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RESEARCH ARTICLE

SOCIAL STEREOTYPES ON ENROLMENT AND COMPLETION RATES OF STUDENTS IN STEM-ORIENTED COURSES IN SELECTED PUBLIC UNIVERSITIES IN KENYA

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ABSTRACT

Science, Technology, Engineering, and Mathematics (STEM) education has a gender disparity. This highlights an injustice issue that exists globally. Girls are prevented from pursuing interests in STEM fields by sociocultural norms that link STEM fields to men. The purpose of this article is to demonstrate how equity can be increased and enrolment and completion rates in STEM-related courses can be improved. The study adopted a mixed methods research design involves the integration of both quantitative and qualitative approaches. The population of the study were students pursuing STEM courses in three selected public universities (University of Nairobi, Jomo Kenyatta University of Agriculture & Technology (JKUAT), and Egerton University). The study included three sampling techniques, namely; purposive, stratified and simple random sampling. Both quantitative and qualitative data was collected and analysed. The results show that male, account for 214 (62.6%) while 128 (37.4%) were female. This is an indication that male students were more, compared to female in STEM courses in the selected universities. The regression results indicate that stereotypes did not significantly predict the outcome variable in the model, as shown by the non-significant p-value ($p = 0.385$) and the confidence interval for the odds ratio including 1.0. While the odds ratio ($Exp(B) = 1.507$) suggests a potential positive relationship between stereotype-related experiences and the outcome (possibly enrolment, persistence, or academic performance). The findings suggest that while most students do not perceive themselves as inherently unfit or incapable of succeeding in STEM courses, there remains a pervasive awareness of social and demographic stereotypessurrounding STEM participation. This study recommends creation of peer mentoring networks and safe spaces for underrepresented students in STEM where they can share experiences and find encouragement.

Keywords: Social Stereotypes, Enrolment, Completion Rates & Stem Oriented Courses

INTRODUCTION

Globally, women's participation in STEM (Science, Technology, Engineering, and Mathematics) undergraduate programs is rather low. In Africa, the numbers are far more dismal. The largest

discrepancy is found in the engineering area. Women made only just 1 in 4 engineering students in 2020 (Luo, et al., 2020). According to Lin & Deemer (2019) The lowest percentage of female scientists was found in Guinea (5.8%). It is equivalent to one in seventeen. Cape Verde (52.3%) and Lesotho (55.7%) fared exceptionally well in terms of gender parity in STEM areas. In Kenya, there is a clear gender gap in STEM engagement, with rates ranging from 30% to 35% (Archer et al., 2013). Women are less likely to enrol in school and even fewer of them will complete it. Moreover, compared to men, their graduation rates are lower. This is a problem that affects both developed and underdeveloped countries.

Gender inequality in STEM disciplines has become a global issue, impeding women's full involvement in these vital fields. There are still too few women in STEM fields of study and employment, which begs the issues of why and how this disparity came to be. Despite progress toward gender equality in other academic subjects, such the arts and social sciences, there is still a noticeable gender disparity in STEM education in Kenya. While gender discrepancies in higher education worsen, women are still underrepresented in scientific subjects where men predominate as students and faculty, despite Kenya having achieved gender parity in elementary education and narrowing the gender gap at the secondary level (Kenya National Examination Council (KNEC), 2022). Both public and private institutions have gender disparities, with a notably pronounced difference in STEM fields.

A thorough analysis of women's and girls' total educational participation and access is necessary if they are to be included in STEM education. The significance of women's presence in STEM areas lies in their ability to encourage diversity in the workforce, which in turn encourages success, productivity, creativity, and innovation (Garriott et al., 2017). This will guarantee women's complete involvement in economic endeavours and the general well-being of society (Holmegaard, Madsen & Ulriksen, 2014). Significant differences still remain across and within regions and countries, despite improvements in the global educational options for girls and young women. The enrolment rate of female students at the primary, secondary, and university stages of education has been rising globally, (Kier, et al., 2014). Though the overall trend is positive, there are significant differences between countries and areas. In Sub-Saharan Africa, where the gross enrolment ratio for girls is less than 20%, there is a stark gender gap in higher education as compared to industrialized nations (Njenga & Odhiambo, 2021).

Kenya's Vision 2030 suggests that excluding the bulk of its inhabitants from STEM professions could be detrimental to the country's ability to become industrialized, as Kenyan society views technology as a tool for development (National Commission for Science, Technology and Innovation (NACOSTI), 2022). Furthermore, it might be difficult to reap the benefits of greater female involvement in STEM, particularly its shown capacity to increase productivity and foster socioeconomic growth, given the persistently low rate of female participation in STEM disciplines. Therefore, in order to find practical solutions, the primary objective of this research is to explore techniques for encouraging female students' access to and involvement in STEM subjects in Kenya's public institutions (Amunga & Amadalo, 2020).

Though the Kenyan government has implemented laws and measures promoting gender equity and equality since 2000, there is evidence of limited access to and participation of female students in STEM programs in universities (NACOSTI, 2022). Affirmative action, the creation of self-sponsored programs (SSP), the provision of financial aid, the fostering of postsecondary institutions, gender sensitization, and outreach initiatives to encourage female participation in higher education are some examples of these policies and activities. This is a result of the policies and activities being insufficient and transient.

Women's equal access to scientific and technological knowledge and skills is first and foremost a rights issue, much as education is a vital human right. Knowledge and skills acquired by studying STEM disciplines contribute to efforts to fight diseases, eradicate poverty, provide food security, improve education, and deal with social challenges. Empowering women can increase the pool of human resources available to drive growth (van Tuijl & van der Molen, 2016). Thus, it is imperative that educational establishments give more role models and mentoring to female students pursuing STEM disciplines. The government should also complement the current policy measures, beginning at the lowest educational levels with gender-responsive STEM programs.
The government should work with institutions to improve financial aid programs with clear regulations that support female students from low-income families. Elimination of socio stereotypes in the society and at individual level is paramount towards enhancing the number of students enrolling in STEM related courses as well as completion of the course. It's on this back drop that this study embarked on. investigating how socio-stereotypes affect enrolment and completion of STEM courses by both male and female students in public universities.

METHODOLOGY

Research Design

Kothari (2004) asserts that a study design is the blueprint for data collection, measurement, and analysis. For this study, a correlation survey research design was employed. Without modifying or controlling any of the variables, a correlational research design made it easier to examine the link between them. The direction and/or degree of the relationship between two or more variables are reflected in a correlation. A correlation may have a positive or negative direction (Johnson & Christensen, 2012). Because of its benefits, correlational research design was the most effective method for carrying out this investigation.Both qualitative and quantitative research methods were used as such the study made use of a mixed method approach.

Research Location

The study was conducted in Nairobi, Kiambu and Nakuru counties where University of Nairobi, Jomo Kenyatta University of Agriculture & Technology (JKUAT), and Egerton University are domiciled.

Study Population

The target population of the study was 104,197 students drawn from seven faculties or schools namely; Faculty of Health Sciences, Faculty of Engineering, Faculty of Pure and Applied Sciences, Faculty of Computer Science, Faculty of Agricultural Sciences, Faculty of Education, Faculty of Environmental Science and Faculty of Building, Construction &Architecture.

Sampling Framework

Purposive sampling was used to select three (3) old universities out of thirty-five (35) existing chartered Public Universities. Nassiuma's (2008) formula was to determine the sample size of 384 students as shown below.

$$n = \frac{NC^2}{C^2 + (N-1)e^2}$$

Where:

n = Sample Size
N = Target Population
C = Coefficient of Variation ($21\% \leq C \leq 30\%$)
e = Precision Level ($2\% \leq e \leq 5\%$)

Therefore;

$$n = \frac{143095 \times 0.3^2}{0.3^2 + (143095 - 1) \times 0.03^2}$$

n = 384 respondents

The students were categorized in strata based on the seven faculties and then a list was generated where simple random sampling was used to select 384 respondents using rotary technique to avoid bias in selecting participants. Key informants who included Deans, HoDs and Academic Registrars were purposively sampled from the three universities constituting thirty (30) key informants.

Study Tools

Data was gathered for the study using two methods: key informant interviews and self-administered questionnaires. utilising many approaches to gather the same data eliminates the drawbacks of utilising a single approach, improves comprehension of the problems being studied, and raises the accuracy of the results (Jensen, 2011). In order to create a single report, this study triangulated the data gathered using various techniques. The precision and depth of the data gathered were enhanced by relying on the two equipment. Additionally, it improved knowledge of the socioeconomic variables affecting gender differences in the enrolment and completion rates of STEM (science, technology, engineering, and math) courses at a few public universities.

To ensure validity and reliability a pretest at Egerton University before the was conducted before the data collection began. The validity of the instruments demonstrated the significance, suitability and relevance of the conclusions. In addition, the test items' clarity was evaluated allowing for the modification of test items that were deemed insufficient or ambiguous. This led to the improvement of the research instruments' quality and dependability.

The 384 chosen students enrolled in STEM courses were given questionnaires as part of the study. The questionnaires were appropriate for the respondents as they saved time and cost of administering them. A questionnaire, according to Creswell et al. (2007), is a self-report tool used to gather necessary data. In addition to offering the benefit of in-person interaction and the necessary explanations, a questionnaire guarantees a high response rate and minimal bias (Mugenda & Mugenda, 2003). The lower cost of data processing and analysis is another benefit of the surveys.

Schedules for key informant interviews provided reliable, in-depth answers to supplement the quantitative data gathered from document analysis and questionnaires. As suggested by Degu and Yigzaw (2006), the interviewer asked more open-ended questions that allowed for debate rather than a rigorous question-and-answer structure, rather than following a predetermined set of questions. The most important information regarding the gaps in the number of students enrolled in science and technology programs was obtained through open-ended interviews with academic registrars, deans, and heads of departments at the individual schools that offer STEM courses.

Data Collection Procedures

Following board of postgraduate studies clearance, a research permission was requested from the National Commission for Science, Technology & Innovation (NACOSTI). This made it possible for the researcher to gain access to staff members of some public universities who serve as vice chancellors and alumni. Additionally, it made it simple for the researcher to obtain the desired sample size in the research areas. Through the office of the dean of students, who assisted in identifying the student participants, appointments for visits were scheduled in advance with the target subjects. Enrolment information was obtained from the program administrators' offices for the respective universities.

Data Analysis

Quantitative data was analysed using both descriptive and inferential statistics with the help of SPSS software version 22. Qualitative data was analysed using content analysis with the help of N-Vivo software version 14 which generated codes and themes based on the responses provided. The data was triangulated into one research report.Inferential statistical analysis conducted included simple and multiple regression analysis, correlation analysis as well as chi-square tests.

Ethical Considerations

The researcher obtained an introductory letter from the school of postgraduate studies and ethical clearance from the ethical review committeewhich enabled to obtain a research permit from NACOSTI (NACOSTI/24/36291). When the research permit was obtained the researcher was given introductory letter from the county commissioners and education officers from the counties where the selected universities are based. The letters were used to reach out dean of students and registrar of academics from the selected institutions of higher learning. All ethical consideration such as informed consent, voluntary participation and confidentiality were observed.

RESULTS

Demographic Characteristics

Table 1 represents background information of the respondents. The results show that male, account for 214 (62.6%) while 128 (37.4%) were female. Majority of the respondents 213 (62·3%) were in the age bracket of 21–23 years, while 79 (23.1%) were in the age of 18–20 years. The remaining 50 respondents (14. 6%) are recorded under those 24–26 years. The finding indicate that majority of the respondents are within the ages of 21–23 years which is an age group that is commonly associated with universities and therefore correlate with the likelihood of being involved in STEM education.

Findings on the KCSE examination show that 121 (35. 4%) of respondents scored an A- grade, while 76 (22. 2%) secured a B and B+ grade, respectively. Together, these three grades (B, B+, and A-) account for nearly 80% of the total sample, indicating that the majority of students in this cohort performed at a relatively high academic level. The grades at the extremes of the scale, B- and C+ are less common. Only 19 students scored B- and 21 students (6.1%) received a C+. The relatively low frequency of B- and C+ grades suggests that few students performed at the minimum level typically considered for university entry.

The findings show that majority of the respondents 143 students (41.8%) pursued science-based courses while engineering had fewer students taking the course with only 79 students (23.1%) followed by mathematics with 69 students (20.2%). The number of respondents enrolled in Technology is comparatively smaller, 51 (14.9%) which may suggest that students in this faculty should be encouraged or provided with more support/resources. The data also reveals the interest in science and engineering courses, which are mostly inclined towards male students and may thus augment the gender divide.

The study findings show that 63 students (18.4%) were in Year 5 which is a low representation compared to year 3 and year 4. This could be due to students graduating or transitioning out of the program after Year 4 or the engineering students who have a 5-year undergraduate program. The majority of the respondents were in their third year with 101 (29.5%) and fourth years with 94 (27.5%). This distribution implies that the collected sample contains numerous students who are pretty much into their courses. The lower response rate in Year 1 (33 respondents, 9.6%) and Year 2 (51 respondents, 14.9%) can be explained by the difficulties in attracting students to the STEM courses or their dropout due to the socioeconomic or gender reasons. This initial drop-off could also be due to students reassessing their commitment to the program early on. The distribution of students by the year of study reveals that most students are in Year 3 and 4, while a few are in Year 5. It is evident that distribution pattern has transitioned at the end of Year 4, an indication that a majority of STEM programs in Kenya have a four-year period. This group helped in comprehension of the factors contributing to such trends would prove beneficial in the efforts aimed to improve retention and success rate in the terminal years.

Table 1: Demographic Characteristics of the Respondents

Respondent's gender	Frequency	Percent
Male	214	62.6
Female	128	37.4
Total	**342**	**100.0**
Respondent's age		
18-20 years	79	23.1
21-23 years	213	62.3
24-26 years	50	14.6
Total	**342**	**100.0**
KCSE examination grade		

C+	21	6.1
B-	19	5.6
B	76	22.2
B+	76	22.2
A-	121	35.4
A	29	8.5
Total	**342**	**100.0**
STEMCourse Pursuing		
Bachelor of Science	101	29.5
Computer science	51	14.9
Engineering	79	23.1
Health science	69	20.2
Agriculture	42	12.3
Total	**342**	**100.0**
Year of Study		
Year 1	33	9.6
Year 2	51	14.9
Year 3	101	29.5
Year 4	94	27.5
Year 5	63	18.4
Total	**342**	**100.0**

Table 2 illustrates gender distribution across various STEM courses among university students. Overall, male students are more represented in each of the listed disciplines, indicating a persistent gender gap in STEM education. The Bachelor of Science program recorded the highest number of male students, with 79 male respondents (23.1%) compared to 22 females (6.4%). This significant difference suggests that science-related disciplines remain male-dominated, possibly due to lingering societal stereotypes and gender norms that associate science with masculinity.

In the field of Engineering, a similar trend is observed: 51 males (14.9%) were enrolled compared to 25 females (7.3%). Although there is a notable female presence in engineering often one of the most gender-imbalanced STEM fields the data still reflects unequal participation, echoing global findings that engineering remains one of the least gender-inclusive professions. Computer Science showed a sharper disparity, with 33 male students (9.6%) and only 18 females (5.3%). The underrepresentation of women in computing aligns with broader research that links the gender digital divide to early exposure, lack of role models, and discouragement from tech-related careers during early education.

In contrast, Health Sciences presented a relatively more balanced gender distribution, with 42 males (12.3%) and 27 females (7.9%). Although male students still outnumber females, the gap is narrower, suggesting that health-related fields may be more appealing to both genders due to their perceived social value and applicability to community care roles.

Finally, the Agriculture program enrolled 26 male students (7.6%) and 16 females (4.7%). While this field traditionally had more male dominance, the presence of female students indicates growing interest, potentially driven by emerging trends in agribusiness, climate-smart agriculture, and food security initiatives.

Table 2: Gender Segregated Data on Enrolment in STEM Courses

STEM Course	Male		Female	
	Freq	Per	Freq	Per
Bachelor of Science	79	23.1%	22	6.4%
Computer science	33	9.6%	18	5.3%
Engineering	51	14.9%	25	7.3%
Health science	42	12.3%	27	7.9%
Agriculture	26	7.6%	16	4.7%

Motivating Factors for Pursuing STEM Courses

Table 3 illustrates the key motivating factors that influenced male and female students to pursue STEM courses, highlighting notable gender differences in these motivational sources. The most prominent motivating factor across both genders was personal interest, with 91 male students (26.6%) and 40 female students (11.7%) citing it as their primary reason for enrolling in STEM disciplines. This indicates that intrinsic motivation plays a significant role in STEM career choice, particularly among male students. The higher percentage of males driven by personal interest may suggest greater confidence, early exposure, or encouragement to explore technical subjects independently.

Parental advice also emerged as a strong external influence, especially for male students, with 56 males (16.4%) and 27 females (7.9%) indicating this factor. This reflects the important role of family in shaping educational and career paths, especially in cultures where parental guidance is valued. The gender gap here may suggest that male students receive more assertive direction or encouragement from parents to pursue STEM fields, possibly due to traditional gender expectations that associate STEM with masculinity.

Interestingly, the influence of professionals in STEM and role models was a motivating factor for 43 male students (12.6%) and 28 female students (8.2%). This underscores the value of mentorship and visible role models in shaping STEM aspirations for both genders. However, the slightly lower response rate among females may point to a lack of accessible female role models in STEM.

Notably, the school environment was reported as a stronger motivator for female students (9.6%) compared to male students (7.0%). This suggests that institutional factors such as supportive teachers, STEM clubs, and encouragement in the classroom are particularly influential for girls, who may rely more on structured learning contexts to build confidence in male-dominated fields.

Table 3: Motivating Factors to Enrol to STEM Courses

Motivating factor	Gender	Frequency	Percentage
Personal interest	M	91	26.6%
	F	40	11.7%
Parental advice	M	56	16.4%
	F	27	7.9%
Influence from Professionals in STEM and Role Models	M	43	12.6%
	F	28	8.2%
School environment	M	24	7.0%
	F	33	9.6%

Social Stereotype from the Society

Results in Table 4 indicate valuable insights into the impact of stereotype-related perceptions and experiences among students pursuing STEM courses. The data was measured using a 5-point Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement. The statement "I often encounter persons suggesting to me that certain groups (where I am not a member) are more suited to pursue STEM courses" had the highest mean score of 3.37 (SD = 1.34). This suggests that a substantial number of students experience exclusionary attitudes, where they are implicitly or explicitly told that they do not "belong" in STEM based on identity markers such as gender, ethnicity, or social background.

The item "I feel there are stereotype-related barriers that affect the type of academic support available to me and how easy it is to access that support" also scored relatively high, with a mean of 3.08 (SD = 1.23). This reflects a perception among students that stereotype may limit their equitable access to academic resources, mentorship, or recognition.

Another area of concern is the statement "I have encountered stereotype-related comments or behaviours due to my pursuit of a STEM course", which had a mean of 3.02 (SD = 1.32). This points to a prevalence of micro aggressions and discriminatory remarks experienced by students, which can lead to disengagement and reduced academic self-concept.

The perception that stereotypes have led students to question their place in STEM or consider dropping out had a mean of 2.93 (SD = 1.33). Although the mean is below the neutral midpoint (3.0), the proximity suggests that a notable portion of students are affected enough by stereotypes to contemplate withdrawal a serious implication for student retention efforts.

In terms of internalized impact, the statement "Stereotypes about who can succeed in a STEM course have affected my confidence in my education" had a lower mean of 2.69 (SD = 1.26). Similarly, "I often feel discouraged due to stereotypes about my background or gender" received the lowest mean score of 2.49 (SD = 1.26). While these means suggest that most students may not overtly report significant internal discouragement,the variability indicated by the standard deviations implies that a sizable subgroup does experience such effects.

The response to "I have experienced stereotype-related discouragement from family or peers due to my pursuit of a STEM course" (mean = 2.85, SD = 1.38) further highlights the influence of social circles in reinforcing or challenging gender and cultural stereotypes.

Table 4: Social Stereotypes from the Society

Opinions	N	Minimum	Maximum	Mean	Std. Deviation
I often encounter persons suggesting to me that certain groups (where am not a member) are more suited to pursue STEM courses	342	1.00	5.00	3.3655	1.34111
Stereotypes about who can succeed in a STEM course have affected my confidence in my education	342	1.00	5.00	2.6901	1.25507
I have experienced stereotype related discouragement from family or peers due to my pursuit of a STEM course	342	1.00	5.00	2.8538	1.37925
I often feel discouraged due to stereotypes about my background or gender	342	1.00	5.00	2.4883	1.25543
I have encountered stereotype- related comments or behaviours due to my pursuit of a STEM course	342	1.00	5.00	3.0234	1.32184
I face negative stereotypes that influence how I am treated or assessed due to my pursuit of a STEM course	342	1.00	5.00	2.7281	1.32172
During my study, I have encountered stereotypes about STEM courses that have made me question my place in STEM courses or have made me consider dropping out	342	1.00	5.00	2.9327	1.32808
I feel there are stereotype- related barriers that affect the type of academic support available to me and how easy it is to access that support	342	1.00	5.00	3.0819	1.23215

Social Stereotype from Students Themselves

Table 4 show statement on social stereotype. The statement "There are certain groups (where I am not a member) that are more suited to pursue STEM courses" had a mean score of 3.01 (SD = 1.51). This result, which sits just above the neutral midpoint of the scale, suggests that many students perceive STEM fields as belonging to particular demographic or social groups likely referring to entrenched gender, ethnic, or class stereotypes. The relatively high standard deviation also indicates varied responses, suggesting that while some students strongly feel excluded, others reject this notion. The statement "It is hard for me to succeed in a STEM course" received a relatively low mean score of 2.26 (SD = 1.32). This indicates that most students do not strongly doubt their ability to succeed, though a notable minority may struggle with self-confidence or face academic challenges. The belief that "STEM courses are difficult"

yielded a moderate mean of 2.78 (SD = 1.34), suggesting that a significant proportion of students acknowledge the academic rigor of STEM programs. However, this is not necessarily viewed negatively, as difficulty can also be interpreted as a sign of challenge and prestige. Importantly, perceptions of difficulty alone may not deter students, unless coupled with low self-efficacy or external discouragement.

The lowest mean score was recorded for the item "I regret having pursued a STEM course", with a mean of 1.96 (SD = 1.16). This suggests that very few students regret their decision to study STEM, indicating a general sense of satisfaction or at least acceptance of their academic path. This is an encouraging finding, implying that despite challenges or stereotypes, most students are committed to their STEM trajectory.

Similarly, the statement "A STEM course is not suitable to a person of my gender" had a low mean of 1.85 (SD = 1.18). This indicates that most students reject gender-based suitability arguments, demonstrating progressive attitudes regarding gender roles in STEM. However, the existence of any level of agreement reflected in the standard deviation points to the persistence of gender stereotypes among some individuals, which may still influence peer dynamics or classroom participation.

Finally, the statement "I think I am treated or assessed negatively by society because of my pursuit of a STEM course" had a mean score of 2.19 (SD = 1.25). This shows that most students do not feel societal disapproval, but some may sense negative bias, especially those from marginalized or underrepresented groups.

Table 5: Social Stereotype from Students Themselves

	N	Minimum	Maximum	Mean	Std. Deviation
There are certain groups (where am not a member) that are more suited to pursue STEM courses	342	1.00	5.00	3.0088	1.50558
It is hard for me to succeed in a STEM course	342	1.00	5.00	2.2573	1.32355
I believe STEM courses are difficult	342	1.00	5.00	2.7836	1.33527
I regret having pursued a STEM course	342	1.00	5.00	1.9561	1.15936
A STEM course is not suitable to a person of my gender	342	1.00	5.00	1.8480	1.18160
I think am treated or assessed negatively by the society because of my pursuant of a STEM course	342	1.00	5.00	2.1871	1.24672

Gender and Completion Rates of STEM Programs

Table 6 shows results of binary logistic regression was conducted to assess the effect of stereotypes on a particular outcome (e.g., course completion, enrolment, or persistence in STEM, depending on your study's focus). The regression coefficient (B) for the stereotype variable is 0.189, with a standard error of 0.218, and a Wald statistic of 0.753. The associated p-value (Sig.) is 0.385, which is greater than the conventional significance threshold of 0.05. This indicates that the effect of stereotype on the outcome variable is not statistically significant in this model. The odds ratio (Exp(B)) is 1.507, suggesting that individuals who experience stereotype-related effects are 1.5 times more likely to experience the outcome compared to those who do not—however, this result is not statistically reliable due to the non-significant p-value. Additionally, the 95% confidence interval for the odds ratio ranges from 0.540 to 1.269, which includes 1.0, further indicating that the result is not statistically significant and may be due to chance. The model's constant (intercept) is -1.452, and it is statistically significant (p = 0.012), meaning that when the stereotype variable is zero, the log odds of the outcome are significantly different from zero. However, this is not sufficient to conclude that stereotypes meaningfully influence the outcome variable in this model.

Table 6: Logistic Regression on Social Stereotype and Completion Rates of Students in STEM Oriented Courses- Variables in Equation

								95% C.I.for EXP(B)	
		B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**Lower**	**Upper**
Step 1[a]	Stereotype	.189	.218	.753	1	.385	1.507	.540	1.269
	Constant	-1.452	.577	6.339	1	.012	.234		

a. Variable(s) entered on step 1: Stereotype.
Source: Field data, 2024

Qualitative data show various responses concerning the role of stereotypes on STEM completion rates and some responses were:

….. After enrolment STEM female learners feel they must keep on always proving they belong, which can erode their self-assurance and perseverance. Compared to male colleagues, female students are more likely to drop out because, according to some, they are alone or because teachers or classmates question their abilities. **Key informant interview, Registrar Academic affairs**

….. The bias that female students are not as productive or productive as their male counterparts underestimates their skills and can discourage them from pursuing internships or careers in STEM disciplines. This affects both their graduation and those who move into the workforce.
Key informant interview, CoD

….. Due to the perception that they are not as good or as successful as their male counterparts, female students sometimes underestimate their potential and may seek fewer internships or jobs

in STEM fields this affects their completion and entry into the workforce in. **Key informant interview, Dean**

DISCUSSION

The demographic data shows that respondents in this study provides an important contextual insight into the dynamics of STEM enrolment and progression among university students. The findings show that male students were more, compared to female in STEM courses in the selected universities. This gender imbalance reflects global trends as noted by Njenga & Odhiambo, (2021) which highlighted that woman remain underrepresented in science, technology, engineering and mathematics particularly in engineering and technology disciplines.Van Aalderen et al. (2018) emphasized that cultural stereotypes and limited exposure to female role models in STEM discourages girls from pursuing such careers, leading to fewer women in these programs.

The age distribution further reveals that a majority of the respondents were aged between 21 and 23 years which aligns with the students in the middle final year of university study. This finding is consistent with typical enrolment patters in Kenyan Public Universities and suggests a sample largely composed of students who have passed the foundational stages form four KNEC exams. These is important because, according to Sahin, Ekmekci & Waxman (2017) students in later academic stages are more likely to have made stable career decisions and thus provide more informed responses on self-efficacy and enrolment motivations.

Academic performance, as reflected by KCSE grades, shows that a significant proportion of respondents scored within high-performance bands of A-to B plain collectively representing nearly 80% of the sample. This suggests that STEM programs in Kenyan universities are attracting high-achieving students**,** aligning with entry requirements and the findings of Nugent et al. (2015), who noted that admission into science-based programs is highly competitive and skewed toward academically elite students. However, the low number of students with C+ and B- grades highlights the continued exclusion of average-performing students, potentially reinforcing social and academic stratification.

Lower enrolment in technology is noteworthy, and could be attributed to limited program availability, weaker career guidance, or perceived difficulty. This is consistent with findings by Garriottet al. (2017) who observed that in the Kenyan context, technology and applied sciences are often less popular due to inadequate exposure at secondary school levels. Moreover, the concentration of students in science and engineering reflects broader gendered preferences, where boys are more likely to be steered toward physical sciences and technical fields**,** as discussed by (Archer, DeWitt & Dillon, 2014).

The interplay of personal, familial, and social influences that shape students' motivations to pursue STEM courses, with distinct gender differences evident across these domains. The most prominent factor identified was personal interest, which aligns with existing literature that underscores the role of intrinsic motivation in shaping STEM career aspirations (Onyancha &

Wambu,2021). The significantly higher percentage of male students citing personal interest compared to female students suggests that male students may experience greater self-directed engagement with STEM subjects, potentially due to early exposure and reinforcement from their environments (Amunga & Amadalo, 2020).

This gender gap in intrinsic motivation could also reflect broader societal narratives that position males as naturally more suited to technical and scientific fields, thereby encouraging early self-identification with STEM disciplines. As noted by Franz-Odendaal, Blotnicky & Joy (2020), societal beliefs about gender and ability can shape students' self-concept and interest long before they reach higher education. Consequently, the lower personal interest reported by female students may be symptomatic of a wider lack of encouragement, exposure, or confidence to explore STEM subjects from an early age.

Parental advice was another significant motivator, particularly among male students as compared to females. This supports findings by Garriott, Hultgren & Frazier (2016) who argue that familial expectations and support play a critical role in STEM career development, especially in collectivist cultures where parental influence is deeply embedded in educational decisions. The gendered pattern in this data may reflect traditional norms where parents are more likely to direct boys into STEM fields perceived as prestigious and financially rewarding, while girls may receive guidance toward traditionally "feminine" disciplines.

The influence of STEM professionals and role models as a motivating factor is further reinforced by literature on the importance of representation and mentorship. According to Marginson et al., (2016) students are more likely to pursue STEM careers when they see relatable individuals succeeding in these fields. However, the relatively lower percentage of female students citing this influence likely reflects a limited visibility of female STEM role models, a challenge widely discussed in research on gender equity in science education (NACOSTI, 2022). The absence of female mentors can result in fewer opportunities for girls to envision themselves belonging or thriving in STEM environments.

The regression results indicate that stereotypes did not significantly predict the outcome variable in the model, as shown by the non-significant p-value ($p = 0.385$) and the confidence interval for the odds ratio including 1.0. While the odds ratio ($Exp(B) = 1.507$) suggests a potential positive relationship between stereotype-related experiences and the outcome (possibly enrolment, persistence, or academic performance), this relationship is not statistically reliable in the current model.

These findings appear to contrast with a broad base of literature that emphasizes the negative impact of stereotypes on students' engagement and outcomes in STEM, especially among underrepresented groups. For example, Sahin, Ekmekci & Waxman (2017) introduced the concept of stereotype threat, arguing that awareness of negative stereotypes can impair performance and reduce persistence in academic fields where one's group is underrepresented. Likewise, Blotnicky, et al. (2018) found that both explicit and implicit stereotypes can deter

women and minority students from entering or staying in STEM fields, primarily by undermining self-efficacy and creating a hostile academic environment.

However, the lack of a significant statistical relationship in this study does not necessarily invalidate these theoretical frameworks. Instead, it may suggest that stereotype-related effects are moderated or mediated by other variables such as self-efficacy, academic support, peer relationships, or institutional culture which were not captured in the model. Garriott, Hultgren, and Frazier (2016) emphasize that stereotype threat may not operate uniformly across all contexts and can be mitigated by factors such as mentoring, positive identity reinforcement, and inclusive learning environments.

Moreover, the findings may reflect a desensitization or normalization of stereotype exposure among students in the sample, particularly if such experiences have become common or are subtly embedded in institutional or social practices. This could lead students to underreport or downplay their impact, making it difficult to capture their influence through direct self-report measures alone.

It is also important to consider the limitations of statistical power and model specification. The standard error (0.218) and relatively narrow confidence interval suggest some level of uncertainty in estimating the true effect. A more comprehensive model including interactions between gender, ethnicity, socioeconomic status, and stereotype exposure might yield clearer insights into how these dynamics affect student outcomes.

CONCLUSION

The findings suggest that while most students do not perceive themselves as inherently unfit or incapable of succeeding in STEM courses, there remains a pervasive awareness of social and demographic stereotypessurrounding STEM participation. The fact that the perception of STEM as being more suited to certain groups (mean = 3.01) hovers slightly above neutral indicates that identity-based exclusion remains a subtle but present barrier for some students. This reflects the influence of societal messages about who "belongs" in STEM whether based on gender, ethnicity, or class.

The regression analysis indicates that stereotype-related experiences do not have a statistically significant effecton the outcome variable in the current model. This indicates that stereotypes, as measured in this model, do not significantly influence the outcome variable. Thus either, stereotype effects may be indirect or mediated by other factors such as self-efficacy, institutional support, or peer interactions, or stereotypes may vary by context and population, requiring more complex models or larger samples to detect nuanced effects.

RECOMMENDATIONS

Based on the findings, several recommendations can be drawn to address the subtle yet persistent impact of social and demographic stereotypes on STEM participation. Institutions should

actively showcase STEM professionals from diverse gender, ethnic, and socioeconomic backgrounds through mentorship programs, career talks, and guest lectures. In addition, the creation of peer mentoring networks and safe spaces for underrepresented students in STEM is essential, as these platforms allow learners to share experiences and find encouragement. Furthermore, schools and universities should introduce interventions that directly address stereotype threat, including value-affirmation exercises, the use of inclusive language, and open classroom discussions about bias.

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