Emerging Trends in Uptake of Stem Courses in University by Female Students in Kenya

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Abstract

This study examines emerging trends in the uptake of Science, Technology, Engineering, and Mathematics (STEM) courses among female students in Kenyan universities between 2015 and 2021. Grounded in Albert Bandura's social learning theory, the research explores how socialization, role models, and environmental factors influence female participation in STEM. A descriptive survey and ex post facto research design were employed, integrating quantitative and qualitative data collected from five selected universities. Data were analyzed using SPSS, applying both descriptive and inferential statistics. Findings reveal that although enrolment in STEM courses increased for both male and female students over the study period, male students consistently outnumbered females across all disciplines. The overall gender disparity ranged between 11% and 14%. Engineering and Physics remained highly male-dominated, with ratios reaching 4:1, while Mathematics and Chemistry showed a narrowing gender gap, with Chemistry approaching parity. Statistical tests confirmed that these differences were significant ($p < 0.001$). The study concludes that, despite measurable progress in female participation, gender inequality in STEM persists in Kenya. It recommends targeted, discipline-specific interventions, including mentorship programmes, gender-responsive pedagogy, and increased visibility of female role models, to enhance equitable participation and achieve sustainable gender parity in STEM education.

Keywords: STEM Courses; Kenya; University Enrollment; Gender Disparity

Introduction

Science, technology, engineering, and mathematics (STEM) is a broad term used to group together these academic disciplines. There is no universal agreement on which disciplines are included in STEM; in particular whether or not the science in STEM includes social sciences, such as psychology, sociology, economics, and political science. According U.S. government, STEM is defined as physical, biological, and agricultural sciences; computer and information sciences; engineering and engineering technologies; Mathematics (Hill et al., 2010).

Over the past two decades, global efforts to improve girls' access to education have led to substantial progress, particularly at the primary level. Recent estimates indicate that girls' enrolment in primary education in low- and middle-income countries now exceeds 85%, with gender parity nearly achieved in many regions (UNESCO, 2023; World Bank, 2022). This progress represents a significant milestone in expanding educational opportunities for girls.

Access to basic education plays a critical role in improving family well-being and driving economic growth. Education enhances women's participation in decision-making processes at household, community, and national levels, thereby strengthening their social and economic empowerment. As a result, girls' education remains a central pillar of global development agendas, including the Sustainable Development Goals (SDGs), particularly Goal 4 on quality education and Goal 5 on gender equality.

An educated female population contributes significantly to increased productivity, improved health outcomes, and broader socio-economic development. Consequently, investing in girls' education continues to be recognized as one of the most effective strategies for promoting inclusive and sustainable development (UNESCO, 2023; World Bank, 2022).

Full participation of women and girls in STEM is integral to achieving gender equality. Recent global estimates indicate that women remain underrepresented in research and development, comprising approximately 30% of the world's researchers, with only modest improvement over the past decade. In higher education, women account for about 35% of STEM enrolments globally, though their representation varies significantly across disciplines, with particularly low participation in engineering, physics, and computing fields (UNESCO, 2025a).

Recent reports further emphasize that increasing women's participation in STEM is not only a matter of equity but also a driver of innovation, economic growth, and sustainable development. Enhancing gender diversity in STEM has been shown to improve research outcomes, broaden perspectives, and strengthen scientific excellence, making it a critical priority in global development agendas (UNESCO, 2024; World Bank, 2022).

In Kenya, recent statistics from the Commission for University Education (CUE, 2025) and the Engineers Board of Kenya (EBK, 2024) indicate that female participation in STEM-related university programmes has improved over the past decade, with women currently constituting approximately 22%–35% of students enrolled in STEM disciplines depending on the field of study. However, significant disparities persist in technical fields such as engineering, computer science, and physics, where female participation remains below 25%. Recent reports further show that women constitute only about 11% of registered professional engineers in Kenya (EBK,2024) while female representation among STEM researchers and academic staff in Sub-Saharan Africa remains between 18% and 33%, reflecting continuing gender inequalities in STEM education and careers (UNESCO, 2025b).

Statement of the Problem

Employment in Science, Technology, Engineering, and Mathematics (STEM) fields continues to expand at a faster rate than non-STEM occupations, driven by rapid technological advancement, digital transformation, and the increasing demand for specialized skills. Recent projections indicate that STEM-related jobs, particularly in computing, engineering, data science, and advanced manufacturing are among the fastest growing globally. These fields are increasingly shaping what are commonly referred to as "jobs of the future," requiring strong analytical, technical, and problem-solving competencies.

Despite this growing demand, women remain underrepresented in STEM education and careers worldwide, and the situation is more pronounced in Kenya. Although access to general education has improved, female participation in STEM courses at the university level remains significantly lower than that of males, particularly in engineering, physics, and technology-related disciplines. This underrepresentation limits women's access to high-growth, high-paying, and innovation-driven career opportunities.

In Kenyan, labour market trends increasingly favor individuals with job-specific and digital skills, many of which are STEM-based. However, women continue to miss out on these opportunities due to persistent gender disparities in STEM uptake, reinforced by socio-cultural norms, limited exposure to role models, and structural barriers within education systems. This is particularly concerning given ongoing national investments in digital transformation and technology-driven development programmes, which are expected to further expand STEM-related employment opportunities.

The continued underrepresentation of women in STEM has broader socio-economic implications. Limited participation in high-value sectors constrains women's economic empowerment, reduces their contribution to national development, and perpetuates gender inequality. Given women's central roles in families and communities, their exclusion from STEM fields also affects intergenerational opportunities and the aspirations of future female learners.

Therefore, there is a critical need to examine and monitor trends in the uptake of STEM courses among female students in Kenyan universities. Understanding these trends is essential for informing targeted interventions, policies, and strategies aimed at promoting gender equity and ensuring that women fully participate in and benefit from emerging opportunities in STEM fields.

Purpose of the Study

The study aims to identify gender disparities in STEM uptake, evaluate the extent of progress toward gender parity, and generate evidence that can inform policies and interventions aimed at enhancing female participation in STEM fields in Kenya.

Objectives of the Study

- To establish the emerging trends of female and male students in the uptake of STEM related courses in Kenyan universities between the years 2015-2021.
- To compare the emerging trends of female and male students in the uptake of STEM related courses in Kenyan universities between years 2015-2021.

Research Hypotheses

H_0: There is no statistically significant difference in the number of female and male students admitted to STEM courses, including Engineering, Mathematics, Chemistry, and Physics, in Kenyan universities between 2015 and 2021.

Literature Review

The underrepresentation of women and girls in Science, Technology, Engineering, and Mathematics (STEM) education and subsequent careers remains a persistent global challenge. While women constitute a substantial proportion of aggregate global university enrollments, they account for approximately only 35% of students in STEM disciplines, with the lowest representation found in engineering, computer science, and physics (UNESCO, 2023, 2024).

This disparity widens during the transition into the labor market. Globally, women comprise a mere 30% of active researchers and less than 25% of information and communication technology (ICT) graduates (OECD, 2022; UNESCO, 2024). Globally, women constitute a minority of researchers and are less likely to pursue STEM careers after graduation (Bello et al., 2021). Empirical research continuously underscores that this gender gap is fundamentally driven by an interplay of socio-cultural, psychological, and institutional factors, rather than innate differences in academic ability.

Gender inequalities in STEM take root early in childhood through socialization processes driven by parents, teachers, peers, and media portrayals (UNESCO, 2017). STEM fields, particularly engineering and computing, are frequently stereotyped as masculine domains. While boys are actively encouraged to engage in spatial, technological, and problem-solving tasks, girls are subtly directed toward traditionally "feminine," care-oriented paths. These persistent cultural stereotypes directly impair girls' self-efficacy. Studies show that girls tend to significantly underestimate their capabilities in mathematics and science compared to boys, even when their objective academic performance is equal or superior (OECD, 2022; UNESCO, 2023). This deflated self-confidence creates an academic "leaky pipeline," causing high-performing girls to voluntarily opt out of advanced STEM pathways during key educational transition points. In addition, media representations and cultural norms frequently portray STEM careers as male-dominated, which discourages girls from pursuing such fields (Colón, 2016). Additionally, anticipated challenges related to work-life balance and limited career progression opportunities influence women's career decisions in STEM.

The lack of adequate visible female role models in textbooks, media, and academic leadership continues to significantly limit girls' professional aspirations by shaping their perceptions of what is achievable within STEM fields. Recent studies demonstrate that exposure to female role models enhances girls' motivation, self-efficacy, and identification with STEM careers by making such pathways appear attainable and socially acceptable (Tal et al., 2024; De Gioannis et al., 2023). Conversely, the lack of representation reinforces persistent gender stereotypes that portray STEM as male-dominated, discouraging girls from pursuing these disciplines and undermining their confidence. Contemporary research further emphasizes the importance of relatable and authentic role models; for example, women STEM influencers on digital platforms have been shown to positively reshape girls' perceptions by presenting scientists as approachable and multidimensional (Steinke et al., 2024). In addition, culturally relevant representation plays a critical role, particularly in African contexts, where showcasing successful local female scientists has been found to challenge entrenched norms and increase girls' aspirations and self-belief (Babalola et al., 2024). Experimental and intervention-based studies also reveal that role models who emphasize growth mindsets, highlighting effort and learning rather than innate ability, significantly improve girls' interest and persistence in STEM (Jaxon & Cimpian, 2024). Furthermore, innovative approaches such as role-model-based educational tools and game-based learning have been shown to enhance girls' engagement and perceptions of their capabilities in STEM-related tasks (Vekiri et al., 2024). Collectively, these findings confirm that representation remains a critical factor in addressing gender disparities in STEM, with modern forms of visibility including digital media, mentorship initiatives, and culturally grounded narratives playing an increasingly influential role in shaping girls' educational and career trajectories.

Within classrooms, structural hurdles continue to stifle female retention. These include non-gender-responsive pedagogy, unconscious biases among educators, and collaborative dynamics that favor male participation (UNESCO, 2023). Furthermore, in low-resource or rural settings, limited institutional access to science laboratories, digital tools, and technical extracurricular activities disproportionately compromise girls' academic preparedness and performance.

Countering these multifaceted barriers requires a comprehensive and coordinated approach that systematically addresses vulnerabilities across all stages of education and career progression, from early schooling to professional advancement (World Bank, 2022). Contemporary literature highlights several high-impact intervention strategies:

- Early Engagement and Inclusive Curricula: Building STEM interest during primary education through hands-on, collaborative learning, while reforming curricula to highlight the diverse historical and contemporary contributions of women to science (UNESCO, 2023).
- Gender-Responsive Teacher Training: Equipping educators with the pedagogical tools to recognize and dismantle unconscious biases, manage equitable classroom dynamics, and cultivate highly supportive learning environments (OECD, 2022).
- Targeted Digital Skills and Boot Camps: Implementing dedicated technical programming, such as global coding and robotics initiatives (e.g., *Girls Who Code*), which have demonstrably increased girls' technical capacities and interest in engineering paths (UN Women, 2023; World Bank, 2022).
- Workforce Policy Reforms: Eliminating the "leaky pipeline" in industry by institutionalizing transparent hiring and promotion frameworks, promoting family-friendly policies (such as flexible work arrangements), providing targeted scholarships, and passing affirmative action policies at the national governance level (OECD, 2022; UNESCO, 2024).

In Sub-Saharan Africa, and specifically within Kenya, the underrepresentation of women in technical disciplines is compounded by broader socio-economic inequalities, rigid traditional gender roles, and high attrition rates between school and the labor market (UNESCO, 2023; World Bank, 2022). Mentorship and role modeling are essential in shaping girls' aspirations. Increasing the visibility of successful women in

STEM through media, educational programmes, and professional networks helps challenge stereotypes and provides inspiration for girls. Mentorship initiatives have been shown to improve confidence, retention, and career outcomes for female students (Karimi et al., 2024; UN Women, 2023).

To systematically mitigate these localized barriers, the UNESCO Nairobi Office in partnership with the Government of Kenya, the National Commission for Science, Technology and Innovation (NACOSTI), and the University of Nairobi launched the annual Scientific Camps of Excellence for Mentoring Girls in STEM in 2014. Originally established to address gender imbalances in basic sciences and engineering, these initiatives have modernized into intensive, week-long residential STEM Boot Camps of Excellence tailored to the demands of the digital economy (Ministry of Education Kenya, 2022; UNESCO, 2023).

Rather than focusing solely on static laboratory experiments, the modern boot camp model heavily immerses high school girls in advanced, real-world competencies:

- Emerging Technologies: Practical labs covering creative coding, artificial intelligence (AI), robotics, digital design, and 3D printing.
- Mentorship and Peer Networks: Blending life skills mentoring with direct experience-sharing sessions involving university students and senior female scientists to demystify entry requirements for tertiary science and ICT courses.
- Corporate Exposure and Inclusivity: Arranging immersive site visits to science-focused industries while establishing dedicated, protective pathways to ensure the active participation of students living with disabilities.

Pairing robust technical training with sustainable professional networks, this initiative continues to reshape higher education enrollment profiles, accelerate gender equity, and maximize women's contributions to national innovation and economic development.

Theoretical Framework

A well-known social learning theory developed by Albert Bandura, who works within both cognitive and behavioural frameworks that embrace attention, memory and motivation was used in this study (Bandura, 1977, 1986). This theory of learning suggests that people learn within a social context, and that learning is facilitated through concepts such as modeling, observational learning and imitation. Bandura put forward "reciprocal determinism" that holds the view that a person's behavior, environment and personal qualities all reciprocally influence each other's. Bandura argues that children learn from observing others as well as from "model" behaviour, which are processes involving attention, retention, reproduction and motivation. Bandura's Social Learning Theory emphasizes that much of human learning occurs observationally through modeling. When applied to STEM education and career paths for girls, the lack of visible female professionals directly impacts the four subprocesses of observational learning namely; Attention Retention Motor Reproduction/Initiation and Motivation.

Conceptual Framework

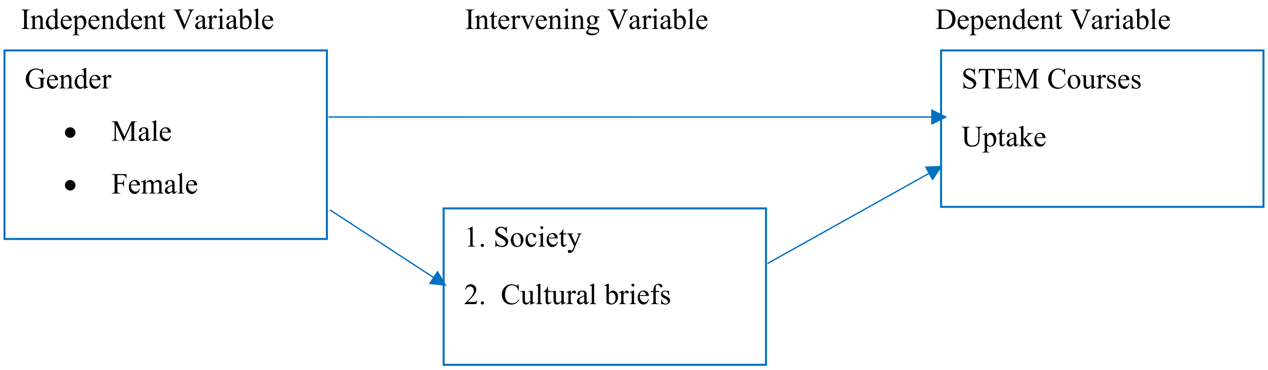

Figure 1: Conceptual Framework of the Study (Source; Author)

The dependent variable of the study is the STEM courses in terms of uptake, progress, academic achievement and completion. This dependent variable is influenced by gender of the student (independent variable) and the society and culture in which the student lives and learns. Randomized selection of the student respondent will control for the intervening variables.

Methodology

The study employed a descriptive survey research design. Research method was ex post facto which shares with experimental research design some of its basic logic of inquiry. According to Kerlinger & Rint (1989) in the context of social sciences research an ex-post facto methods investigation seeks to reveal possible relationships by observing an existing condition or state of affairs and looking back in time for plausible contributing factors. It uses data already collected but not necessarily amassed for research. Cohen et al. (2000) noted that instead of taking equivalent groups and subjecting them to different treatments to determine difference in the dependent variable (in this study uptake of STEM courses by female University students) an ex post facto experiment begins with groups that are already different in some respect and searches in retrospect for the factors that brought about the differences.

To find out the factors contributing to the trend of female students in the uptake of STEM related courses in Kenyan universities a cross-sectional survey method was used. Cross-sectional surveys are primarily used to determine prevalence which equals the number of cases in a population at a given point in time (Levin, 2006). Typically, a cross-sectional study involves drawing a sample of elements of the population of interest. The design is useful in describing the characteristics of a large population, making use of large samples, thus making the results statistically significant even when analyzing multiple variables; the design also allows use of various methods of data collection such as questionnaire, structured and unstructured interviews and document analysis. It also makes use of standardized questions where reliability of the items is determined. Further, the findings of the study can be generalized (Owens, 2002).

The target population of this study comprised all female and male students who enrolled in STEM courses in Kenyan universities between the 2015/2016 and 2020/2021 academic years. According to data from the Kenya Universities and Colleges Central Placement Service (KUCCPS, 2021), the total number of students admitted to STEM courses across all 53 accredited universities during the six-year period was 646,725, comprising 371,575 male students (57.4%) and 275,150 female students (42.6%). These universities included 22 chartered public universities, 9 public constituent colleges, 17 private chartered universities, and 5 private constituent colleges. The accessible population for the study was limited to students enrolled in five purposively selected public universities offering comprehensive STEM programmes, representing approximately 23% of the total public university sector in Kenya.

Purposive sampling was used to select five universities based on three criteria: first, the need for institutions with uninterrupted STEM programmes offerings across 2015-2021, a requirement that was fulfilled by only 14 of the 53 Kenyan universities; second, the need for sufficient female enrollment numbers (excluding institutions with fewer than 100 STEM students per cohort to avoid statistical instability); and third, the goal of geographic and institutional diversity (Nairobi, Central, Rift Valley, Coastal regions; comprising two comprehensive universities, two technology-focused universities, and one regional university). While this approach limits generalizability to all 53 universities, it ensures an information-rich sample appropriate for the research objectives, as random sampling would risk including institutions with incomplete data or negligible STEM enrolments.

A total sample size of 250 students was selected using a multistage sampling approach to facilitate the collection of both quantitative and qualitative data. First, five (5) universities offering comprehensive STEM programmes were purposively selected from the target population. Within each university, four core STEM disciplines (Engineering, Chemistry, Physics, and Mathematics) were included in the study. The sample was proportionally distributed across the universities, with 50 students for each institution. These were further allocated across the four disciplines such that two courses had 13 students each and the remaining two had 12 students each to achieve the required sample size.

Within each discipline, students were selected using simple random sampling from official class registers to ensure representativeness and minimize selection bias. To incorporate both quantitative and qualitative data, the selected students were further divided into two groups: approximately half of the respondents ($n \approx 125$) participated in the quantitative component through structured questionnaires, while the remaining half ($n \approx 125$) were engaged in the qualitative component through semi-structured interviews. This approach enabled the study to generate statistically generalizable findings while also capturing in-depth insights into the factors influencing female students' participation in STEM courses.

In addition, Heads or Chairs of Departments (HODs/CODs) from the selected STEM disciplines were purposively included as key informants to provide expert perspectives and institutional context. This mixed-methods design enhanced the validity and comprehensiveness of the study by triangulating data from multiple sources.

The study used three (3) instruments namely Students' Uptake Report (SUR), STEM Female Students Questionnaire (SFSQ) and Head of Department Questionnaire (HoDQ)

Validity of the questionnaires was sought through the opinion of five (5) experts from the School of Education, Arts and Human resources at University of Kabianga (UoK). Reliability of the questionnaires was established by Cronbach Alpha coefficient. The reliability coefficients of the instruments of this study were estimated using Cronbach's Alpha Coefficient (α). An alpha value (α) of 0.887 was obtained for the students' questionnaires while the alpha value (α) HODs/CODs' questionnaire was found to be 0.781. The instruments were therefore found reliable to collect the anticipated data. According to Nunnally & Bernstein (1994), an alpha value of above 0.7 is considered suitable to make possible group inferences that are accurate.

The summary data form didn't require establishing reliability. They were, however, found able to organize the required data in a way that enabled accurate analysis of the data.

The researchers obtained clearance to carry out research from the Directorate of Research, Linkages and Extension and DVC (PR &D) to enable pursuit of permit from the National Commission of Science, Technology and Innovation (NACOSTI). In addition, the researchers sought ethical approval from UoK Institutional Ethics Review Committee (IERC). The researchers then sought permission from the relevant authorities in each university under study.

Descriptive statistics (means standard deviations and percentages) and inferential statistics including t-test were used for data analysis. This was done by the use of the Statistical Package for Social Sciences (SPSS) Version 11.5.

Results and Discussions

Trends of Uptake of Male and Female Students in all STEM Courses

Number of male and female admitted to STEM courses by gender between 2015 and 2021 is shown in table 1.

Table 1: Number and percentage of female and male students admitted into STEM courses by gender

Cycle	Male		Increase		Female		Increase		Difference (Male-Female)
	Number	%			Number	%			
2015/2016	39, 018	59			27, 108	41			11, 910
2016/2017	47, 457	57	+8, 439	50	35, 579	43	+8,472	50	11, 878
2017/2018	50, 193	57	+2, 736	49	38, 428	43	+2, 849	51	19, 765
2018/2019	40, 509	59	-9, 684	-	28, 041	41	-10, 387	-	12, 468
2019/2020	52, 611	59	+12, 102	58	36, 877	41	+8, 836	42	15, 734
2020/2021	141, 787	57	+89, 176	55	109, 117	41	+72,240	45	32, 670

Source: Kenya Universities and Colleges Central Placement Service (KUCCPS) (2021)

It is clearly visible that the number of female students admitted into STEM courses in the six years under study is lower than that of male students. This indicates that Kenya is nowhere near in achieving gender parity in STEM courses uptake at the university. In other words, the under-representation of women in STEM fields in Kenya persists. This finding is in agreement with the finding of Bezanson (2021), that the under-representation of women in STEM fields persists across the continent and globally.

In the six years under study the percentage of male joining the STEM course in Kenyan universities is either 57% of 59%, while that of female is either 41% or 43%. This constitutes a disparity of between 11% and 14% which is not very high but still reasonable. This means that mitigations that are being offered to reduce disparity have only managed to hold it at between 11% and 14% for the six years under study. There is need to look for other innovative ways of reducing the disparity or better still way of creating gender parity in STEM courses uptake at the universities in Kenya.

The percentage increment in admissions in STEM courses of male is higher above 50% compared to that of female in 2018/2019-2019/2020 and 2019/2020-2020/2021 academic years. In 2015/2016 -2016/2017 the increment was equal at 50%, while 2016/2017-2017/2018 increment of female admission was higher at 51% with male being 49%. The equal 50% increment is very encouraging indicating that gender parity is possible while 51% increment in favor of female is an indication that gender parity is attainable over time. Figure 2 shows the trend of admission during the same period.

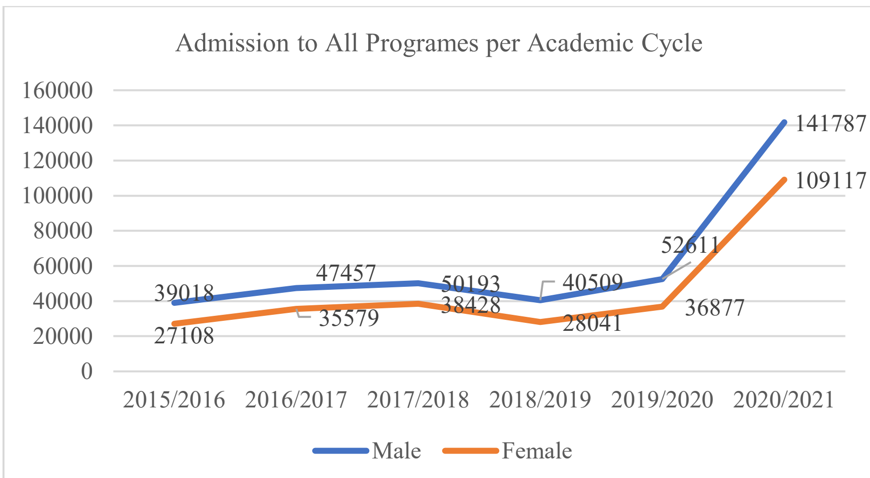

Figure 2: Trends in admissions of male and female students in STEM courses in universities

The graph shows a general increase in admission of both male and female in STEM course. However, the numbers of male students in STEM course are consistently higher during the 6 years under study.

A chi-square test of independence showed a statistically significant association between gender and STEM enrolment across the six academic years, $\chi^2 (5, N = 646{,}725) = 324.63, p < .001$, indicating that male enrolment was significantly higher than female enrolment.

Chi-square tests for each academic year were also done, and it indicated that they were all significant (all $p < .001$), demonstrating a persistent gender imbalance favoring male students across all years from 2015 to 2021.

Engineering [Civil, Electrical, Mechanical, Aeronautical, Geospatial, Software]

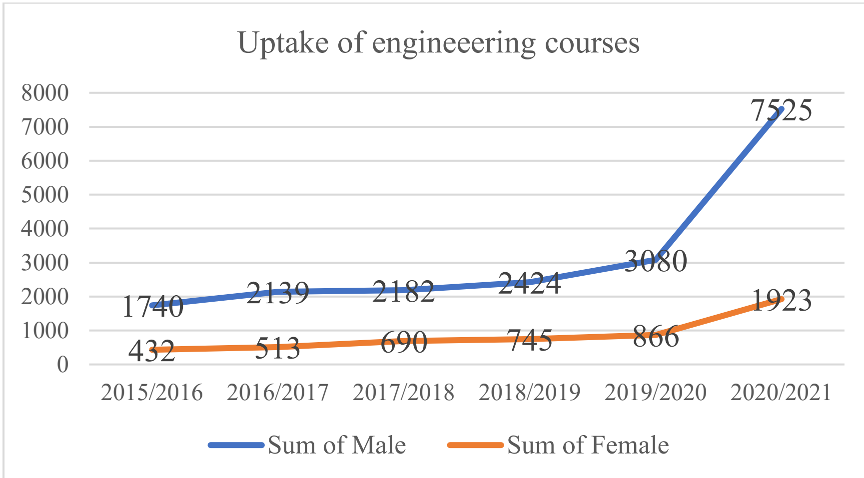

Figure 3: Uptake of STEM courses in Engineering [Civil, Electrical, Mechanical, Aeronautical, Geospatial, Software]

Results indicate that an increasing number of male and female taking engineering courses. There was a huge increase in admissions in 2020/2021 with the uptake higher than double. This could be associated with continued sensitization of students on importance of STEM courses as careers of the future. However, the increase in number of male students taking engineering was much higher than that of female students in the six years under study as shown in Figure 3. The ratio of the number of male students to female students admitted in engineering courses between 2015 and 2021 is shown in table 2.

Table 2: Ratio of male to female admission in Engineering courses

Year	Male	Female	Ratio of Male (M) to Female (F)admission M: F
2015/2016	1740	432	4:1
2016/2017	2139	513	4:1
2017/2018	2182	690	3:1
2018/2019	2424	745	3:1
2019/2020	3080	866	4:1
2020/2021	7525	1932	4:1

The table shows a clear and persistent gender imbalance in admissions to engineering courses over the six-year period, with male students consistently outnumbering female students by a ratio of 3:1 to 4:1. In all the years under study, male enrolment is substantially higher than female enrolment, confirming that engineering remains a male-dominated field. Although both male and female admissions increase over time, the rate of growth is higher for male students, particularly in the 2020/2021 academic year, where male admissions rise sharply. Female admissions also increase in absolute numbers, suggesting improved access or growing interest among women; however, this growth is not sufficient to significantly narrow the gender gap. A slight improvement in gender balance is observed in the 2017/2018 and 2018/2019 academic years, where the ratio improves to 3:1, indicating relatively higher female participation compared to earlier and later years. Despite this modest progress, the ratio reverts to 4:1 in subsequent years, suggesting that gains in female participation were not sustained.

Mathematics Programmes (with Economics/Computer)

The data shows a consistent gender gap in admissions to Mathematics-related programmes (including Economics, Computer Science) over the six-year period, although both genders show overall growth as shown in Figure 4.

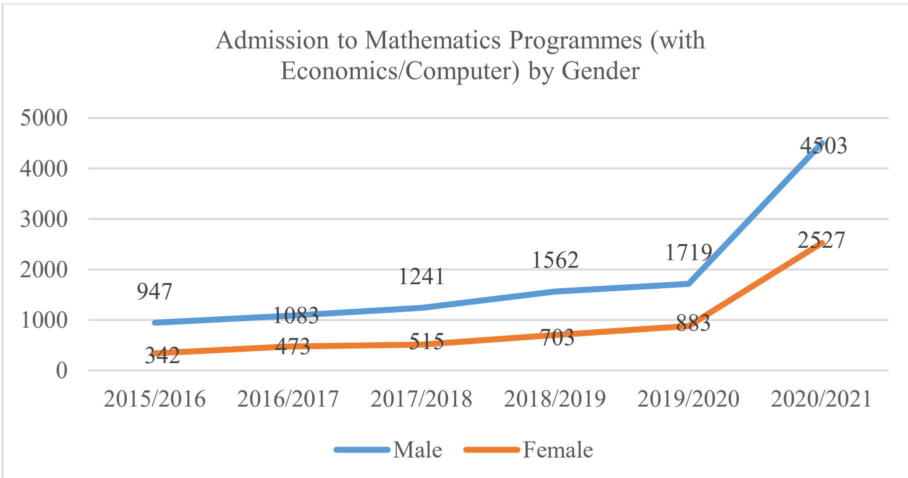

Figure 4: Number of male and female students admitted in mathematics programmes

Figure 4 shows that admissions for both male and female students increased steadily from 2015/2016 to 2019/2020, followed by a sharp rise in 2020/2021. This could be attributed

possibly to increased university capacity, national STEM promotion, or higher demand for quantitative skills. At every point in the series, male enrolment exceeds female enrolment. However, the gender gap narrows significantly over time. The narrowing gap suggests growing interest among young women in mathematics-related programs, possibly due to:

- Increased advocacy for women in STEM
- Scholarships or affirmative action
- Role models and mentorship
- Improved career awareness in STEM fields

This suggests meaningful progress toward gender parity in mathematics programmes.

Chemistry Programmes (Environmental Chemistry, Industrial, Analytical, Biochemistry)

The admission trends for Chemistry-related programmes (Environmental Chemistry, Industrial Chemistry, Analytical Chemistry, and Biochemistry) show overall growth for both genders, with a persistent but narrowing gender gap across the six-year period (Figure 5). These trends point to positive movement toward gender equity in chemistry programmes, though continued efforts are needed to close the gap. Efforts to close the gap include mentors increasing female confidence and interest in laboratory sciences, reduced social-cultural barriers and Policy influence emphasizing gender equity in STEM. This can go along in improving performance by girls in chemistry and biology at secondary school level.

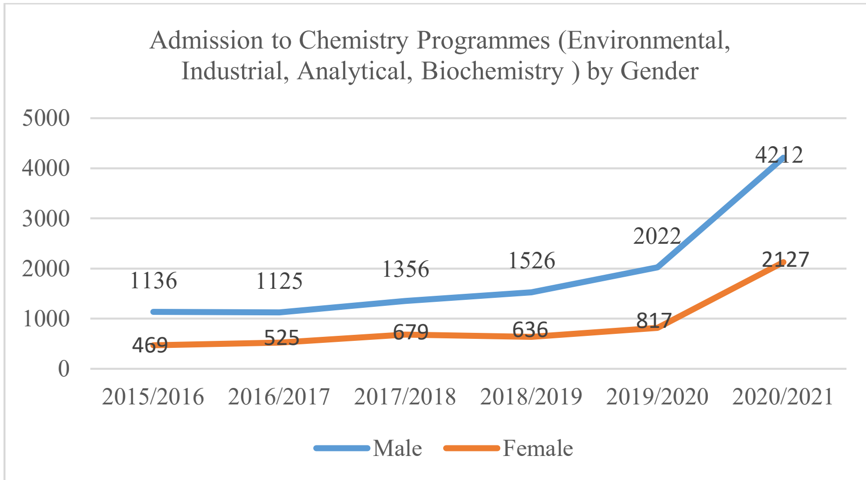

Figure 5: Number of male and female students admitted in chemistry programmes

Physics Programmes (Applied Physics, Astrophysics, Geophysics, Environmental Physics)

Admissions to Physics-related programmes (Applied Physics, Astrophysics, Geophysics, Environmental Physics) shows a persistent gender disparity, with male students dominating enrolment throughout the six-year period (Figure 6). However, both genders show notable increases especially in the final year.

Moderate growth Followed by a sharp increase is seen in admissions of male students as compared to those of Female students which show very low participation with gradual increase. The low participation of female students in physics programmes over the years reflects persistent gender stereotypes that position physics as a male-dominated field (Abraham & Barker, 2023).

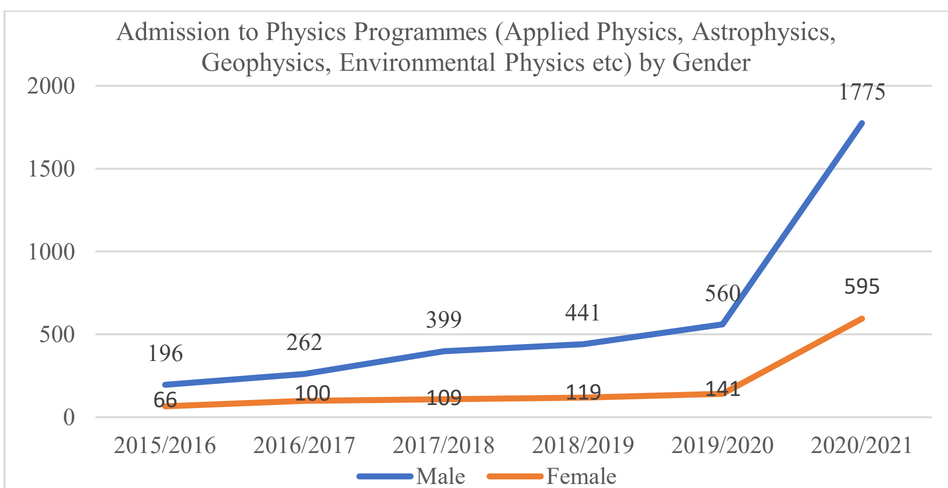

Figure 6: Number of male and female students admitted in Physics programmes

The findings highlight three key patterns:

- Physics programmes continue to attract far more male than female students, indicating persistent gender stereotyping and barriers affecting girls' participation.
- Both genders show increasing interest, especially in 2020/2021, reflecting broader STEM expansion in Kenya.
- Female enrolment is growing, albeit proportionally low, suggesting the need for targeted interventions such as mentorship, awareness campaigns, teacher training, and career guidance for girls.

A Wilcoxon Signed-Rank Test was performed to test the hypothesis: 'There is no statistically significant difference in the number of female and male students admitted in Engineering, Mathematics, Chemistry and Physics programmes in Kenyan universities between years 2015-202I.'The results (P-Value < 0.001) show there is a statistically significant difference between the number of male and female students enrolled in these STEM programmes, with male enrollment being consistently higher across all disciplines and years.The data shows a persistent gender gap. While both groups saw increased enrollment over the period (especially in the 2020/2021 surge), the absolute difference in numbers remains statistically significant, confirming that male students are enrolled at substantially higher rates than their female counterparts in these specific fields.

Conclusion

The admission patterns across the three STEM disciplines Engineering, Mathematics, Chemistry, and Physics reveal consistent growth for both genders over the six-year period, but also highlight persistent gender disparities, with male students significantly outnumbering female students in all fields. However, the findings show a gradual narrowing of the gender gap, particularly toward the final year (2020/2021), thus a slow but meaningful progress toward gender parity in STEM.

Overall, the findings highlight systemic and persistent gender disparities in STEM courses admissions. The dominance of male students points to possible underlying factors such as gender stereotypes, socio-cultural expectations, limited female role models, and differences in subject choice at earlier levels of education. The findings underscore the need for targeted interventions, including gender-sensitive admission policies, mentorship programs, and early exposure of girls to STEM subjects, to promote more balanced participation in STEM education.

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