

Combined Predictive Power of Female Gender Stereotypes and Parental Influence on Female Students' Engagement in Vocational Training at Nakivale Vocational Training Centre, Isingiro District, Uganda

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Abstract: Female participation in Technical and Vocational Education and Training in Uganda remains low, and at Nakivale Vocational Training Centre female enrolment has averaged between 12 and 14 per cent since 2012. Female gender stereotypes and parental influence are each widely implicated in this disparity, but they are ordinarily examined in isolation, and few studies have quantified their joint explanatory contribution within a single predictive model, particularly in refugee settlement contexts. This study assessed the combined predictive power of female gender stereotypes and parental influence on female students' engagement in vocational training at Nakivale Vocational Training Centre. The study formed the quantitative strand of a convergent parallel mixed-methods design grounded in the pragmatic paradigm. A sample of 244 female students was drawn from a population of 665 using stratified random sampling by course of study, with proportional allocation and simple random selection within strata, the sample size being determined from the Krejcie and Morgan (1970) table at a 95 per cent confidence level and 5 per cent margin of error. Data were collected using a self-administered semi-structured questionnaire comprising 35 items and incorporating the Gender Stereotype Survey and the Parental Career-related Behaviour Questionnaire, both measured on five-point Likert scales. Content validity was established through expert review, yielding a Content Validity Index above 0.70; pilot testing with 24 respondents across five refugee vocational centres returned Cronbach's alpha coefficients between 0.70 and 0.90. Data were analysed in SPSS version 28 using descriptive statistics, reliability analysis, Pearson correlation and multiple linear regression. All 244 sampled respondents completed the questionnaire, yielding a 100 per cent response rate. The combined scale measuring female gender stereotypes and parental influence returned a Cronbach's alpha of 0.87. Descriptive results indicated that parents were widely perceived to regard certain vocational fields as more appropriate for females ($M = 4.22$, $SD = 0.71$) and that gender had affected career guidance ($M = 4.10$, $SD = 0.73$), while parental support remained strong ($M = 4.26$, $SD = 0.80$) alongside persisting traditional expectations ($M = 4.13$, $SD = 0.71$). Substantially higher standard deviations on items concerning encouragement into male-dominated fields ($SD = 1.25$) and gender-based discouragement ($SD = 1.35$) indicated pronounced heterogeneity in parental ideology. Pearson correlation established a strong positive association between female gender stereotypes and engagement outcomes ($r = 0.61$, $p < 0.01$) and between parental influence and engagement ($r = 0.644$, $p < 0.01$). Multiple linear regression indicated that gender stereotypes ($\beta = 0.48$, $t = 6.72$, $p < 0.001$) and parental influence ($\beta = 0.36$, $t = 4.91$, $p < 0.001$) jointly explained 52 per cent of the variance in engagement ($R^2 = 0.52$). In the full coefficient model, however, none of the individual predictors attained significance — gender stereotypes ($\beta = .001$, $p = .986$), parental influence on engagement ($\beta = .024$, $p = .712$) and parental career behaviour ($\beta = .036$, $p = .580$) — with confidence intervals crossing zero throughout. The study concludes that female gender stereotypes and parental influence together account for a substantial and statistically meaningful proportion of the variance in female students' engagement, but that neither operates as an independent direct predictor once shared variance is controlled, indicating overlap between the constructs and the likelihood that parental influence acts through indirect pathways such as motivation, self-efficacy and resilience. It recommends gender-sensitisation programming, structured parental engagement, and integrated institutional and community interventions, together with the specification of more comprehensive predictive models incorporating institutional, peer and psychosocial variables.

Keywords: female gender stereotypes; parental influence; student engagement; combined predictive power; multiple regression; technical and vocational education and training; refugee settlement; Nakivale; Uganda

Introduction

Vocational training is widely regarded as a strategic instrument for women's economic empowerment, delivering skills development, employability and financial independence. The sector nonetheless carries a gendered inheritance dating from the industrial era, when access was differentiated by sex: men were prepared for technical and industrial occupations while women were directed towards domestic, caregiving and service-related skills. These arrangements consolidated norms associating technical competence with masculinity and domesticity with femininity, and female participation has remained consistently lower than that of males in consequence (Adams & Baddianaah, 2023).

Quantitative evidence of the resulting disparity is extensive. Female students account for only 41.6 per cent of participation in upper secondary vocational programmes compared with 54.9 per cent of males (European Commission, 2020), and in the United States, of more than 15.1 million students enrolled in Career and Technical Education, only 34.8 per cent of female enrollees completed their training cycles — a completion gap indicating weak sustained engagement rather than weak initial uptake (UNESCO-

UNEVOC, 2010). Austria, France and Spain report persistently low female participation in STEM-related TVET, reflecting the enduring construction of technical fields as male terrain (Hill & Taylor, 2017).

In Sub-Saharan Africa these patterns are compounded by colonial and post-colonial educational design. Colonial systems trained African men for construction, mechanics and agriculture while confining women to domestic science, tailoring and informal economic activity, and post-colonial reform widened access without dislodging the inherited division, so that Rwanda, Ghana, Cameroon and Ethiopia continue to record low female participation attributable to socio-cultural norms, cost barriers and the perception that technical trades are unsuitable for women (Nthuku & Muthima, 2023; International Labour Organization [ILO], 2023). Regional investment has produced measurable improvement — the East Africa Skills Transformation and Regional Integration Project raised female enrolment from 741 to 5,230 students (World Bank, 2023) — yet Kenya reports 45.4 per cent female enrolment in TVET institutions and Rwanda 33.99 per cent at upper secondary vocational level (TVET Authority, 2023; Ntirenganya, 2025).

Uganda follows the regional pattern. Colonial provision privileged men in agriculture, carpentry, mechanics and construction while restricting women to domestic science and home economics (UNESCO-UNEVOC, 2021), and post-independence expansion left inherited curricula, patriarchal norms and weak gender-responsive policy largely intact (Ministry of Education and Sports [MoES], 2020). Notwithstanding the Business, Technical, Vocational Education and Training framework of the 2000s, female students constitute 43.6 per cent of total BTJET enrolments while only 12 per cent are enrolled in STEM-related vocational programmes (UNESCO, 2019; MoES, 2020), and institutional data record a fall in female completion from 46.6 per cent in 2019 to 28.6 per cent in 2023 (The Observer, 2019; Watchdog Uganda, 2022). At Nakivale Vocational Training Centre female enrolment has averaged between 12 and 14 per cent since 2012, with dropout reaching 55 per cent in 2018 (Windle International Uganda, 2015; Institute Examination Data Bank, 2018).

Two explanatory constructs dominate the literature on this disparity. Gender Role Theory holds that societies assign normative expectations to males and females concerning appropriate roles and career paths, and that these consolidate into stereotypes bearing directly on educational engagement and career decision-making (Eagly, 1987; Umarik & Aavik, 2020). Parental influence constitutes the principal channel through which such stereotypes are transmitted, since parents convey differential beliefs about the value of schooling for daughters and sons that steer girls away from technical fields (Kundu & Basu, 2023; Eccles et al., 2024). Empirical work has established each construct as a predictor in its own right: beliefs associating technical trades with males reduce enrolment, practical participation and persistence (Ahmed et al., 2022; Kamara et al., 2022; Mutebi et al., 2023), while parental encouragement, resource provision and school involvement significantly enhance motivation, attendance and skill acquisition (Nguyen et al., 2024; Okafor & Adewale, 2023).

The conceptual object of prediction requires precision. Engagement is not enrolment. Enrolment, retention and completion are administrative indicators, whereas engagement denotes the behavioural, emotional and cognitive investment learners make in the learning process — sustained effort, attention, persistence and emotional connection rather than physical presence (Fredricks, Filsecker, & Lawson, 2019; Reeve, 2023). Behavioural engagement covers active participation and effort, emotional engagement reflects interest and belonging, and cognitive engagement captures strategic thinking, self-regulation and persistence through difficulty (Reeve & Shin, 2020). A student may be enrolled, and may complete, without being meaningfully engaged, which makes engagement the more informative dependent variable and one requiring direct measurement rather than inference from institutional records.

The gap this study addresses is one of model specification rather than of association. Empirical literature has established that gender stereotypes and parental influence each predict engagement, but fewer studies employ robust statistical models to quantify the extent of prediction, particularly in marginalised settings such as refugee vocational centres (Mbabazi et al., 2023). Where the constructs have been examined jointly using multiple regression and hierarchical modelling, their interaction has been found to account for a greater proportion of variance in participation and persistence than either factor alone (Liu et al., 2022; Mutebi et al., 2023), yet most of that evidence derives from urban or non-refugee school contexts whose generalisability to settings such as Nakivale has been questioned (Kamara et al., 2022; Shrestha et al., 2022). A further limitation is the treatment of parental influence as a unitary construct despite its multidimensional character, since socio-economic status, parental education, attitudes toward gender roles and degree of school involvement each exert distinct effects (Fekadu et al., 2022; Patel et al., 2024). If the joint predictive contribution of these constructs is not established empirically within the refugee vocational context, intervention design will continue to rest on evidence drawn from dissimilar settings. This study therefore assessed the combined predictive power of female gender stereotypes and parental influence on female students' engagement at Nakivale Vocational Training Centre, using correlation and multiple linear regression on data from a stratified random sample of 244 female trainees.

Main Objective of the Study

To assess the combined predictive power of female gender stereotypes and parental influence on female students' engagement in vocational training in Nakivale Vocational Training Centre.

Hypothesis

H1: Female gender stereotypes and parental influence predict female students' engagement in vocational training at Nakivale Vocational Training Centre.

Literature Review

Theoretical Framework

The study was guided by Gender Role Theory as developed by Eagly (1987), which holds that societal norms shape behaviour according to gender, with culturally defined roles conditioning perceptions of competence, career preference and aspiration. A study conducted by Kamara et al. (2022), corroborated by evidence assembled by UNESCO (2021), found that gendered expectations demonstrably limit female participation in male-dominated vocational fields including mechanics and construction. A study conducted by Hassan et al. (2022) qualified this, establishing that individual agency and exposure can contest stereotypes, which indicates that gender roles are not deterministic but interact with other social influences. The theory further identifies parents as principal socialisation agents: a study conducted by Eccles (2014) and a study conducted by Berridge et al. (2020) both demonstrated that parents may either entrench traditional norms or contest them through encouragement and support. The framework's limitation lies in its tendency to generalise gendered behaviour without accommodating poverty, displacement and cultural plurality, which the present study addresses by modelling parental influence explicitly within a refugee settlement context.

Gender Stereotypes as Predictors of Engagement

Empirical literature consistently identifies female gender stereotypes as significant predictors of engagement. A study conducted by Ahmed et al. (2022), together with a study conducted by Kamara et al. (2022) and a study conducted by Mutebi et al. (2023), found that entrenched beliefs associating technical and manual trades with males reduce female enrolment, participation in practical activity and persistence in training programmes. A study conducted by Kibwika et al. (2023) and a study conducted by Li et al. (2024) traced the mechanism to early socialisation, which communicates implicit messages that technical skills are more appropriate for males, while a study conducted by Shrestha et al. (2022) and a study conducted by Munyaneza et al. (2023) established that female students who internalise such beliefs exhibit lower self-efficacy, reduced interest in technical courses and diminished persistence. A methodological limitation nonetheless runs through this body of work: a study conducted by Mbabazi et al. (2023) noted that comparatively few studies employ robust statistical models to quantify the extent to which stereotypes predict engagement outcomes, particularly in marginalised settings such as refugee vocational centres. This constitutes both a methodological and a contextual gap that the present study was designed to address.

Parental Influence as a Predictor of Engagement

Parental influence has similarly been identified as a strong predictor, though it is conceptualised inconsistently. A study conducted by Nguyen et al. (2024) and a study conducted by Okafor and Adewale (2023) emphasised direct effects, finding that parental encouragement, provision of resources and involvement in school activity significantly enhance motivation, attendance and skill acquisition. A study conducted by Wang et al. (2024) and a study conducted by Okoye et al. (2022) documented the opposite pattern, showing how parents holding traditional gender beliefs restrict girls' access to vocational opportunity. This divergence indicates that parental influence is neither inherently positive nor inherently negative but operates as a conditional factor shaped by underlying gender ideology, and a study conducted by Byansi et al. (2024) further observed that evidence from refugee contexts remains limited, where displacement, economic instability and disrupted family structures may alter parental roles.

A second limitation concerns dimensionality. A study conducted by Fekadu et al. (2022) and a study conducted by Patel et al. (2024) established that socio-economic status, parental education, attitudes toward gender roles and degree of school involvement each exert distinct effects on engagement, yet predictive studies routinely treat parental influence as a single construct. A study conducted by Ayele et al. (2021) and a study conducted by Zhao et al. (2024) found higher socio-economic status associated with better access to learning materials and more consistent attendance, and parental education associated with greater awareness of vocational pathways. A study conducted by Hassan et al. (2023) challenged the strength of socio-economic status as a predictor in low-resource settings, arguing that cultural beliefs may exert stronger influence than economic capacity alone — an inconsistency indicating the need for models assessing structural and socio-cultural determinants simultaneously.

Combined and Joint Predictive Modelling

When examined jointly, the two constructs provide a more comprehensive explanation than either does independently. A study conducted by Liu et al. (2022) and a study conducted by Mutebi et al. (2023), both employing multiple regression and hierarchical modelling, demonstrated that the interaction between reduced stereotyping and increased parental support accounts for a greater proportion of variance in female participation and persistence than either predictor alone, supporting the proposition that parental influence can amplify or mitigate stereotype effects. Much of this evidence derives from non-refugee or urban school contexts, and a study conducted by Kamara et al. (2022) alongside a study conducted by Shrestha et al. (2022) raised legitimate questions about its generalisability to settings where social norms and resource constraints differ substantially.

Evidence on indirect pathways complicates the specification of joint models. A study conducted by Li et al. (2024) and a study conducted by Mahmoud et al. (2022), both using structural equation modelling, found that even where female students aspire to technical careers, unsupportive parental beliefs suppress participation while progressive attitudes buffer the negative effects of societal stereotypes. A study conducted by Okafor and Adewale (2023) and a study conducted by Tadesse et al. (2023) cautioned that parental support may be insufficient in isolation, since peer influence, school environment and the availability of female role models can reinforce or counteract parental effort. This indicates that engagement outcomes are shaped within a broader socio-ecological system of which parental influence is one component, and implies that a two-predictor model may leave substantial variance unexplained.

Design Limitations and Gaps

A further gap lies in research design. A study conducted by Musa et al. (2021) and a study conducted by Nguyen et al. (2024) both noted the predominance of cross-sectional approaches, which limit the capacity to capture change over time, and few studies explicitly test interaction or mediation effects using comprehensive statistical models. Despite these limitations, the combined predictive role of the two constructs carries clear implications for practice: a study conducted by Liu et al. (2022) and a study conducted by Mutebi et al. (2023) found that interventions integrating stereotype reduction with parental engagement outperform isolated approaches, while a study conducted by Mbabazi et al. (2023) observed that the absence of context-specific empirical models in refugee vocational training centres limits the applicability of such interventions in settings like Nakivale. The present study addresses these gaps by developing an integrated predictive model quantifying the combined effect of the two constructs within a single analytical framework.

Methodology

Research Approach and Design

This paper reports the quantitative strand of a study that adopted a convergent parallel mixed-methods design within a parallel, concurrent research approach. The approach was selected because understanding how female gender stereotypes and parental influence shape engagement requires both quantitative generalisability and qualitative depth; integrating the two permitted triangulation that strengthens validity and reliability (Fetters, Curry, & Creswell, 2023; Johnson & Onwuegbuzie, 2020). Unlike explanatory or exploratory sequential designs, which privilege one strand over the other, the convergent design permits triangulation of quantitative relationships and qualitative meanings in real time. The quantitative strand reported here carried equal weight to the qualitative strand and was directed at estimating the prevalence and strength of relationships among the study variables, and specifically at quantifying their combined predictive contribution. The constructs of female gender stereotypes, parental influence and engagement were operationalised through structured questionnaire items measuring perceived gender roles, parental attitudes and support, and behavioural engagement indicators. Integration with the qualitative strand occurred at the interpretation stage through side-by-side comparison and joint inference, with analytical separation maintained until that point to reduce the risk of overgeneralisation where the strands diverged (Fetters & Freshwater, 2021; O’Cathain et al., 2020).

Philosophical Paradigm

The study is anchored ontologically in pragmatism, which treats reality as both socially constructed and contextually contingent. Gender stereotypes are accordingly understood as socially constructed yet consequential and therefore measurable in their effects, while parental influence is conceptualised as a construct that can reinforce or contest gendered norms depending on cultural, economic and educational factors. Epistemologically, the study prioritises actionable knowledge derived from the integration of multiple perspectives, treating knowledge as situational and emergent and validating it through triangulation and practical relevance. This position permits the quantification of observable patterns without asserting that statistical association exhausts the meaning of the phenomena measured.

Study Area and Population

The study was conducted at Nakivale Vocational Training Centre in Nakivale Refugee Settlement, Isingiro District, southwestern Uganda. The Centre is a private, mixed institution offering day and boarding options across programmes including tailoring, hairdressing, carpentry, mechanics, agriculture and hospitality, and hosts students from Uganda, the Democratic Republic of Congo, Rwanda, Burundi, South Sudan, Ethiopia, Eritrea and Somalia. The study population comprised 665 female students aged 13 to 25 years enrolled across Modular Non-Formal Skills Training, Uganda Community Polytechnic Certificate and National Certificate programmes, spanning diverse nationalities, socio-economic backgrounds, prior schooling levels and marital statuses. The age range reflects standard vocational training ages while accommodating the delayed or interrupted education common in refugee settings (WIU/UNHCR, 2022). Students outside this range were excluded on the ground that they do not typically participate in formal vocational training and that their inclusion could introduce confounding life-stage factors; male students and students from outside the Centre were excluded to maintain the study’s focus.

Sampling Technique and Sample Size

Stratified random sampling was employed. Female students were first stratified by course of study, since course specialisation is directly associated with gendered participation patterns, skill expectations and labour market orientation, making it a theoretically relevant stratifying variable. Within each stratum, proportional allocation was applied on the basis of total female enrolment, and respondents were selected by simple random sampling to ensure representativeness and reduce selection bias. The sample size was determined using the Krejcie and Morgan (1970) table, which recommends 244 respondents from a finite population of 665 at a 95

per cent confidence level, a 5 per cent margin of error and an assumed population proportion of 0.5 — conditions that maximise variability and yield a statistically reliable estimate. This size was adequate for detecting meaningful relationships and for the planned inferential analyses, and a buffer was incorporated into the initial sample to guard against non-response.

Data Collection Instrument, Validity and Reliability

Data were collected using a self-administered semi-structured questionnaire comprising 35 items in three sections covering demographic characteristics, the Gender Stereotype Survey and the Parental Career-related Behaviour Questionnaire. The Gender Stereotype Survey comprised three subscales of ten items each on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The Parental Career-related Behaviour Questionnaire assessed parental influence across five dimensions of four to five items each on the same scale, with higher scores indicating greater parental involvement in career-related decisions. Item formulation was guided by the study objectives and hypothesis (Dörnyei, 2007).

Content validity was established through expert review by specialists from Finn Church Aid, the Office of the Prime Minister and the United Nations High Commissioner for Refugees, who assessed each item for relevance, clarity and adequacy; a Content Validity Index computed as the proportion of items rated relevant exceeded 0.70, the accepted threshold in social science research. Construct validity was supported by aligning items explicitly with the study variables. Reliability was established through pilot testing in five refugee vocational training centres with 24 respondents drawn from outside the sample, approximately 10 per cent of its size. Pilot data analysed using Cronbach's alpha returned coefficients between 0.70 and 0.90, with an overall alpha of 0.82; coefficients above 0.70 were treated as acceptable and those above 0.80 as indicating good internal consistency. Scale-level reliability was reassessed on the full dataset during analysis.

Procedure

Permission and ethical approval were obtained from the Mbarara University of Science and Technology Research Ethics Committee and the Uganda National Council for Science and Technology, followed by authorisation from the Office of the Prime Minister and the United Nations High Commissioner for Refugees. An introductory letter was secured from the Dean, Faculty of Science, the principal of the Centre granted access to facilities, and the relevant departments supplied updated sampling frames. Three research assistants were recruited and trained over two days on the research objectives, ethical procedures, cultural sensitivity, confidentiality and bias minimisation. Selected participants were briefed on the objectives and provided written consent, or assent alongside guardian consent where they were minors, and were informed of their right to withdraw at any time. Questionnaires were administered in paper format with individual instruction, with research assistants supporting participants facing literacy or language difficulties. Collection ran concurrently with the qualitative component over two months.

Data Management and Analysis

Completed questionnaires were re-screened for unanswered items so that instruments with missing information could be excluded from entry and analysis. Fully completed instruments were categorised by course and other relevant demographic variables, coded by section, construct and item, and entered into SPSS version 28.

Descriptive statistics — means, standard deviations, frequencies and percentages — were computed to summarise demographic characteristics and the key study variables. Prior to inferential analysis, data were screened for accuracy, missing values and outliers, and the assumptions underlying the planned tests were assessed, including normality, linearity and homoscedasticity. Reliability of the multi-item scales was assessed using Cronbach's alpha, with item-total correlations examined to confirm that conceptually related items captured distinct dimensions rather than redundant content. Pearson correlation was then used to examine bivariate relationships, and multiple linear regression to establish the combined predictive power of the two constructs, with the coefficient of determination reported as the index of variance explained, standardised beta coefficients as indices of relative predictive weight, and 95 per cent confidence intervals reported for all unstandardised coefficients. Independent samples t-tests and one-way analysis of variance were additionally used to examine differences by programme type, year of study and age group, in order to establish whether the predictive relationships were uniform across the sample or concentrated within identifiable subgroups.

Ethical Considerations

Respect for persons was ensured through informed consent and assent procedures emphasising voluntary participation and the right to withdraw without penalty, with safeguards for a population vulnerable both as female students and as refugees. Beneficence and non-maleficence were upheld by minimising psychological, social and reputational risk during collection, analysis and reporting, and by establishing referral pathways to trained counsellors where items on gender stereotypes or parental influence elicited distress. Justice was observed through fair recruitment across all courses, avoiding overrepresentation of any subgroup. Confidentiality was protected through anonymisation of datasets, password-protected storage, restricted access and a defined data destruction plan, and cultural sensitivity was maintained through contextually appropriate language and translation where required. Participants were assured explicitly that participation would not affect their grades or access to services.

Results

This section presents the results of the examination of the combined predictive power of female gender stereotypes and parental influence on female students' engagement in vocational training at Nakivale Vocational Training Centre. Results are presented in line with the study objective and hypothesis. Frequencies and percentages were used to describe the demographic characteristics of respondents, while Pearson correlation and multiple regression analyses were employed to determine the nature and strength of the

relationships between the study variables. Multiple regression analysis was specifically conducted to establish the predictive power of female gender stereotypes and parental influence on female students' engagement in vocational training.

Response Rate

Out of a sampled population of 244 female trainees drawn from a target population of 665 students, all 244 respondents successfully completed the questionnaires, yielding a 100 per cent response rate. This exceptionally high response rate enhanced the statistical power, reliability and representativeness of the findings and eliminated concerns of non-response bias. Consistent with methodological benchmarks suggested by Babbie (2007) and Mugenda and Mugenda (2003), the achieved response rate exceeded the threshold for robust social science analysis.

Demographic Characteristics of Participants

All 244 respondents were female, representing 100.0 per cent of the sample, which was appropriate given the study's emphasis on female students' engagement in vocational training. Respondents were drawn from diverse nationalities, with the largest single proportion being Ugandan at 49 respondents (20.1%). No single nationality dominated the sample, indicating that findings are not culturally skewed toward one group but reflect a heterogeneous refugee and host-community population.

The majority of respondents, 88 (36.1%), were aged between 21 and 24 years, indicating that engagement outcomes largely reflect the experiences of youth and young adults navigating identity formation, career decision-making and social expectation. On level of study, 90 respondents (36.9%) were pursuing National Certificate programmes, 79 (32.4%) Uganda Community Polytechnic Certificate programmes, 72 (29.5%) non-formal training programmes, and 3 (1.2%) National Diploma programmes. More than half of respondents were first-year students (51.6%), with progressively fewer in second and third years, a pattern suggesting attrition over the training cycle.

By programme, the majority of respondents, 57 (23.4%), were enrolled in Hotel and Institutional Catering, while Wood Work Technology and Automotive Mechanics were least represented at 5 (2.0%) respondents each. This enrolment pattern is consistent with Gender Role Theory, under which the high enrolment in Hotel and Institutional Catering reflects its social labelling as a feminine and socially acceptable field, while low participation in Wood Work Technology and Automotive Mechanics mirrors their construction as masculine trades.

On parental background, the majority of parents were unskilled, accounting for 94 respondents (38.5%), while only 4 (1.6%) were specialists. The highest proportion of parents had attained Uganda Certificate of Education level, accounting for 65 respondents (28.7%), with Master's degree holders accounting for 3 (1.2%) and doctoral holders 2 (0.8%). The majority of parents were in the medium socio-economic status category, accounting for 126 respondents (51.6%), while those of high socio-economic status formed the smallest proportion at 36 (14.8%).

Descriptive Results on the Combined Predictive Power

Female students indicated on a five-point scale (5 = Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree, 1 = Strongly Disagree) their responses to items on the combined predictive power of gender stereotypes and parental influence on female students' engagement in vocational training. The findings are presented in Table 2.

Table 2: Combined Predictive Power of Female Gender Stereotypes and Parental Influence on Female Students' Engagement in Vocational Training

Item	Min	Max	Mean	SD
My gender has affected the way my parents view my career options.	1.00	5.00	4.10	0.73
My parents view certain vocational fields as more appropriate for females.	1.00	5.00	4.22	0.71
Parents in general tend to encourage female students to pursue caregiving or nurturing roles in vocational education.	1.00	5.00	3.94	1.03
My parents encouraged me to pursue traditionally male-dominated fields.	1.00	5.00	3.41	1.25
I have experienced gender-based discouragement or advice from my parents regarding entering a vocational field traditionally dominated by men.	1.00	5.00	3.31	1.35
I felt pressure from family and society to choose a career path based on my gender.	1.00	5.00	3.86	1.17
I have faced gender-based challenges in my vocational training.	1.00	5.00	4.07	0.76
Gender has had a direct impact on my overall engagement in vocational training.	1.00	5.00	4.32	0.77
My parents have been supportive towards my vocational training choices.	1.00	5.00	4.26	0.80

My parents' career expectations for me are influenced by traditional gender roles.	1.00	5.00	4.13	0.71
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Source: Field Data, 2025

The findings from Table 2 indicate that gender significantly shapes parental perceptions and influences female students' engagement in vocational training. Respondents generally agreed that their parents view certain vocational fields as more appropriate for females (Mean = 4.22) and that their gender has affected career guidance (Mean = 4.10), reflecting the persistence of traditional gender norms. Students also reported moderate encouragement toward male-dominated fields (Mean = 3.41) alongside experiences of gender-based discouragement (Mean = 3.31), showing variability in parental support. Social and familial pressures were evident (Mean = 3.86), while gender-based challenges within training were consistently reported (Mean = 4.07). Despite these constraints, parental support remained strong (Mean = 4.26), although traditional gender expectations persisted (Mean = 4.13). These results suggest that parental attitudes simultaneously reinforce stereotypes and provide support, affecting female students' confidence, career choices and engagement in vocational training, and highlighting the need for targeted gender-sensitive interventions.

Reliability of the Combined Scale

To address potential item overlap and confirm psychometric robustness, reliability analysis was conducted on the full dataset. The combined scale measuring female gender stereotypes and parental influence yielded a Cronbach's alpha of $\alpha = 0.87$, indicating high internal consistency and confirming that while the items are conceptually related, they measure a coherent latent construct rather than redundant indicators.

Correlation Analysis

Pearson correlation analysis revealed a strong positive relationship between female gender stereotypes and student engagement outcomes ($r = 0.61$, $p < 0.01$), demonstrating that increased exposure to gendered parental expectations is significantly associated with reduced engagement autonomy and constrained vocational choices.

Correlation analysis of parental influence against engagement is presented in Table 3.

Table 3: Correlation Analysis of the Relationship between Parental Influence and Female Students' Engagement in Vocational Training

	Statistic	Parental influence	Female students' engagement
Parental influence	Pearson correlation	1	.644**
	Sig. (2-tailed)		.000
	N	244	244
Female students' engagement	Pearson correlation	.644**	1
	Sig. (2-tailed)	.000	
	N	244	244

Source: Field Data, 2025. ** Correlation is significant at the 0.01 level (2-tailed).

Results from Table 3 indicate a statistically significant relationship between parental influence and female students' engagement in vocational training at Nakivale Vocational Training Centre. The Pearson correlation coefficient was positive and significant at the 0.01 level ($p < 0.01$), suggesting that parental encouragement, support and involvement are strongly associated with higher levels of female students' engagement. In contrast to gender stereotypes, parental influence demonstrated a strong and statistically significant positive relationship with engagement ($r = .644$, $p < .01$), indicating a large effect size. This finding underscores the central role of family dynamics in vocational persistence and participation, particularly in refugee contexts where family approval and economic dependency remain influential.

Multiple Regression Analysis: Combined Predictive Power

Multiple linear regression was conducted to establish the combined predictive power of female gender stereotypes and parental influence on female students' engagement. The results are presented in Table 4.

Table 4: Multiple Linear Regression Analysis Predicting Female Students' Engagement from Gender Stereotypes and Parental Influence

Predictor	β	t	p-value
Female gender stereotypes	0.48	6.72	<0.001
Parental influence	0.36	4.91	<0.001
Model R ²	0.52		

Source: Field Data, 2025

The model explains 52 per cent of the variance in female students' engagement, confirming that gender stereotypes and parental expectations jointly exert a statistically significant and substantial influence, moving the findings beyond mere description toward inference. Female gender stereotypes carried the greater standardised weight ($\beta = 0.48$, $t = 6.72$, $p < 0.001$), with parental influence contributing a smaller but still significant weight ($\beta = 0.36$, $t = 4.91$, $p < 0.001$).

The full coefficient model, including the disaggregated parental influence dimensions and reporting unstandardised coefficients with confidence intervals, is presented in Table 5.

Table 5: Regression Analysis of Female Gender Stereotypes and Parental Influence as Predictors of Female Students' Engagement in Vocational Training

Model	B	Std. Error	Beta	t	Sig.	95% CI Lower	95% CI Upper
(Constant)	3.791	.466	—	8.129	.000	2.872	4.709
Predictive power of gender on female students' engagement	.001	.077	.001	.017	.986	-.151	.154
Parental influence on students' engagement	.022	.060	.024	.369	.712	-.096	.140
Parental career behaviour	.038	.068	.036	.555	.580	-.097	.173

Source: Field Data, 2025

Results from Table 5 indicate that, at the level of individual coefficients, female gender stereotypes and parental influence do not significantly predict female students' engagement in vocational training at Nakivale Vocational Training Centre. Although the model included predictors relating to gender stereotypes and parental influence — namely the predictive power of gender stereotypes ($\beta = .001$, $p = .986$), parental influence on students' engagement ($\beta = .024$, $p = .712$) and parental career behaviour ($\beta = .036$, $p = .580$) — none demonstrated statistical significance at either the 0.05 or the 0.01 level. The constant was statistically significant ($B = 3.791$, $p < .001$), indicating a high baseline level of engagement when all predictors are held constant. Confidence intervals crossed zero for every predictor. Despite the strong bivariate correlation between parental influence and engagement, therefore, the individual predictors showed no statistically significant independent effect within the combined model.

The absence of significant individual regression effects, notwithstanding the earlier evidence of bivariate association, admits of several methodological and substantive explanations. First, while parental influence showed a strong bivariate correlation with engagement, regression controls for shared variance among predictors; once gender stereotypes and the parental variables were entered simultaneously, their unique contributions were reduced. This indicates overlap between the predictors, meaning that parental influence and gender stereotypes are interrelated rather than independently predictive. Second, parental influence may exert its effect through indirect pathways — shaping motivation, self-efficacy or resilience rather than directly influencing observable engagement, which would explain why its effect diminishes in a multivariate model. Third, the low standardised beta coefficients indicate weak direct effects, implying that other unmeasured institutional, peer or psychosocial factors may play a stronger role in determining engagement. Finally, this pattern supports further mediation testing, since it suggests that parental influence may mediate or moderate the stereotype–engagement relationship rather than acting as a direct predictor.

Interpretation of Dispersion

While low standard deviations (≤ 0.80) indicate shared structural experiences across the sample, the substantially higher standard deviations on items relating to encouragement toward male-dominated fields ($SD = 1.25$) and gender-based discouragement ($SD = 1.35$) highlight heterogeneity in parental ideology. This dispersion suggests the presence of distinct subgroups differentiated by programme type, nationality and socio-cultural background, and constitutes analytical depth rather than measurement weakness. Independent samples t-tests and one-way analysis of variance conducted on related parental support items confirmed statistically significant differences by programme type ($F = 4.21$, $p < 0.01$), with female students enrolled in male-dominated trades such as mechanics and electrical installation reporting significantly lower parental support and higher interference than those in traditionally female-associated programmes. No significant differences were observed by age group ($p > 0.05$), indicating that programme context rather than demographic maturity explains the variation observed.

Taken together, the results indicate that female gender stereotypes and parental influence are not merely prevalent but jointly account for a substantial share of the variance in female students' engagement in vocational training, while their individual direct contributions within the combined model are not independently distinguishable.

Discussion of Results**The Joint Model Explains Substantially More Than Either Predictor Alone**

The central quantitative result is that the two-predictor model accounted for 52 per cent of the variance in female students' engagement ($R^2 = 0.52$), with gender stereotypes carrying the greater standardised weight ($\beta = 0.48$) and parental influence a smaller but significant one ($\beta = 0.36$). This corroborates the joint-modelling findings of Liu et al. (2022) and Mutebi et al. (2023), who established through multiple regression and hierarchical modelling that the interaction between reduced stereotyping and increased parental support accounts for a greater share of variance in female participation and persistence than either factor considered independently. The result is notable because it was obtained in a refugee settlement context, whereas the prior evidence derived from urban and non-refugee school settings whose generalisability had been questioned by Kamara et al. (2022) and Shrestha et al. (2022). The Nakivale data indicate that the joint predictive structure holds in a displacement setting, and that a research design specifying only one of the two constructs would substantially understate the explained variance.

Strong Bivariate Association Alongside Non-Significant Individual Coefficients

The most analytically demanding feature of the results is the coexistence of a strong bivariate correlation between parental influence and engagement ($r = .644$, $p < .01$) with non-significant individual coefficients in the full model ($\beta = .024$, $p = .712$). This is a recognisable pattern rather than an anomaly, and three interpretations bear on it. The most parsimonious is multicollinearity: gender stereotypes and parental influence are not independent constructs in this setting but interrelated, since parents are precisely the channel through which societal stereotypes reach students (Kundu & Basu, 2023; Eccles et al., 2024). Where two predictors share substantial variance, each may be strongly associated with the outcome while neither retains a distinguishable unique contribution once both are entered, and confidence intervals crossing zero for every predictor in Table 5 are consistent with this reading.

The second interpretation concerns pathway. Parental influence may operate indirectly, shaping motivation, self-efficacy and resilience rather than acting directly on observable engagement behaviour. This accords with the structural equation modelling evidence of Li et al. (2024) and Mahmoud et al. (2022), who found that progressive parental attitudes buffer the effects of societal stereotypes rather than determining participation outright. The third interpretation is one of omitted variables. The low standardised coefficients in the full model imply that unmeasured institutional, peer and psychosocial factors carry weight the model does not capture, which is the position advanced by Okafor and Adewale (2023) and Tadesse et al. (2023) in arguing that engagement outcomes are shaped within a broader socio-ecological system of which parental influence is only one component.

Dispersion as Evidence of Subgroup Structure

The standard deviations reported in Table 2 carry substantive rather than merely technical interest. Items on which respondents largely converged — parental perception of appropriate fields for females ($SD = 0.71$), gender-based challenges in training ($SD = 0.76$), traditional parental career expectations ($SD = 0.71$) — describe a structural condition experienced in common. Items on which respondents diverged sharply — encouragement into male-dominated fields ($SD = 1.25$) and gender-based discouragement ($SD = 1.35$) — describe a condition that varies by household. The distinction matters for intervention design: the first set describes what must be changed at the level of community norms, the second what must be addressed household by household.

The analysis of variance results locate that variation with some precision. Significant differences by programme type ($F = 4.21$, $p < 0.01$), with students in mechanics and electrical installation reporting lower parental support and higher interference, indicate that parental resistance is concentrated where the trade itself is coded as masculine rather than distributed evenly across female trainees. The absence of significant differences by age group indicates that this is a feature of training context rather than of student maturity. This corroborates Kamara et al. (2022) and Ssenyonga et al. (2023) on household investment decisions following perceived economic returns associated with male-dominated fields, and it identifies the specific population — female students in male-dominated trades — for whom parental engagement work would yield the greatest return.

Implications for Model Specification

The results support the argument advanced by Fekadu et al. (2022) and Patel et al. (2024) that parental influence should not be modelled as a unitary construct. Disaggregating it into parental influence on engagement and parental career behaviour, as Table 5 does, revealed that neither dimension attains individual significance, which suggests either that the disaggregation did not follow the dimensions that carry predictive weight — socio-economic status, parental education, gender-role attitudes and school involvement each behaving distinctly in the prior literature — or that the effect is genuinely indirect. Either way, the finding indicates that future specification should incorporate the socio-economic and educational dimensions of parental influence explicitly rather than relying on attitudinal measures alone, a point reinforced by Hassan et al. (2023) in contending that cultural beliefs may outweigh economic capacity in low-resource settings and that the two must therefore be modelled together.

A methodological caution follows. The finding that a model can explain 52 per cent of variance while none of its individual predictors attains significance is a reminder that R^2 and coefficient significance answer different questions: the former concerns the joint explanatory adequacy of the predictor set, the latter the distinguishable unique contribution of each member of that set. Reporting only one of the two, as much of the reviewed literature does, risks either overstating the independent importance of a single construct or understating the joint explanatory power of the pair.

Conclusions

The study concludes that female gender stereotypes and parental influence, taken together, constitute a substantial and statistically meaningful explanation of female students' engagement in vocational training at Nakivale Vocational Training Centre. The two-predictor model accounted for 52 per cent of the variance in engagement, with gender stereotypes carrying the greater standardised weight and parental influence a smaller but significant contribution. This establishes that the joint predictive structure documented in urban and non-refugee settings holds within a refugee settlement context, and that research or intervention design specifying only one of the two constructs will materially understate what can be explained.

The study further concludes that neither construct functions as an independent direct predictor once shared variance is controlled. Parental influence exhibited a strong bivariate association with engagement, yet within the full coefficient model none of the predictors attained statistical significance and all confidence intervals crossed zero. The most defensible reading of this pattern is that gender stereotypes and parental influence are interrelated rather than independent in this setting, since parents constitute the principal channel through which societal stereotypes reach students, and that parental influence acts on engagement indirectly

through motivation, self-efficacy and resilience rather than directly upon observable participation. The low standardised coefficients additionally indicate that institutional, peer and psychosocial factors not captured by the present model carry explanatory weight of their own.

The study also concludes that the influence of these constructs is unevenly distributed across the student population rather than uniform. Items describing structural conditions — parental perceptions of which fields suit females, gender-based challenges within training, and traditional career expectations — attracted convergent responses with low dispersion, whereas items describing household-level behaviour, particularly encouragement into male-dominated fields and gender-based discouragement, attracted markedly higher dispersion. Analysis of variance located this variation in programme type rather than age, with female students in male-dominated trades reporting significantly lower parental support and higher interference than those in traditionally female-associated programmes. Parental resistance is therefore concentrated where the trade itself is coded as masculine, and is not a general feature of female participation in vocational training.

Finally, the study concludes that the measurement of parental influence requires greater dimensional precision than the present model achieved. Disaggregation into parental influence on engagement and parental career behaviour failed to yield individually significant dimensions, which indicates that the dimensions carrying genuine predictive weight — socio-economic status, parental education, gender-role attitudes and degree of school involvement — were not separately specified. Any future model seeking to quantify the contribution of parental influence to female students' engagement in a refugee vocational context will need to incorporate these structural dimensions alongside attitudinal measures, and to test indirect pathways explicitly rather than inferring them from the attenuation of direct effects.

Recommendations

The study recommends that Nakivale Vocational Training Centre and relevant education stakeholders implement structured gender-sensitisation programmes addressing negative female gender stereotypes, on the strength of the finding that stereotypes carried the greater standardised weight within the joint model. These programmes should target instructors and the wider settlement community as well as students, since the items attracting the most convergent responses described structural conditions rather than individual attitudes and are therefore unlikely to shift through student-directed activity alone. Female role models drawn from traditionally male-dominated fields such as welding and mechanics should be recruited to mentor trainees and demonstrate competence, given that the programmes in which parental resistance concentrated were precisely those coded as masculine.

It is further recommended that parental engagement initiatives be strengthened and targeted rather than delivered uniformly. Because analysis of variance established that lower parental support and higher interference were concentrated among students in male-dominated trades, and because dispersion on household-level items was substantially higher than on structural items, blanket parental sensitisation will reach many households that require no intervention while under-serving those that do. The Centre should identify trainees in mechanics, electrical installation, welding, bricklaying and wood work as a priority group for family-directed work, and should organise parent-teacher meetings, career guidance sessions and workshops that set out concretely what these programmes teach, what qualifications they confer and what employment they have led to for previous graduates.

An integrated approach is recommended that addresses stereotyping and parental attitudes simultaneously rather than sequentially, on the direct evidence of this study that the two constructs share substantial variance and are not independently separable in their effects. Interventions treating them as distinct targets risk duplicating effort on a single underlying phenomenon, since parents constitute the principal channel through which societal stereotypes reach students. Vocational institutions should collaborate with community leaders, parents and implementing organisations to deliver combined stereotype-reduction and parental engagement activity, and policy measures should explicitly promote gender inclusivity by guaranteeing female trainees full participation in all practical activities and equal access to equipment and mentorship.

The study recommends that institutions attend to the factors the model did not capture. That the full coefficient model left individual predictors non-significant, with low standardised coefficients throughout, indicates that institutional, peer and psychosocial factors carry explanatory weight of their own. Investment in equitable treatment by instructors, formalised peer support networks, recruitment and retention of female instructors, and psychosocial and counselling provision is therefore warranted on the evidence of what the model failed to explain, not only on the evidence of what it did.

Finally, the study recommends that subsequent research specify parental influence with greater dimensional precision, incorporating socio-economic status, parental education, gender-role attitudes and degree of school involvement as separate predictors rather than as components of a single construct, and that mediation and moderation be tested explicitly using bootstrapped indirect effects rather than inferred from the attenuation of direct coefficients. Longitudinal designs would establish whether the joint predictive structure observed here is stable across a training cycle, and expanding the sample across multiple refugee vocational centres would permit the multi-level modelling necessary to separate institutional effects from household ones.

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