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Council for Technical Education and Vocational Training

RESEARCH REPORT

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Situation of Students' Attraction towards Engineering Programs: A Case Study

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This research report is the product of professional research. It has been prepared by the consultant for the purpose of providing insights and recommendations to Council for Technical Education and Vocational Training (CTEVT). The findings, interpretation and conclusions expressed in this work do not necessarily reflect the views of CTEVT. The analysis and interpretation made herein are based on the consultant's expertise in the field of study. CTEVT does not guarantee the accuracy, entirety, or currency of the information contained in this work and holds no responsibility for potential errors, omissions, or inconsistencies in the data.

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EXECUTIVE SUMMARY

Technical and Vocational Education and Training (TVET) is crucial for developing skilled human resources and driving social and economic transformation. In Nepal, the Council for Technical Education and Vocational Training (CTEVT) serves as the apex body responsible for overseeing TVET programs. However, CTEVT has witnessed a significant decline in enrollment, particularly in long-term engineering programs. To address this issue, this study aims to identify the reasons behind the low enrollment and provide recommendations for improvement.

Research Objectives and Questions

The objectives of the study are to assess the enrollment trend in long-term engineering programs, explore the factors contributing to the low enrollment, understand stakeholder perspectives, and provide recommendations to mitigate the issue. The research questions focus on the enrollment trend over the past 4-5 years, the underlying causes of low enrollment, and potential measures for improving enrollment rates.

By addressing these research questions, this study seeks to provide valuable insights into the challenges faced by CTEVT in attracting students to its engineering programs. The findings and recommendations will contribute to enhancing enrollment and strengthening TVET in Nepal, aligning it with the needs of the industry and the aspirations of students.

Literature Review

The literature review encompassed three main aspects: the review of diploma level engineering curricula (Appendix-3), the review of pre-diploma level engineering curricula (Appendix-4), and the image of technical and vocational education and training (TVET). Although, some of the curricula of CTEVT diploma level engineering programs slightly differed, mostly they found to have a sound content and structure, with student-instructor ratios 1:48 for theory classes, and 1:12 for practical and demonstration settings. Emphasis was placed on 75% of technical teachers being full-time.

Similarly, the curricula of CTEVT pre-diploma engineering programs, specifically in civil engineering (which provides the overall insight of curricula of this level), were comprehensive, with overall student-instructor ratios 1:40 for theory classes, and 1:10 for practical sessions. The use of diverse instructional media and materials was encouraged. However, the review also highlighted the image problem faced by TVET, suggesting the need to enhance the perception and attractiveness of TVET through quality improvement, industry linkages, and addressing social stigma. Collaborative efforts and knowledge sharing were deemed essential. Overall, the curricula of both levels were found to be well-structured, based on appropriate student-instructor ratios, and designed to provide effective instruction, while addressing the image problem of TVET was crucial to attract more students and promote its significance.

Methodology

The research methodology employed in this study involved a combination of quantitative and qualitative approaches to investigate trend and the reasons influencing enrollment trends in CTEVT engineering programs. The quantitative component focused on analyzing enrollment trends at the diploma and pre-diploma levels using data available from the CTEVT database over the past 4-5 five years. This analysis aimed to identify patterns and trends in enrollment. The qualitative component utilized a case study approach, following Yin's guidelines (Yin, 2018), and involved purposeful sampling of participants. The research design initially focused on the Kathmandu Valley and one municipality of one province out of the Valley but extended to include one province after discussions with the Research Management Committee (RMC) at CTEVT. Data were collected through eight focus group discussions and interviews with 25 research participants, including experts, policymakers, industry representatives, and students. Semi-structured questionnaires and a case study protocol were used to guide data collection. Thematic analysis was employed to analyze the qualitative data and identify key findings. The integration of both approaches allowed for a comprehensive understanding of the reasons influencing attraction to, or in other words, enrollment trend in CTEVT engineering programs. Ethical considerations were maintained throughout the research process, with participants' privacy and confidentiality protected using pseudonyms.

Findings

From the trend analysis of the past five years in the Nepali calendar (BS 2075, 2076, 2077, 2078, and BS 2079), we can observe certain trends and patterns in the enrollment of CTEVT engineering programs in both diploma and pre-diploma level. In both of these programs, enrollment is decreasing since few years. Although enrollment is not decreasing in all subjects, the mostly dominant subjects are civil engineering.

From the research findings in qualitative part, it is highlighted three layers of reasons for less attraction to CTEVT engineering programs: contextual, institutional, and personal. These layers were presented as an *Onion-Layer* metaphor situating at the core, middle and outer layer. Under the contextual (or socio-economic) reasons, which were the root cause creating environment for other reasons and beyond the control of CTEVT, limited opportunities, the allure of foreign education and employment, diminishing value of TVET, and preference for faster educational pathways contribute to reduced attractiveness. Insufficient recognition and employment prospects, limited job market opportunities, and insufficient recognition of TVET qualifications also play a significant role.

The institutional-level reasons, which is directly under the scope of CTEVT, include the haphazard extension of TVET institutions, weakening instructional quality, dearth in linkage with business-industries and employers, problems in existing curricula, lack of information dissemination, awareness raising, and counseling, and weak administration and governance. Personal level reasons, i.e., associated with perceptions and awareness towards TVET programs, also influence the attractiveness, with factors such as the perception of general education (10+2 route) as easier and timelier, weakness of the examination system, high cost, and less prestigious perception of vocational-oriented education.

The research participants provided suggestions to enhance engineering program enrollment in the TVET sector, emphasizing improving instructional curricula and maintaining the quality, restoring the sector's image, and strengthening industry linkages. The findings have implications for policy formulation, further research, and practical value for TVET scholars and general readers. The study also acknowledges challenges and limitations, such as resource

limitations and response of research participants less focused on engineering programs but on overall CTEVT programs, which may have influenced the comprehensiveness of the findings.

Based on our findings, it is recommended for the following actions to improve enrollment in engineering programs: (1) Revise engineering program curricula to prioritize practical skills development; (2) Strengthen monitoring mechanisms to ensure effective implementation of curricula; (3) Intensify awareness and counseling services to raise awareness about TVET programs and provide counseling to needy people; (4) Strengthen industry linkages to bridge the gap between education and industry; and (5) Improve the examination system by addressing its shortcomings and ensuring timely conduction of examinations and certifications. These recommendations aim to address the declining enrollment and enhance the quality and relevance of TVET programs.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BS	Bikram Sambat (Years as per Nepali Calendar)
CEHRD	Center for Education and Human Resource Development
CTEVT	Council for Technical Education and Vocational Training
FGD	Focus Group Discussion
GPA	Grade Point Average
HR	Human Resources
ILO	International Labor Organization
ICT	Information and Communication Technology
MoEST	Ministry of Education, Science and Technology
NPC	National Planning Commission
NSTB	National Skill Testing Board
NVQF	National Vocational Qualifications Framework
OECD	Organization for Economic Cooperation and Development
OJT	On-the-job training
SEE	Secondary Education Examination
TECS	Technical Education in Community School
TITI	Training Institute for Technical Instruction
TSLC	Technical School Leaving Certificate
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization

PART I: INTRODUCTION

Technical and Vocational Education and Training (TVET) plays a crucial role in developing skilled and competent human resources necessary for social and economic transformation. It aims to equip young individuals with occupational skills that enable them to enter specific professional careers (The Organization for Economic Cooperation and Development [OECD], 2012). The present fifteenth periodic plan of the country is envisioned that during the period of 2019/20 to 2023/24 a robust foundation for economic prosperity will be laid by creating "accessible modern infrastructure and intensive connectivity; development and full utilization of human capital potential; high and sustainable production and productivity; and high and equitable national income." (National Planning Commission [NPC, 2020]. To fulfil this giant vision, it is necessary to produce a competent human resource.

In Nepal, the Council for Technical Education and Vocational Training (CTEVT) serves as the apex body responsible for designing, implementing, and regulating TVET programs. CTEVT formulates policies, develops program standards and curricula, and oversees coordination, accreditation, monitoring, and supervision (CTEVT, 2019). With over 1,200 affiliated and constituent technical institutions across the country, CTEVT has an annual capacity of approximately 80,000 enrollments (CTEVT, 2020).

However, in recent years, CTEVT has experienced a significant decline in enrollment, with only half of its capacity being utilized. Particularly concerning is the decreasing enrollment in the long-term engineering programs offered by CTEVT. In light of this situation, there is a need to conduct a study to investigate the reasons behind this decline in enrollment at the pre-diploma and diploma levels CTEVT Engineering programs. This research aims to provide insights into the reasons contributing to less attraction to CTEVT engineering programs, i. e. low enrollment in the programs, and offer recommendations to improve the enrollment situation.

Objectives of the Study:

The main objectives of this study are as follows:

1. Assess the enrollment trend in long-term engineering programs of CTEVT over the past 5 years.
2. Explore the reasons contributing to the low enrollment of students in long-term engineering programs of CTEVT.
3. Understand the perspectives of different stakeholders regarding the declining enrollment.
4. Provide recommendations to CTEVT on measures that can be adopted to mitigate the low enrollment and improve enrollment rates in long-term programs.

Research Questions:

This study seeks to answer the following research questions:

1. What has been the trend of student enrollment in long-term engineering programs of CTEVT in the past 4-5 years?
2. What are the underlying causes of the low enrollment of students in long-term engineering programs of CTEVT?
3. What measures can CTEVT adopt to address the low enrollment and improve enrollment rates?

The report is divided into five parts. Part II reviews the CTEVT engineering curricula at the diploma and pre-diploma levels, as well as the general literature on the image of TVET programs. Part III outlines the methodological approach used in the study. Part IV presents the findings and brief discussions based on the data collected. Finally, Part V summarizes the findings, draws conclusions, and provides recommendations, along with discussing the implications and limitations of the study.

PART II: REVIEWING LITERATURE

This section of the report consists of two parts: a review of CTEVT engineering curricula, focusing on both diploma and pre-diploma levels, and a literature review on the attraction of students toward TVET programs. It provides a comprehensive foundation for understanding the current state of these areas and serves as a basis for further analysis and recommendations in subsequent sections.

CTEVT Diploma Level Engineering Curricula

The teacher-student ratio for CTEVT diploma level programs is designed to ensure effective instruction and interaction. For theory and tutorial classes, the ratio is 1:48, allowing for comprehensive coverage of the curriculum. In practical and demonstration settings, the ratio is set at 1:12 to facilitate hands-on learning experiences. For bench work, where individual attention is crucial, the ratio is further reduced to 1:8 (although it can slightly differ in some subjects). It is recommended that 75% of the technical teachers be full-time, ensuring dedicated expertise and commitment to the program.

To maintain the quality of instruction, CTEVT sets certain qualification requirements for instructional staff. The program coordinator should hold a master's degree in the related subject area, ensuring a high level of expertise and coordination. Disciplinary subject-related teachers should have a bachelor's degree in their respective subject areas. Instructors, responsible for practical instruction, should have a bachelor's degree or equivalent qualification along with a minimum of 3 years of work experience in the related subject area. Foundational subject-related teachers should possess a master's degree in the respective subject area, focusing on foundational courses.

Curricula emphasize the use of diverse instructional media and materials to enhance the teaching and learning process. Printed media materials, such as assignment sheets, case studies, handouts, performance checklists, and textbooks, provide essential resources for students. Non-project media materials, including displays, models, photographs, flipcharts, and posters, aid in visual learning and comprehension. Projected media materials, such as slides and multimedia projectors, is required for facilitating interactive presentations. Audio-visual materials, computer-based instructional materials, web-based instructional materials, and the utilization of education-

focused social media platforms also provisioned. Additionally, radio, television, and telephone resources can be utilized for educational purposes, according to the curricula.

The teaching and learning methodologies employed in CTEVT diploma level programs encompass a range of approaches to cater to different learning styles. These methodologies include illustrated talks, lectures, tutorials, group discussions, demonstrations, simulations, guided practice, practical experiences, fieldwork, report writing, term paper presentations, case analysis, tutoring, role-playing, heuristic methods, project work, and other forms of independent learning. Theory classes primarily involve lectures, discussions, seminars, interactions, assignments, and group work. Practical sessions focus on demonstrations, observation, guided practice, self-practice, and project work.

CTEVT diploma level engineering programs promotes a blended approach to learning, incorporating inductive, deductive, and learner-centered approaches. Learner-centered approaches is aimed for prioritizing student engagement, active participation, and self-directed learning, enabling students to take ownership of their learning process.

The evaluation of students in CTEVT diploma level engineering programs comprises both internal assessment and final summative evaluation. Internal assessment includes regular formative evaluations in both theory and practical components, providing continuous feedback to students. The weightage of theory and practical marks is outlined in the course structure. Formats for continuous assessment are developed and applied following CTEVT guidelines. Students are required to complete internal assessment requirements before appearing in the final examination. Students must pass all subjects, both in theory and practical, to obtain certification.

CTEVT Pre-Diploma Level Engineering Curricula

The CTEVT pre-diploma level curricula in engineering aim to provide comprehensive education and practical training to students aspiring to enter the field. The program ensures that qualified instructional staff are in place. 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 TSLC with relevant work experience. Effective communication and instructional skills are also emphasized for all staff members.

To ensure a conducive learning environment, the teacher-student ratio is maintained to 1:40 for theory classes, allowing for larger class sizes, while practical sessions have a ratio of 1:10 to facilitate individualized guidance and hands-on learning. It is recommended that at least 75% of the teachers be full-time, ensuring their availability and commitment to effective teaching.

A range of instructional media and materials are recommended to enhance instruction and practical learning. Printed media materials, such as assignment sheets, handouts, textbooks, and performance checklists, provide essential resources for students. Non-projected media materials, including displays, models, photographs, and posters, contribute to visual learning. Projected media materials, such as slides and multimedia projectors, enable dynamic presentations. Audio-visual materials, including films and audiotapes, provide supplementary resources, while computer-based and web-based instructional materials offer interactive and online learning opportunities. The use of education-focused social media platforms, radio, television, and telephone communication are also encouraged.

Teaching methodologies in the pre-diploma level curricula employ a combination of approaches to cater to diverse learning needs. These include illustrated talks, lectures, tutorials, group discussions, demonstrations, simulations, practical experiences, fieldwork, report writing, and case analysis, among others. The curriculum promotes inductive, deductive, and learner-centered approaches to learning, ensuring students actively engage with the subject matter and develop critical thinking skills.

Evaluation in the program is carried out through internal assessments and final examinations. Theory and practical assessments are conducted, with a 50% weightage given to each in the final evaluation. Students must pass all internal assessments to be eligible for the final examination. Continuous evaluation by instructors is emphasized to assess students' progress and proficiency in each subject. The program also includes an on-the-job training component, which is evaluated through a collaboration between the institute, the OJT provider, and the CTEVT Office of the Controller of Examinations. The evaluation criteria consider practical performance, logbook/portfolio maintenance, viva-voce examinations, and institutional practicum attendance.

Attraction of Students Toward TVET Programs

The image problem of technical and vocational education and training (TVET) is a universal concern. Although there are other bottlenecks such as physical infrastructure, Nepali society holds positive perceptions towards higher education e. g. science and technology education (Dhamala et. el., 2021). But, despite its importance, TVET faces challenges in comparison to academic education pathways (Billett, 2018). Reasons contributing to the low image of TVET include poor quality, weak industry linkages, social stigma, cultural barriers, and a shortage of qualified teachers. To address these issues, a virtual conference on "Improving the image of TVET" was organized by UNESCO-UNEVOC. The conference brought together participants from 82 countries who engaged in discussions about the influencing reasons, consequences, and perspectives of young people regarding TVET. Policies and practices that have helped improve the image of TVET were also examined, highlighting the importance of collaborative efforts and knowledge sharing in tackling the image problem (Billett, 2018).

In Saudi Arabia, where there is a shift from an oil-based to an investment-focused economy, the importance of skilled labor in the private sector has increased (Aldossari, 2020). However, there has been a historical stigma attached to TVET in favor of white-collar jobs. To understand the impact of socio-economic transformations on attitudes towards TVET, a quantitative study was conducted among 1007 TVET students in Saudi Arabia. The study revealed a significant relationship between perceptions of TVET and reasons such as gender, family income, and parental educational level (Aldossari, 2020).

In Ethiopia, understanding reasons that impact students' attitudes towards TVET felt essential. A study conducted among 134 pre-secondary school students aimed to determine the relationships between demographic reasons, knowledge possession, interest, motivation, and TVET stream selection. The findings showed a significant relationship between information delivery methods (such as teachers, parents, peers, and internet platforms) and students' motivation to choose TVET (Mohamed, 2022). Socioeconomic reasons, parental influence, and the quality of TVET education also played a significant role in shaping students' attitudes towards TVET. These findings emphasize the need for concerted efforts from government, TVET authorities, and the community to promote the importance of TVET, enhance its quality,

and provide guidance and counseling services to influence students' career choices (Mohamed, 2022).

In Dhankuta, Nepal, the discipline of geography has been offered at the Bachelor's degree level since 1970 within the Faculties of Education and Humanities, and Social Sciences (Linkha, 2021). A review of 25 years of student enrollment data in the Bachelor's first year revealed fluctuations in enrollment rates in the Faculty of Education, while the Faculty of Humanities and Social Sciences maintained a relatively stable enrollment rate (Linkha, 2021). Reasons contributing to the decline in the Faculty of Education's enrollment include together with institute’s other decisions, changes in state economic policies (Linkha, 2021).

In conclusion, the literature review highlights the importance of addressing the image problem of TVET and understanding the reasons that influence students' attitudes towards TVET in different contexts. By improving the perception, quality, and relevance of TVET programs, it is possible to attract more students and contribute to the development of skilled human capital in line with national and global goals.

PART III: METHODOLOGY

The research methodology employed in this study encompasses both quantitative and qualitative approaches to provide a comprehensive understanding of the reasons influencing enrollment trends in CTEVT engineering programs.

Research Design, Methods and Participants

The quantitative component focuses on analyzing enrollment trends in two specific programs, namely the diploma and pre-diploma levels. The enrollment data from the CTEVT database over the past five years serves as the basis for this analysis. This quantitative analysis aims to identify trends and patterns in enrollment, providing a quantitative overview of the current situation.

In addition to the quantitative analysis, a qualitative case study approach, following the guidelines set by Yin (2018), was conducted. The qualitative component aimed to delve deeper into the underlying reasons affecting enrollment. The case study utilized purposeful sampling, selecting research participants based on specific criteria. A case study protocol (Appendix-1) was developed to provide a roadmap for conducting the research, ensuring consistency and coherence in data collection.

Initially, the research design focused on the Kathmandu Valley and one municipality outside the Valley. However, after discussions with the Research Management Committee (RMC) at CTEVT, it was decided to extend the scope of the study to include additional locations. As a result, the qualitative phase of the research was conducted in four municipalities of three provinces: Bagmati, Lumbini, and Madhesh. This extention allowed for a more diverse representation of perspectives and experiences.

The qualitative data collection involved conducting eight focus group discussions (FGDs) and meetings with different groups across the three provinces, as depicted in Table 1. The stakeholders for research participants were requested formally with a letter (Appendix-2). These FGDs provided a platform for in-depth discussions and the exploration of participants' insights, experiences, and opinions regarding enrollment in CTEVT engineering programs. Furthermore, interviews were conducted with 25 TVET stakeholders (Table 2). These interviews provided

valuable perspectives and insights from various stakeholders, including TVET experts, administrators, industry representatives, and students.

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

Semi-structured questionnaires were used for the interviews, ensuring flexibility in data collection while maintaining a focus on the research objectives. The case study protocol, including a matrix with discussion guiding points (as shown in the Protocol, Appendix-1), helped

streamline the interview process, 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

Data Analysis and Meaning Making

Data collected from the FGDs and interviews were recorded and noted. Informed by the consent of the research participants, a subset of the interviews (14 out of 25) was recorded and

transcribed selectively (Jack, 2008; Leavy, 2015). The remaining interviews and FGDs were carefully noted and documented for subsequent analysis. Additionally, informal discussions with the general public and individuals involved in TVET were held to gather additional insights, although these discussions are not included in the research report.

Thematic analysis was employed to analyze the qualitative data and identify key findings. The data were organized into thematic clusters representing the main reasons for the declining enrollment in CTEVT engineering programs. This analytical process allowed for the identification of patterns, commonalities, and variations in the data, enabling a comprehensive understanding of the reasons influencing enrollment trends. The analysis was conducted based on a combination of contextual understanding, the available literature, and the perspectives shared by the research participants.

By combining quantitative analysis and qualitative case study methods, this research methodology provides a comprehensive and multi-faceted examination of the reasons influencing enrollment trends in CTEVT engineering programs. The integration of both approaches enables a deeper understanding of the complex dynamics at play and contributes to the development of informed recommendations for addressing the challenges faced in the TVET sector.

Research Ethics Considered

Throughout the research process, great importance was placed on upholding ethical considerations, taking into account the local cultural values and norms. Prior permission was sought from the research participants with the support from various individuals, including principals and officials from technical institutions, social workers, and members of the general public. In order to protect the privacy of the participants, pseudonyms were used during data analysis and presentation (see Appendix-5 for further details). The research team remained fully committed to ensuring the well-being and rights of the participants, reflecting the core principles of ethical conduct. The invaluable cooperation and support received from diverse stakeholders played a pivotal role in the successful completion of the study. By employing pseudonyms, the researchers respected and upheld the participants' anonymity, recognizing the significance of maintaining their confidentiality.

PART IV: DECREASING ENROLLMENT TREND IN ENGINEERING PROGRAMS

This part presents the findings of the research pertaining to the main research questions, which focused on understanding the student enrollment trend in long-term engineering programs of CTEVT over the past five years based on the database obtained from CTEVT.

Enrollment Trend for Diploma Level Engineering Programs

Based on the provided enrollment numbers (Table 3) for the past five years in the Nepali calendar (BS 2075, 2076, 2077, 2078, and BS 2079), we can observe certain trends and patterns in the enrollment of CTEVT engineering programs.

For Architecture Engineering, we can observe a fluctuating trend over the five-year period. The number of entrance examination appeared and registered students were 79 and 64 respectively in BS 2075. It increased to 336 and 115 respectively in BS 2076, reached its peak at 265 and 168 in BS 2077, and then decreased to 188 and 140 in BS 2078. In BS 2079, the number slightly decreased further to 170 and 113. These fluctuations indicate variations in the popularity and demand for Architecture Engineering during these years.

In the field of Automobile Engineering, there was a substantial growth in enrollments over the five-year period. Starting from 236 entrance appeared and 122 registered students in BS 2076, the numbers steadily increased to 666 entrance exam appeared and 336 registered in BS 2077. It reached its peak at 634 entrance appeared students in BS 2078. However, in the last year, BS 2079, the entrance appeared students' numbers decreased to 372 among which total of 261 were registered. Overall, the trend suggests a rising interest in Automobile Engineering programs, with a slight decline in the most recent year.

Other programs such as Biomedical Equipment, Civil, Civil (Hydro-power), Computer, Electrical and Electronics, Electronics, Geomatics, and Information Technology also show variations in enrollment numbers over the five-year period. Some programs experienced fluctuations, while others showed gradual growth or decline.

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 Equipment	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 Electronics	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 Technology	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

Source: Prepared based on the data available from CTEVT

Overall, the trend analysis of CTEVT engineering graduates based on the provided enrollment numbers suggests both stability and changes in the popularity and demand for different engineering programs. These trends can provide insights for decision-makers to better understand the evolving preferences of students and make informed decisions regarding program offerings and resource allocations.

Among the programs listed, the dominant program in terms of enrollment numbers appears to be Civil Engineering. With consistently high enrollment figures over the five-year period, ranging from 10,718 entrance examination appeared and 4439 registered students in BS 2075 to 9,424 and 5289 students in BS 2080, Civil Engineering shows a strong but declining trend. This program consistently attracted a significant number of students, indicating a continued demand for Civil Engineering education, albeit not fulfilled the quota.

Although quotas of the programs generally in increasing trend, the overall trend of the program can be characterized as relatively stable with a slight decline in recent years. While there was a notable increase in entrance exam appeared students in BS 2077, reaching a peak of 17,272, the numbers decreased to 15,519 in BS 2078 and further decreased to 9,424 in BS 2079. So, it is important to consider the reasons that may have influenced these enrollment trends.

Based on the provided data, we can imply several results. Firstly, Civil Engineering has maintained its position as a popular program, consistently attracting a large number of students over the years. This suggests that there is a more interest in this field and a perceived value of civil engineering program among students.

Secondly, the fluctuating enrollment numbers in other programs, such as Architecture Engineering and Automobile Engineering, indicate varying levels of demand and changing student preferences. These trends can be used to assess the overall popularity and market demand for specific engineering programs.

Additionally, the emerging interest in programs like Agriculture Engineering and Biomedical Engineering, as indicated by the enrollments in the most recent year (BS 2079), suggests potential areas that may warrant further attention and investment in the future.

However, in overall, the sharp decline in enrollments from BS 2077 to BS 2079 can be considered alarming and warrants further investigation. A significant drop in entrance

examination appeared and registered students within a short span of time could indicate various reasons that may have influenced student choices and affected the demand for certain programs.

Several factors could contribute to this decline. To fully understand the reasons behind the decline and to assess whether it is a cause for concern, a deeper analysis of the specific circumstances would be necessary. It would be important to gather additional information, such as qualitative data or insights from students, industry professionals, and TVET experts, to gain a comprehensive understanding of the situation.

Enrollment Trend for Pre-Diploma Level Engineering Programs

The trend analysis of CTEVT pre-diploma engineering programs from BS 2076 to BS 2079 (as the data were obtained only for four years) as provided in the Table 4 reveal interesting patterns in enrollment numbers across different pre-diploma programs. Among the programs, Civil Engineering and Surveying show fluctuations, while others display varying degrees of stability or fluctuations.

The Civil Engineering program witnessed a significant increase in entrance appeared students from BS 2076 to BS 2077, but then experienced a decline in BS 2078 and further decrease in BS 2079. Similarly, the Surveying program showed fluctuations of entrance appeared students, with a peak in BS 2078. On the other hand, programs like Computer, Refrigeration and AC, and Water Supply demonstrated relatively stable enrollments over the four-year period, although the enrollment size is comparatively low.

Some programs experienced notable fluctuations, such as Automobile and its Apprenticeship program. In the Automobile program, there was a peak in entrance appeared students in BS 2077, followed by a decline in BS 2078 and a subsequent increase in BS 2079. The same trend can be observed in the Automobile (Apprenticeship) program, with a significant jump in BS 2079 compared to the preceding years.

Applicants for the course in the Electrical, Electronics, Mechanical, and Mechanical (Apprenticeship) programs displayed varying degrees of fluctuations, with no clear upward or downward trend. The IT (Apprenticeship) program witnessed variations in enrollments, including a significant growth in BS 2079 compared to the previous years.

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	Regis-tered	Quota	Entrance	Regis-tered	Quota	Entrance	Regis-tered	Quota	Entrance	Regis-tered	
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	

Source: Prepared based on the data available from CTEVT

Note*: Total quota is seen except apprenticeship programs

Overall, the trend analysis suggests a mixed pattern in the enrollments of CTEVT pre-diploma engineering programs. While some programs experienced stability or minor fluctuations, others demonstrated peaks and declines. The sharp decline of applicants in certain programs from BS 2077 to BS 2079 raises concerns and warrants further investigation. It is crucial to examine the underlying factors contributing to these trends and devise strategies to address the declining enrollments.

Among the CTEVT pre-diploma engineering programs, the dominant program in terms of enrollments is the Civil Engineering program. It consistently had the highest number of enrollments throughout the four years, starting with 3608 entrance exam appeared and 3215 registered in BS 2076 and reaching its peak at 5399 and 2732 of applicants and registered students respectively in BS 2077. However, there was a decline in applicants and registered students in the following years, with 3860 and 2033 in BS 2078 and further decreasing to 2757 and 1413 in BS 2079. The overall trend of the Civil Engineering program shows an initial surge in enrollments followed by a gradual decline. This trend indicates the need for further analysis to understand the factors influencing the fluctuations in student interest and to devise strategies to maintain a steady enrollment rate.

To imply the results, it is essential to assess the reasons behind the fluctuations in enrollments in different programs. The decline in enrollments from BS 2077 to BS 2079 is indeed a cause for concern and requires further investigation. The significant drop in enrollments across various programs during this period raises questions about the underlying factors contributing to this decline. It could be indicative of challenges or issues that affected the overall attractiveness of the CTEVT pre-diploma engineering programs.

Qualitative research can provide valuable insights into students' decision-making processes, their perceptions of the programs, and the factors influencing their enrollment choices. It can uncover specific challenges or barriers that students may have faced during the years of decline and shed light on their preferences, expectations, and concerns. Similarly, engaging with TVET stakeholders including experts and industry representatives through qualitative research can provide valuable insights into curriculum quality, industry demand, and potential areas for improvement.

PART V: WHY ENROLLMENT IN TVET ENGINEERING PROGRAMS DECREASING?

The subsequent section of this report delves into the reasons behind the declining enrollment in CTEVT Engineering programs, as highlighted by the insights gathered from interviews and focus group discussions and meetings with the research participants. Drawing from a qualitative case study approach, the findings are presented using the metaphor of an "Onion Layers," which encompasses three distinct layers: the contextual layer at the core, the institutional level layer in the middle, and the personal level layer on the outer surface (See Figure 1). The contextual layer is situated at the core because this acts as the primary reason creating environment for other reasons. Similarly, personal reasons are situated at the surface as it is visible to the general public. This approach provides a comprehensive understanding of the complex reasons contributing to the reduced attractiveness of these programs, enabling a more holistic analysis of the enrollment decline.

Contextual Reasons: Socio-Cultural Environment as a Core

Within this section, we explore the socio-cultural and contextual reasons that significantly impact the declining attraction to the CTEVT engineering programs. These reasons, which lie beyond the direct control of CTEVT, play a pivotal role in shaping the enrollment trends. By delving into the socio-cultural environment, we aim to shed light on the broader societal, national and international, influences that have contributed to the diminishing interest in these programs. It is important to recognize that these contextual reasons require attention and understanding as part of the larger framework for addressing the enrollment decline in TVET engineering programs.

Youth Situation: Adversities Versus Opportunities

One of the primary reasons for decreased attraction to the programs is found lack of opportunities for students in Nepal, leading them to seek educational and employment opportunities abroad. Kunti, a TVET expert, highlighted that students are inclined to go abroad for work due to the limited prospects available domestically. Kiran, a TVET expert working in national and international TVET fields, added that the socio-cultural environment encourages youth to pursue education abroad, perpetuating the notion that nothing significant happens in the

country (*Nairashyata* is everywhere). The forces of globalization have also influenced the mindset of the youth, fostering the belief that foreign education holds more value.

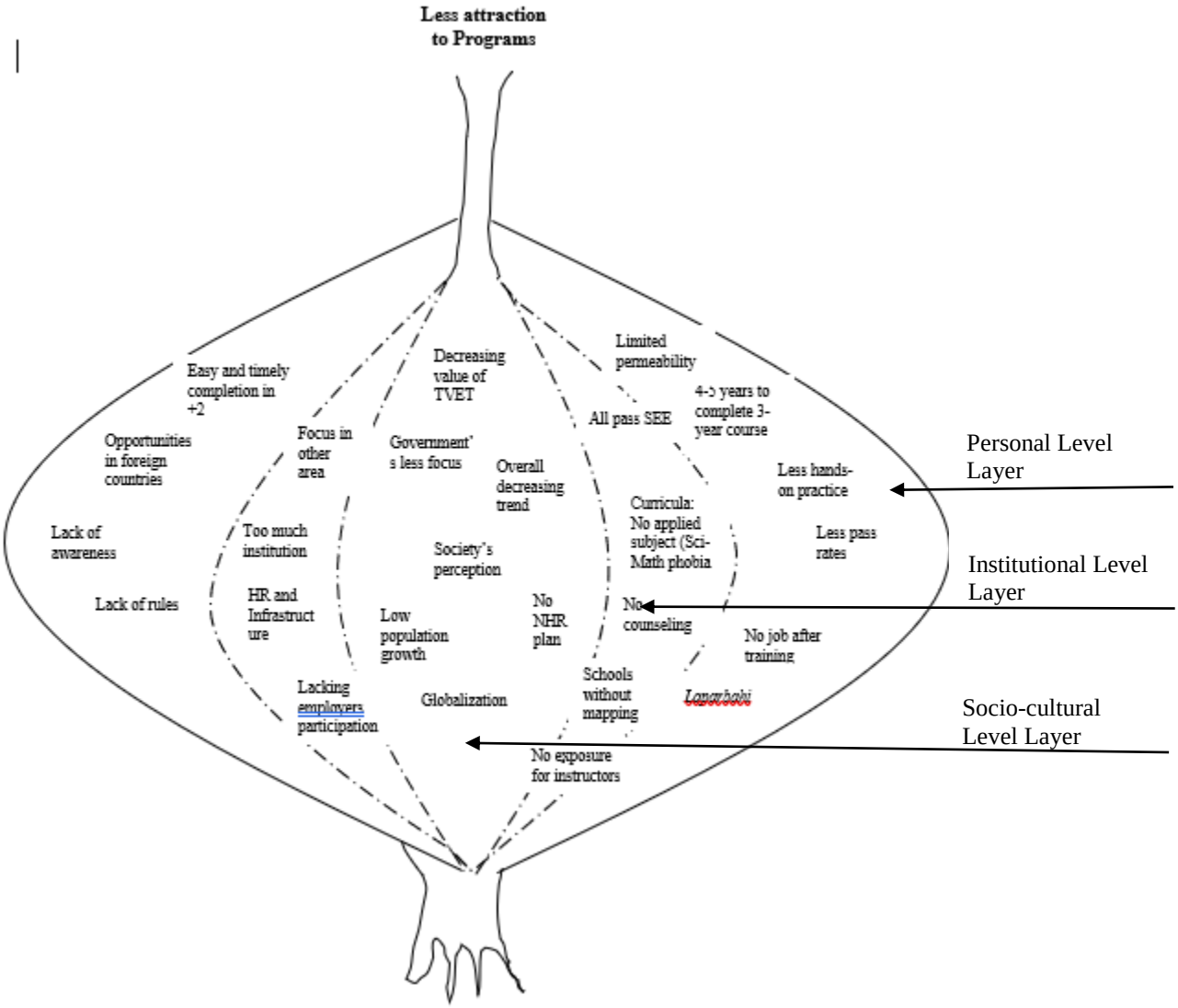

Figure 1. Layers of the Reasons for Decreasing Enrollment: An Onion Metaphor

The value of TVET programs, including engineering, has witnessed a decline in recent years, further impacting enrollment. Kiran emphasized that the diminishing value of engineers in society contributes to the decreasing interest in TVET programs. Additionally, urban youth prefer to pursue the +2 education stream rather than opting for TVET paths. Gajendra, a coordinator of a TECS school located in Kathmandu Valley, shared the challenge of attracting students from the Valley as valley-dwellers are less keen to send their children to TVET programs. This trend is reinforced by Kanchan, a construction company owner with long TVET

experience, who mentioned that the attraction of fast-tracking education by completing +2 and then going abroad after a language course is prevalent among the youth.

Another critical reason is the lack of understanding regarding the value of technical certificates. Sundar, the owner of a mechanical workshop in Nepalgunj, highlighted that students do not comprehend the potential of a technical education and are instead attracted to higher income prospects abroad. Ram, a guardian of a graduate and a veteran in the field of mechanical engineering, explained that the dream of going abroad is deeply ingrained in the minds of TVET graduates. He also mentioned the unnecessary demands exhibited by Nepali youth workers, resulting in the employment of workers they prefer from neighboring countries.

The prevailing trend among students is to pursue +2 education and bachelor-level courses, which can be completed within a shorter timeframe. This sentiment is echoed by Nirjala, a principal of a CTEVT constituent school, who highlighted the general inclination of students to follow the +2 stream. Madhav, a senior official from CTEVT, emphasized that the decreasing enrollment is not limited to engineering programs but is observed across various programs and institutions. The allure of studying and working abroad, coupled with the decreasing respect towards engineering graduates, further contributes to the declining enrollment numbers.

Furthermore, negative perceptions are formed due to the high number of unemployed job-seekers in the country, creating a discouraging environment for prospective students. Puru, the managing director of a structural engineering consulting firm, noted the prevalent mentality among today's youth to seek opportunities abroad for study and work. The comparative ease and shorter duration of general education (+2) in contrast to the prolonged result publication process in TVET diploma programs are additional reasons deterring students from enrolling in TVET engineering programs.

These contextual reasons collectively impact the youth's decision-making process, leading to a decreased interest in TVET engineering programs. The combination of limited opportunities, the allure of foreign education and employment, the diminishing value of TVET, and the preference for faster educational pathways contribute to the downward enrollment trend in TVET engineering programs.

Insufficient Recognition and Employment

The decreasing enrollment trends in TVET engineering programs can also be attributed to the insufficient recognition and employment prospects associated with these programs. Several reasons contribute to this issue:

Firstly, there is a lack of proper job market opportunities for TVET graduates. Kanchan highlighted the limited job prospects available for graduates in Nepal, which discourages students from pursuing TVET engineering programs. The insufficient recognition of TVET qualifications by *Lok Sewa Ayog* (Public Service Commission) further exacerbates the employment challenges faced by graduates.

Furthermore, the competition for sub-engineer positions is unjust, with Bachelor of Engineering (BE) and Master of Engineering (ME) graduates applying for these roles. As a result, TSCL or Diploma graduates often face difficulties in securing employment, and even engineers experience unemployment. Gajendra mentioned that only individuals with connections (referred to as "Pahunchwala") manage to secure jobs at the local level, while diploma and pre-diploma graduates face increased competition and limited opportunities.

In some cases, as Gajendra mentioned, employers exploit the situation by hiring failed students at lower salaries instead of seeking out qualified and passed students. This practice further undermines the value and prospects of TVET graduates in the job market. Graduates also face challenges in finding suitable employment due to the limited job opportunities and the relatively small scale of the local industry.

Another issue is the comparatively lower salaries offered to TVET graduates, which deters potential students from enrolling in TVET engineering programs. Kanchan emphasized that graduates receive less salary in comparison to their counterparts from other educational streams.

The lack of recognition and exploitative employment practices are evident in the expressions of various stakeholders. Usha, a graduate of CTEVT diploma engineering program (from a TECS institute in Kathmandu Valley), mentioned that employers are exploiting engineering human resources by providing very low salaries. Similarly, Parshuram, a guardian and an experienced retired teacher, pointed out the difficulty in finding jobs for TVET graduates.

FGD-1 participants also emphasized that produced graduates are difficult to sell in the job market.

The possibility of obtaining government positions (Jagir) acts as a significant attraction for students. However, the limited availability of such positions contributes to the decreased interest in TVET engineering programs. Many employers also hire workers from neighboring countries, such as India, due to the unnecessary demands and behavior exhibited by some Nepali youth, as mentioned by an entrepreneur of Nepalgung (Ram).

Summarizing the all information it can be said that the insufficient recognition and employment prospects associated with TVET engineering programs contribute to the decreasing enrollment trends. The recent report also portrays that employment of CTEVT graduates overall is less than 60% (Adhikari et. al, 2023) which justifies the information provided by the research participants.

Entry Qualifications Affecting Result

Entry qualifications have a significant impact on the results and overall quality of TVET engineering programs. Several reasons related to entry qualifications affect the outcomes. The current trend of all students passing the Secondary Education Examination (SEE) has implications for the quality of TVET programs. Akash mentioned that nowadays, almost all students are passing the SEE examination, which raises questions about the rigor and standards of the evaluation process.

Parshuram, a guardian and an experienced retired teacher, noted that the decreasing quality of general schools affects the quality of CTEVT programs. The declining standards in general education can have a detrimental impact on the preparedness and foundation of students entering TVET engineering programs.

The grading system of the SEE examination also plays a role in affecting the quality of students enrolling in TVET programs. Madhav highlighted that the grading system allows low graders, even those with D grades or a GPA of 1.6, to enroll in CTEVT programs. This dilution of entry qualifications may lead to students with inadequate academic performance joining the engineering programs.

The impact of the COVID-19 pandemic is also evident in the education system, as Madhav mentioned that individuals who only completed up to grade 8 (without studying grades 9 and 10) were able to pass the SEE examination. This suggests potential gaps in knowledge and preparation among students entering TVET engineering programs.

Insufficient school-level education in some general schools contribute to students' inability to pass diploma courses. FGD-5 participants highlighted the inadequacy of school education in preparing students for the challenges of TVET programs.

The intake criteria for TVET engineering programs also play a role in affecting the quality of graduates. FGD-6 participants noted that students with D+ grades in school can enroll in these programs but often struggle to complete the courses, creating a negative impression. FGD-7 and FGD-8 participants also pointed out the problem with enrollment criteria, allowing students with D or E grades to apply for engineering programs. This compromises the quality of graduates and hampers the overall reputation of the programs.

In summary, the entry qualifications for TVET engineering programs have an impact on the results and quality of graduates. The trend of all students passing SEE, declining standards in general education, the grading system allowing low performers to enroll, the impact of the COVID-19 pandemic on examination results, insufficient school-level education, and problematic enrollment criteria all contribute to the challenges faced by students in these programs. Addressing these issues is crucial to ensuring the quality and effectiveness of CTVET engineering program.

Lacking Proper Implementation of Visions and Policies

The declining enrollment in TVET engineering programs can be attributed to, according to the research participants, the lack of proper implementation of visions and policies in Nepal's education system. One of the major concerns is the government's limited emphasis on TVET, as mentioned by Kiran, A TVET expert working in national and international TVET fields. The lack of priority given to TVET programs hampers their development and growth. Additionally, there is a clear absence of proper policies and a national human resource plan in the country. Kiran highlights the lack of vision and policies, indicating that the government has not provided a clear roadmap for the development and promotion of TVET education.

The unfavorable policies of the government towards TVET programs are also cited as a significant obstacle. The participants in FGD-1 express their dissatisfaction with the government's policies, which they believe are not supportive of those opting for TVET programs.

Overall, the lacking proper implementation of visions and policies in the education system, along with the government's limited emphasis and unfavorable policies towards TVET, contribute to the decreasing enrollment in TVET engineering programs. Addressing these issues and developing comprehensive visions and policies can help create a more conducive environment for the growth and development of TVET education in Nepal.

Enrollment Trend in Other Educational Fields Also Not Encouraging

According to some research participants, the declining enrollment trend is not limited to the TVET sector or engineering field but is observed across various educational fields. They view this decrease in enrollment as a natural occurrence to some extent, e. g. due to the decrement in population growth (The Kathmandu Post, 2021). Considering this broader context is important in understanding the reasons behind the reduced interest in TVET engineering programs and developing effective strategies to address the issue.

Institutional Level Reasons: Quality Concerns at the Core

In this section, we focus on the institutional level reasons for the decreasing enrollment, which are directly related to CTEVT and fall within its mandate and responsibilities. These reasons are depicted in the "Onion Layers" metaphor presented in Figure 1. By examining these reasons, we can gain insights into the quality concerns within CTEVT that may be influencing students' interest in enrolling in TVET engineering programs.

Haphazard Extension of TVET Institutions

This sub-topic reveals various concerns raised by different sources regarding the proliferation of TVET institutions without proper planning and assessment. Parag, TVET Administrator working in CTEVT Headquarters, points out the excessive numbers of schools, particularly TECS Schools, that are rapidly mushrooming without considering the actual demand and requirements. This uncontrolled growth raises questions about the necessity of having such a large number of institutions in the TVET sector (Rupa). Gajendra highlights the issue of some

schools admitting students based on the cut-off list of CTEVT, which may compromise the quality of education and affect enrollment.

The lack of market studies and needs assessment is a common concern raised by multiple sources. Kanchan, a construction company owner with long TVET experience, emphasizes that the opening of too many technical schools without a proper understanding of the market demand leads to an imbalance between the number of graduates and available job opportunities. Similarly, Sundar points out that there are more TVET programs than the actual demand, which can result in graduates struggling to find employment.

The abundance of TVET institutions is a noticeable trend mentioned by several sources. Nirjala observes that technical schools are prevalent everywhere, even beyond what is necessary, which creates competition for student enrollment. Parshuram expresses confusion among guardians due to the excessive number of TVET institutions, making it challenging to decide where to send their children for education.

The affiliation process of institutions by CTEVT also comes under scrutiny. Akkal, a Managing Director of an engineering consultancy and contractor company in Bardibas (Madhesh Pradesh), raises concerns about the excessive affiliation of institutions, leading to a surplus of graduates in the job market. This oversupply can affect the employability of TVET graduates and diminish the value of their qualifications.

The discussions in various focus group discussions (FGDs) and meetings highlight the negative consequences of the haphazard extension of TVET institutions. FGD participants remark on the significant increase in the number of institutions, the lack of proper mapping, and the saturation of TVET schools in close proximity. This oversaturation, driven by political reasons as well, results in a low level of quality production and an imbalance between the supply and demand of TVET graduates.

Although the sufficient and equitable access of people to TVET, as indicated by the national educational objectives (MoEST, 2022) is still in question (Neupane, 2020), the concerns raised by different sources indicate that the rapid growth of TVET institutions without proper planning, needs assessment, and market studies has led to an excess of technical institutions and programs, making it difficult to attract students and maintain quality. The haphazard extension of

TVET institutions has become a significant reason affecting the enrollment trends and the overall effectiveness of TVET education.

Despite that the constitution has given priority to TVET and government plans and policies also tried to be focused on TVET, it has become an irony that the enrolment rate in CTEVT engineering programs is gradually decreasing. The CEHRD has initiated technical education in 9-12 Grades. To counter this situation, CTEVT also expanded its programs (maybe haphazardly). Now there are around 500 such CEHRD schools in different parts of the country where the students can get technical education (including engineering programs) free of cost. This is also one of the reasons for decreasing enrollment in engineering programs.

Weakening Instructional Quality

Numerous reasons contribute to the weakening instructional quality in TVET programs in Nepal which is directly related to shape the image of people toward the programs, as highlighted by various research participants. Lokendra, TVET expert with more than four decades of TVET work-experiences, points out a performance gap, where graduates are unable to effectively perform the required work. This issue is exacerbated by the lack of qualified teachers, further emphasized by Lokendra.

Gagan, a TVET expert and researcher with a solid work experience in TVET management and delivery, raises concerns regarding the insufficient human resources and infrastructure within TVET institutions. This hinders the delivery of quality education and limits hands-on practice for students. Additionally, schools operating in rented houses lack the necessary facilities, negatively impacting the learning environment, as noted by Gajendra. This phenomenon seems also common in other educational fields. The study conducted by Dhamala, Koirala, Khatiwada, and Deshar (2021) identified several challenges in expanding science and technology education in Nepal, including inadequate physical infrastructure, insufficient and unskilled faculty, and ineffective management practices. However, the value provided by the society to those programs is different that TVET programs.

The degradation of students' quality is also observed by Gajendra, citing the lack of resources in rural areas and negligible practical classes. These limitations hinder the acquisition of essential skills and knowledge. Kanchan highlights the unpreparedness of graduates,

questioning their workability and the quality of instruction in their institutions. Instructors themselves lack adequate training, and labs are often ill-equipped, further compromising the learning experience.

The weak monitoring mechanism in place, as mentioned by Kanchan, contributes to the declining instructional quality. Ram shares his observations from a mechanical workshop, where graduates from long-term mechanical programs struggle to perform tasks effectively, reflecting the inadequacy of the TVET system. Ram further expresses concerns about the decreasing quality of reputed institutions and the anxiety surrounding the future prospects of his son.

Mausam, a graduate of CTEVT diploma engineering program (from a TECS institute in Kathmandu Valley), criticizes the education system for its excessive focus on theory, resulting in a lack of emphasis on practical skills. Madhav, a senior Official from CTEVT Regional Office, concurs, emphasizing the weakening quality of instruction. Akkal points out the *immaturity* of graduates who possess theoretical knowledge but lack practical skills, leading to their inability to face workplace challenges. Many graduates find themselves in a state of uncertainty, as they are unable to apply their acquired knowledge effectively.

Puru raises concerns about the low quality of CTEVT production, as evidenced by the hesitance of diploma and pre-diploma graduates to seek employment due to their inadequacies. This includes a lack of not only technical skills but also soft skills. FGD-1 participants further highlight the insufficient experience of instructors, particularly among new ones, despite their theoretical understanding.

Inadequate facilities for practical classes in private technical schools, outdated infrastructure in technical institutions, and a growing skill gap further contribute to the declining instructional quality. There is a mismatch between curricula and real instructional activities, and the evaluation methods predominantly rely on viva voce assessments, neglecting practical competence.

The scarcity of skilled instructors, particularly in remote locations, poses a significant challenge for TVET institutions, as finding qualified educators becomes difficult. FGD-2 participants emphasize the decreasing quality of TVET programs, especially in engineering trades. In rural institutions, a single instructor often facilitates multiple subjects, compromising the quality of education.

Issues related to CTEVT's affiliation distribution without proper needs assessment and instances of institutions operating without genuine commitment are also noted. The unavailability of qualified instructors, unhealthy competition among training institutions, and inadequate instructor training further contribute to the weakening instructional quality in TVET programs.

Dearth in Linkage with Business-Industries and Employers

The lack of linkage between TVET programs and business-industries, as well as employers, poses significant challenges in Nepal's education system. Kanchan, a construction company owner with long TVET experience, emphasizes the weak industry linkage, indicating a limited connection between TVET institutions and the business sector. This hampers the alignment of educational programs with industry demands and hinders students' ability to acquire relevant skills.

Akkal raises concerns about the insufficient participation of employers in TVET programs. When *immature graduates* seek employment, employers often lack the time and resources to provide the necessary coaching and training. This highlights the disconnection between educational institutions and employers' expectations, further exacerbating the skills gap.

The FGD-8 participants highlight the utmost shortage of linkage between education and employment. This lack of connection results in limited opportunities for TVET graduates to secure suitable employment. Additionally, there is a notable absence of linkage between institutions and the *Lok Sewa Ayog* (Public Service Commission), which further restricts employment prospects for TVET graduates.

Collaboration between CTEVT, government bodies, and stakeholders is necessary (Bhandari, 2023) to improve governance, ensure sustainability of private institutions, and maintain the quality and integrity of the TVET sector as a whole. Addressing the dearth in linkage with business-industries and employers requires active participation from employers in shaping the curricula and providing practical training opportunities. Strengthening the collaboration between TVET institutions and the business sector can help bridge the gap between skills acquired through education and the demands of the labor market (Bhandari, 2023).

Furthermore, establishing effective communication channels between institutions and employment agencies can facilitate better employment prospects for TVET graduates.

Problems in Existing Curricula

Although, the literature review of the CTEVT engineering curricula revealed its advancement, according to the research participants existing engineering curricula are not fit for producing desired human resources. Raj highlights the difficulty in passing English due to weak background preparation, suggesting that the curriculum does not adequately address language skills. Lokendra, TVET expert with more than four decades of TVET work-experiences, points out that the curriculum is theory-focused, with implementation being a major challenge. The lack of applied subjects and practical learning opportunities limits students' ability to develop hands-on skills and apply theoretical knowledge in real-world contexts.

Parag, a TVET Administrator working in CTEVT Headquarters, raises concerns about the expertise involved in curriculum development, as the process lacks the involvement of relevant experts. Kiran, TVET expert working in national and international TVET fields, emphasizes that the curriculum is dominated by headquarters (HQ), indicating a centralized approach that may not sufficiently consider industry needs. Gajendra highlights the lack of participation from Technical Education and Vocational Training (TEVT) schools in curriculum development, resulting in a curriculum disconnected from ground realities.

High drop-out rates, as noted by Gajendra, indicate that the curriculum may not effectively engage and retain students. Kanchan points out that the curricula have not adequately addressed changing technology, which is crucial for preparing students to adapt to evolving industry requirements. FGD-1 participants express concerns about outdated and traditional subjects, limiting exposure to relevant and in-demand skills.

Insufficient involvement of teachers in curriculum development, as mentioned by the FGD-2 participants, results in a curriculum misaligned with teaching methodologies and practical requirements. Sundar and the FGD-2 participants emphasize the need for regular updates and revisions to ensure that the content remains relevant and responsive to industry needs.

Difficult subjects and the absence of practical skills, as highlighted by Mausam and the FGD-8 participants, contribute to student failures, dropouts, and a lack of confidence. These issues call for a comprehensive review and revision process involving industry experts, instructors, and stakeholders. Efforts should focus on incorporating applied subjects, practical skills, and up-to-date content aligned with emerging technologies and market demands.

Lack of Information Dissemination, Awareness Raising and Counseling

The current state of information dissemination, awareness raising, and counseling in Nepal's TVET sector poses significant challenges. Participants have identified several issues that hinder access to information and awareness about available programs and opportunities.

Absence of counseling services leaves students and their guardians without guidance in making informed educational choices. Subsequently, there is a lack of awareness among the general population regarding technical education and the offerings of institutions like CTEVT and its programs. Limited knowledge about CTEVT courses, as highlighted by Kunti, a guardian of a graduate of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley), contributes to the low visibility and understanding of TVET programs.

Kiran, a TVET expert working in national and international TVET fields, observes a decline in parental involvement in choosing educational paths for their children, indicating a lack of awareness among parents as well. Ram, a guardian of a graduate of CTEVT diploma engineering program (from a constituent school in Lumbini Province), and Mausam emphasize the insufficient dissemination of information, leading to decreased interest in TVET programs. Parshuram further notes that important details about available programs, fees, and scholarship opportunities are not adequately shared with students and their guardians.

The overall lack of counseling and awareness-raising initiatives within CTEVT negatively impacts students' decision-making processes and limits their understanding of the potential benefits and career prospects associated with technical education. Many students, such as Priyansi, Damodar, Sandesh, Milan, and Smriti, express a lack of knowledge about CTEVT and its programs, relying on their guardians' suggestions or feeling uninformed about available opportunities.

Weak Administration and Governance

According to the research participants, the administration and governance of Nepal's TVET sector face significant challenges that hinder its effectiveness and overall quality. Participants have highlighted various issues related to administration and governance in CTEVT and its institutions.

Lokendra, TVET expert with more than four decades of TVET work-experiences, points out the absence of technical experts in key positions within CTEVT, which can limit the sector's ability to make informed decisions and implement relevant policies. Kanchan, a construction company owner with long TVET experience, compares CTEVT to a bureaucratic entity and suggests that competent individuals within the organization are not given appropriate responsibilities, potentially hampering effective governance, and ultimately enhance the image.

The outdated darabandi system, which determines the allocation of resources, reflects a lack of adaptability to current needs and demands. Additionally, the absence of tracer studies in CTEVT programs is a concerning oversight, as it hampers the ability to track graduates' employment outcomes and assess the effectiveness of the programs.

FGD participants also raise concerns about weak governance within CTEVT. The lack of an appropriate system to motivate and reward instructors, as well as the absence of instructional training opportunities, leads to demotivation and a decline in instructional quality. Excessive workloads placed on instructors, such as handling multiple classes simultaneously, further contribute to diminished quality.

Personal Level Reasons: Perceptions and Awareness Towards TVET Programs

Flow of Message: "Why to Go There?"

The perception and awareness surrounding TVET programs significantly influence students' decision-making process. Various reasons were expressed by the research participants that contribute to the declining attractiveness of CTEVT engineering program as well as TVET programs in Nepal overall, as students question the reasons to choose this educational pathway.

As Akash expressed, one common consideration is the perception that pursuing the general 10+2 route offers an easier and more timely path for further studies. The perception of

people that CTEVT courses have very less opportunity for further educational progression may discourage students from opting for them. Additionally, the extended duration required to complete a three-year TVET course, often stretching to four or five years, is seen as a disadvantage when compared to the prompt results and shorter duration of +2 courses.

The weakness of the examination administration and the prevalence of low pass rate of the students in TVET engineering programs further contribute to a negative perception, as Madhav expressed. Students and their guardians become frustrated with the delayed publication of results, which can sometimes take more than a year. The emphasis on theory-based examinations in CTEVT programs, despite the curriculum's focus on practical skills, may also deter students from enrolling.

Financial considerations also play a role, as the cost of TVET programs, especially in private institutions, is perceived as high. With fees reaching up to 4.5 lakhs in private institutions and 2.5 lakhs in TECS, students and their families face significant financial burdens (Gajendra).

The declining image of CTEVT programs and the perception of vocational-oriented education as less prestigious than general education pathways or opportunities for studying abroad contribute to the diminishing attractiveness. This perception can undermine students' confidence in the value and prospects of TVET programs.

Moreover, the prolonged duration for result publication and the extended course completion period, surpassing the stated duration of three years, create disillusionment among prospective students. The need to repeat certain contents when transitioning from a Diploma program to a Bachelor's level program adds to the perceived inefficiency of TVET education.

Another Message: Fear of Being Fail

The fear of failure emerged as another prominent concern among individuals considering TVET programs. Participants highlighted various reasons contributing to this fear.

One common aspect mentioned was the difficulty in grasping the teaching and learning process. Some individuals expressed challenges in comprehending the course content, which created a sense of anxiety and fear regarding their ability to successfully complete the program.

A specific fear mentioned was related to the subjects of English, Science and Math. Participants described experiencing a phobia or apprehension towards these subjects, which are often integral components of TVET courses. The perceived complexity and difficulty of these subjects increased the fear of failure among students.

Madhav, one of the research participants, pointed out that the high level of courses, particularly in terms of language and scientific subjects, often resulted in a higher number of back papers or failed exams. This further intensified the fear of being unable to successfully pass the required subjects, adding to the overall apprehension surrounding TVET programs.

The fear of failure represents a significant barrier for individuals considering TVET programs, as it affects their confidence and motivation to pursue technical education. Addressing this fear is very urgent.

"Lack of accountability": A Bitter Feedback from TVET Stakeholders

According to the feedback received from TVET stakeholders, *lack of accountability* was identified as a major concern in CTEVT courses. Akash, a third-year student of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley) specifically highlighted the issue of *lack of accountability*, particularly in relation to the delayed result publication. This lack of accountability has raised concerns among stakeholders regarding the transparency and efficiency of the evaluation process.

Sundar, owner of mechanical workshop in Nepalgunj (Lumbini Province), expressed dissatisfaction with the prevailing *lack of accountability* in TVET programs. He pointed out the weakening standards of education and the presence of internal politics among staff and instructors. Sundar also emphasized that some institutions prioritize their own financial interests (referred to as *Talab pakaune*) rather than focusing on providing quality education.

During the research, Manjita shared her personal experience and concerns regarding *lack of accountability* in the TVET institution where her son is studying. She mentioned that the irregularity of classes in the institute, pretending simple reason such as such as the conduction of the Secondary Education Examination (SEE) in their school, raised doubts about the commitment of the institution to providing consistent and reliable technical education. In addition to instructional activity related *lack of accountability*, Manjita also highlighted its

presence in the management aspect. She pointed out the lack of accountability and proper systems in place to ensure effective administration and overall quality control.

The FGD sessions further revealed stakeholders' concerns about *lack of accountability* in CTEVT. Participants raised issues regarding the lack of timely examinations, which has implications for students' progress and decision-making processes.

Overall, perception of *lack of accountability* emerged as a significant challenge in the TVET sector, affecting various aspects such as result publication, instructional standards, internal dynamics, and management practices needs an immediate move.

TVET Stakeholders' Suggestions for Improvement in Enrollment Situation

This section analyzes and presents the suggestions provided by the research participants for improving the enrollment situation in engineering programs. The participants offered multiple suggestions, which have been categorized into two broader headings: 1) Enhancing overall instructional quality and 2) restoring image and intensifying information and communication. Among the three layers of the reasons mentioned above, the main layer that CTEVT has to consider is the middle one—institutional layer which are provided as suggestions. These suggestions provide valuable insights into potential measures that can be taken to address the decreasing enrollment trend and attract more students to TVET engineering programs.

Enhancing Overall Instructional Quality

The research participants, both from the interviews and focus group discussions and meetings, expressed the need for improvement in instruction quality. This sentiment was shared by almost all participants and is evident in their responses. In the following sub-sections, we analyze and present the information related to this aspect, highlighting the key findings and suggestions provided by the participants. The insights gathered shed light on the importance of enhancing overall instructional quality as a means to address the decreasing enrollment trend in TVET engineering programs.

Upgradation and Implementation of Curricula

To address the current challenges and improve the enrollment situation in TVET programs, several suggestions have been put forth by stakeholders. According to Kiran, a TVET

expert, one key area of focus is the proper implementation of the existing curricula and its contemporary upgradation. It is widely acknowledged that the curricula need to be revised and aligned with the changing demands of the industry and job market. This includes shifting from traditional programs to those with high demand, for instance chemical engineering, to cater to the evolving needs.

There is a consensus that curricula should emphasize both knowledge and skills, ensuring a balance between theoretical understanding and practical application. Participants have stressed the need for synchronization in the duration for pre-diploma, diploma, and apprenticeship programs. The curricula should be competency-based rather than content-based, reflecting the skills and expertise required by industries as Sundar and Nirjala expressed. To achieve this, it is crucial to involve real experts in the development of curricula (Nirjala). Questions have been raised also regarding the expertise of those responsible for curriculum development, highlighting the importance of involving qualified professionals as Rupa, a TVET expert with a long work experience particularly in producing TVET instructors and trainers, mentioned

Furthermore, the quality of students entering TVET programs is seen as a concern, as the declining quality of the Secondary Education Examination (SEE) affects the quality of CTEVT graduates (Nirjala). Furthermore, suggestions have been made to simplify difficult subjects, provide more practical classes, and address the high failure rate in certain subjects, as Mausam and Usha expressed. Regular revision of the curricula is deemed necessary to keep pace with industry advancements and exclude unused and obsolete skills (Madhav and FGD-1).

Curriculum Implementation

Effective implementation of the curricula is crucial to ensure the desired outcomes. Stakeholders have emphasized the importance of considering feedback from schools and institutions as a vital component for improving curriculum implementation (Kiran). It is essential to focus not only on increasing access but also on improving the quality of instruction (Gajendra). To enhance the quality of instruction, efforts should be made to tap into the talents and expertise of individuals, including retired professionals as Kanchan, an experienced contractor and TVET professional expressed.

There is a call for a national commitment to enhance the quality of instruction, highlighting the significance of this issue (Ram). Institutions should be mindful of the time

required for students to complete a course, and measures should be taken to expedite the process (Manjita). Besides, regular instructional trainings to the instructors, such as the ISI and OSU programs, should be provided to enhance the overall quality of graduates. Up-to-date tools and equipment are essential, and institutions should ensure their availability to facilitate effective learning, as stated by Nirjala.

Participants have stressed the need to shift the focus from theory-centered assessments to skill-focused examinations (Madhav). The ultimate goal of CTEVT should be to produce graduates who are competent for the demands of the market (Akkal). Workplace practice should be integrated into the curricula, with provisions for daily recording, verification, and evaluation of practical experiences as Akkal, one of the construction and consulting entrepreneur, expressed. *Darbandi* (staff positions, numbers and overall organizational structures should be reviewed and updated to align with present requirements (Lokendra).

Additionally, stakeholders have highlighted the importance of monitoring infrastructure closely to ensure its adequacy and functionality (FGD-2). Students as research participants have emphasized the need for sufficient practical classes to develop their skills and become qualified professionals (FGD-5).

By implementing these suggestions, focusing on curriculum upgradation and effective implementation, and addressing issues related to teaching quality, infrastructure, and practical training, the TVET sector can work towards improving the enrollment situation in engineering programs and producing skilled graduates who meet the needs of the industry and job market.

Robust Monitoring System

The implementation of a robust monitoring system is crucial for ensuring the quality and effectiveness of TVET programs. In this research, participants have emphasized the need for regular monitoring to address the existing challenges and improve the overall functioning of the system (Gagan). Suggestions have been put forth to establish a separate monitoring division within CTEVT that focuses on monitoring both instructional activities and the availability and functionality of tools and equipment (Kanchan). It is important to monitor both teachers and managers to eliminate any lapses or carelessness (Manjita).

The provision of regular monitoring mechanisms is essential to maintain and enhance the quality of TVET programs (Nirjala). Stakeholders have stressed the importance of a strong monitoring system (Parshuram) and emphasized the need for a robust quality control system within CTEVT (Akkal). It is suggested that CTEVT should not only focus on producing graduates but also provide students with job hunting skills to improve their employability (Puru).

Addressing lapses and ensuring accountability is a key aspect of the monitoring system. Stakeholders have called for the elimination of any lapses or carelessness from CTEVT (FGD-3). Moreover, there is a suggestion to implement policies that discourage unhealthy competition among institutions in pulling and enrolling students (FGD-7).

By establishing a dedicated monitoring division, ensuring regular monitoring, and implementing strong quality control measures, CTEVT can strengthen its oversight and create a conducive environment for continuous improvement. A robust monitoring system can help identify areas of improvement, address lapses, and maintain the quality standards of TVET programs including engineering.

Need-Based Institutions and HR production

To ensure the effectiveness and sustainability of TVET programs, stakeholders have highlighted the importance of establishing need-based institutions and aligning human resource production with market demands. Participants have expressed concerns about the haphazard extention of institutions and the need for consolidation (Gagan, Rupa). They argue that the country does not require an excessive number of TVET institutions and suggest that a more sustainable approach would involve reducing the number to a required size, thereby saving valuable human and other resources.

A key recommendation is to base program offerings on comprehensive needs assessments to ensure that the skills being developed align with the demands of the job market. This approach would lead to the production of graduates who possess the skills and competencies needed by industries (Gajendra, Akkal). Research participants also proposed a forceful merger of TVET providers when necessary to optimize resources and streamline operations (Gajendra). They emphasize the need to eliminate the *Andhadhundha* (blind-eyed)

affiliation of institutions and to avoid the concentration of multiple technical schools in one area (Gajendra).

The focus should be on retaining only those institutes capable of delivering quality education and effectively meeting the needs of the industry (Parshuram). Approval and affiliation of institutions should be based on the demand within specific sectors (Puru). Stakeholders recommend mapping and careful consideration when granting institutional affiliations to ensure that they are aligned with market needs (FGD-7).

The establishment of need-based institutions and the production of skilled human resources emerged as key strategies to address the current challenges in the TVET sector. The research participants emphasized the importance of aligning the curriculum and training programs with the demands of the market, thereby ensuring the relevance and employability of graduates. By implementing these suggestions and fostering close collaboration between TVET institutions, industries, and policymakers, it is possible to create a more responsive and effective TVET system that meets the needs of both students and the labor market.

Strengthen Linkage and Collaboration

To enhance the effectiveness and relevance of CTVET engineering programs, stakeholders emphasize the importance of establishing strong linkages and collaborations with various stakeholders, particularly the industry. Participants have highlighted the need to increase employment linkage and establish connections with industries to bridge the gap between skills development and job opportunities (Gagan, Kiran).

According to Gajendra, a program coordinator in TECS school, specific attention should be given by CTEVT to supporting and enhancing the quality of TECS institutions. He also emphasized on a triangular partnership involving local-level stakeholders, technical schools, and CTEVT to foster collaboration and synergy. This collaborative approach ensures that TVET institutions are closely connected to local communities and industries, creating a more responsive and demand-driven training system (Madhav).

Research participants of FGD-1 also emphasized the importance of industry linkage to produce graduates who possess the skills and competencies required by the job market. They recommend the provision of internship opportunities to allow students to gain practical

experience and develop a deeper understanding of industry needs, as was expressed in FGD-2. Organizing job fairs can also facilitate access to information on vacancies and employment opportunities for TVET students (FGD-5).

Furthermore, it is crucial for local levels to provide support and create an enabling environment for TVET students, increasing the attractiveness and relevance of TVET programs (FGD-6). Collaborative efforts between TVET institutions, industry stakeholders, and local communities will contribute to the production of skilled graduates who are well-prepared to meet the demands of the job market and contribute to local development.

Strengthening linkages and collaboration emerged as a crucial factor in enhancing the effectiveness and relevance of TVET programs. The research participants highlighted the importance of establishing strong connections between TVET institutions, industries, and local communities to bridge the gap between education and employment. This collaborative approach enables the sharing of expertise, resources, and knowledge, leading to the development of industry-relevant curriculum, provision of internships and apprenticeships, and organization of job fairs. By fostering stronger partnerships and actively involving stakeholders, TVET institutions can better address the skill requirements of industries and enhance the prospects of their graduates in the job market.

Enhance Examination System/Administration

To improve the efficiency and effectiveness of the examination system/administration in TVET programs, research participants have identified several areas for improvement. Timely result publication is highlighted as a crucial aspect that needs attention (Gagan, FGD-1, FGD-2, FGD-3, FGD-5, FGD-7, Mausam, Usha). Ensuring that examination results are published promptly not only instills confidence among students but also enables timely progression and decision-making regarding further education or employment opportunities.

The nature of examinations themselves should be reconsidered, with a shift towards more practical-focused assessments (Parag, Kanchan, FGD-1, FGD-2, FGD-6). Research participants in this regard, emphasize the importance of practical evaluation alongside limiting theoretical test minimal. This can be achieved through the establishment of a practical-based examination arrangements that reflects real-world scenarios and challenges.

There is a call for decentralizing the examination process and providing more authority to instructors (FGD-1) of the institutions. By empowering instructors to conduct assessments at the institutional level, the examination administration can become more flexible and responsive to the specific needs and capacities of each TVET institution. This decentralization also facilitates a deeper understanding of students' progress and allows for timely interventions when needed.

The need for a comprehensive review of the examination system and administration is echoed by stakeholders, emphasizing the importance of implementing a practice-focused approach (FGD-6). Practical examinations should be conducted following clear guidelines and standards to ensure fairness and consistency across institutions (Madhav).

In addition to timely result publication and practical assessments, stakeholders stress the importance of completing courses within the stipulated duration (Gajendra). This requires efficient management of the examination process to prevent unnecessary delays and ensure that students can progress smoothly through their programs.

By revamping the examination system and administration to incorporate practical assessments, decentralizing the process, and emphasizing timely result publication, TVET programs can better evaluate students' skills and competencies, align assessments with industry requirements, and provide timely feedback to support student progression and success.

Revamping the examination system/administration within TVET programs is essential for ensuring comprehensive assessment of students' skills and competencies. The research participants emphasized the need to shift towards a more practical-based assessment approach that aligns with industry requirements and reflects real-world scenarios. Decentralizing the examination process and empowering instructors to play a more active role in assessment can enhance the authenticity and contextual relevance of evaluations. Additionally, placing a strong emphasis on timely result publication ensures that students receive prompt feedback, allowing for timely interventions and support.

Reforms Needed

According to research participants, several key reforms are needed in the TVET sector to enhance its effectiveness and relevance. Gagan, a TVET expert and researcher with a solid work experience in TVET management and delivery, emphasizes the importance of a separate

monitoring division within CTEVT to ensure regular monitoring of both available tools and equipment and instructional activities. Kanchan, a construction company owner with long TVET experience, supports this view and suggests that CTEVT should focus on becoming a technical institution rather than an administrative one, with the right individuals placed in appropriate positions.

Research participants also highlight the need to address administrative weaknesses and update the workforce within CTEVT. Gajendra suggests revising outdated practices, such as the improving the efficiency of administrative processes. Moreover, Kanchan emphasizes the importance of research in TVET programs, suggesting the establishment of research units in model schools under CTEVT to inform evidence-based decision-making.

To improve the quality of TVET programs, Manjita and Sundar advocate for eliminating lapses in quality control (*Lack of accountability*) and placing counseling and information desks within CTEVT. Continuous tracer studies are also recommended to assess graduate employment outcomes.

Madhav, a TVET administrator and Kiran, a TVET expert highlight the need to strengthen apprenticeship programs, establish province-focused TITI, and promote industry linkages for job placements. It is also suggested that high costs associated with TVET education should be reduced to make it more affordable and accessible to students.

FGD participants emphasize the need to strengthen job placement units in institutions, raise instructor motivation, and provide pre-training programs. They also suggest adopting a staff retention policy and enforcing qualification levels for overseas employment. Furthermore, Madhav emphasized the importance of making TVET a political agenda for the state to garner support and resources.

Reforms in TVET sector of Nepal is vital as indicated by recent government report (MoEST, 2023). According to the research participants in this research, particularly to enhance the attraction to CTEVT engineering programs, reform needed include establishing a separate monitoring division, addressing administrative weaknesses, emphasizing research and province-focused approaches, improving quality control, enhancing counseling and information services, conducting tracer studies, offering educational opportunities, strengthening apprenticeships, reducing costs, and promoting industry linkages. By implementing these reforms, quality and

relevance of the TVET engineering programs can be enhanced, producing skilled graduates aligned with the needs of the labor market and supporting overall national development.

Restoring Image and Intensifying Information and Communication

Together with enhancing TVET programs quality, intensifying information and communication efforts are crucial for restoring the image of CTEVT and the success of the TVET sector in Nepal, as indicated by the research participants. Such effort seems vital for contributing the national goal of the country of developing competent human resources through TVET (NPC, 2020). Providing orientation to students and implementing different measures to inform people about CTEVT courses can help create awareness and attract more students. Kiran, a TVET expert working in national and international TVET fields, emphasizes the need for a strong communication strategy and the sharing of success stories to showcase the achievements and benefits of TVET programs.

Participants also highlight the importance of conducting massive awareness and information campaigns. Gajendra suggests that all institutes should take responsibility for this under their *social responsibilities*. Manjita emphasizes the need for counseling and motivation to guide and inspire students and their guardians to choose technical education.

To reach a wider audience, advertisement through various channels is recommended. Mausam suggests utilizing different media platforms to disseminate information about TVET programs. Parshuram and Madhav emphasize the importance of awareness-raising programs, including media and information dissemination initiatives, to inform the public about job opportunities and the benefits of TVET education.

FGD participants also stress the need for increased awareness-raising and counseling programs, conducted on a massive scale and regularly. They note that many people are unaware of CTEVT courses and suggest utilizing different media platforms for information dissemination.

Finally, participants highlighted the importance of clearing the negative image associated with CTEVT and increasing awareness through intensified awareness programs. Puru emphasizes the need to address the negative perception surrounding CTEVT, while FGD participants recommend increasing awareness-raising programs to promote the positive aspects of TVET education.

In conclusion, restoring the image of CTEVT and intensifying information and communication efforts are essential for promoting TVET education (UNESCO, 2028). As research participants expressed, through targeted advertising, orientation programs, counseling, and ongoing awareness campaigns, the public can become more informed about the benefits and opportunities offered by TVET programs, ultimately attracting more students and fostering a positive perception of technical education in the country.

PART VI: CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

This section provides the summary of key findings of the research, implications of the study for technical education policy and practice, and limitations of the study and recommendations for future research

Summary of Key Findings

Findings from this research highlight three layers of reasons for less attraction to CTEVT engineering programs: contextual, institutional, and personal. Contextually, limited opportunities, the attraction of foreign education and employment, diminishing value of TVET, and preference for faster educational pathways contribute to reduced attractiveness. Insufficient recognition and employment prospects also play a significant role, with limited job market opportunities, and insufficient recognition of TVET qualifications. Entry qualifications affect results, with the declining quality of general schools and weak entry requirements impacting student readiness. Similarly, lacking visions, policies, and government emphasis on TVET education further contribute to the decline. The issue extends beyond TVET engineering programs, affecting various educational fields.

Under the institutional level reasons several key findings emerge from the analysis:

Haphazard Extension of TVET Institutions:

- Excessive growth of TVET institutions without proper planning and assessment raises concerns about the necessity and quality of education.
- Lack of market studies and needs assessment results in an imbalance between graduates and available job opportunities.
- Abundance of TVET institutions creates unhealthy competition for student enrollment and confusion among guardians.
- Excessive affiliation of institutions leads to a surplus of graduates in the job market, affecting their employability.

Weakening Instructional Quality:

- Insufficient human resources and infrastructure hinder the delivery of quality education and practical training.

- Lack of resources particularly in rural areas and inadequate practical classes further impact the quality of instruction and ultimately the graduates.

Dearth in Linkage with Business-Industries and Employers:

- Weak linkage between TVET programs and the business and industry sector hamper the alignment of educational programs with industry demands.
- Insufficient participation of employers in TVET programs leads to a skills gap and limited employment prospects for graduates.

Problems in Existing Curricula:

- Although the composition of curricula seems having a good standard, these focus too much on theory hindering the development of hands-on skills.
- Curriculum development lacks meaningful involvement from relevant experts and disconnects from ground realities and industry needs.

Lack of Information Dissemination, Awareness Raising, and Counseling:

- Absence of counseling services and limited dissemination of information contribute to a lack of awareness among students and their guardians.
- Inadequate information sharing about available programs and opportunities affect the visibility and understanding of TVET.

Weak Administration and Governance:

- Lack of technical experts in key positions within CTEVT and outdated resource allocation systems hamper effective governance.
- Weak governance practices, demotivated instructors, inadequate compensation, and limited professional development opportunities impact instructional quality.
- Growth of private TVET institutions without sustainability considerations undermine the integrity of the TVET sector which is directly linked to the attraction of engineering programs.

Perceptions and Awareness Towards TVET Programs:

- The perception that pursuing the general 10+2 route offers an easier and more timely path for further studies discourages students from choosing TVET programs.

- The limited opportunities for progression within TVET programs and the extended duration required to complete them are seen as disadvantages compared to the shorter duration of +2 courses.
- The weakness of the examination administration in maintaining the examination schedules and minimal pass rates in TVET engineering programs contribute to a negative perception among students and their guardians.
- The high cost of TVET programs, especially in private institutions, is perceived as a financial burden.
- The perception of vocational-oriented education as less prestigious than general education pathways contribute to the diminishing attractiveness of TVET programs.
- Fear of failure is a significant concern among individuals considering TVET programs, particularly due to difficulties in grasping the teaching and learning process and the perceived complexity of subjects like English, Science and Math.
- *Lack of accountability*, is a major concern in CTEVT programs, specifically regarding delayed result publication, weakening standards of education, internal politics among staff and instructors, irregularity of classes, and lack of effective administration and quality control.

The research participants offered suggestions to enhance engineering program enrollment in the TVET sector, focusing on two main areas: improving instructional quality and restoring the sector's image. To enhance instructional quality, participants emphasized curriculum alignment with industry demands, competency-based curricula, involvement of industry experts, and practical classes. Implementing curricula effectively through feedback incorporation, quality instruction, and instructor training was also highlighted. Strengthening monitoring mechanism either from the provincial offices or center, ensuring availability of tools and equipment, and providing job hunting skills were seen as essential.

The participants stressed the need for need-based institutions, consolidating resources, and aligning human resource production with market demands. Establishing strong industry linkages, internships, and job fairs were recommended to bridge the gap between skills development and employment opportunities. Improving the examination administration involved timely result publication, practical-focused assessments, decentralization of examinations, and adhering to

course durations. Participants called for practical-based assessments, empowering instructors, and comprehensive review of the examination system.

In summary, the suggestions aimed to improve TVET engineering program enrollment by enhancing instructional quality, implementing a robust monitoring system, establishing need-based institutions, strengthening industry linkages, and revamping the examination system and administration. Implementing these recommendations can attract more students, produce skilled graduates, and meet industry and job market needs.

Restoring the image of CTEVT and intensifying information and communication efforts were identified as crucial by the research participants. They emphasized the following key points:

- Orientation and awareness: Providing orientation programs and implementing measures to inform people about CTEVT courses were seen as important for creating awareness and attracting more students. A strong communication strategy and sharing success stories were recommended to showcase the achievements and benefits of TVET programs.
- Awareness campaigns and counseling: Conducting massive awareness and information campaigns, along with counseling and motivation, were highlighted. Institutes were encouraged to take social responsibility in raising awareness. Counseling programs were suggested to guide and inspire students and their guardians towards technical education.
- Advertisement and media platforms: Participants recommended utilizing various media platforms to disseminate information about TVET programs. Advertising through different channels and conducting awareness-raising programs, including media and information dissemination initiatives, were seen as effective in informing the public about job opportunities and the benefits of TVET education.
- Clearing negative image and promoting positive aspects: It was emphasized to address the negative perception associated with CTEVT and increase awareness through intensified programs. Participants stressed the need to promote the positive aspects of TVET education through increased awareness-raising initiatives.

Recommendations

Based on our findings, we propose the following recommendations targeting improving the situation of enrollment in CTEVT engineering programs. These recommendations are put under two following categories:

1) Recommendations requiring structural change

a) Evaluate and improve the examination system and administration: Conduct a comprehensive examination of the existing examination arrangements to address its shortcomings. Ensure timely conduction of examinations and certifications, maintain examination schedules, and explore practical-focused assessment methods. Timely publication of results will contribute to a positive perception of TVET programs and enhance student confidence.
b) Strengthen industry linkages: Consolidate partnerships and collaborations with both private and public sector employers to bridge the gap between education and industry. Foster stronger relationships through internships, OJTs, job fairs, and active involvement of employers in curriculum development and program design to ensure alignment with industry needs.

2) Recommendations for immediate action.

a) Review and revise engineering program curricula: Thoroughly examine the curricula of engineering programs and make necessary adjustments to prioritize practical skills development over excessive theoretical content.
b) Enhance monitoring mechanisms: Strengthen the regular monitoring system, with a specific focus on ensuring effective implementation of the curricula. Regular evaluation and feedback processes should be established to monitor the quality of instruction, practical classes, and overall program delivery.
c) Intensify awareness and counseling services: Conduct proactive awareness campaigns and counseling activities to inform students and their guardians about the benefits and opportunities associated with technical education.

Implications of the Study

The findings presented in this research have significant implications in three main areas. First, they hold policy implications that can contribute to future policy formulation in the TVET sector. The research provides valuable insights and recommendations that can inform the development of effective policies aimed at improving TVET programs and addressing the challenges identified, such as enhancing the examination system and administration, fostering business and industry linkages, and promoting demand-based human resource production.

Second, the research highlights several areas that require further exploration and investigation. Although some good practices in CTEVT Examination arrangements have initiated, further areas include examining how it can be enhanced to better assess student learning and skills and publish results on time, exploring strategies to foster business and industry linkages that are contextual and beneficial for both parties, and investigating approaches to align human resource production with the demands of the job market. These research gaps provide opportunities for future studies and deeper understanding of key aspects in the TVET sector.

Lastly, the research findings have practical value for TVET scholars and general readers. Scholars in the field of TVET can benefit from the insights and recommendations presented in this research, which can inform their work and contribute to the advancement of knowledge in the sector. General readers, including policymakers, practitioners, and individuals interested in TVET, can gain a better understanding of the challenges and potential solutions to improve TVET programs, thereby promoting informed decision-making and actions to enhance the quality and effectiveness of TVET education.

Challenges and Limitations of the Study

During the study, certain challenges and limitations were encountered, which are important to acknowledge. These challenges include:

1. Resource limitations: Due to constraints in resources, it was not feasible to visit all seven provinces for data collection. Although the purpose of this research was not generalization, it affected obtaining perspectives from different regions.
2. Trend Analysis of Pre-Diploma level program had to perform only for four years as the data were obtained only for this period)

3. Change in planned category of students: The originally intended category of students, specifically those who passed the entrance examination for engineering programs but did not enrol, could not be included in the study. This change was necessitated by their unavailability during the study period, which may have impacted the comprehensiveness of the data.
4. Broadened focus beyond engineering programs: While the research questions and guiding points were primarily focused on engineering programs within CTEVT, many research participants provided responses that encompassed a broader scope, including CTEVT's long-term diploma and pre-diploma programs. This divergence from the initial focus may have influenced the depth and specificity of the findings related to engineering programs.

It is important to acknowledge these limitations as they may affect the study's findings. Future research endeavours can consider addressing these challenges to enhance the comprehensiveness of the study.

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APPENDICES

Appendix-1: Case Study Protocol

Case Study Protocol[2]

Assessment of Low Enrollment Trend in Long-Term Engineering Programs of CTEVT

A. Introduction

The purpose of this case study is to explore the reasons for low enrollment in CTEVT long-term engineering programs. The study aims to answer the following research questions:

1. What is the student enrollment trend in long-term engineering programs of CTEVT in the last five years?
2. What are the causes of the low enrollment of students in long-term engineering programs of CTEVT?
3. What are the measures CTEVT can adopt to mitigate the low enrollment?

B. Methods, Research Participants and Selection Criteria

Following a quantitative trend analysis, the study will be conducted using a qualitative case study design. Data will be collected through semi-structured interviews with participants selected through maximum variation sampling (Yin, 2018). The following participants will be selected based on the criteria:

The following tentative numbers of research participants for the case study are proposed:

Graduate student (Male-2, Female-2 including both diploma and pre-diploma programs)

- Passed from any engineering program within 2 years
- Vice/Principal assures that s/he can provide information in the related matter
- Preferably from rural locations

Potential student

- Student studying in 9 or 10 class of a public school
- The head teacher/ class teacher has the information that s/he is planning to joint CTEVT long term program (preferably in engineering program)

Guardian of potential/student (2 guardians of already graduated students, and 2 potential students)

- Who is informed about the CTEVT and other TVET/ Education provisions of the country

TVET Administrator (1 from CTEVT HQ, 1 from CTEVT Provincial Office, 2 from Technical Schools; gender should be considered)

- As recommended by CTEVT RI Division

TVET expert

- More than 10 years of experience in the national TVET system

[2] The Case Study Protocol is prepared prior to commencement of the fieldwork. However, some part of the protocols had to amend.

- Well informed about the decreasing trend of CTEVT programs' enrollment

Employers

- Among the members of subject committee at NVQS

C. Data Collection

The data collection process will be conducted as follows:

- The participants will be informed about the purpose of the study and will be asked for their consent to participate.
- Semi-structured interviews will be conducted with each participant based on the thematic guiding points as given below. The interviews will focus on the research questions and will be audio-recorded.
- Data will be transcribed and analyzed using thematic analysis.

1) What are the causes of the low enrollment of students in long-term engineering programs of CTEVT?
2) What are the measures CTEVT can adopt to mitigate the low enrollment?

SN	Themes	TVET administrators	TVET experts	Guardians	Potential/ Students	Employers
1	**Enrollment trend in Civil engineering Programmes**	What do they know? How do they explain the trend of the last five years?	What do they know? How do they explain the trend of the last five years?	When they enrolled their children? What is their perception? Are they satisfied?	When they enrolled? What is their perception? Are they satisfied?	What do they know? What is their perception?
2	**Causes of low enrollment**	What do they know about low enrollment? How do they perceive it? What are the causes? Are there any specific issues? Any specific examples?	What do they know about low enrollment? How do they perceive it? What are the causes? Are there any specific issues? Any specific examples?	What do they know about low enrollment? How do they perceive it? What are the causes? Are there any specific issues? Any specific examples?	What do they know about low enrollment? How do they perceive it? What are the causes? Are there any specific issues? Any specific examples?	What do they know about low enrollment? How do they perceive it? What are the causes?

3	**Measures for increasing enrollment**	How do they see the solution to the issues? What are they doing? What works? What does not work? Are there any specific issues? Any specific examples?	How do they see the solution to the issues? What are they doing? What works? What does not work? Are there any specific issues? Any specific examples?	How do they see the solution to the issues? What works? What does not work?	How do they see the solution to the issues? What works? What does not work? Any specific examples?	How do they see the solution to the issues?

D. Data Analysis

Selective approach of data transcribing (Jack, 2008; Leavy, 2015) will be made. Data will be analyzed using thematic analysis. The transcripts of the interviews will be read and re-read to identify themes related to the research questions. The themes will be organized into categories and subcategories to provide an in-depth understanding of the reasons for low enrollment in CTEVT long-term engineering programs.

E. Ethical Considerations

The study will be conducted in accordance with ethical principles for qualitative research. The participants will be informed about the purpose of the study and their confidentiality will be protected. All personal information will be kept confidential and only used for the purpose of the study. The participants will be informed that they can withdraw from the study at any time without any consequences.

F. Expected Outcomes

The study is expected to provide an in-depth understanding of the reasons for low enrollment in CTEVT long-term engineering programs. The findings will be useful for CTEVT in developing measures to mitigate the low enrollment. The study will also contribute to the body of knowledge on the enrollment trends in technical and vocational education and training (TVET) programs.

G. Timeline

The study will be conducted over a period of 8-12 weeks. The data collection process will be completed within 4-6 weeks and the data analysis will be completed within 2-3 weeks. Similarly, finalization of the research report will be completed within additional 2-3 weeks.

H. Tentative List of Literature

- Creswell, J. W. (2018). Qualitative inquiry & research design: Choosing among five approaches. Sage publications.
- Yin, R. K. (2018). Case study research and applications: Design and methods. Sage publications.
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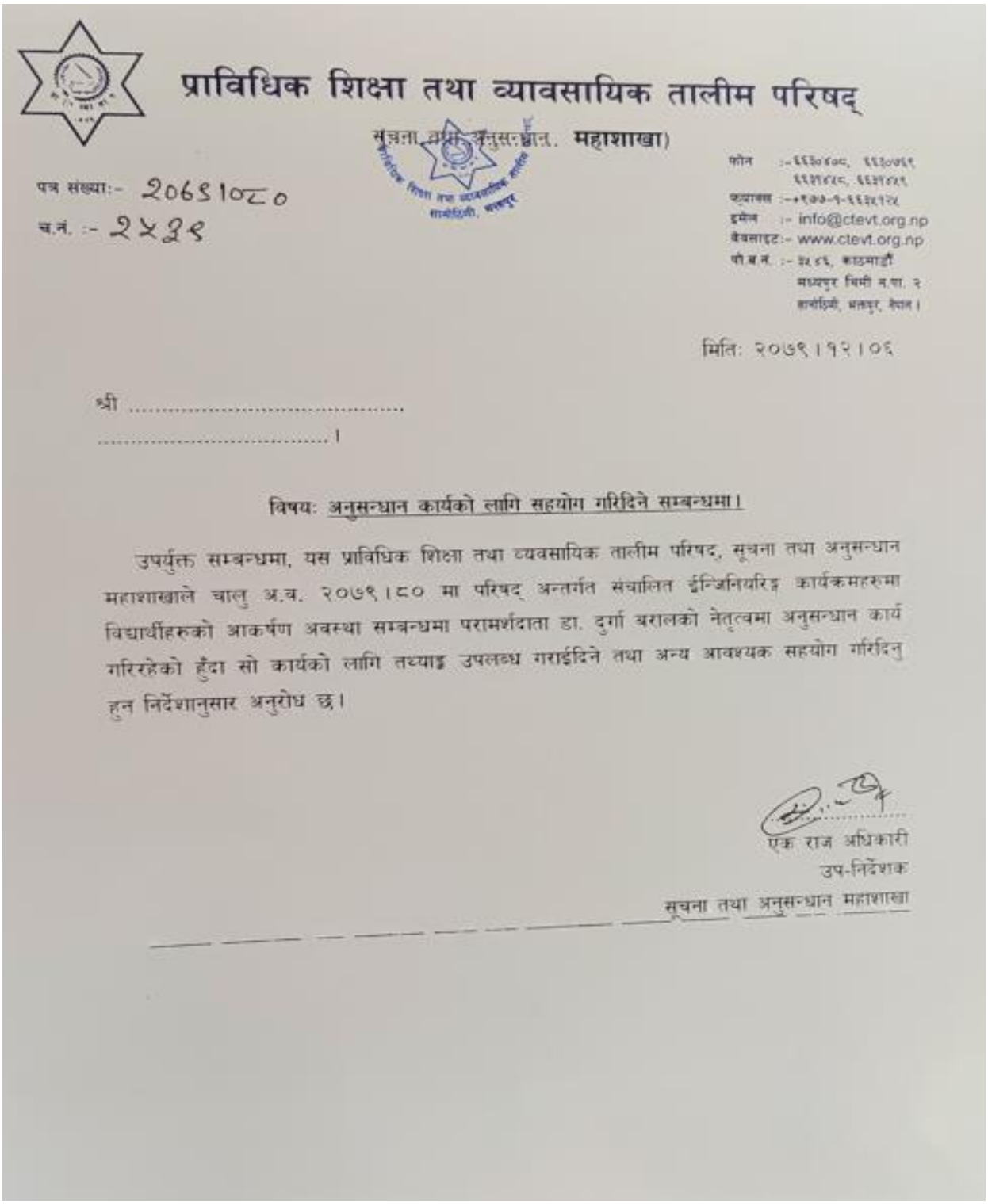
- Merriam, S. B. (2009). Qualitative research: A guide to design and implementation. John Wiley & Sons.

- Berg, B. L. (2012). Qualitative research methods for the social sciences. Allyn & Bacon.
- Jack, S. K. (2008). Doing Qualitative Research Using Your Computer: A Practical Guide. Sage Publications Ltd.
- Leavy, P. (2015). Method Meets Art: Arts-Based Research Practice. Guilford Publications.

I. Tentative Table of Contents of the Research Report

Appendix-2. Request Letter from CTEVT to the Stakeholders



प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद्

सूचना तथा अनुसन्धान महाशाखा)

पत्र संख्या:- २०६९।०८०

च.नं. :- २५३९

फोन :-६६३०४०८, ६६३०७६९
६६३१८२८, ६६३१८२९
फ्याक्स :-+९७७-१-६६३५१२५
इमेल :- info@ctevt.org.np
वेवसाइट:- www.ctevt.org.np
पो.ब.नं. :- ३५८६, काठमाडौं
मध्यपुर थिमी न.पा. २
भक्तपुर, नेपाल।

मिति: २०७९।१२।०६

श्री .....

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विषय: अनुसन्धान कार्यको लागि सहयोग गरिदिने सम्बन्धमा।

उपर्युक्त सम्बन्धमा, यस प्राविधिक शिक्षा तथा व्यवसायिक तालीम परिषद्, सूचना तथा अनुसन्धान महाशाखाले चालु आ.व. २०७९।८० मा परिषद् अन्तर्गत संचालित ईन्जिनियरिङ्ग कार्यक्रमहरुमा विद्यार्थीहरुको आकर्षण अवस्था सम्बन्धमा परामर्शदाता डा. दुर्गा बरालको नेतृत्वमा अनुसन्धान कार्य गरिरहेको हुँदा सो कार्यको लागि तथ्याङ्क उपलब्ध गराईदिने तथा अन्य आवश्यक सहयोग गरिदिनु हुन निर्देशानुसार अनुरोध छ।

एक राज अधिकारी
उप-निर्देशक
सूचना तथा अनुसन्धान महाशाखा

Appendix-3. General Information on CTEVT Diploma Level Curriculum

S. No.	Programs	Duration	Entry Criteria	Group Size (max)	Present Quota
1	Diploma in Civil Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC Pass or SEE with minimum C grade in Compulsory Mathematics & Science and D+ in English. • Pre-diploma in Civil Engineering with minimum 67.00%. • Should pass entrance examination administered by CTEVT.	48	11410
2	Computer Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point • Pre-diploma in related subject or equivalent with minimum 68.33% • Pass entrance examination administered by CTEVT.	48	2832
3	Electronics Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	384
4	Electrical Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	1440
5	Geomatics Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	1280
6	Electrical & Electronics Engineering	3 Years (6 semesters, each semester	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English	48	384

		19.5 weeks)	• Pre-diploma in related subject or equivalent with minimum 68.33%. Pass entrance examination administered by CTEVT		
7	Mechanical Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	648
8	Automobile Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. Pass entrance examination administered by CTEVT	48	952
9	Information Technology	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. Pass entrance examination administered by CTEVT	48	1280
10	Architecture Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	528
11	Biomedical Equipment Engineering	18 months (3 semesters, each semester 20 weeks)	• 10+2 equivalent to the science stream • Pass entrance examination as administered by CTEVT.	48	24
12	Civil Engineering (Thap) (Specialized in bridge engineering ?)		• TSLC in Civil Engineering or equivalent. • Should pass entrance examination as administered by CTEVT/sponsoring organization • At least one year working experience in relevant • field.	48	96

13	Refrigeration and A/C	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	144
14	Civil Engineering (Specialized in Hydropower)	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	528
15	Mechatronics Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC pass or SEE or equivalent with minimum C Grade (2.0 Grade Point) in Mathematics and Science and 1.6 Grade Point or equivalent in English • Pre-diploma in related subject or equivalent with minimum 68.33%. • Pass entrance examination administered by CTEVT	48	24
16	Agricultural Engineering	3 Years (6 semesters, each semester 19.5 weeks)	• SLC Pass or SEE with minimum C grade in Compulsory Mathematics & Science and D+ in English. • Pre-diploma in Civil Engineering with minimum 67.00%. • Should pass entrance examination administered by CTEVT.	48	96
17	Biomedical Engineering		• SLC pass or SEE or equivalent with minimum 1.6 Grade Point in altogether subjects • Pass entrance examination administered by CTEVT	48	48
					22098

Source: Prepared based on the information of CTEVT website and diploma level curricula

Appendix-4. General Information on CTEVT Pre-Diploma/TSLC Level Curriculum

S. No.	Programs	Duration	Entry Criteria	Gr. Size	Present Quota
1	Civil Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	40	13780
2	Survey Engineering	18 months (15 months class + 3 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	40	1320
3	Mechanical Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	40	363
4	Automobile Engineering	18 months (15 months class + 3 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	24	345
5	Computer Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	40	2040
6	Electrical Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) Pass entrance examination administered by CTEVT	40	2745
7	Water Supply & Sanitary Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	40	115
8	Refrigeration & AC Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) Pass entrance examination administered by CTEVT	Th-40 Pr-20	24
9	Electronics Engineering	18 months (12 months class + 6 months OJT)	• SLC with any grade and any GPA (Since 2072 SLC). • SLC appeared (Before 2072 SLC) • Pass entrance examination administered by CTEVT	40	52

10	Railway Engineering	18 months (15 months class + 3 months OJT)	• SEE with any grade and any GPA • Pass entrance examination administered by CTEVT	40	N/A

Source: Prepared based on the information of CTEVT website and diploma level curricula

Appendix-5. Pseudonyms Used for the Interviewed Research Participants

S. No.	Name
Category: TVET Experts (4)	
1	Kiran: A TVET expert working in national and international agencies Lokendra: A TVET expert with more than four decades of TVET work-experiences Rupa: A TVET expert with a long work experience particularly in producing TVET instructors and trainers Gagan: A TVET expert and researcher with a solid work experience in TVET management and delivery
Category: Business/Industry (4)	
2	Kanchan: Construction company owner with long TVET experience Sundar: Owner of mechanical workshop in one city located in Nepalgunj (Lumbini Province) Akkal: Managing Director of an Engineering Consultancy and Contractor Company in Bardibas (Madhesh Pradesh) Puru: Managing Director of a structural engineering consulting firm in Kathmandu (Bagmati Province)
Category: TVET Administrator (4)	
3	Parag: TVET Administrator working in CTEVT Headquarters Gajendra: Coordinator of a TECS School located in Kathmandu Valley Nirjala: Principal of one of the CTEVT constituent schools located in Lumbini Province Madhav: Senior Official from CTEVT Regional Office
Category: TVET Student/Graduates (4)	
4	Raj: Graduate of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley) Usha: Graduate of CTEVT diploma engineering program (from a TECS institute in Kathmandu Valley) Akash: Third-year student of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley) Mausam: Graduate of CTEVT diploma engineering program (from a TECS institute in Kathmandu Valley)
Potential students (5)	
5	Smriti: Tenth-grade student of a general secondary school located in Mahottari district (Madhesh Pradesh) Milan: Tenth-grade student of a general secondary school located in Mahottari district (Madhesh Pradesh) Priyansi: Tenth-grade student of a general secondary school running CEHRD program located in Nawalparasi district (Lumbini Pradesh) Damodar: Tenth grade student of a general secondary school running CEHRD program located in Nawalparasi district (Lumbini Pradesh) Sandesh: Tenth grade student of a general secondary school running CEHRD program located in Nawalparasi district (Lumbini Pradesh)

Category: Guardian (4)	
1	Kunti: Guardian of a graduate of CTEVT diploma engineering program (from a constituent institute in Kathmandu Valley) Manjita: Guardian of a CTEVT diploma first-year student (from a constituent institute in Nepalgunj, Lumbini Province) Parashu: Guardian of a graduate of CTEVT diploma engineering program (from a TECS school in Kathmandu Valley) Ram: Guardian of a graduate of CTEVT diploma engineering program (from a constituent school in Nepalgunj, Lumbini Province) who was one of the supporter of the institution at the time of its establishment