

Determinants of Female Students' Participation in Hard Trade Programmes in Vocational Training Institutions in Bukoba Municipality

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Abstract

The study examines the determinants of female students' participation in hard trade programmes in vocational training institutions in Bukoba, Tanzania. Using a mixed-methods approach under a pragmatist convergent design, the study involved 130 respondents: 103 male students who participated in the quantitative study, 2 Principals, and 25 female students who participated in the qualitative study. Quantitative data were analysed descriptively using SPSS software version 26, and qualitative data were collected through semi-structured interviews and analysed thematically. The study employed purposive and stratified sampling followed by simple random. The study found that female participation in hard trade programmes remains low and uneven due to social and institutional constraints. Though institutional leadership is challenged by stereotypes, weak support systems, limited resources, and poor industry linkages, mentorship, career guidance, sensitisation, and stakeholder collaboration are key strategies for improving participation. In conclusion, the study revealed that female participation in hard trade programmes remains low and uneven, largely due to persistent social and institutional constraints that limit women's access, enrolment, and retention in these programmes. The study recommends that strengthening gender-responsive policies, coordinated interventions, and support systems are necessary to improve female participation in hard trade programmes.

Keywords: *Female students' participation, Hard trade programmes, Vocational training institutions, Bukoba municipality*

Introduction

Technical and vocational education and training (TVET) is widely recognized as a key driver of skills development, employability, and socio-economic transformation. It equips learners with practical, occupation-specific competencies that enhance productivity and self-reliance across formal and informal sectors of the economy (Shi & Bangpan, 2022). By integrating theory with hands-on training, TVET contributes directly to

poverty reduction and national development by producing a skilled workforce aligned with labour market demands (Iliescu et al., 2025). Within this framework, institutional leadership becomes a decisive factor in ensuring effective training delivery, equity, and inclusive participation in vocational education systems.

TVET programmes are broadly categorized into soft and hard trades. Soft trades include tailoring, catering, hospitality, and secretarial work, while hard trades involve technical fields such as welding, electrical installation, masonry, motor vehicle mechanics, and mechanical engineering (Matiba & Vaginga, 2022). Despite strong labour-market demand for hard trade skills, female participation remains consistently low, reflecting persistent inequality in access to technical training opportunities and raising concerns about gender equity in vocational education systems.

Globally, female participation in technical and engineering-related programmes remains limited despite the expansion of TVET systems. Female enrolment in engineering and technical fields remains below 20%, including 14.1% in Australia, 9.5% in the United Kingdom, and 19.3% in the United States (Merchant, 2025). In Canada, female participation in engineering-related programmes stands at approximately 18.5% (Adams & Baddianaah, 2023). While socio-cultural barriers are widely recognized, institutional leadership is increasingly identified as a critical determinant shaping access, participation, and retention of female students in technical education through policy implementation and institutional culture.

Institutional leadership in vocational training institutions refers to the processes through which administrators, principals, and training managers coordinate resources, implement policies, and shape institutional environments to achieve educational goals (Jeon et al., 2021). Effective leadership ensures the translation of national TVET policies into practical actions through planning, supervision, and promotion of inclusive learning environments. Conversely, weak leadership is associated with poor policy enforcement, inadequate accountability, and persistent gender disparities in training outcomes (Leithwood et al., 2019).

In Sub-Saharan Africa, similar patterns persist despite reforms in vocational education systems. In Kenya, female enrolment in hard trade programmes is reported at 39.4%, while in Rwanda only about 3% of technical students are in mechanical-related fields, and in Ghana female participation was 16.7% between 2019 and 2020 (Adam & Baddianaah, 2023). These figures reflect

deep-rooted structural and institutional constraints that continue to limit women's participation in technical and vocational training across the region.

In Tanzania, the Vocational Education and Training Authority (VETA) has implemented reforms to expand access and promote gender equality in vocational education (URT, 2021). National education policies further emphasize increased participation of women in technical fields (Kalolo, 2025). Despite these efforts, female participation in hard trade programmes remains low, with enrolment rates recorded at 14% in mechanical trades, 14% in construction, 16% in automotive, and 19.5% in electrical fields (Matiba & Vaginga, 2022), indicating that policy intentions have not fully translated into equitable outcomes.

Institutional leadership in vocational training centres is expected to translate national TVET and education policies into practical, inclusive actions that promote equal participation. This includes ensuring that gender-responsive strategies are effectively implemented through clear procedures, fair resource allocation, and continuous monitoring of female enrolment in technical programmes. However, evidence from Tanzania indicates that female participation in vocational education remains uneven, particularly in hard trade areas. National data show that female enrolment in mechanical trades is about 14%, construction 14%, automotive 16%, and electrical fields 19.5% (Matiba & Vaginga, 2022). These figures demonstrate a persistent gender gap in technical training, suggesting that institutional systems may not be fully effective in achieving equitable participation in hard trade programmes.

In Bukoba Municipality, the situation is more evident at the institutional level, where female enrolment in hard trade programmes, including motor vehicle mechanics and electrical installation, remains consistently low. The 12% and 15%, followed by declines to 10% and 9%, indicate not only low participation but also a negative trend over time (Omari, 2021). This finding suggests that, despite the availability of vocational training opportunities, institutional conditions may not be sufficiently enabling for female students to enroll, remain, and succeed in traditionally male-dominated technical programmes.

The interaction between socio-cultural influences and institutional conditions also shapes the persistence of low participation. Gender stereotypes and community expectations continue to discourage female engagement in technical fields, while institutional weaknesses may fail to counteract these pressures through targeted support mechanisms. However, what remains

unclear is the determinants of female students' participation in hard trade programmes in vocational training institutions in Bukoba, Tanzania. This creates an important analytical gap at the local level.

Msuya and Lema (2020) together with Berg and Block (2021) indicate that the persistent underrepresentation of females in hard trade programmes is largely influenced by a combination of societal attitudes and educational experiences, where gender stereotypes, cultural expectations, and school-based learning environments discourage girls from pursuing technical and vocational fields traditionally dominated by males. However, a key gap in these studies is that they do not sufficiently explain how these factors operate in specific local contexts, nor do they deeply explore the practical strategies educational institutions can adopt to address and reduce this imbalance. This leaves limited empirical understanding of context-specific interventions that could effectively promote greater female participation in hard trade programmes. Therefore, the study is designed to examine the following objectives:

- i) Female students' representation in hard trade programmes
- ii) Female students' participation in practical training activities in hard trade programmes
- iii) Female students' interest in enrolling in hard trade programmes in Tanzania

Literature Review

Determinants of Female Students' Participation in Hard Trade Programmes in Vocational Training Institutions

In the Netherlands, Berg and Blok (2021) examined female participation in technical vocational programmes using a mixed-methods design that integrated enrolment data from 12 institutions with interview findings. Their study revealed that female enrolment in engineering and mechanical trades remained persistently low, largely due to entrenched gender stereotypes and limited exposure to technical careers during early stages of education. These findings suggest that socio-cultural perceptions continue to influence female students' educational and career choices, thereby restricting their participation in traditionally male-dominated vocational fields. Furthermore, its focus on an urban European setting limits the applicability of the findings to developing countries with different socio-cultural and institutional environments. In contrast, the current study investigates the determinants of female students' participation in hard trade programmes within Tanzanian vocational training institutions. By employing a mixed-methods approach

and drawing evidence from a developing-country context, the study provides a broader understanding of the topic.

In the Sub-Saharan African context, Nkosi and Maseko (2022) investigated female participation in engineering and mechanical programmes in Technical and Vocational Education and Training (TVET) institutions located in Gauteng and KwaZulu-Natal, South Africa. Using a mixed-methods design involving 520 students and lecturers, the study revealed that female participation in hard trade programmes remained persistently low due to gender stereotypes, inadequate mentorship opportunities, and the widespread perception that technical occupations are male-dominated. These findings suggest that socio-cultural norms and institutional environments continue to shape female students' decisions to enrol and remain in technical vocational programmes. While the study successfully identified key barriers to participation, its analysis focused predominantly on student-related factors, providing limited insight into how institutional leadership practices may facilitate or constrain female engagement in hard trades. Moreover, the study was conducted within a relatively well-resourced TVET system, which differs considerably from the resource and management realities of many vocational institutions in developing countries such as Tanzania. Consequently, the transferability of its findings to the Tanzanian context is limited. To address these gaps, the current study examined the determinants of female participation in hard trade programmes in Tanzanian vocational training institutions.

In the East African context, Andiemba and Manasi (2021) The study examined Female Students Participation in Technical Vocational Education and Training in West Pokot County, Kenya This study looks at enrolment trends for female students in vocational training centres and further examines factors discouraging female students from joining vocational training institutions (VTCs). To collect data, interviews and documentary evidence were used. The respondents for the study involve managers of selected VTCs in West Pokot County. Analysis of data was done through qualitative and quantitative methods. The study found out that the distribution of students in all public VTCs in West Pokot County favoured the male gender over female students. For women enrolled in various programmes, only 45.0% fully completed their programme. It was found out that courses offered in VTCs tend to attract more male students compared to female ones. The distribution of the teaching workforce in VTCs was found to be male-dominated and therefore, female students did not have role models to look up to. The research also found out that majority of girls who were unable to proceed to

secondary and tertiary education were not aware of the opportunities available in VTCs in the county.

In Tanzania, Matiba and Vaginga (2022) examined female participation in hard trades within Tanzania's Vocational Education and Training (VET) system. A qualitative design was employed, involving 72 participants, including female trainees, instructors, employers, and principals. Data were collected through semi-structured interviews and focus group discussions and analysed using content analysis. The findings reveal significantly lower female participation in hard trades compared to soft trades. The study identifies several key factors contributing to this gender imbalance, including gender role stereotyping, employers' reluctance to hire or support women in hard trades, lack of female role models, absence of formal career guidance and counselling services, and gender-biased curriculum materials. These findings suggest that both socio-cultural perceptions and institutional support mechanisms play a significant role in influencing female participation in hard trade programmes. While the study provided valuable insights into the barriers facing female students, its analysis concentrated largely on socio-cultural and student-related factors, giving limited attention to the role of institutional leadership in shaping participation patterns. Consequently, the study did not adequately explain how leadership practices, policies, and strategic interventions within vocational institutions may either promote or hinder female involvement in technical fields. To address these limitations, the current study adopted a mixed-methods design to examine the determinants of female participation in hard trade programmes across Tanzanian vocational training institutions.

Again, Msuya and Lema (2020) examined gender disparities in technical programmes in Dodoma and Arusha through a quantitative survey involving 380 students from 10 vocational colleges. The study found that female students were significantly underrepresented in engineering and construction programmes, largely due to prevailing cultural perceptions that regard technical occupations as male domains, inadequate mentorship opportunities, and limited exposure to technical education during earlier stages of schooling. These findings demonstrate that both societal attitudes and educational experiences contribute to the continued underrepresentation of females in hard trade programmes. The study further implies that barriers to participation extend beyond individual choice and are embedded within broader social and institutional structures that shape students' career aspirations and educational pathways. However, the exclusive use of quantitative methods restricted the researchers' ability to explore

participants' experiences, perceptions, and institutional realities in greater depth. Consequently, the study provided limited understanding the determinants of female participation in hard trade programmes within Tanzanian vocational training institutions. To address these limitations, the present study adopted a mixed-methods approach that combined quantitative and qualitative data to generate both statistical and contextual insights.

Research Methodology

The study adopted a pragmatic research paradigm and employed a mixed-methods approach to investigate the determinants of female students' participation in hard trade programmes within vocational training institutions in Bukoba, Tanzania. A convergent research mixed design was utilised. According to Creswell and Creswell (2018) a researcher collects both quantitative and qualitative data, analyzes them separately, and then compares the results to see if the findings confirm or disconfirm each other. The sample size of the study was determined using the Krejcie and Morgan (1970) table, which provides a scientifically accepted method for selecting an adequate sample from a known population to ensure representativeness and statistical reliability. Based on this guideline, the study involved 103 male students, 25 female students, and two principals, ensuring that the selected participants were sufficient to capture relevant perspectives while maintaining balance between key respondent groups within the study context. Participants were selected using stratified, simple random, and purposive sampling techniques. Stratified sampling ensured adequate representation of different student groups, simple random sampling was used to select male students, while purposive sampling was applied in selecting principals and female students based on their experiences and roles related to vocational education and training. To enhance the credibility and validity of the findings, multiple data collection methods were employed. Quantitative data were gathered through questionnaires administered to male students, whereas qualitative data were collected through interviews with principals and female students. Respondents were given sufficient time to complete the questionnaires before they were collected for analysis. Interviews were conducted at convenient times agreed upon by both the researcher and participants, and the responses were recorded and documented for subsequent analysis.

The validity of the research instruments was established through expert evaluation, where three research specialists reviewed the instruments for relevance, clarity, and appropriateness. Reliability of the quantitative instrument was determined using Cronbach's Alpha coefficient, while

trustworthiness of the qualitative data was enhanced through triangulation and peer debriefing.

Following data collection, completed questionnaires were screened for completeness, coded, and entered into the Statistical Package for Social Sciences (SPSS) version 26 for analysis. Quantitative data were analyzed using descriptive statistics, specifically frequencies and percentages. The results generated from SPSS were presented in tabular form to facilitate interpretation and discussion. Qualitative data obtained from interviews were transcribed, organized, and analyzed using thematic analysis. According to Ary et al. (2010), qualitative data analysis involves four main steps: organizing and familiarizing oneself with the data, identifying categories and themes, coding and reducing themes, and finally presenting the themes according to the research questions. The four-step qualitative data analysis procedure proposed by Ary et al. (2010) was adopted because it provides a systematic and rigorous approach for managing qualitative data, identifying meaningful patterns and themes, and ensuring that the findings are clearly organized and aligned with the study's research questions. Finally, the quantitative and qualitative findings were integrated during the interpretation stage to provide a holistic understanding of female students' participation in hard trade programmes in vocational training institutions in Bukoba Municipality, Tanzania. The reliability of the questionnaire was determined using Cronbach's Alpha in SPSS version 26. A coefficient of 0.70 or above was considered acceptable for reliability (Okendo et al., 2020). Ethical considerations in this study include obtaining a research clearance permit, securing informed consent from participants, avoiding plagiarism and fraud, ensuring proper referencing, and maintaining confidentiality of the information collected

Findings and Discussion

The Determinants of Female Students' Participation in Hard Trade Programmes in Vocational Training Institutions

The paper examined the determinants of female students' participation in hard trade programmes in vocational training institutions. The data for this study were collected through questionnaires and interviews. Interviews were held with 2 Principals and 25 female students. Table 1.0 presents quantitative data collected from male students with a Likert scale. The analysis and discussion of the findings were organized based on the determinants of female students' participation in hard trade programmes in vocational training institutions.

Table 1.0:

Questionnaire Responses from male students on the determinants of female students' participation in hard trade programmes in vocational training institutions (n = 103)

Statement	1 (n, %)	2 (n, %)	3 (n, %)	4 (n, %)	5 (n, %)
Female students are adequately represented in hard trade programmes in this institution.	29 (28.2%)	36 (35%)	-	16 (15.5%)	22 (21.4%)
Female students actively participate in practical training activities in hard trade programmes.	32 (31.1%)	30 (29.1%)	6 (5.8%)	17 (16.5%)	18 (17.5%)
Female students attend hard trade classes regularly and consistently.	33 (32%)	23 (22.3%)	9 (8.7%)	26 (25.2%)	16 (15.5%)
Female students demonstrate confidence when participating in hard trade learning activities.	54 (52.4%)	28 (27.2%)	3 (2.9%)	5 (4.9%)	13 (12.6%)
Female students are actively involved in workshop and laboratory activities alongside male students.	34 (33%)	29 (28.2%)	-	27 (26.2%)	13 (12.6%)
Female students complete hard trade programmes at a rate comparable to male students.	34 (33%)	28 (27.2%)	3 (2.9%)	15 (14.6%)	23 (22.3%)
Female students show strong interest in enrolling in and continuing hard trade programmes.	44 (42.7%)	39 (37.9%)	-	6 (5.8%)	14 (13.6%)

Source: Field Data (2026).

Key: (1) Strongly Disagree, (2) Disagree, (3) Undecided, (4) Agree, and (5) Strongly Agree.

Therefore, within the study, the study examined the determinants of female students' participation in hard trade programmes in vocational training institutions. The data indicate that, regarding the statement that female students are adequately represented in hard trade programmes at the institution, a majority of male students 65 (63.2%) disagreed or strongly disagreed with the statement. In contrast, a minority of male students, 38 respondents (36.9%), agreed or strongly agreed.

The findings indicate that female students remain underrepresented in hard trade programmes within the institution. The predominance of disagreement responses suggests that respondents perceive female participation in these programmes to be below the expected level of gender equity in vocational education and training. This perception implies that female students are concentrated in a limited number of programme areas and have relatively low representation in technical specializations traditionally dominated by males, such as engineering, construction, and automotive trades. The findings are consistent with those of Andiema and Manasi (2021), who found out that the distribution of students in all public VTCs in West Pokot County favoured the male gender over female students. For women enrolled in various

programmes, only 45.0% fully completed their programme. Overall, the findings point to the persistence of structural, socio-cultural, and institutional barriers that continue to limit female participation in hard trade programmes. This underscores the need for vocational institutions to strengthen enrolment initiatives, provide targeted encouragement and mentorship opportunities, and enhance institutional support mechanisms aimed at promoting equitable participation of female students in technical fields.

The finding contrasts with Transformational Leadership Theory (Bass, 1985; Burns, 1978), which posits that effective leadership should foster inclusive institutional cultures, reduce participation gaps, and promote equitable representation through inspirational motivation, individualized consideration, and supportive practices. The observed perception of underrepresentation of female students in hard trade programmes suggests that these leadership outcomes have not been fully realized within the studied institutions. Instead of achieving balanced participation, gender disparities persist, indicating that leadership efforts to encourage and sustain female engagement in technical fields may be limited, inconsistently applied, or constrained by broader institutional and socio-cultural factors.

The finding aligns with Nkosi and Maseko (2022), who reported that female participation in technical and vocational education programmes remains low and uneven due to persistent gender stereotypes, limited institutional support, and inadequate exposure to hard trade fields. Their study further established that even where enrolment occurs, female representation in engineering and mechanical trades remains constrained by institutional and social barriers that limit full integration into practical training environments. In the same line, the current finding that female students are perceived as not adequately represented in hard trade programmes confirms the continued presence of these structural and institutional constraints, indicating that gender imbalance in vocational training persists despite ongoing efforts to promote inclusion.

The finding is inconsistent with Sustainable Development Goals 4 and 5 (United Nations, 2015), which emphasize inclusive and equitable quality education and gender equality at all levels of education and skills development. The perceived underrepresentation of female students in hard trade programmes indicates persistent disparities in access and participation within vocational training institutions, suggesting that equal opportunity in technical education has not yet been fully realized. This finding contradicts SDG 4's target to ensure inclusive and equitable access to vocational skills training for all learners, as well as SDG 5's objective to eliminate gender-

based barriers in education and empower women and girls in non-traditional fields. The finding therefore reflects ongoing structural and institutional gaps that hinder full attainment of global gender equality and inclusive education targets.

Within the study, the study examined the statement that female students actively participate in practical training activities in hard trade programmes, a minority of male students 35 (34.0%) agreed or strongly agreed, suggesting that some respondents perceive female participation in practical training positively. In contrast, majority of male students (60.2%) disagreed or strongly disagreed with the statement, suggesting that most do not perceive female students as actively engaged in practical training activities within hard trade programmes.

This pattern implies that female participation in hands-on vocational activities is perceived as limited by the majority of respondents, indicating uneven engagement across workshop environments within vocational institutions. The findings are consistent with those of Msuya and Lema (2020). who reported that female students were markedly underrepresented in engineering and construction programmes. Their study attributed this disparity to persistent cultural beliefs that associate technical careers with men, insufficient mentorship support for female learners, and limited exposure to technical and vocational education during the early years of schooling. It suggests that practical involvement is influenced by structural and operational factors such as unequal access to equipment, variations in instructor support, and differences in workshop organization across programmes. Inconsistent exposure to practical sessions further contributes to this perception, as some female students benefit from supportive, well-resourced learning environments, while others experience limited participation opportunities. The data reflect that female engagement in hard trade practical training is not consistently embedded across institutions, but varies according to institutional capacity, instructional practices, and the availability of equitable hands-on learning conditions.

The finding implies that female participation in hands-on vocational activities is perceived as limited by the majority of respondents, indicating uneven engagement across workshop environments within vocational institutions. It suggests that structural and operational conditions, including unequal access to tools and equipment, variations in instructor support, and differences in the organization of practical sessions across programmes, shape practical involvement. Inconsistent exposure to workshop-based learning further

reinforces this pattern, in which some female students benefit from more supportive, resource-rich environments, while others experience limited participation opportunities. The findings are consistent with those reported by Andiemba and Manasi (2021), who found out that courses offered in VTCs tend to attract more male students compared to female ones. The distribution of the teaching workforce in VTCs was found to be male-dominated and therefore, female students did not have role models to look up to. The research also found out that majority of girls who were unable to proceed to secondary and tertiary education were not aware of the opportunities available in VTCs in the county.

The finding underscores that female engagement in hard trade practical training is not uniformly established. Still, it fluctuates according to institutional capacity, instructional practices, and the extent of equitable access to hands-on learning experiences.

The finding contrasts with the Education and Training Policy (2014, revised 2023), which emphasizes equitable access, participation, and gender parity in all levels of education and training, including vocational and technical fields. While the policy requires institutions to eliminate structural and cultural barriers that limit female engagement in practical and technical learning, the observed uneven participation suggests that implementation gaps persist at the institutional level. In particular, disparities in access to workshops, inconsistency in instructional support, and variation in learning environments indicate that policy provisions on inclusive participation are not being fully translated into uniform practice across vocational institutions. This divergence points to a disconnection between policy intentions on gender equity in skills development and the actual lived experiences of female students in hard trade programmes.

The finding is also consistent with Matiba and Vaginga (2022), who reveal significantly lower female participation in hard trades compared to soft trades. The study identifies several key factors contributing to this gender imbalance, including gender role stereotyping, employers' reluctance to hire or support women in hard trades, lack of female role models, absence of formal career guidance and counselling services, and gender-biased curriculum materials. Similarly, the present finding indicates that female participation in hands-on vocational activities is not consistently observed across all training environments, reflecting the influence of institutional disparities in resources, instructional practices, and learning support systems on engagement in hard trade programmes.

The finding misaligns with Transformational Leadership Theory (Bass, 1985; Burns, 1978), which posits that effective leadership should consistently create inclusive, supportive, and empowering learning environments that enable all learners, regardless of gender, to participate fully and confidently. In this case, the observed uneven participation of female students in practical vocational activities suggests that such leadership outcomes are not being uniformly realized across institutions. The variation in engagement suggests gaps in individualized attention, inspirational motivation, and equitable facilitation of learning opportunities, all central elements of transformational leadership. Rather than reflecting a stable and enabling environment as theorized, the pattern indicates inconsistencies in leadership practices that fail to fully eliminate participation barriers in hard trade programmes fully.

Again, within the study, the researcher examined the level of female students' interest in enrolling and continuing in hard trade programmes in vocational training institutions. The data indicate that, regarding the statement that female students show a strong interest in enrolling in and continuing hard trade programmes, a great majority of male students 83 (80.6%) disagreed or strongly disagreed with the statement. In contrast, an extremely minority, 20 (19.4%), agreed or strongly agreed. The data suggest that female students are perceived as having limited interest in entering and persisting in hard trade programmes, reflecting a weak inclination toward sustained engagement in technical fields and indicating persistent socio-cultural and exposure-related constraints within vocational training contexts. The finding shows that female students are perceived as having limited interest in enrolling in and continuing hard trade programmes, as most respondents disagreed with the statement, suggesting a weak inclination to sustain participation in technical-vocational pathways. This perception reflects broader contextual factors such as limited early exposure to practical technical work, gendered expectations that shape career preferences, and insufficient encouragement or guidance toward hard trade fields. It further implies that institutional and socio-cultural environments may not effectively sustain female learners' motivation once they enter or consider these programmes, thereby reducing the continuity of engagement in male-dominated vocational areas. The finding is in agreement with those of Berg and Blok (2021) who observed consistently low levels of female participation in technical and engineering vocational programmes in the Netherlands. They attributed this trend to the persistence of gender stereotypes as well as limited early exposure to technical disciplines. Their research further indicated that, even with institutional initiatives aimed at improving access, female learners

were still less likely to sustain engagement in hard trade pathways, especially in occupations that have traditionally been socially constructed as male-dominated.

The finding indicates that interest among female students in enrolling in and continuing hard trade programmes is perceived as relatively low, as the majority of respondents disagreed with the statement. The finding suggests that engagement in technical-vocational pathways is not strongly sustained in terms of intention and continuity. The finding further suggests that initial attraction to hard trade fields may not translate into long-term commitment. The pattern further points to possible limitations in awareness, orientation, and reinforcement mechanisms within vocational settings that are essential for maintaining learner interest in specialised technical areas.

The finding contrasts with Schema Theory, as the observed limited interest among female students indicates the persistence of entrenched gendered cognitive structures that continue to shape perceptions of hard trade programmes as predominantly male domains. Within this theoretical lens, such schemas appear to influence how female learners interpret vocational pathways, leading to reduced perceived self-relevance and a weaker inclination to enrol and sustain participation in technical fields. This finding suggests that, despite exposure to vocational training environments, gendered mental models remain limited in their restructuring, indicating that existing cognitive classifications continue to influence educational and career preferences.

The finding also contrasts with Transformational Leadership Theory, which assumes that effective institutional leadership should actively cultivate learners' motivation, confidence, and sustained engagement through inspirational motivation, individualized consideration, and consistent encouragement. The reported low interest among female students implies that these leadership mechanisms are not sufficiently effective in reshaping attitudes toward hard trade programmes. This finding suggests gaps in the intensity, consistency, or reach of transformational leadership practices within vocational institutions, resulting in limited impact on strengthening long-term commitment and engagement of female learners in male-dominated technical pathways.

The finding aligns with Berg and Blok (2021), who reported persistently low female engagement in technical and engineering vocational programmes in the Netherlands, attributing the pattern to gender stereotypes and limited early exposure to technical fields. Their study demonstrated that, despite

institutional efforts to expand access, female learners continued to show a weaker inclination toward sustained participation in hard trade pathways, particularly in occupations that had long been socially constructed as male-dominated. Similarly, the present finding reflects limited interest among female students in enrolling in and continuing hard trade programmes, indicating that gendered perceptions and exposure gaps remain influential determinants of participation across different vocational contexts.

Furthermore, the study examined the level of female students' attendance in hard trade classes in vocational training institutions. The data indicate that, regarding the statement that female students attend hard trade classes regularly and consistently, a slight majority of male students (42 respondents, 40.8%) agreed or strongly agreed, while a majority (56 respondents, 54.3%) disagreed or strongly disagreed. This data suggests that female students' class attendance is perceived as inconsistent, with a tendency toward irregular participation in scheduled learning sessions across hard trade programmes. The pattern reflects variability in engagement, indicating that attendance is not uniformly stable across institutions or training environments.

The data suggest that irregular attendance may hinder sustained skill acquisition and continuity in competency-based learning, where consistent participation is central to mastering both practical and theoretical components. Such inconsistency may be associated with institutional scheduling challenges, socio-economic pressures, or limited learning support systems, all of which affect regular attendance at class sessions. Consequently, the effectiveness of training outcomes may be uneven, as attendance interruptions reduce opportunities for progressive skill development and continuous assessment in vocational education settings.

The finding indicates that female students' attendance in hard trade classes is perceived as inconsistent, with a majority of respondents disagreeing that attendance is regular and continuous, while a slightly larger majority agreed. This pattern suggests uneven participation in scheduled learning sessions, with class attendance not stable across cohorts or training contexts. It reflects fluctuations in engagement that may vary by institution, programme structure, or learner circumstances, leading to non-uniform attendance behaviour within hard trade programmes.

The finding indicates that female students' attendance in hard trade classes is perceived as inconsistent, with a majority of respondents disagreeing that attendance is regular and continuous. In contrast, a slight majority reported agreement, reflecting uneven participation in scheduled learning sessions

across vocational institutions. This pattern aligns with Andiemba and Manasi (2021), who found that the distribution of the teaching workforce in VTCs was found to be male-dominated and therefore, female students did not have role models to look up to. The research also found out that majority of girls who were unable to proceed to secondary and tertiary education were not aware of the opportunities available in VTCs in the county.

The finding indicates that female students' attendance in hard trade classes is perceived as inconsistent, with a majority of respondents disagreeing that attendance is regular and continuous. In contrast, a slight majority reported agreement, reflecting uneven participation in scheduled learning sessions across vocational institutions. This finding contrasts with Sustainable Development Goal 4 (United Nations, 2015), which emphasizes inclusive, equitable, and continuous participation in quality education for all learners, as irregular attendance disrupts sustained learning, which is required for effective competency development. It also misaligns with Sustainable Development Goal 5 (United Nations, 2015), which promotes gender equality and full participation of women in education and skills training, since inconsistent engagement suggests persistent structural and socio-cultural barriers that limit stable involvement of female students in vocational training programmes.

The finding indicates that female students' attendance in hard trade classes is perceived as inconsistent, with a majority of respondents disagreeing that attendance is regular and continuous. In contrast, a slight majority reported agreement, reflecting uneven participation in scheduled learning sessions across vocational institutions. This pattern aligns with Transformational Leadership Theory (Burns, 1978; Bass, 1985), which emphasizes that consistent participation in learning environments is strengthened when institutional leaders provide structured support, motivation, and individualized consideration that sustain learner engagement. Where such leadership practices are uneven or insufficiently institutionalized, learner commitment and attendance may fluctuate, reflecting reduced reinforcement of continuous participation in competency-based training processes.

To triangulate the questionnaire data, the researcher conducted semi-structured interviews with two Principals and 25 female students to obtain deeper insight into female students' attendance in hard trade classes within vocational training institutions. The responses from female students indicated that participation in workshop and laboratory sessions is present but not consistently stable across training sessions, with engagement varying

depending on access to practical opportunities and institutional support. This view was consistently reflected by five respondents, who commented as follows:

We participate in workshop and laboratory activities, but our involvement is not consistent due to limited access to some practical sessions and occasional challenges in attending all scheduled activities alongside male counterparts.

The quotation indicates that female students are involved in workshop and laboratory activities; however, their participation is not consistent across all practical sessions. It reflects the presence of structural and operational constraints, including limited access to some workshops, scheduling difficulties, and possible competing responsibilities that reduce full attendance in practical training. The comparison with male counterparts further suggests that access to hands-on learning opportunities may not be equally distributed or consistently available, leading to irregular engagement. This response implies that, while inclusion exists in principle, practical participation is constrained by contextual barriers that hinder consistent involvement in competency-based vocational training.

The finding indicates that although female students do participate in workshop and laboratory activities, their engagement is not consistently sustained across all practical sessions. The finding suggests that access to hands-on training opportunities is irregular, with some students unable to fully attend or benefit from every scheduled practical activity. The variation in participation reflects underlying constraints such as limited availability of workshop space, scheduling conflicts, and possible institutional or personal factors that disrupt continuous attendance. As a result, female students' exposure to practical skill development is uneven, which may affect the continuity of competency acquisition in hard trade programmes.

The finding aligns with Nkosi and Maseko (2021), who found that female participation in hard trade programmes remained persistently low due to gender stereotypes, inadequate mentorship opportunities, and the widespread perception that technical occupations are male-dominated. These findings suggest that socio-cultural norms and institutional environments continue to shape female students' decisions to enroll and remain in technical vocational programmes. Similarly, the present finding indicates that female students participate in workshop and laboratory activities. Still, their engagement is not consistently sustained across all practical sessions, reflecting the continued influence of barriers that hinder full participation in hard trade programmes.

Again, the Principals' responses indicated that female students generally show limited interest in enrolling in and continuing hard trade programmes. The principals noted that although some female students choose technical trades, many remain reluctant to pursue or persist in these programmes due to prevailing perceptions about the suitability of hard trades for women, concerns about the demanding nature of the courses, and challenges associated with sustaining participation. This view was consistently expressed by the principals, who commented as follows:

Many female students are still hesitant to enroll in hard trade programmes, and some who initially join struggle to continue until completion. Negative perceptions about technical trades, limited encouragement, and concerns about the nature of the work often reduce their interest in pursuing these programmes over the long term.

The response implies that female students' interest in enrolling in and continuing hard trade programmes remains relatively low, as many are discouraged by negative perceptions of technical occupations, inadequate support and encouragement, and concerns about the demands associated with hard trades. It further suggests that while some female students enter these programmes, sustaining their commitment throughout the training period remains a challenge, thereby limiting their continued participation and progression in traditionally male-dominated vocational fields.

The study's findings indicate that female students' interest in enrolling in and continuing hard trade programmes remains limited, as many are reluctant to pursue technical fields and face challenges sustaining their participation once enrolled. This finding suggests that negative perceptions toward hard trades, inadequate encouragement, and concerns about the nature of technical occupations continue to influence female students' decisions to enter and remain in these programmes, thereby constraining their long-term participation in vocational training.

The study's findings align with Nkosi and Maseko (2022), who found that gender stereotypes, limited mentorship, and perceptions of male dominance in hard trades constrained female participation in TVET engineering and mechanical programmes. Similarly, the present finding indicates that female students show limited interest in enrolling in and continuing hard trade programmes, suggesting that persistent social perceptions and inadequate support mechanisms continue to reduce female learners' willingness to enter and remain in technical-vocational pathways.

The study's findings align closely with Gender Schema Theory (Bem, 1981), which posits that individuals construct cognitive frameworks for gender-appropriate roles through socialization. The observed limited interest of female students in enrolling and continuing in hard trade programmes reflects the internalization of culturally constructed beliefs that technical and mechanical occupations are predominantly male domains. As a result, such gendered perceptions shape educational choices, reduce self-perceived suitability for hard trades, and ultimately constrain both enrolment intentions and persistence in vocational pathways for female learners.

The study's findings also strongly contrast with Transformational Leadership Theory (Bass, 1985; Burns, 1978), which emphasizes that effective leadership should inspire, motivate, and empower learners to overcome structural and psychological barriers to participation. The limited interest demonstrated by female students suggests that existing leadership practices within vocational institutions may not be sufficiently effective in reshaping perceptions, challenging gender stereotypes, or providing the level of encouragement and mentorship required to sustain female engagement in hard trade programmes. This finding indicates a gap between the expected outcomes of transformational leadership and the observed levels of female participation in technical vocational education.

Conclusions

The study concludes that female students' participation in hard trade programmes in vocational training institutions remains low and inconsistent. Although some female students demonstrate confidence and willingness to engage in technical training, their overall representation and active involvement in workshop-based learning are still limited. The study further reveals that enrolment alone does not guarantee sustained participation, as many female students' experience reduced engagement or discontinue their studies due to negative societal perceptions of hard trades, inadequate support and encouragement, and challenges associated with learning in predominantly male environments. Therefore, the level of female participation in hard trade programmes is influenced more by social and institutional factors than by the students' abilities or interest in technical fields.

Recommendations

This section should capture recommendation for practical, policy and theoretical

Practical Recommendation

Implement awareness campaigns, mentorship programmes, guidance and counselling services, and create supportive, gender-inclusive learning environments to enhance female participation and retention in hard trade programmes.

Policy Recommendations

Develop gender-inclusive policies, provide scholarships and incentives, and establish strategies that promote equal opportunities and increase female enrolment and retention in hard trade programmes.

Theoretical Recommendations

Future studies should further examine the factors influencing female participation and retention in hard trade programmes to refine existing theories and generate new insights.

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