implementation of the Centrally Sponsored Scheme for vocational education among the schools and regions.

Further research conducted in various states of India also highlights differences in the effectiveness of vocational education schemes. Gandhi (2012) evaluated vocational education in Tamil Nadu and found positive student responses towards enrolling in vocational courses. However, Gandhi noted that there were concerns regarding the availability of resources and practical training facilities. Whiteside and Desai (2000) examined vocational higher secondary education graduates in Gujarat and found that vocational education contributed positively to employability, although stronger industry connections were required to improve labour market outcomes. Similarly, Singh, Grover, Padmanabhan, and Chaudhary (2015), in their evaluation of vocational education in the Bhopal Division, reported that vocational programmes enhanced students' skills and career readiness, but identified infrastructure and implementation challenges that affected programme effectiveness.

The quality and capability of vocational teachers have been identified as crucial factors of successful programme implementation. Attaochu (2013) emphasized that the effectiveness of technical and vocational education is significantly influenced by teacher quality.

Balasubramanian (2002) advocated the inclusion of computer education in both pre-service and in-service teacher training programmes to enhance instructional quality. More recently, Joseph (2017) highlighted the importance of techno-pedagogical practices in improving teaching effectiveness, while Hoekstra (2023) demonstrated how technology-enabled professional development can strengthen vocational educators' competencies.

Student interest and perceptions play a significant role in determining the success of vocational education programmes. Studies by Javed (1990), Das (1991) and Sundararajan (1993) found that vocational interests among students are influenced by personal aspirations, career opportunities, and perceived employment benefits. Joshi (1992) reported that although students appreciated the practical orientation of vocational education, they faced challenges related to limited employment opportunities and inadequate practical exposure. These findings suggest that the effectiveness of TVET Programmes is effective and relevant only if student perceptions, ambitions and knowledge are taken into consideration.

Participation in Economic Growth, facilitating employability and entrepreneurship is considered to be a major objective behind vocational education (Chhikara & Singh, 2002) argued that vocational training institutions play a critical role in improving employability by facilitating market-oriented skills. Gupta and Datta (2023) also found that vocational education significantly improves employment prospects among youth from low-income households. Bairagya (2021) reported that formal vocational training positively impacts the earnings of rural self-employed individuals in India. Likewise, Sanjay (2010) highlighted the role of vocational education in preparing youth to take advantage of emerging employment opportunities, particularly in outsourcing and service sectors.

A positive correlation is found between economic development and vocational education in the available literature, thereby highlighting its role in improving living standards and participating in the economic development of the country.

Audu, Obeta, and Onoh (2013) argued that technical and vocational education contribute substantially to human capital development and sustainable national growth. Curtin, Stanwick, and Beddie (2011) emphasized the

importance of innovation and enterprise skills in vocational education, while Rao et al. (2024) highlighted the growing role of information technology integration in enhancing vocational skills and human development outcomes in India.

Challenges and problems related to the availability of infrastructure and resources persist during the implementation of vocational education. Puyate (2008) cited the problems related to inadequate facilities, insufficient equipment and lack of instructional materials as major limitations as well as challenges in the implementation process. Likewise, Mishra (1985) noted that work experience programmes faced constraints leading to limited practical training and learning. Verma and Saraswathi (1983) focused on the importance of aligning curriculum content with workplace competencies to ensure meaningful skill acquisition among learners.

In addition to this, rising to prominence was the consideration of industry expectations in curriculum and assessment practices. Curriculum relevance to requirements of the labour market was emphasised by Farooq, Ajmal, and Nafees (2011) through advocating frequent review of the curriculum. Recommendations for closer alignment between vocational and higher education providers to allow learners to obtain dual qualifications and better career opportunities were made by McLaughlin and Mills (2011). Similar improvements to quality were argued to be achievable in VET by Sandu and Sharma (2020) through quality improvement practices.

Vocational education, despite receiving significant policy focus and scaling up of programmes, suffers from issues in quality of TVET implementation, industry participation, infrastructure, and learner outcomes, as suggested by several research studies. However, the literature also indicates that vocational education can positively impact employability, skill development, academic commitment, and career preparedness when implemented effectively. The majority of past studies focused on programme evaluation, employability outcomes following vocational programmes, infrastructure quality, or teacher effectiveness at state- or institution-specific levels. Few studies assess students' views on the implementation and impact of school-based vocational education programmes across the entire western region of India. Therefore, this study aims to fill that gap by providing empirical evidence on students' experiences, perceptions, challenges faced, and perceived outcomes resulting from vocational education programmes.

Despite national mandates, the regional implementation of the process has not been smooth. Literature from Western India (Gujarat, Maharashtra, Goa, Madhya Pradesh, Chhattisgarh) indicates a knowledge gap regarding region-specific investigation. Most research has not examined student experiences in Grades 9–12 in depth, yet these students are best placed to reflect policy impacts. Students represent the “ground truth”: their interest, satisfaction with resources, and perceptions of vocationalisation's effect on career prospects determine whether it succeeds socially and economically. A clear understanding of the situation requires reviewing current scholarly discourse to identify where implementation efforts stand and where they falter.

2. Review of Literature

Previous research provides the theoretical foundation for evaluating the current state of vocationalisation in India. All researchers note that, despite strong policy intent, implementing the framework in practice remains a complex and challenging process.

Conceptual Foundations: Kaushik (2014) and Kumar (2020) discussed that skill-based education is the foundation of economic growth of the country. They suggest that the system needs to be flexible and inclusive to keep up with what the job market actually wants. Arora (1999) in his paper entitled “Re-Engineering Vocational Education” also pointed out that vocational education has been slow to improve because the courses often don't align with the needs of society or linked with the industry. While organizations like the NCVT and institutions like ITIs are still very important, there is still a persistent feeling that vocational education is just an inferior alternative to other types of schooling.

Policy Frameworks: While the NEP 2020 has given significant attention for its comprehensive approach to revamping vocational education, implementation has been noted as “painfully slow” (Kumar, 2020). The difference between the target set for 2025 and the present model of growth stagnation indicates that the shift from mere policy writing to making vocational subjects a part of mainstream subjects is not an easy one.

Integration Models: To make effective integration, we need to use what Knoll (1997). This pedagogical approach that combines practical and hands-on experiences with classroom or theoretical learning so students can learn to solve real-world problems and work independently. It acts as a dual curriculum that helps people improve their current skills while also getting them ready for the future. For these models to be successful, they need support from leadership, freedom for teachers to make their own decisions, and enough time to actually put everything into practice.

Global vs. Local Implementation: International examples from Australia and the Netherlands demonstrate success in establishing structured school–industry partnerships and training teachers to place greater conversational emphasis on career discussions. In contrast, research conducted in India, including studies from Tamil Nadu, Andhra Pradesh and Himachal Pradesh, shows persistent disparities. Common local issues include the absence of specialized administrative bodies, insufficient resources and social attitudes that portray vocational tracks as suitable only for “weaker” students.

2.1. Research Gaps

- **Regional Absence:** No Specific research supported by empirical data focusing on Western Region of India.
- **Grade Focus:** Limited analysis specifically targeting the Grades 9–12 vocational transition in school settings.
- **Scheme Evaluation:** A paucity of localized studies assessing the specific impact of the Samagra Shiksha scheme on student outcomes.
- **Stakeholder Perspectives:** A neglect of multi-stakeholder views, particularly the “beneficiary” perspective of the student as the primary evaluator of the system.

These identified gaps are aligned or connect directly to the specific objectives of this study, which seeks to give a localised empirical assessment of these challenges/issues.

2.2. Objectives of the Study

The following are the objectives of the study.

- 1. To analyse the current status of vocational education implementation under Samagra Shiksha in secondary schools in the Western Region of India.
- 2. To identify the systemic flaws and bottlenecks in the implementation process.
- 3. To find out factors influencing students’ perceptions regarding the importance and effectiveness of vocational training.
- 4. To find specific areas where teacher readiness and instructional quality can be enhanced.

2.3. Research Questions

The study is based on the following five research questions.

- 1. What is the current status of vocationalisation implementation under Samagra Shiksha in the target region?
 - 2. What are the levels of student engagement and participation in vocational subjects?
 - 3. How prepared are vocational teachers to deliver the curriculum effectively according to student feedback?
 - 4. What are the major challenges and barriers faced by schools during implementation?
 - 5. What gaps exist in the availability of infrastructure and resources required for successful vocational delivery?
- These questions were systematically examined through a rigorous methodological framework.

3. Methodology

A descriptive research design was adopted for this study, and a stratified random sampling technique was employed to ensure proper representation from different states and the union territory within the western region of India. The target population comprised students in grades 9–12 who have opted for vocational education under the Samagra Shiksha Scheme.

The aim of this research is purely descriptive within the framework of the positivist paradigm and is appropriate for large-scale educational assessments to identify trends and patterns systematically.

- Design: A quantitative method emphasizing numerical data to identify trends across diverse geographic and socioeconomic backgrounds.
- Sampling: This study used stratified random sampling, selecting 24 schools across six States/UTs. Of 1,243 students contacted, 927 valid responses were obtained. The sample distribution is shown in Table 1.

Table 1. Distribution of schools and students per state/UT.

State	Schools	Students
Chhattisgarh	Govt. Harihar H S. School, (PMSHREE)	72
	Govt Higher Secondary School Belsonda, Mahasamund	40
	Swami Atmanand Utkrusht Hindi Medium School, Mahasamund	71
	J R Dani Govt Girls Higher Secondary School Raipur	214
		397
Daman & Diu and Dadra Nagar Haveli	Govt. HSS, Zari, Daman	47
	G.H.S.S. Bhimpore	50
	Govt. H. S. School Khanvel	81
	Govt Higher Secondary English Medium School Tokarkhada	44
		222
GOA	PM SHRI L.H.B.D Government High School, Thane, Sattari, Goa	36
	PM Shri Govt. High School, Betoda, Ponda-Goa	40
	Government High School Dhaushire	40
	Government High School Amona Bicholim Goa	6
		122
Gujarat	Sarakari Madhyamik and Uchhatar Madhyamik Shala Juhapura	34
	Model School Rajoda	38
	Gangadhara High School	40
	Gautami Kanya Vidhyalay	71
		183
Madhya Pradesh	Govt. HSS Amrai, Bhopal	22
	Govt HSS, Misrod	22
	Govt. Excellence Bal Vinay Mandir H.S. Indore	75
	Govt. HSS Mangliya, Indore	40
		159
Maharashtra	Lal Bahadur Shastri High School, Khadki, Pune	41
	Z.P. High School, Kodamendhi	42
	NMC Sanjay Nagar Hindi High School, Nagpur	41
	Lonavala Nagar Parishad Madhyamik Vidyalay Khandala	36
		160
Total		1243

- Instrumentation: Data were gathered via structured questionnaires developed through Working Group Meetings involving industry professionals and policymakers to ensure content validity.
- Statistical Analysis: Data were processed using SPSS and Excel, employing Frequency, Percentage, Mean, Standard Deviation (SD), t-tests, and Chi-square tests.

Ethical adherence was strictly maintained through informed consent and anonymity, though the study is limited by its geographic focus on Western and Central India.

4. Results and Discussions

The Results and Discussion section summarizes findings from survey data collected in vocational schools and interprets them within the context of existing literature and policy objectives. The analysis focuses on key aspects of vocational education implementation, including demographic factors, institutional support, resource availability, teaching and learning processes, student perceptions, skill acquisition, and implementation challenges. This section presents a comprehensive overview of the current status of vocational education, identifying strengths and critical gaps requiring attention, and analyzes both quantitative responses and their implications. The findings are discussed in relation to previous studies and national vocational education goals to generate actionable insights for policy and practice.

1. Demographic Profile

The researcher ensured balanced participation: 54.8% female and 45.2% male. Most students (56.7%) belong to the 16–17-year age group, indicating findings mainly reflect senior secondary perspectives. Regarding location, the sample was nearly evenly divided: 50.4% urban and 49.6% rural students.

2. Current Status of Implementation

- **Instructional Time:** A substantial proportion of schools (69.69%) allocate four or more periods per week to vocational subjects or courses, indicating a strong commitment to the curriculum. However, a small share (5.18%) provides only one period weekly, which is insufficient for hands-on or practical learning. Notably, in some states such as Chhattisgarh and DNHDD, certain schools offer only one weekly period, which researchers consider inadequate for effective vocational training or for covering the required curriculum. Allocating sufficient instructional time is an essential resource in the TVET ecosystem because it emphasizes learning by doing and supports meaningful skill development.
- **Resource Availability:** There is high satisfaction (91.70%) regarding the availability of workshops, laboratories, subject-related tools, and raw materials. However, a notable gap exists in textbook availability, with 27.70% of students reporting a lack of structured reading materials. The deficiency of textbooks represents a significant gap in the distribution of curriculum materials, potentially forcing teachers to rely on nonstandard instructional methods. These findings align with Mehta (1983) and Lahkar and Kakati (2008) concerning logistical hurdles in providing textbooks in regional languages. A complementary ecosystem should be explored to facilitate learning resources through technological interventions.
- **Vocational activities:** Practical sessions (97.08%) and guest lectures (96.87%) are the most frequently organized events. Conversely, job fairs (36.58%) and on-the-job training (OJT) (54.15%) are the least commonly arranged, indicating limited direct industry recruitment and fewer opportunities for practical workplace experience.

Schools generally succeed in delivering academic knowledge internally, but they face challenges collaborating with external companies for industry partnerships and student placements. Practical exposure through site visits, expert guidance, internships, and on-the-job training helps bridge these gaps by aligning classroom learning with workplace expectations and industry requirements.

3. Challenges in Implementation

However, there are several critical barriers that students point out despite generally positive ratings, as exhibited in Table 2. They are:

- **Infrastructure and Materials:** Over 57% of students agree that infrastructure, including specialized labs, is insufficient, and 59.55% report a lack of adequate teaching materials.
- **Constraints on Subject Availability:** Majority of the students (70.34%) said that there is a narrow range or limited options of vocational subjects currently offered, indicating a demand for a curriculum that better aligns with modern industry trends.
- **Limited Practical Exposure/Training:** Almost 56.53% of the student expressed their concern regarding the adequacy of hands-on practical training, which is often hindered by equipment shortages or a lack of industry partnerships.

The high availability rating (91.7%) and the claimed “insufficient” infrastructure (57.17%) present a significant contradiction. According to a study, there is a difference between functional adequacy and basic availability; schools may have the resources, but they may be out-of-date or inadequate for the number of pupils.

Table 2. Challenges faced in vocational education.

Challenges	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total Responses
Lack of sufficient infrastructure including lab	65	185	147	226	304	927
	7.01%	19.96%	14.86%	24.38%	32.79%	100.00%
Insufficient teaching materials / Textbooks	54	233	88	294	258	927
	4.83%	24.13%	9.49%	31.72%	27.83%	100.00%
Availability of Trained vocational teachers in the concerned subject	66	144	50	263	404	927
	7.12%	14.53%	4.39%	28.37%	43.58%	100.00%
Limited subject options	35	95	145	340	312	927
	3.78%	10.25%	14.64%	36.68%	33.66%	100.00%
Lack of practical training	85	210	108	247	277	927
	9.17%	22.65%	11.65%	26.65%	29.88%	100.00%

4. Students’ Perceptions and Motivation

- **Influencing Factors:** Table 3 presents the factors influencing students’ decisions to enroll in vocational education. The findings indicate that Self-interest (78.21%) is the main reason why students prefer to vocational education, followed by teacher influence (70.77%), parent influence (58.58%) and peer influence (43.26%) is the least influential. This change to self-interest indicates that vocational education is becoming

a chosen option rather than a last resort for poorly performing students. This aligns with the findings of Bhargava (1991) where 83% of students chose the stream due to personal interest.

Table 3. Influencing factors.

Influence by the	Not Important at all	Not Very Important	Neutral	Important	Very Important	Total Responses
Teacher	6	8	17	240	656	927
	0.65%	0.86%	1.83%	24.89%	70.77%	100.00%
Parents	3	12	54	315	543	927
	0.32%	1.29%	4.83%	33.98%	58.58%	100.00%
Peer/friends	22	37	125	342	401	927
	2.37%	3.99%	13.48%	36.89%	43.26%	100.00%
Self-interest	3	10	30	159	725	927
	0.32%	1.08%	3.24%	17.15%	78.21%	100.00%

- Satisfaction and Enjoyment: The vocational education is well received by its beneficiaries, with 77.78% reporting a high level of enjoyment and 96.87% stating they would recommend vocational education to their peers.
- Acquisition of Skills: Table 4 presents students’ perceptions of the basic skills acquired through vocational education. It is inferred from the Table 4 that students believe that they have a balanced development of competencies; their preference is for life skills (39.63%) and employability skills (36.99%) over technical skills (23.38%). This indicates that although there is growth in holistic development in respect of vocational education, there might be a need for strengthening and improving technical skills also. The relatively low acquisition of technical skills implies that even though this may be succeeding in “holistic personal development,” but there is a need to improve “technical proficiency or skill sets” by providing more opportunities through hands-on training/practical’s and workshops, as well as OJT.

Table 4. Basic skills gained from vocational education.

States / UT	Employability Skills	Vocational Subject-related Skills	Life Skills	Total Responses
Responses	519	328	556	1403
Percent	36.99%	23.38%	39.63%	100.00%
Percent of Cases	56.05%	34.42%	60.04%	151.51%

5. Teaching-Learning and Evaluation
- Teacher Competency or Expertise: Vocational teachers were rated extremely high, with 98.6% of students describing teachers’ competency, i.e., their knowledge and expertise, as “Good” or “Excellent”. Further, students stated their satisfaction (98.71%) with the overall teaching-learning process.
 - Focus Areas for Improvement: The future of vocational education lies in increased use of technology (23.16%) and in developing practical skills (22.70%) rather than emphasizing theoretical subject knowledge.
 - Assessment Reforms: There is a strong preference of student involvement of experts from industries (30.86%) and continuous assessment (24.24%). Moreover, students insisted that tests should be conducted using the same equipment as in practice sessions.
 - Academic impact: Notably, 96.12% of students reported that learning vocational subjects increases engagement and retention, enhances recall, and improves academic results and outcomes by teaching more practical skills.

4.1. Discussions

The following key points were noted based on the results.

- Instructional Commitment vs. Resource Shortage: A high allocation of periods indicates strong instructional commitment. Conversely, a shortage of textbooks or learning materials reflects curriculum materials distribution gaps. Mehta (1983) observed that many states adopted nationalized textbooks and attempted distribution in regional or minority languages, which remains a logistical hurdle. Lahkar and Kakati (2008) argued that if teachers want to teach in their mother tongue without textbooks or materials, they must translate resources themselves, creating inconsistencies in textbooks and learning materials.
- The Gap in Industry Integration (OJT and Job Fairs): The data indicates a very strong internal school environment within the institution but a weak external linkage with industry. This can be inferred as a “lack of direct industry recruitment opportunities”. Traditionally, Dhote (1991) and Rao (1996) suggested that in the absence of apprenticeship and OJT, vocational education fails to provide “vertical mobility” or prepare students for immediate self-employment. According to Amu and Offei-Ansah (2011) the “major problem” with these linkages is often a curriculum structure that is not flexible enough to include industry practices.
- Student Motivation (Interest-Driven vs. External Influence): The result show that students are “self-interested” reflects a positive shift compared to their earlier perceptions about vocational education as a “last option” for those who are unable to enter academic streams. Likewise, Bhargava (1991) found that 83% of students who joined vocational education for reasons of interest. However, in this study, the researchers noted that the significant influence of teachers and parents’ forces “strong career guidance and parental involvement” to sustain this interest. This is supported by Sulistiobudi and Kadiyono (2023) who claim that parent-student career linkage is a substantial correlation with the employability of students of vocational education.
- Skill Acquisition and Academic Synergy: Low development of subject-specific technical skills suggests that while vocational education promotes holistic soft skills, technical competencies require further enhancement. Researchers note that the practical, engaging nature of vocational subjects improves general academic

performance, increasing retention and engagement. This supports the NEP 2020 vision of integrating vocational education with mainstream academics to reduce dropout rates and boost cognitive engagement.

- **Infrastructure and Material Constraints:** These findings point to a “mismatch” between policy intent and ground-level reality. Osagie (2015) highlights that a “lack of thorough preparation before policy rollout” often leads to these shortages in infrastructure and materials. In the Indian context, researchers note that the “painfully slow and stagnant growth” of vocational education over decades is often rooted in these persistent resource gaps and poor and slow implementation of policies.
- **Pedagogy and Assessment Reforms:** The high rating for teachers confirms they are “well-qualified and effective” despite resource constraints. However, the push for industry-involved assessment reflects a student desire for “real-world feedback” that matches “actual job requirements”. This mirrors the global shift toward Competency-Based Education (CBE) and the need for “dual curriculum models” that prepare students for both current market needs and future innovation. Integrating vocational education with majority involvement of industry can facilitate the shift in the way inputs are given to students.
- **Regional Disparities:** Researchers conclude that these variations suggest that “certain states have stronger vocational education policies and better teacher training programs”. Dey and Srivastava (2022) argue that these “glaring disparities” across Indian states often reflect broader socio-economic underdevelopment in certain regions, requiring a more “systemic re-imagination” of how TVET is funded and implemented at the state level.

To conclude, significant improvements in the TVET ecosystem are observed regarding the effectiveness of the teaching–learning process, availability of resources, enhanced opportunities for practical and on-the-ground learning, integration of vocational education into the school curriculum, and improved student acceptance. Students report high levels of satisfaction, motivation, and perception of academic advantages associated with vocational education, indicating that vocational education is increasingly recognized as an important pathway for career growth and personal development. However, persistent challenges remain concerning the adequacy of infrastructure, availability of learning materials and textbooks, limited options for choosing vocational subjects and courses, lack of industry exposure through on-the-job training and job fairs, and regional disparities that affect the attainment of vocational education goals. The results indicate a need for stronger industry collaboration, increased availability of resources, development of more varied curricula, integration of appropriate technologies, and implementation of competency-based assessment practices. Addressing these challenges will be essential for strengthening the quality, relevance, and employability outcomes of vocational education and for achieving the broader vision of skills development and workforce readiness envisioned under national education and skilling policies.

4.2. Recommendations

To be effective, recommendations must be multi-scalar, addressing both the policy and school-level execution.

1. **For Government**
 - Standardize the 4+ period requirement and streamline the distribution of vocational textbooks to eliminate the 27.7% gap.
 - Adopt the “Hub and Spoke Model” to allow under-resourced schools to access centralized, high-quality skill labs.
 - Facilitate Multi-Lingual digital content through a Learning Management System that closes the gap of non-availability of learning material.
 - Allocation of unutilized resources across various government bodies and institutions that can close the infrastructure gaps.
 - Facilitate interaction and Internship opportunities in Govt Sector for Students.
2. **For Schools**
 - Mandate the formation of industry-advisory committees and increase the frequency of Job Fairs and field visits.
 - Expand subject options into 21st-century sectors like AI, robotics, and healthcare.
 - Formation of Alumni associations that facilitate student interaction with alumni, facilitating transfer of learnings.
 - MoU's with Local Industries for facilitating interaction by industry experts, OJTs, Guest Lectures, etc.
3. **For Teachers**
 - Integrate ICT/Digital tools (AR/VR simulations) and provide reading materials in regional languages to address comprehension barriers.
 - Move toward competency-based pedagogy that aligns with the Knoll "Project Method."
 - Interact with Industry Professionals to understand the latest technology in the vocational streams facilitate in schools.
 - Student Counselling and Support in Promoting and Sustaining Involvement in Vocational Education.
 - Parent Counselling
4. **For Industry**
 - Formalize OJT through MOUs and actively participate in the Assessment Process (as requested by 57.82% of students) to ensure certifications hold market value.
 - Facilitate Industry Resources, including Human Resources to guide students and teachers for effectiveness of TVET.

4.3. Policy Implications

These statistics will play a vital role in developing the Samagra Shiksha and NSQF frameworks. The findings on “Self-Interest” and “Teacher Influence” indicate that career-counselling strategies should shift from high-pressure peer models to teacher-led mentoring. Additionally, the fact that 96.12% of students improved their academic

performance suggests vocational education is an effective tool for retaining students and enhancing outcomes across cohorts.

5. Conclusion

The results of this study confirm that vocational education provided in schools in the Western Region of India is undergoing a positive transformation, although capital constraints remain. A recommendation rate of 96.87% indicates the clear value of this vocational education among major stakeholders, notably the students. Vocational subjects not only provide practical skills but also increase students' interest in and confidence toward academics. However, a clear gap exists between available “human capital” (well-trained, highly rated teachers) and “systemic capital” (outdated textbooks, insufficient on-the-job training, and lack of job fairs).

Mehrotra (2021) rightly points out that India's skill-development framework must shift from a supply-led model, which merely offers courses, to a demand-led system tightly linked to the labour market. Classroom guest lectures and practical sessions are valuable, but the system lacks the final mile of vocational education: immersive on-the-job training (OJT) and recruitment through job fairs.

To satisfy the skills needed in the 21st-century global economy, the Samagra Shiksha framework must move beyond classroom walls and form formal industry partnerships. A 57.82% demand for industry-based assessment and evaluation indicates students are ready for market-aligned rigors. The text highlights a 27.7% shortage of textbooks and a 57% infrastructure deficit that must be resolved. Addressing the 27.7% textbook gap and the 57% infrastructure shortfall will ensure vocational education is not perceived merely as an alternate track for those who did not succeed in the academic mainstream. Bridging the infrastructure and placement deficits will help India convert its large demographic dividend into a highly productive workforce.

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