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Article

Declining Enrollment in Long-Term Engineering Programs: Stakeholders' Perspectives

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Abstract

This study investigates the declining enrollment in long-term engineering programs under the Council for Technical Education and Vocational Training (CTEVT) in Nepal, a critical issue affecting the development of skilled human resources and socio-economic transformation. The study analyzes enrollment data over the past 4 to 5 years and assesses enrollment trends. It also incorporates insights from focus group discussions and interviews with various stakeholders, identifies underlying causes of low enrollment, and proposes actionable recommendations. The findings reveal a multifaceted decline influenced by contextual factors, such as socio-economic conditions, the allure of foreign education, and the diminishing value of Technical and Vocational Education and Training (TVET). At an institutional level, issues include haphazard extension of TVET institutions, weakened instructional quality and inadequate industry linkages. Personal perceptions also contribute that vocational education is often seen as a less prestigious alternative to general education. The study's comprehensive analysis culminates in recommendations as suggested by the research participants focused on curriculum revision, strengthening industry linkages and enhancing the overall perception and quality of TVET programs. These insights are crucial for policy formulation, educational reforms, and aligning TVET with industry needs and student aspirations in Nepal.

Keywords: TVET enrollment, diploma in engineering, educational environment, decreasing enrollment, stakeholders' perspectives

Introduction

The Technical and Vocational Education and Training (TVET) is recognized globally as a pivotal force in developing skilled and competent human resources essential for social and economic transformation (OECD, 2012). It strategically equips young individuals with necessary occupational skills to pursue specific professional careers. In Nepal, this vision aligns with the fifteenth periodic plan, which aspires to lay a robust foundation for economic prosperity from 2019/20 to 2023/24 by focusing on creating accessible modern infrastructure, developing and fully utilizing human capital potential,

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enhancing production and productivity and achieving high and equitable national income (National Planning Commission [NPC], 2020). To fulfill this ambitious vision, the production of competent human resources is indispensable.

The Council for Technical Education and Vocational Training (CTEVT), as the apex body in Nepal, is entrusted with the critical responsibility of designing, implementing, and regulating TVET programs. CTEVT's role encompasses formulating policies, developing program standards and curricula, and overseeing coordination, accreditation, monitoring and supervision (CTEVT, 2019). With a network of over 1,200 affiliated and constituent technical institutions across the nation, CTEVT boasts an annual enrollment capacity of approximately 80,000 students. However, in recent days, enrollment, particularly in long-term engineering programs, is only half of its capacity (CTEVT, 2020). This underutilization raises pressing questions on the factors contributing to the declining interest in these programs and underscores urgency for a study.

This research is therefore aimed at understanding the decline in enrollment in CTEVT's long-term engineering programs at both pre-diploma and diploma levels. It seeks to uncover the multifaceted reasons behind this trend, understand various stakeholder perspectives on their recommendations to reverse this downturn. To achieve these aims, the study poses three main research questions: What has been the enrollment trend in these programs in recent years? What are the underlying causes of this decline? And, what do TVET stakeholders foresee for addressing these challenges and improve enrollment rates? The answers to these questions are vital for formulating effective strategies to enhance the appeal and effectiveness of TVET programs in Nepal, ensuring they align with industry needs and student aspirations. The paper presents the review of two CTEVT engineering curricula and literature on attraction to TVET, outlines the methodological approach, presents findings and discussions, and concludes with a summary of insights and recommendations.

Understanding Situation: Review of Engineering Curricula and Attractions to TVET

The review is divided into an analysis of the CTEVT engineering curricula at both diploma and pre-diploma levels and a broader examination of the factors influencing student attraction towards TVET programs. This review lays a foundational understanding of the current state of TVET, facilitating further analysis and recommendations.

Reviewing CTEVT Diploma Level Engineering Curricula

Presently, there were 17 diploma level engineering curricula in CTEVT. The teacher-student ratio for theory and tutorial classes is set at 1:48. For practical and demonstration settings, the ratio is reduced to 1:12, and for bench work, it is further reduced to 1:8 although this can slightly differs in some subjects. Various instructional media and materials are prescribed, including printed media, non-projected and projected materials as well as audio-visual and web-based instructional materials to cater to diverse learning styles.

The program coordinator is required to hold

a master's degree in the related subject area. Disciplinary subject-related teachers should have a bachelor's degree in their respective subject areas, and instructors responsible for practical instruction should have a bachelor's degree or equivalent qualification along with a minimum of 3 years of work experience. The evaluation of students includes regular formative evaluations and final summative evaluation, ensuring a proper understanding of their knowledge and skills.

Reviewing CTEVT Pre-Diploma Level Engineering Curricula

At present, there were 10 pre-diploma level engineering curricula in CTEVT. The pre-diploma level curricula focus on providing education and practical training. The lead instructor is required to hold a bachelor's degree, while assistant instructors should have a diploma level qualification. Practical assistants or teaching aids should have completed Technical School Leaving Certificate (TSLC) with relevant work experience. The teacher-student ratio for theory classes is 1:40 and for practical sessions, it is 1:10.

Effective communication and instructional skills are emphasized for all staff members. A range of instructional media and materials are recommended similar to the diploma level. The curriculum promotes inductive, deductive and learner-centered approaches to learning. Students must pass all internal assessments to be eligible for the final examination which includes practical performance, logbook/portfolio maintenance, viva-voce examinations and institutional practicum attendance.

Comparing diploma and pre-diploma level curricula, the diploma programs are more advanced and theory-intensive than that of pre-diploma programs. They are designed to provide a higher level of knowledge with basic skills in specific engineering disciplines. The pre-diploma programs, however, are foundational and aim to prepare students for entry-level positions or further education at the diploma level. Although both levels emphasize practical skills and hands-on learning, the pre-diploma programs are more skills focused.

Attraction of Students Toward TVET Programs

The TVET grapples with an image problem universally despite its critical role in fostering skilled workforces. While higher education, particularly in fields like science and technology, is often viewed favorably in societies, such as Nepal (Dhamala et al., 2021), TVET frequently encounters comparison challenges with academic education pathways (Billett, 2018). Contributing factors to TVET's diminished image include perceived poor quality, weak industry connections, social stigma, cultural barriers and a shortage of qualified instructors. Addressing these challenges, UNESCO-UNEVOC orchestrated a virtual conference on "Improving the image of TVET," drawing participants globally to deliberate on the influencing factors, effects and youth perspectives on TVET, underscoring the imperative for collaborative efforts and knowledge dissemination in upgrading TVET's reputation (Billett, 2018).

In regions experiencing economic transitions, such as Saudi Arabia's shift from an oil-based to an investment-driven economy, the demand for skilled labor has surged, illustrating the

evolving role of TVET (Aldossari, 2020). However, historical preferences for white-collar roles over TVET paths underscore deep-seated cultural stigmas. A study among Saudi TVET students reveals a significant interplay between TVET perceptions and variables like gender, family income and parental education levels (Aldossari, 2020). Similarly, factors influencing student attitudes towards TVET were explored in Ethiopia, revealing substantial correlations between demographic factors, knowledge, motivation, and the chosen TVET stream. The study emphasizes the collective role of government, TVET authorities, and communities in elevating TVET's stature and quality (Mohamed, 2022).

Within Nepal, disciplines, such as Geography Subject in Dhankuta have demonstrated fluctuating enrollment rates, influenced by broader factors including educational policies and economic changes (Linkha, 2021). These instances reflect the broader context within which TVET operates, and it is marked by fluctuations and external influences that impact student enrollment and perception.

Summarizing Literature Review

In synthesizing the review of CTEVT engineering curricula and the broader factors influencing student attraction towards TVET programs, it is evident that while structured curricula and focused instructional strategies form the backbone of technical education, the broader image and perception issues significantly impact student enrollment. The curriculum integrates diverse instructional methods, practical training, and sound evaluation processes at both diploma and pre-diploma levels, ensuring a robust educational framework. However, the global struggle with TVET's image, exacerbated by socio-cultural biases, quality concerns and industry disconnections, highlights the need for a multifaceted approach. Addressing these challenges through policy reforms, industry collaborations and image-building efforts is crucial to enhance TVET's appeal and effectively harness its potential in building a skilled workforce (Bhandari, 2023). This understanding paves the way for a more nuanced approach to improving TVET's attractiveness and aligning it more closely with national and global development goals.

Methodology

The research employed both quantitative and qualitative methodologies to analyze enrollment trends and exploration of the reasons in CTEVT long-term engineering programs. The quantitative part of the study analyzed enrollment data from the CTEVT database over the past five years, focusing on diploma and pre-diploma levels to discern patterns and trends (Creswell & Clark, 2017).

For obtaining qualitative information to explore the underlying reasons affecting enrollment, initially, the field work centered around the Kathmandu Valley of Bagmati province. Later on, the study expanded to other two provinces: Lumbini, and Madhesh. This broader scope facilitated the inclusion of diverse perspectives through eight focus group discussions (FGDs) (Table 1) and 25 interviews with a range of stakeholders including TVET experts, industry representatives, administrators, students, and guardians (Table 2). Participants were selected through purposeful sampling and engaged using semi-structured

questionnaires, ensuring a rich and varied collection of insights (Patton, 2015).

Data from FGDs and interviews were meticulously recorded and transcribed selectively (Jack, 2008; Leavy, 2015) with a subset being noted for analysis. Thematic analysis was employed to sift through the data, categorizing it into themes that reflect the reasons behind the declining enrollment trends. This thematic organization drew from a blend of the researchers' contextual understanding, literature review, and the perspectives offered by participants (Braun & Clarke, 2006).

Ethical considerations were deeply ingrained in the research process. All participants were requested for permission, and pseudonyms used to maintain anonymity and respect cultural sensitivities (Bryman, 2016). The research was conducted with utmost regard for the participants' rights and well-being, reflecting the ethical standards necessary for a study of this nature.

The research methodology, grounded in quantitative analysis and enriched by a qualitative case study approach, provided a nuanced understanding of the enrollment trends in CTEVT engineering programs. It balanced statistical trends with in-depth personal and contextual insights while upholding strict ethical standards to offer a comprehensive view of the factors influencing enrollment in these programs.

Table 1

Information on Focus Group Discussions

S. No	Institution Type	Area/Province	Positions of participants	Number of participants
1	CTEVT constituent TVET institution	Nepalgunj/Lumbini	Vice principals, departmental heads and instructional staff	10
2	CTEVT affiliated private TVET institution	Nepalgunj/Lumbini	Founder, principal and instructors	4
3	CTEVT affiliated private TVET institution	Nepalgunj/Lumbini	Students of civil engineering program	33
4	General school running 9-12 class CEHRD programs	Nepalgunj/Lumbini	Class-11 students	17
5	General school running TECS program	Kathmandu/Bagmati	Students, graduates and guardians	10
6	General school running TECS program	Kathmandu/Bagmati	Principal, departmental heads and instructors	7
7	CTEVT affiliated private institution	Butwal/Lumbini	Founders and principal	4
8	CTEVT constituent TVET institution	Bardibas/Madhesh	Principal, departmental heads and instructors	11
			Total	96

Interview process was streamlined, ensuring that relevant topics were covered consistently across the interviews.

Table 2

Information on Interviewed Research Participants

S. No	Category	From (Institution/location)	Nos
1	TVET Experts	Available in Kathmandu Valley	4
2	Representatives from Business/Industry	Engineering construction industry from Kathmandu Valley-1 Civil engineering Consultancy from Kathmandu Valley-1 Mechanical engineering from Lumbini Province-1 Civil construction and consultancy from Madhesh Province	4
3	TVET Administrators	Official from CTEVT Examination-1 Official from CTEVT Provincial Office-1 Principal of constituent technical school-1 Coordinator of TECS School-1	4
4	Engineering Program student/graduates	Graduate from constituent school of Kathmandu Valley-1 Graduate from TECS school in Kathmandu Valley-1 Present student of constituent school in Kathmandu Valley-1 Present student of TECS school in Kathmandu Valley-1	4
5	General school students	Tenth grade students from general school without CEHRD programs-2 Tenth grade students from technical stream of CEHRD-3	5
6	Guardians of students/graduates	Guardian of a graduate from constituent school in Kathmandu Valley-1 Guardian of a graduate from TECS school in Kathmandu Valley-1 Guardian of a graduate from constituent school out of Kathmandu Valley-2	4
		Total	25

By combining quantitative trend analysis with qualitative case studies, the research methodology offers an examination of the factors influencing enrollment trends in CTEVT engineering programs. The integration of these approaches not only provides a deeper understanding of the issue but also contributes to the development of informed, contextually relevant recommendations for enhancing the appeal and effectiveness of TVET programs in Nepal.

Enrollment Situation: Trends and Reasons

This section of this research paper delves into the critical analysis of student enrollment trends within long-term engineering programs offered by the CTEVT in the last five years. Drawing on a database from CTEVT, this part aims to uncover the underlying patterns and shifts in enrollment figures, providing a nuanced understanding of the dynamics influencing these trends. By focusing on the

quantitative trajectory and the qualitative reasons behind these enrollment figures, this section offers a detailed exploration of the factors driving student decisions and the broader implications for technical education in the region.

Decreasing Enrollment Trend in Engineering Programs

The research focused on understanding the enrollment trend in long-term engineering programs of CTEVT over the past four to five years based on the data obtained from CTEVT. The findings reveal variations and enrollment patterns across diploma and pre-diploma level programs, indicating both stability and changes in the popularity and demand for different engineering disciplines.

Enrollment Trend for Diploma-Level Engineering Programs

The analysis of diploma-level engineering programs showed a diverse range of trends (Table 3). Architecture Engineering experienced fluctuating enrollment numbers, suggesting variable popularity and demand over the years. Automobile Engineering displayed substantial growth initially, with a slight decline in the most recent year, indicating a rising but potentially plateauing interest. Other programs like Biomedical Equipment and Civil and Electronics Engineering showed their unique trends, some experiencing fluctuations while others saw gradual growth or decline. Civil Engineering, in particular, remained a consistently popular program although it showed a declining trend, which suggests sustained interest but possibly emerging issues affecting enrollment.

Table 3

Enrollment in CTEVT Diploma Level Engineering Programs

Year	2075 BS (2018-2019)			2076 BS (2019-2020)			2077 BS (2020-2021)			2078 BS (2021-2022)			2079 BS (2022-2023)		
Program	Quota	Ent-rance	Regist-ration	Quota	Ent-rance	Regist-ration	Quota	Ent-rance	Regist-ration	Quota	Ent-rance	Regist-ration	Quota	Ent-rance	Regist-ration
Agriculture	-	-	-	-	-	-	-	-	-	-	-	-	96	56	47
Architecture	144	79	64	336	115	121	432	265	168	432	188	140	528	170	113
Automobile	96	312	58	408	236	122	904	666	336	904	634	317	952	372	261
Biomedical	-	-	-	-	-	-	-	-	-	-	-	-	48	32	27
Biomedical Equip-ment	24	41	24	24	45	24	24	49	24	24	63	24	24	54	24
Civil	5465	10718	4439	8674	10967	5311	9634	17273	7404	9826	15520	6727	11410	9424	5289
Civil (Hydro-power)	48	125	48	144	103	45	240	217	127	288	294	135	528	197	146
Computer	1520	1346	752	1920	1364	780	2256	1860	972	2256	1862	1000	2832	1709	932
Electrical and Elec-tronics	48	126	48	96	107	116	144	343	171	144	273	174	384	175	99
Electronics	384	97	48	384	89	26	384	34	28	384	26	17	384	32	19
Geomatics	232	848	373	1144	1526	757	1672	2712	1298	1720	3133	1429	1280	1962	1182
Information Tech-nology	240	133	98	616	371	220	1032	836	478	1032	1036	487	1280	988	605
Total	8201	13825	5952	13746	14922	7522	16722	24254	11006	17010	23028	10450	18794	15171	8744

Based on the data collected from CTEVT

Table 4

Enrollment in CTEVT Pre-Diploma Level Engineering Programs

Year	2076 (2019-2020)			2077 (2020-2021)			2078 (2021-2022)			2079 (2022-2023)			Remarks
Program	Quota	Entrance	Registered	Quota	Entrance	Registered	Quota	Entrance	Registered	Quota	Entrance	Registered	
Automobile	346	225	171	306	367	168	306	345	162	345	294	159	
Automobile (Apprenticeship)	N/A	166	162	N/A	203	75	N/A	94	46	N/A	559	243	
Civil	5830	3609	3215	6670	5399	2732	6710	3859	2033	13780	2757	1413	
Civil (Apprenticeship)	N/A	0	0	N/A	N/A	N/A	N/A	62	37	N/A	525	260	
Computer	1640	1172	1135	1840	1717	1009	1840	1610	975	2040	1585	916	
Electrical	2345	1360	1150	2465	1451	790	2465	1192	691	2745	1134	688	
Electrical (Apprenticeship)	N/A	219	215	N/A	480	174	N/A	171	75	N/A	380	187	
Electronics	66	26	26	52	43	20	52	29	23	52	41	37	
IT (Apprenticeship)	N/A	228	228	N/A	179	65	N/A	53	30	N/A	705	250	
Mechanical	323	163	116	323	189	109	313	218	104	363	138	82	
Mechanical (Apprenticeship)	N/A	193	193	N/A	274	116	N/A	196	91	N/A	367	150	
Refrigeration and AC	24	50	50	24	33	25	24	32	24	24	34	24	
Surveying	1328	1145	1113	1280	1911	887	1280	1869	879	1320	1356	620	
Water Supply	75	11	10	115	28	21	115	14	11	115	8	0	
	11977*	8567	7872	13075*	12274	6221	13115*	9744	5325	20784*	9883	5029	

Based on the data collected from CTEVT

*Total quota is seen except for apprenticeship programs

Enrollment Trend for Pre-Diploma Level Engineering Programs

The pre-diploma level engineering programs also displayed a mix of stability and fluctuations (Table 4). Civil Engineering and Surveying witnessed significant changes in enrollment numbers, indicating varying levels of student interest over time. Some programs demonstrated relative stability, while others like Automobile and its Apprenticeship counterpart showed notable peaks and declines. The overall trend suggests that while certain programs maintain steady interest, others are subject to changing student preferences, market demand, and possibly other external factors.

Implications of the Enrollment Trends

The observed enrollment trends raise several implications. Firstly, the fluctuating and sometimes declining numbers in specific programs could reflect broader shifts in the job market, technological advancements, or changes in educational policy and student perceptions. For consistently popular programs like Civil Engineering, the declining trend might indicate emerging challenges or saturation in the field. Secondly, the variations in program popularity could inform CTEVT's strategic planning, curriculum development, and marketing efforts to align with current and future market demands.

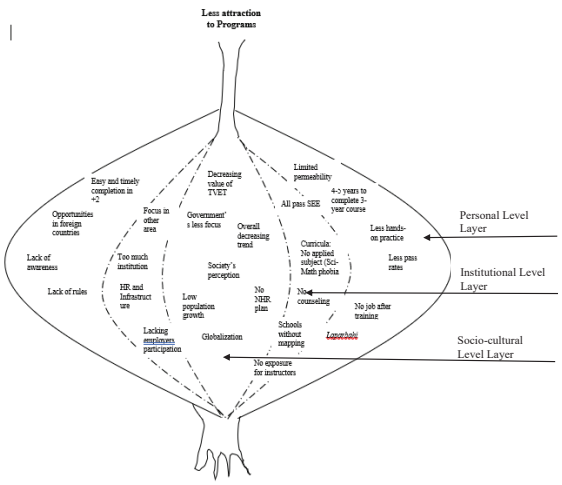
While the quantitative data provide a clear picture of the trends, there's a need for further qualitative analysis to understand the reasons behind these patterns. Understanding students' decision-making processes, industry needs, and the quality of the programs will be crucial in addressing the dwindling interest. Interviews with students, educators, and industry representatives could shed light on these aspects, providing a clear understanding of the reasons influencing enrollment trends.

Why Enrollment in Some TVET Engineering Programs Decreasing?

This section explores the multifaceted reasons behind the declining enrollment in CTEVT Engineering programs informed by insights from interviews, focus group discussions, and meetings with research participants. Utilizing a qualitative case study approach, the findings are conceptualized within the metaphor of "Onion Layers," revealing contextual, institutional and personal reasons (Figure 1). The intent of the picture as onion is that most visible and widespread reasons are in personal level and then the major reasons are institutional (as middle layer of an onion). The socio-cultural reasons are the real crux which is also the reason for other two layers of reasons—institutional and personal.

Figure 1

Layers of the Reasons for Decreasing Enrollment: An Onion Metaphor



Contextual Reasons: Socio-Cultural Environment at the Core

The socio-cultural context significantly impacts the fading attraction to CTEVT engineering programs. Research participant, Kunti, a guardian of a graduate of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley), and Kiran, TVET expert working in an international organization, identified a lack of domestic opportunities leading Nepali students to seek education and employment abroad. As they stated it was influenced by a global mindset attaching more value with foreign education. Kiran further noted the declining societal value of engineers and the preference among urban youths for higher secondary (+2) level education pathways and fast-track education leading to opportunities abroad. Sundar, an owner of mechanical workshop in a city of Nepalgunj (Lumbini Province), and Ram discussed the lack of understanding about the potential of technical education and the higher income prospects overseas. These perceptions combined with the longer duration and perceived inferiority of TVET compared to general education obviously contribute to the downward enrollment trend.

The insufficient recognition and employment prospects further deter students (Adhikari et. al, 2023). Kanchan, a construction company owner with long TVET experience pointed out the limited job opportunities and the Public Service Commission's failure to recognize TVET qualifications adequately. Gajendra, a coordinator of a TECS School located in Kathmandu Valley, and Usha, a graduate of CTEVT diploma engineering program (from a TECS institute in Kathmandu Valley), highlighted exploitative employment practices and lower salaries for TVET graduates, while Parshuram and FGD-1 participants note the difficulty TVET graduates face in the job market. These factors collectively diminish the appeal of TVET engineering programs.

Entry qualifications also play a critical role in affecting TVET program results. Akash, a third-year student of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley, and Madhav, a senior official from CTEVT regional office discussed the implications of the SEE examination trend, where almost all students pass, diluting the pool of potential TVET candidates. Parshuram and FGD-5 participants note the declining quality of general schools and how this affects the preparedness of students entering TVET programs. Additionally, the intake criteria allow students with lower grades to enroll, leading to quality concerns among graduates.

The lack of proper implementation of visions and policies significantly hinders TVET growth and development. Kiran criticized the government's limited emphasis on TVET and the absence of clear policies and a national human resource plan. FGD-1 participants express dissatisfaction over government policies that do not support TVET aspirations. This systemic issue requires clear visions and policies to enhance the TVET sector's growth and development.

Some participants note the diminishing enrollment trend is not confined to the TVET sector. They view this decrease in enrollment as a natural occurrence to some extent, e. g. due to the decrease in population growth (The Kathmandu Post, 2021). So it is a broader educational issue, partially

attributed to demographic changes. This wider context is crucial for understanding the specific challenges within the TVET sector and developing targeted strategies to address them.

Institutional Level Reasons: Quality Concerns at the Core

Institutional level concerns within CTEVT's mandate significantly contribute to the lessening enrollment in TVET engineering programs. Parag, a TVET administrator working at CTEVT Headquarters, and others expressed concerns about the rapid, unplanned proliferation of TVET institutions, particularly TECS Schools, without considering actual demand and requirements. This haphazard extension, as Gajendra and Kanchan noted, leads to an imbalance between the number of graduates and job opportunities, diluting the quality of education (MoEST, 2022), and questioning the access and equity to TVET (Neupane, 2020). Participants in focus group discussions also express the negative impact of this saturation of the institutions and consequently the diminishing quality of TVET education.

Another critical issue is the weakening instructional quality in TVET programs. Lokendra, a TVET expert with more than four decades of TVET work-experiences, pointed out a significant performance gap, exacerbated by the dearth of qualified teachers. Gagan, a TVET expert and researcher with a solid work experience in TVET management and delivery, and Gajendra discussed the insufficiency of resources and infrastructure with some schools even operating in rented houses, severely impacting the learning environment. Kanchan and others criticized the curriculum for being overly theoretical, inadequately updated, and disconnected from industry needs, leading to graduates who are theoretically knowledgeable but practically incompetent.

Another significant concern is the lack of effective linkage between TVET programs and industries. Kanchan and Akkal, a managing director of an engineering consultancy and contractor company in Bardibas (Madhesh province) respectively, highlighted the weak industry connections, leading to ill-prepared graduates for the workforce. The FGD-8 participants stressed the near-absence of linkage between education and employment, badly limiting graduates' employment prospects.

Curriculum issues are a major point of contention. Raj, a graduate of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley), and Lokendra criticized the curriculum for not addressing essential skills like English language proficiency and for being too theory-focused. Parag and Kiran were concerned over the lack of involvement from relevant experts in curriculum development, leading to a curriculum that is disconnected to ground realities and industry needs. Mausam, a graduate of CTEVT diploma engineering program (from a TECS institute in Kathmandu Valley), and FGD-8 participants pointed out that the curriculum's focus on difficult subjects and insufficient practical skills contribute to high dropout rates and paucity of confidence among students.

The dearth of proper information dissemination, awareness raising, and

counseling further worsens the enrollment decline. Kunti, Kiran, and others noted the absence of counseling services and a general lack of awareness among students and parents about TVET programs and their benefits. This information deficiency leads to uninformed decisions and a decreased interest in TVET programs.

Weak administration and governance within CTEVT and its affiliated institutions are also to blame. Lokendra and Kanchan criticized the lack of technical experts in key positions and the outdated resource allocation system. The absence of tracer studies and the deficit of a system to motivate and reward instructors, as mentioned in FGD discussions, reflect a broader issue of weak governance that undermines the quality and attractiveness of TVET programs.

In summary, the institutional reasons contributing to the decreasing enrollment in TVET engineering programs are multifaceted, ranging from the unchecked growth of institutions and weakening instructional quality to inadequate industry linkage and curriculum issues. These combined with ineffective information dissemination and weak administration and governance paint a concerning picture for the future of TVET in Nepal. Addressing these issues requires a concerted effort from CTEVT and relevant stakeholders to ensure the quality and relevance of TVET education.

Personal Level Reasons: Perceptions and Awareness

Perceptions and awareness significantly influence students' choices regarding TVET programs. As Akash pointed out, the general perception is that traditional 10+2 education offers a more straightforward and quicker path to further studies than TVET courses, often seen as offering limited progression opportunities. This sentiment is compounded by the extended duration and perceived complexity of TVET courses compared to the prompter results of general education stream, as highlighted by Madhav. The high costs associated with private TVET institutions, as mentioned by Gajendra, also discourages potential students.

Additionally, the fear of failure is a substantial barrier. As Madhav noted, many students are apprehensive about complex subjects like English, Science and Math, contributing to high failure rates and further discouraging enrollment. A perceived lack of accountability within TVET institutions aggravates this fear. Akash and Sundar, and Manjita, a guardian of a CTEVT diploma first-year student (from a constituent institute in Nepalgunj, Lumbini province), expressed concerns over delayed result publications, irregular classes, and the overall weakening standards of education, highlighting an urgent need for reform (MoEST, 2023).

Feedback from various stakeholders, including Sundar and FGD session participants, reflects a broader concern over the lack of accountability and transparency in CTEVT's administration and governance. This perceived absence of responsibility impacts all levels, from result publication to instructional quality and management practices. Addressing these personal-level reasons is crucial to enhancing the attractiveness and effectiveness of TVET programs.

In summary, the decline in enrollment in TVET engineering programs is a

complex issue influenced by socio-cultural, institutional and personal factors. Addressing these challenges requires a robust strategy that considers the multifaceted nature of the problem, as suggested by the research participants.

Improvement in Enrolment Situation: TVET Stakeholders' Perspectives

By highlighting the interplay among improving instructional quality, establishing robust monitoring mechanisms, and intensifying information and communication efforts, this section underscores the solid efforts required to address the enrollment challenges TVET engineering programs face and pave the way for a more skilled and competent workforce.

Enhancing Overall Instructional Quality

Stakeholders call for an urgent overhaul of the TVET curriculum, suggesting regular updates and a shift to competency-based content to meet industry needs better (Kiran, Sundar). According to Nirjala, a principal of one of the CTEVT constituent schools located in Lumbini province, and Madhav, real-world expertise in curriculum development is deemed crucial, and the curriculum should be synchronized across various program levels for consistency. Regular revisions and an emphasis on practical skills over theoretical knowledge are highlighted as key to improving instructional quality (Usha, FGD-1).

A separate monitoring division within CTEVT is suggested by Kanchan and Gagan to oversee instructional activities and infrastructures, ensuring adherence to quality standards. Regular monitoring mechanisms are recommended to maintain and enhance program quality, with a focus on practical training and infrastructure adequacy (FGD-2, Nirjala). Similarly, Gagan and Rupa, TVET experts with a long work experience particularly in producing TVET instructors and trainers, stressed the importance of aligning TVET offerings with market demands and consolidating institutions to optimize resources. Gajendra suggested a thorough needs assessment to guide program offerings and eliminate redundant institutions. Collaboration between TVET providers and industries is crucial to ensure that graduates meet market needs (FGD-7: Puru, Managing Director of a structural engineering consulting firm in Kathmandu, Bagmati Province).

Strengthening industry linkages and partnerships with local communities is emphasized to enhance the relevance and effectiveness of TVET programs (Gagan, Kiran). Initiatives like internships, job fairs, and industry input in curriculum development are suggested to bridge the gap between education and employment (FGD-1, FGD-2).

Timely publication of results and a shift towards practical-focused assessments are recommended to improve the examination system (Gagan, FGD-1). Similarly, Parag and FGD-6 participants suggested decentralization of the examination process and empowerment of instructors to conduct assessments at the institutional level. Besides, other reforms in administrative processes, workforce updates, and the establishment of research units are recommended to address existing challenges and improve TVET's effectiveness (Gagan, Kanchan). Continuous

tracer studies, enhanced counseling services and improved job placement units are also suggested by Manjita, Sundar and Madhav to ensure graduates' successful transition to the workforce.

The suggestions from stakeholders provide a roadmap for improving enrollment in TVET engineering programs. By focusing on curriculum updates, quality monitoring, need-based institution establishment, strengthened industry linkages, examination system reforms, and institutional reforms, the TVET sector can enhance its appeal, relevance and effectiveness, ultimately attracting more students and meeting the evolving needs of the industry and the nation. This situation ultimately contributes to enhance the image towards CTEVT programs.

Restoring Image and Intensifying Information and Communications

The review reveals that the unchecked proliferation of TVET institutions has led to quality concerns, with insufficient market studies and a lack of proper planning leading to a surplus of graduates ill-equipped for the job market. Research participants like Parag and Gajendra expressed urgent need for a more strategic approach, emphasizing the importance of aligning institutions with real market demands. The instructional quality is also under scrutiny, with participants like Lokendra and Gagan highlighting a performance gap exacerbated by the dearth of qualified instructors and inadequate resources. The disconnection between TVET programs and industry needs, as noted by Kanchan and Akkal, further hinders graduates' employability, calling for strengthened linkages and more responsive curricula.

In the realm of personal perceptions, the attraction of foreign education, the undervaluation of technical certificates, and the preference for faster educational pathways like the +2 system are diminishing the appeal of TVET programs. As highlighted by Kiran and Gajendra, this trend is intensified by the societal stigma attached on vocational education and a general lack of awareness about the potential and opportunities it offers. The fear of failure, particularly in challenging subjects, and the perceived high costs of TVET education, as noted by participants like Madhav and Gajendra, further deter potential students. Moreover, a pervasive lack of accountability in the system, as pointed out by Akash and Sundar, undermines trust and confidence in the effectiveness of TVET programs.

To reverse these trends, stakeholders propose a multifaceted strategy focused on improving instructional quality and restoring the image of CTEVT. This includes updating and effectively implementing curricula to meet industry demands as suggested by Nirjala and Kiran, and establishing a robust monitoring system for better quality control as recommended by Gagan and Kanchan. Establishing need-based institutions and aligning human resource production with market demands, as emphasized by Gajendra and Akkal, is also crucial.

Simultaneously, efforts to restore CTEVT's image through intensified information and communication, as Kiran and Manjita advocated, are vital. This involves clearing negative perceptions, promoting the value of TVET, and ensuring widespread awareness of its benefits and opportunities. Participants also stress the importance of reforms

in examination systems, administrative processes, and enhancing industry linkages as Puru and FGD participants noted.

In conclusion, revitalizing the image of CTEVT and amplifying information and communication efforts are crucial for advancing TVET education as underscored by UNESCO (2018) and echoed by research participants. Through strategic and targeted advertising, massive orientation programs, effective counseling and sustained awareness campaigns, the public's understanding of the numerous benefits and opportunities provided by TVET programs can be significantly enhanced. Such concerted efforts are instrumental in attracting a greater number of students and nurturing a favourable perception of technical education in Nepal, thereby ensuring its pivotal role in national development and individual empowerment.

Conclusion, Implications and Limitations

Based on the research participants' expression and the analysis, this section provides the key findings and furnishes recommendations. It also presents the implications, limitations, and challenges faced during the research process.

Summary of Key Findings

This study has identified a complex interplay of contextual, institutional and personal factors contributing to the declining enrollment in CTEVT engineering programs. Contextually, students are deterred by limited local opportunities and drawn to the perceived advantages of foreign education and employment, while the diminishing value of TVET and preference for quicker educational pathways further exacerbate the issue. Institutionally, haphazard expansion of institutions, weakening instructional quality, insufficient industry linkages, and outdated curricula are identified as critical deterrents. On a personal level, negative perceptions and awareness of TVET, fears of failure, and concerns over financial burdens and job prospects significantly influence student decisions. These layered findings underscore the multifaceted nature of the enrollment challenge, calling for a nuanced and focused approach to address the issues identified.

Implications of the Study

The study's findings have significant implications for policy formulation and future research in the TVET sector. They provide a detailed understanding of the challenges faced, guiding policymakers in developing strategies to enhance the attractiveness and effectiveness of TVET programs. The insights can also direct future research towards unexplored areas, such as the impact of specific policy changes or the long-term trends in TVET enrollment. For TVET scholars, these findings enrich the academic discourse, while for general readers, they offer an in-depth understanding of the complexities of technical education in Nepal.

Challenges and Limitations of the Study

This study faced several challenges and limitations that must be acknowledged. Resource constraints limited the geographical scope and depth of the study, potentially affecting the representativeness and comprehensiveness of the findings. The availability of data for only a limited period limited the ability to perform an extensive trend analysis. The inability to include

all intended categories of students might have impacted the richness and variety of perspectives captured. Additionally, the broadened focus beyond specific engineering programs could have diluted the specificity of the findings. Recognizing these limitations is crucial in interpreting the study's findings and should be considered in future research efforts to enhance the comprehensiveness and accuracy of similar studies in the TVET sector.

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