

Impact Assessment of Technical Instruction and Vocational Andragogy Training for TVET Trainers of Bhutan

Sangay Tshewang, *M. Ed*^a, Yonten Pelzang, *MPA*^b, Karma Dorji, *Diploma in EE & TE*^b

^aTechnical Training Institute, Chumey, ^bTechnical Teacher Training and Resource Centre, Gelphu

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***Original Research Papers** are papers that report on original empirical research with a focus on teaching and learning. Papers may be qualitative or quantitative and include an Abstract, Introduction, Method, Results, Discussion, and Reference section, as well as any tables and/or figures.

Abstract

This study examined the effectiveness of Technical and Vocational Andragogy or Instruction Pedagogy (ToT) training and how it can enhance trainers' performance in delivery. Trainers' performance is vital to every country; Technical and Vocational Education and Training (TVET) in Bhutan is no exception. The study was based on an explorative research design with descriptive analysis. A purposive sampling technique was used to select the respondents (trainers). The survey research instrument (self-administered questionnaire) was designed to have both open-ended and closed-ended items.

The study's findings revealed that 70% of TVET trainers in Technical Training Institutes (TTIs) and Institutes of Zorig Chusum (IZCs) have diplomas, indicating a need to upgrade their qualifications. The study found that 96.4% of trainers strongly agreed that the ToT training has helped develop their confidence, which gave them more self-assurance. The content is objectively aligned and well-structured, with an 84.9% positive evaluation. 88% of respondents claimed they could replicate the knowledge and skills learned during the ToT program. Knowledgeable and experienced instructors can motivate students and ensure that more objective assessments produce better outcomes. This corroborates the study's findings, which indicate that 93% of participants concur that their instructors' professional ability can significantly impact graduates' performance.

The Technical Teacher Training and Resource Centre (TTTRC) technical instruction and vocational andragogy program received 73% satisfaction. This study enhances TTTRC's capabilities and role in TVET faculty capacity development, supporting a paradigm change in instructional pedagogy. It provides policy intervention and feedback to strengthen the program over the next twenty years.

Background

Technical and Vocational Education and Training (TVET) in Bhutan focuses on equipping individuals with practical skills for employment and entrepreneurship. It is offered to students, job seekers, and working professionals, including TVET

trainers, to enhance their technical expertise and teaching methodologies. The program aims to support Bhutan's economic development by creating a skilled workforce aligned with industry needs. As of December 2024, there are 10 TVET institutions, comprising eight vocational institutions and two institutions of 13 Traditional Arts and Crafts called the Institute of Zorig Chusum (IZCs).

The TVET system has seen several noteworthy changes since the founding of National Technical Training Authority (NTTA), a specialized organization established in 1999 to plan and manage the TVET sector. The NTTA's responsibilities were moved to the Department of Occupational Standards (DOS) and the Department of Human Resources (DHR) of the Ministry of Labour and Human Resources (Molhr) in 2003. The DOS was tasked with establishing the Bhutan Vocational Qualification Framework (BVQF) to strengthen national standards and create a quality assurance system. On the other hand, the DHR ensured that the nation had enough human resources—both quantity and quality—to support the nation's sustained socioeconomic development. Despite the remarkable progress in this field, an assessment of the TVET system reveals several problems and limitations. Thirteen procedures for quality assurance were created to guarantee a certain level of uniformity and dedication to excellence amongst providers. However, the BVQF registration rate of only 34% of providers indicates a lack of commitment to these requirements, which needs urgent improvement (MolHR, 2016). It was also discovered that the occupational standards were quite limited and did not adapt to the shifting demands of the labour market.

Further, the TVET Blueprint (2016-2026) also highlighted a few of the significant challenges the TVET system in Bhutan faced. The problems have been categorized into four major headings:

1. inadequate capacity
2. poor quality
3. low market relevance
4. weak policy and institutional capacity

Having implemented various strategies reflected in the TVET Blueprint 2016 and in the last stage of the implementation, a new TVET reform plan had to be urgently formulated in 2022. The low social status of the TVET remains the major drawback as society continues to give more importance to

academic education and fails to realize the TVET's colossal potential and unique role in developing society and the economy. Despite the implementation of the TVET Blueprint, youth unemployment continues to pose challenges. However, concerted efforts to accelerate growth and enhance employment opportunities with a high proportion of foreign workers always remain high.

TVET equips individuals with the knowledge, skills, and competencies needed for the workforce. Institutions like technical training centres and Zorig Chusum ensure a steady supply of competent trainers through technical instruction and vocational andragogy. The effectiveness of these trainers directly impacts industry performance and competitiveness. However, poor instruction, inadequate trainee understanding, and irrelevant training content hinder success. While no institution aims to produce unskilled workers, many TVET trainers lack relevant expertise, often possessing limited practical skills, which weakens their ability to demonstrate and impart knowledge to learners effectively.

Bhutan faces a shortage of competent TVET trainers, with 50% holding only a diploma or lower and many lacking formal training. Half have no instructor training, and short-term contracts discourage development. To address this, a mandatory two-week ToT program was introduced, ensuring trainers receive certification, though it contrasts with the four-year teacher training in education colleges.

In 2004, six TVET participants underwent an eight-week pilot training on four modules, becoming core trainers. Since then, 336 public, private, and NGO individuals have received pedagogical training. While some changed careers, most remain trainers. Given the government's significant investment in TVET trainer development, assessing the effectiveness of technical instruction and vocational andragogy is essential.

Table 1: Participants of TOT categorized by gender

SI#	Category	Male	Female	Total
1	Public	170	71	241
2	Private & NGOs	57	38	95
Total		227	109	336

Research Problem

Teaching in the twenty-first century is a difficult job. Recent social, political, and economic changes have significantly impacted teachers' roles in the classroom and education in general. Due to shifting responsibilities, increasing societal expectations, and legislative criteria, high-quality instructors must be employed (Gajdos, 2016). Researchers and educators agree that teachers' quality significantly impacts students' learning and achievement. Hardré (2003) claimed that effective teachers must have content knowledge, skills, and a practical teaching methodology. According to a study by Halpern & Hakel (2002), faculty development programs focusing on teaching theory and techniques foster professionalism, build community, and equip educators with the skills to teach diverse students effectively.

Although professional development is widely acknowledged as essential for enhancing teachers' abilities and instruction, examining professional development studies has continuously brought attention to the ineffectiveness of most initiatives (Bayar, 2014). Many variables cause this inefficiency. Further, Guskey (2002) defines professional development as a systematic effort to improve teaching practices, beliefs, and student outcomes. Teachers seek it for knowledge, skills, and personal growth to enhance student achievement. They also value practical, immediately applicable strategies for their daily classroom activities.

Pre-and in-service teacher research projects contend that having a professional teaching background entails a unique combination of advanced subject-matter expertise and general problem-solving abilities (Guskey, 2002; Bayar, 2014; Wati, 2011; Ma et al., 2018). A teacher's professional life has daily problems and difficulties, whether in the content they teach, curriculum design, or managing the different needs of students. Therefore, training teachers in the skills necessary to deal with these problems becomes essential to professional development. Teacher training directly impacts teaching methods and student achievement. Nzairwehi & Atuhumuze (2019) found that students taught by trained teachers performed significantly better than those taught by untrained teachers. Subedi (2015) found that teacher training enhances confidence and skills, improving teaching methods and assessment. However, its direct impact on teaching and learning is unclear, and a lack of refresher courses is noted. The study also observed increased student motivation to learn and succeed.

In-service teachers are used to taking different types of professional development programs. These programs can be short-term for a few days or long-term and can extend for several weeks or months. Trainers need a wide range of skills to respond to various challenges. Several experts argue that TOT in instructional pedagogy is critical to professional development (Gajdos, 2016).

Since 2004, many TVET trainers have received professional development and certification in Technical Instruction and Vocational Andragogy, as required by the Quality Management System and Regulations for Registration of Training Providers. Despite being in place for nearly 20 years, no impact assessment has been conducted to evaluate the program's effectiveness. Additionally, with time and technological advancements, the program's content is overdue for revision.

Similarly, Behroz-Sarcheshmeh et al. (2017) concluded that trained teachers have more assertive communication, teaching, and critical thinking skills, improving student achievement and interest. Özüdoğru (2020) found that trained teachers responded better to student questions than untrained teachers. Subedi (2015) highlighted a lack of refresher training, monitoring, and evaluation, recommending that training providers create support strategies before, during, and after training. This study aims to address this research gap.

Although there is a belief that Module 3 content needs updating, such changes are not feasible without empirical investigation. The program's content is likely outdated with evolving times and technology. Technological advancements continuously impact classroom teaching (Wong & Tsang, 2009). Additionally, the demands of industries for TVET graduates are changing as they seek technical skills and marketable qualities in graduates (Low, 2006; Lee, 2003; Kumar & Hsiao, 2007; Woodward et al., 2010). This highlights the need for ongoing curriculum updates.

Employers now expect TVET graduates to have technical and non-technical skills, as relying only on technical knowledge is insufficient (Halpern & Hakel, 2002). Conventional methods like lectures and lab work are inadequate for developing these skills. Malaysian engineering education, for example, needs reassessment, with a shift towards more effective teaching methods that meet the skills modern employers require,

as traditional, teacher-centred approaches are becoming obsolete.

Thus, to manage 21st-century TVET trainees effectively, a shift to student-centred learning, focusing on active learning and student participation, is essential. TVET trainers also need to be equipped with modern strategies and skills. Additionally, there is a need for more qualified TOT trainers at the Technical Teacher Training and Resource Centre (TTTRC), as many have left or taken different roles. With only two trainers remaining, conducting impact studies on the TOT program is crucial to ensure the relevance and adequacy of technical instruction and vocational andragogy.

Research Questions

To learn more about how technical instruction and vocational andragogy affect TVET trainers in the public and private sectors, the following questions will be investigated in this study:

1. How much does involvement in andragogy and technical instruction programs affect trainers' knowledge, abilities, and skills in both andragogy and instruction?
2. How do technical instruction and vocational andragogy impact the confidence and competencies of TVET trainers?
3. What barriers prevented the application of vocational andragogy and technical instruction?

Research Objectives

The study's main objectives are as follows:

1. To assess the effectiveness of technical instruction and vocational andragogy in enhancing instructional and pedagogical skills among trainers.
2. To determine the shortcomings and difficulties in the current technical instruction and vocational andragogy program.
3. Provide methods for continuously enhancing technical education and andragogy programs to adapt to the shifting needs of the labour market and technology.

The Significance Of The Study

One of the critical issues identified in the TVET reform plan 2022 is that any TVET trainer in the country can be considered

highly qualified and professional with the right attitude, artistry, and confidence. The role of TVET trainers needs to be reframed within the contexts of globalization and sustainable development, advances in ICT, and rapid technological change. The foremost asset of any TVET institution is its human capital, often dubbed as a 'knowledge asset', whose professional standards need to be enhanced through regular skills updating programs. Moreover, TVET institutions should be able to attract and retain the best trainers.

Without a professional training college for trainers, most TVET trainers are fresh recruits from TTIS/IZCS, have university degrees, and a few are trained outside the country. Most trainers were trained through technical instruction and vocational andragogy, focusing on pedagogy. In general, the professionalization of TVET trainers remains an issue in terms of quality and quantity. The motivation of teachers and trainers could be much higher, possibly due to a lack of career progression (TVET Statistics, 2022). Thus, this study will serve as a benchmark for enhancing the TTTRC's capabilities and role as the accountable organization for TVET faculty capacity development. Additionally, it will support the requirement for a paradigm change in the TOT in the environment of instructional pedagogy. ToT has remained stagnant for almost 20 years after its implementation, without any adjustments due to changes in time and technology. Such a study will help provide policy intervention, such as revision of the TOT curriculum, review of budget allocation, training of master trainers for TOT, revision of outdated modules or introduction of digital tools to align with current industry standards and feedback to strengthen the program.

Research Methodology

This explorative quantitative research study aimed to learn more about the efficacy of technical teaching and vocational andragogy, also known as instructional pedagogy, for TVET trainers through online survey responses. Descriptive statistics included frequency, mean and percentage for non-numerical data.

The study population comprises 336 private and public trainers who have undergone TOT instructional pedagogy. In essence, they are the ones who underwent this training, which was started in 2004 by the then Ministry of Labour and Human Resources. The program aimed to solve the problems associated with TVET instructors by providing high-quality instruction with substantial assistance for

trainers' training. A sample size of 336 sampling units, consisting of 227 male and 109 female ToT participants, was collected using the purposive sampling technique. As a quantitative approach, the study broadly used an online survey as a data collection tool. A survey collects data to learn or study using a standardized questionnaire. Surveys systematically ask people for information about their attitudes, knowledge, behaviours, opinions, and beliefs. The success of survey research depends on how participants answer the questionnaire and the reliability and validity of the instruments. As such, a closed-form questionnaire tool (Likert scale) was administered to TVET trainers trained in instructional andragogy, with a Cronbach alpha score of 0.863, indicating that the test items are consistent and reliable. For this paper, 15 similar items were chosen to test the internal consistency or reliability.

Additionally, Namgyel (2003) states that a significant advantage of the questionnaire is that many respondents can participate in the project, enhancing the validity of the research. Further, Moser and Kalton (1971) claim that nine out of ten social surveys use a questionnaire of some kind, making it the most commonly used technique in survey research.

The quantitative data from the online survey questionnaire was analyzed and cross-checked using MS Excel. Based on these classifications, the researchers organized a series of discussion sessions over the crude data and information to achieve a common understanding of the meaning and implications of the themes of inquiry. Individual experts from the core study team prepared the report following the discussions.

Results

Data Analysis

This research study involved 125 TVET trainers from TVET institutes to determine the efficiency and effectiveness of TOT programs. All the participants underwent various TOTs offered by TTTRC.

Respondents' Gender

Men have entirely dominated the gender ratio of TVET trainers. However, in collaboration with various international organizations, the Government of Bhutan has been working to improve gender equity in all sectors, including TVET. The data above clearly shows gender inequality: Most respondents

are male, comprising 76% of the total respondents. Female respondents make up only 24% of the total. This indicates a higher representation of males in the survey or group than females. See [Figure 1](#).

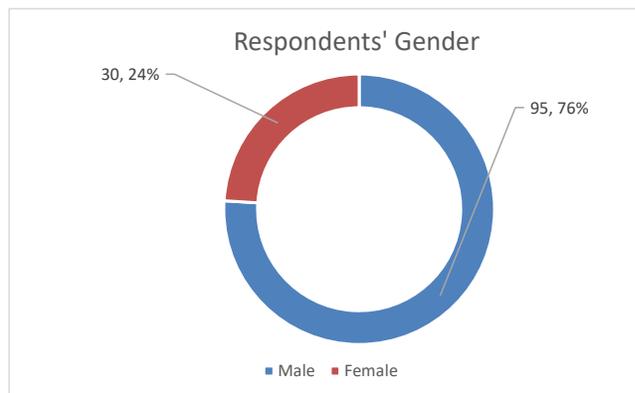


Figure 1: Respondents' Gender

Respondents' age

The data displays that the largest segment is in the 31-35 age range, indicating a predominantly middle-aged demographic. The distribution is relatively even across other age brackets, with the 36-40 and 41-45 age groups also having significant representation. The smallest group is those aged 45 and older. This distribution suggests a balanced mix of ages, slightly emphasizing the 31-35 range. See [Figure 2](#).

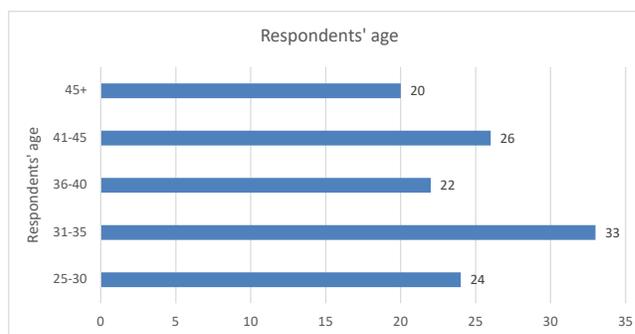


Figure 2: Respondents' age

Respondents' employment status

This indicates that a significant majority, 90.4%, is employed regularly, suggesting a stable and long-term employment status for most respondents. In contrast, only 9.6% are on contract, which typically implies a temporary or project-based work arrangement. The substantial difference highlights that the workforce predominantly comprises regular employees, reflecting a more secure and permanent employment environment among the respondents. See [Figure 3](#).

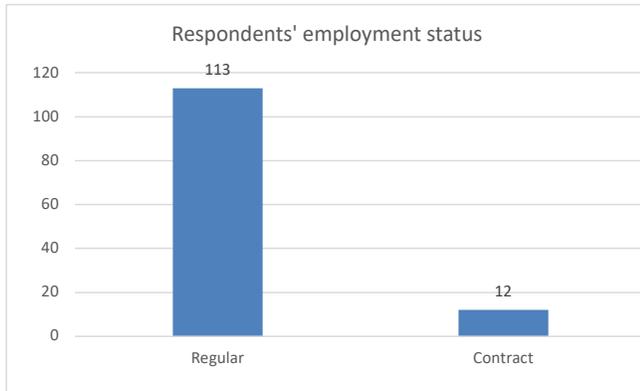


Figure 3: Respondents' employment status

Respondents' qualification status

Most respondents (70.4%) have a Diploma qualification, followed by 20% with a degree. Those with Certificates or a qualification of Class XII or below make up 4% each, while only 1.6% hold a Master's Degree. Overall, the data shows a substantial prevalence of diploma holders, with a lesser representation of higher degrees and certificates. Since many holds Diploma-level qualifications, offering them pathways to degree certificates could improve their career prospects and increase their work output in relevant fields. See [Figure 4](#).

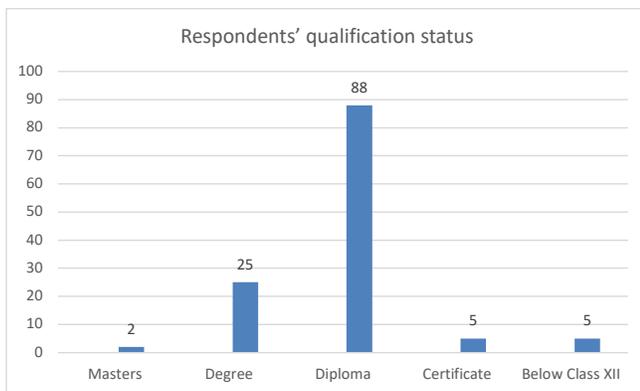


Figure 4: Respondents' qualification status

Status of employment organization

This data shows a clear dominance of civil servants, with 115 individuals compared to seven candidates in private organizations, two in non-governmental organizations, and one in a family business. The data indicates a strong preference or trend towards civil service roles over other sectors, despite the many obligations and challenges. See [Figure 5](#).

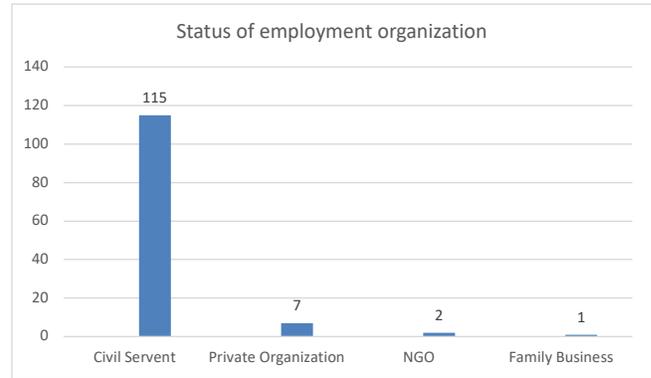


Figure 5: Status of employment organization

Response status to if the course improved confidence as a TVET trainer

The data shows that the majority of respondents, over 80%, have confidence that the training content is prepared by a team of subject matter experts, clearly suggesting that the training programs are generally well-regarded in terms of content quality and expertise.

However, 13.9% of neutral responses and 5.7% of disagree responses highlight areas of uncertainty or concern. These groups may feel that the content creators are not sufficiently qualified or that the content could be refined or improved further.

To narrow it down, the data reflects a strong belief in the expertise behind the training programs, with a large majority expressing confidence in the process. Addressing the concerns of the neutral and negative respondents could further strengthen trust and satisfaction with the training content. See [Figure 6](#).

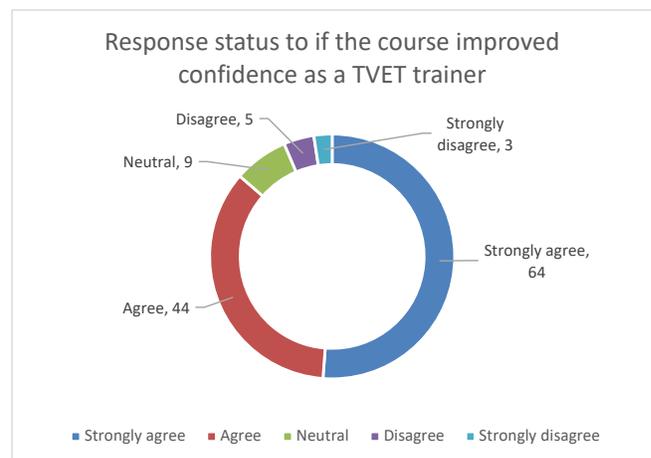


Figure 6: Response status to if the course improved confidence as a TVET trainer

Response status to if the transfer of learning is more effective when micro-teaching is added

Over 40.2% of respondents strongly believe micro-teaching significantly improves learning transfer, viewing it as an effective method for applying skills in practical situations. This strong support highlights its value in enhancing learning outcomes. Nearly 49.6% of respondents agree that micro-teaching improves learning transfer, showing broad approval of its effectiveness, though with potential for further improvement. Around 10.2% of respondents were neutral about the effectiveness of micro-teaching, suggesting mixed experiences or the need for more tailored approaches to suit different contexts. A small 3.4% strongly disagree with the effectiveness of micro-teaching, indicating dissatisfaction and suggesting potential shortcomings or challenges that could be addressed. See [Figure 7](#).

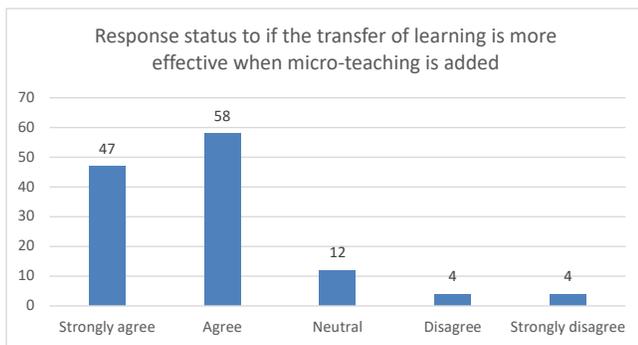


Figure 7: Response status to if the transfer of learning is more effective when micro-teaching is added

Response status to if the duration of micro-teaching is adequate

72.1% of respondents (19.4% strongly agree, 52.7% agree) find the micro-teaching duration adequate, while 15.5% are neutral. Only 9.3% (7% disagree, 2.3% strongly disagree) find the duration inadequate. This suggests that most participants are satisfied with the length, but feedback from the smaller group of dissenters could provide valuable insights into whether adjustments are needed. See [Figure 8](#).

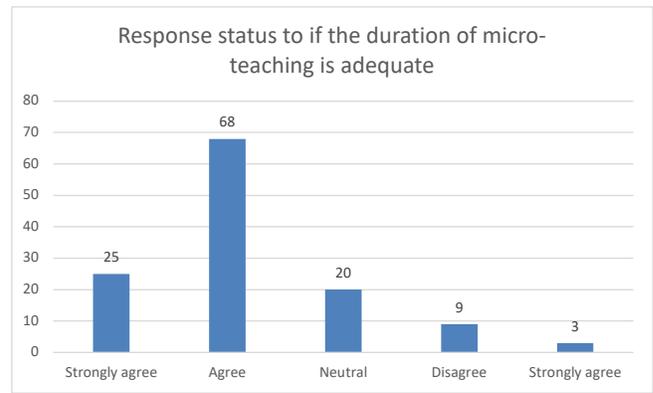


Figure 8: Response status to if the duration of micro-teaching is adequate

Trainers' confidence level and preparedness

A significant majority of respondents either agree (47.2%) or strongly agree (35.2%) that the trainers were confident and prepared. Combined, this gives 82.4% positive feedback.

Around 10.4% of respondents are neutral, suggesting no strong opinion. Only a smaller portion, 7.2% (combining disagree and strongly disagree), felt that the trainers were not confident or prepared.

The data indicates a strong positive perception of the trainers, with over 80% of respondents agreeing that the trainers were confident and prepared. The low percentage of disagreement (7.2%) suggests that the negative perception is minimal. The neutral responses (10.4%) may indicate that some participants were indifferent or unsure about the trainers' confidence and preparedness. See [Figure 9](#).

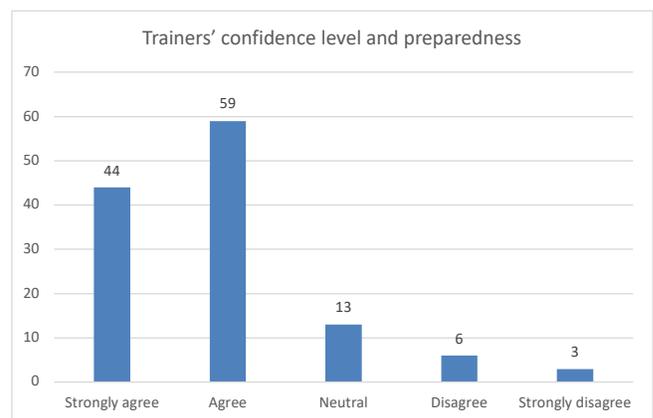


Figure 9: Trainers' confidence level and preparedness

Impact of ToT on personal behaviour

Most respondents (69.6%) chose “neutral,” suggesting no significant change or uncertainty regarding the TOT program’s impact on their training behaviour. This neutral response may be due to many trainers having recently completed pedagogy training but not implementing all the modules or gathering feedback from their learners. Furthermore, they are yet to. A smaller group (24.8%) reported a positive impact, with 20.8% saying “very much” and 4.0% saying “extremely.” Additionally, 5.6% noted only a slight change in behaviour.

The data shows that most participants did not perceive a significant change in their training behaviour due to the TOT program, as reflected by the high number of “neutral” responses. However, a considerable minority experienced a notable positive impact, suggesting the program was effective for some. A small portion reported minimal effects, indicating that while the program’s impact varied, the most common response was uncertainty or no significant change in behaviour. See [Figure 10](#).

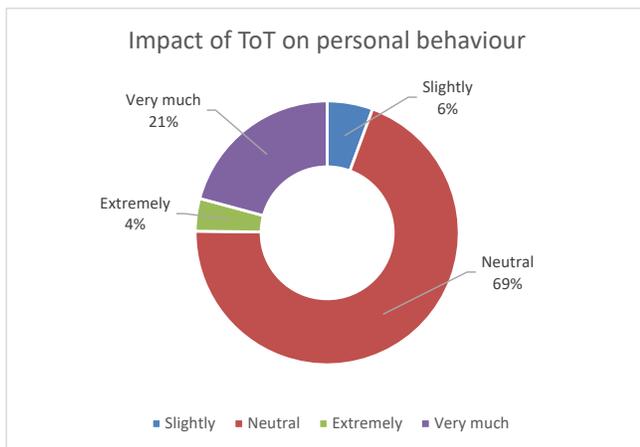


Figure 10: Impact of ToT on personal behaviour

Program’s effectiveness

Most respondents (61%) rated the technical instruction and vocational pedagogy programs as “average,” indicating they met basic expectations but could be improved. About 29.3% rated the program as “excellent,” showing strong satisfaction, while 9.8% rated it as “good,” reflecting a positive view but with room for improvement. Overall, the program is seen as adequate, with potential for refinement to increase its effectiveness and exceed participants’ expectations. See [Figure 11](#).

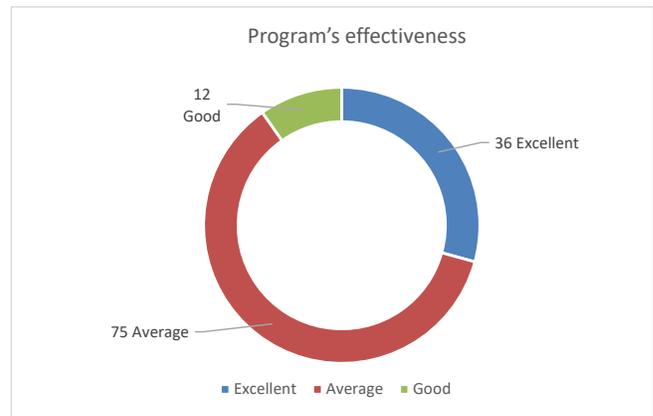


Figure 11: Program’s effectiveness

Program’s level of satisfaction

The data reveals that 73.6% of participants are satisfied or extremely satisfied with TTTRC’s technical instruction and vocational andragogy—however, 20% express dissatisfaction, indicating areas for improvement to meet participants’ needs better.

While the TTTRC’s technical instruction and vocational andragogy programs are generally well-received, the presence of a significant minority of dissatisfied participants suggests room for improvement. Addressing the concerns of the disgruntled group, possibly through feedback collection and program adjustments, could help to enhance overall satisfaction and effectiveness. See [Figure 12](#).

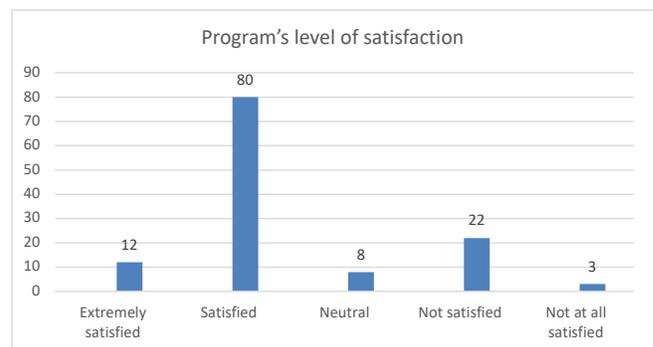


Figure 12: Program’s level of satisfaction

Level of satisfaction with the assessment modalities

The largest group of respondents, around 35 respondents, chose “neutral,” indicating they neither had strong positive nor negative opinions about the assessment modalities.

While combining “extremely Satisfied” and “satisfied,”

59 respondents reflect a positive satisfaction level, representing a significant proportion of the participants. A smaller segment, 31 respondents, were dissatisfied with the assessment modalities. There seems to be a relatively balanced distribution between satisfied and dissatisfied, though there is a clear lean toward neutrality or positive experiences overall.

To summarize the overall findings, the data suggests that while many respondents have no strong opinion, a notable proportion is satisfied. However, a significant group is dissatisfied, which could warrant further investigation or improvements to the assessment approach. See [Figure 13](#).

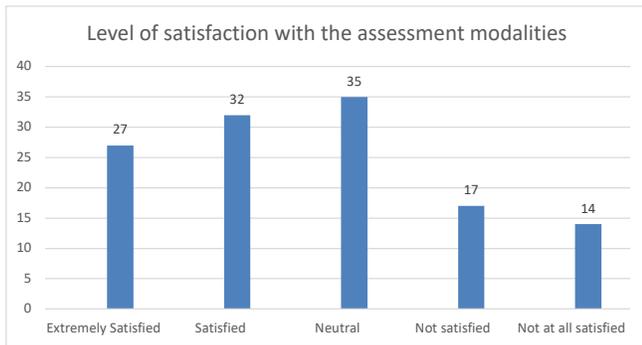


Figure 13: Level of satisfaction with the assessment modalities

Level of agreement for the need of refresher course

Data analysis shows strong support for a refresher course, with 33% strongly agreeing and 58 respondents agreeing, indicating broad consensus on its importance. Opposition is minimal, with only 1% disagreeing and 10% strongly disagreeing. One respondent (less than 1%) was neutral, suggesting most had a clear stance. The data suggests that offering a refresher course would align with the majority's expectations and needs. The reason for 91% agreeing to have a refresher course for TOT Pedagogy is that it has been almost 20 years since the launch of such a program, and revision of the TOT curriculum has not happened due to the lack of such study. See [Figure 14](#).

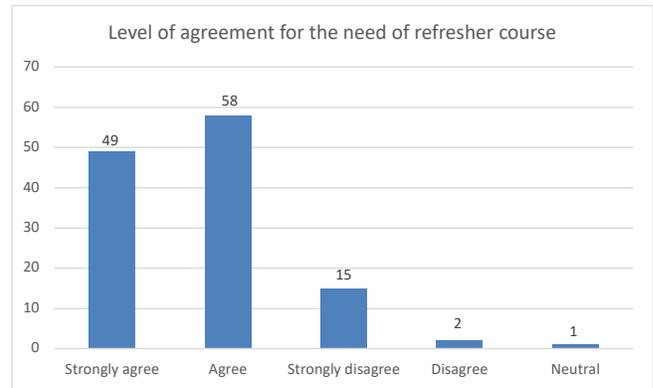


Figure 14: Level of agreement for the need of refresher course

Response status to if the trainers' capability has significant impact on trainees

Out of 125 potential respondents, 117 answered, yielding a 93% response rate. A substantial majority, 44 strongly agreeing and 62 agreeing, totaling over 90%, believe trainer capability significantly impacts graduate performance. Only eight respondents were neutral, suggesting they lack sufficient information or see other contributing factors.

Only three respondents disagreed, indicating minimal opposition to the idea that trainer capability impacts graduate performance. With no strong disagreement, the data strongly supports the importance of trainer development and education. See [Figure 15](#).

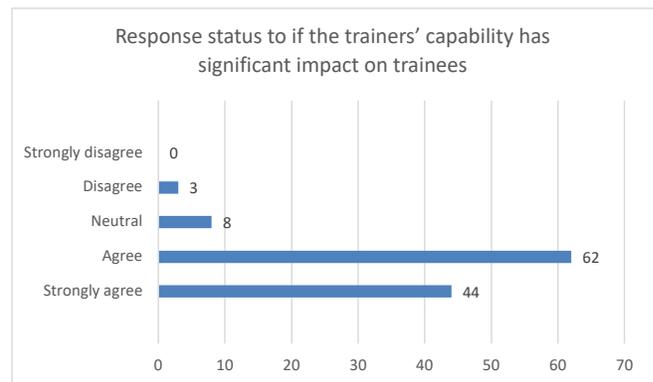


Figure 15: Response status to if the trainers' capability has significant impact on trainees

Perceived challenges

The open-ended questionnaire identified eight key challenges in implementing the ToT program. The top issue was the lack of training materials (13.67%), followed by time constraints (9.4%) and budget limitations (8.54%). The last reported challenge was understanding trainees' diverse backgrounds

(1.70%). These qualitative responses were quantified for analysis. See [Figure 16](#).

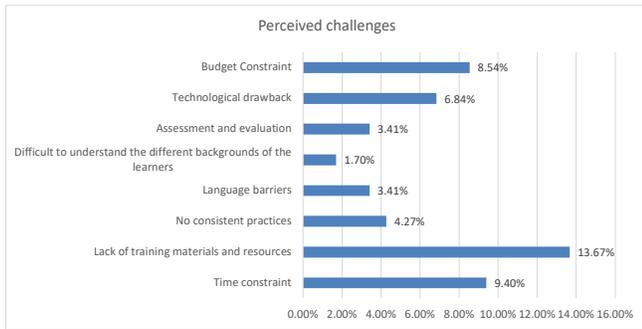


Figure 16: Perceived challenges

Need to update the program

To assess the need to update the ToT program, participants were asked which areas required review. Over 56.3% identified Module 3 (Visualization) needing updates, as digital tools like interactive whiteboards and 3D modelling replace traditional visual aids. Modern visuals enhance engagement and accommodate diverse learning styles. Additionally, 43.23% highlighted the need to review Module 4 (Evaluation) to align assessment methods with TVET's competency-based curriculum. The current program covers only basic questioning techniques, and introducing advanced questioning is essential for more effective assessment and evaluation. See [Figure 17](#).

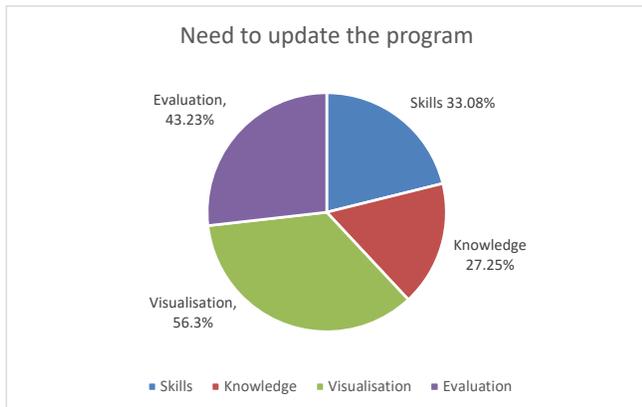


Figure 17: Need to update the program

Discussion

This study revealed that 70% of trainers in TTIs and IZCs hold diplomas, highlighting the need for qualification upgrades in line with course diversification plans and curriculum requirements. Many institutions plan to introduce diploma courses by 2025, making degree-qualified trainers essential.

Upgrading existing trainers with 8-10 years of experience, rather than hiring new faculty, is more efficient. The Technical Teacher Training and Resource Centre can collaborate with two colleges of education to offer qualification upgrades via hybrid programs during vacations, benefiting the government and human resource retention. Many qualified professionals leave the system for better opportunities, as seen in the Bhutan Labour Market Information System (BLMIS), where at least 10 degree-qualified TVET trainers have left or are on extended leave. Thus, upgrading the qualifications of trainers with diplomas is critical to ensuring the sustainability and growth of the TVET sector in Bhutan.

The TVETMIS database reveals that only 46 of 120 private registered training institutes have TOT-certified trainers, indicating the program's limited reach in private institutions. The ToT program should be extended to private TVET trainers. Literature suggests that TVET teachers in developing countries often avoid teaching employability skills. Studies emphasize the need for training TVET teachers to improve their competency and highlight the importance of continuous professional development to ensure quality graduate outcomes. Additionally, 93% of respondents agreed that trainers' professional capability significantly impacts graduate performance, aligning with previous research (Lai et al., 2019; Okolie et al., 2020; Subedi, 2015).

The results also indicated that 96.4% of the respondents expressed that the Tot programs have developed their confidence as trainers. This is mainly because the programs are well structured and aligned with the program contents, with 84.9% having a positive perception of the training objectives and needs. TOT pedagogy focuses on equipping trainers with effective teaching strategies and tools, enhancing their instructional skills. As trainers gain a deeper understanding of various teaching methods, they become more confident in delivering content. TOT helps educators understand adult learning principles, including how to engage and motivate learners, strengthening their ability to tailor lessons to different needs. This knowledge boosts confidence in addressing a variety of learning styles and challenges.

Data shows that 88% of respondents feel the training content applies to their daily work, boosting their confidence. Subedi (2015) also found that teacher training enhances confidence by new knowledge and skills. However, the specific impact on teaching and learning remains unclear. The positive response

is attributed to the balanced mix of theoretical and practical content, with 76% strongly agreeing. The study suggests that skilled and knowledgeable trainers are key to motivating students. Ongoing training is essential to keep TVET trainers updated with modern pedagogy and industry knowledge (Okoye, 2010).

The success of ToT programs is primarily attributed to the management of experienced trainers (80%). Subedi (2015) found that trained teachers improve student motivation and success. These teachers use diverse teaching methods, leading to better results and more objective assessments. The effectiveness of TVET programs depends on the quality of trainers' instruction (Chua & Jamil, 2012). Therefore, evaluating the impact of training and professional development for TVET trainers is essential, and this research aims to assess the efficacy of instructional pedagogy in enhancing TVET trainers' performance.

In TVET, trainers play a crucial role in developing skilled professionals. To ensure graduates possess essential competencies, addressing the challenges trainers face and improving their teaching effectiveness is vital. Suhaili & Mohama (2021) and Ismail et al. (2016) highlight that micro-teaching allows trainers to practice and refine teaching skills in a controlled setting. The study reveals that micro-teaching enhances trainers' confidence and knowledge transfer, with 89.9% strongly agreeing on its effectiveness. Additionally, 72.1% of participants believe the 15-minute micro-teaching duration is sufficient for practicing acquired skills. Based on these findings, the 15-minute micro-teaching component should be continued in the ToT program.

A critical factor in preparing trainers for 21st-century learners is using teaching-learning materials, with 80% of respondents affirming their importance. This shows that master trainers are well-prepared, utilizing modern technology and ideas, aligning with Ortega-Sánchez et al. (2020), who emphasize the role of digital technologies in enhancing learning. The study also revealed that 78.4% of trainers received positive feedback regarding neutrality, though 7.2% expressed dissatisfaction about perceived bias. This highlights the need for a bridging program on ethics and integrity for master trainers to address concerns about bias.

The overall objective of the TOT program was to instigate positive change in TVET trainers' behaviour, attitude, and

practice. However, 69.6% of participants reported neutral responses, indicating no noticeable change in behaviour, while 24% felt the program had impacted them. Only 61% deemed the program adequate, suggesting mixed perceptions. This aligns with Hizam et al. (2021), who found that pre-service teachers gained general and pedagogical skills. Additionally, Subedi (2015) noted improvements in teacher collegiality and teaching methods post-training, with trained teachers adopting better study habits and utilizing textbooks and curricula more effectively.

The open-ended question on the need to review and update the ToT curriculum corresponds to the above result. For instance, many participants remarked that Module 3 (Visualization) required review and update as digital tools and software revolution, such as interactive whiteboards, 3d modelling programs, and multimedia presentations, have made creating and incorporating rich visual content into lessons easier. The other reasons the program is rated ineffective are outdated content and pedagogy. It has been almost two decades since the launch of this program. The statistics on the requirement of refresher courses for the trainers indicate positive feedback, with more than 80% strongly agreeing with the need for regular training.

The satisfaction level with the technical instruction and vocational andragogy provided by TTTRC was high, with over 73% of participants expressing satisfaction. However, 20% were dissatisfied, indicating a need for program adjustments. The trainers appreciated the program for addressing their needs, aligning with Bayar's (2014) conclusion that professional development should target individual teacher needs. Participants liked the program's aims, content, and structure, with support from trainers and continuous feedback. Most found the two-week module length sufficient, balancing training and regular responsibilities. However, some suggested that Module 4, which covers evaluation, should include advanced questioning techniques. Challenges faced by participants in implementing the program included a lack of training materials, time and budget constraints, technological drawbacks, inconsistent assessment, and language barriers. These issues need to be addressed to improve the program's effectiveness.

Conclusion

The study aimed to assess the effectiveness of technical instruction and vocational andragogy in enhancing

instructional and pedagogical skills among TVET trainers. It revealed that 70% of TVET trainers in TTIs and IZCs have diplomas, indicating a need to upgrade their qualifications. Training institutions plan to start diploma courses by 2025, and upgrading those with a minimum of eight to ten years is advantageous. A hybrid qualification upgrade program in collaboration with the two colleges of education could be initiated for TVET trainers, which will benefit the government financially and retain human resources. Thus, upgrading the qualifications of trainers with diplomas will boost the morale of the staff and retain the best practitioners.

According to this study, 96.4% of trainers reported satisfaction with ToT training, which has increased their confidence. The content has an 84.9% favourable perception and is objectively aligned and well-structured. 88% of respondents said they could replicate the knowledge and skills learnt during the program. Students can be motivated by informed and skilled instructors, and more objectivity in assessments produces better outcomes. Correspondingly, the study also suggests that the Technical and Vocational Andragogy or Instruction Pedagogy curriculum needs review and update due to the digital tools and software revolution, outdated content, and outdated pedagogy. Module 3, visualization, needs updating, and over 80% of participants agree that trainers need regular training, indicating the need for regular refresher courses.

The technical instruction and vocational andragogy program at TTTRC received over 73% satisfaction, with 20% dissatisfied. The trainers were satisfied with the program, as it addressed their needs. Teachers liked the program's aims, content, structure, activities, trainer support, and continuous feedback. Most participants (70%) found the two-week allotment for each module sufficient, as they had to attend regular classes and any longer would result in additional coursework. The program received positive feedback, but participants faced challenges implementing it due to a lack of resources, time constraints, budget constraints, technological drawbacks, inconsistent assessment, and language barriers.

The participants also raised concerns about including the psychology module in ToT. More than 65% of the trainers have raised concerns that they do not have adequate knowledge and experience in dealing with trainees' behaviours. Due to this, TVET trainers fail to comprehend diverse behaviours

and create a supportive classroom environment that fosters positive relationships and emotional well-being. Incorporating psychological principles into teaching enhances the educational experience and contributes to students' overall development, preparing them for future challenges.

The study has several limitations that should be considered. First, the small sample size of the participants reduces the generalizability of the findings in the current study. Further, data from online self-reported surveys depended upon participants' ability to provide truthful information (Sue & Ritter, 2007). As per the training database, more than 95 private candidates have undergone ToT training; however, only 8.54% have responded to the survey. The low number of private and other NGO participants is mainly due to the poor database and alumni tracking system, which TTTRC should strengthen.

The need for more budget and support fueled the research process. Due to this, the researchers had to adapt the research design to be quantitative, using a survey questionnaire instrument. Thus, further research on similar topics can be conducted using mixed methods, employing focus group discussions to gain an in-depth understanding of the topic based on the findings.

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Note on Contributors

Sangay Tshewang, a seasoned educator and Principal of Technical Training Institute—Chumey in Bumthang, brings his extensive experience and academic background to this research. He holds a master's degree in Educational and Management from Paro College of Education, Royal University of Bhutan, and a Bachelor's degree in English and Geography from Samtse College of Education. His research has been

published in the Journal of Bhutan Studies, the International Journal of Humanities and Education Development, and the Journal of Innovation in Polytechnic Education.

Yonten Pelzang, a civil servant, served as a principal at the Technical Trainers Training and Resource Centre, Department of Workforce Planning and Skills Development, under the Ministry of Education and Skills Development. He holds a Master of Public Administration from the University of Canberra, Australia, and a Bachelor of Education [Geography] from Samtse College of Education, Bhutan. In his twenty-three years of service, he has profound experience in Educational Management and Administration as a Principal at various schools and Technical Training Institutes. Currently, he is engaged in Curriculum Development for TVET. He has published his research paper in the International Journal of Humanities and Education Development.

Karma Dorji, currently working as the Training Director of TTTRC with over 25 years of experience, has had a successful career in TVET, including 14 years with an international donor partner, collaborating and implementing TVET reform initiatives to create the most substantial TVET in Bhutan. He holds a diploma in Electrical Engineering and a diploma in Technical Education.

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