

Factors Affecting Female Learner's Enrolment in Technical Courses, At Karumo Technical Training Institute, Meru- Kenya

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Abstract (10pt)

Technical courses offers hands-on experience to foster a wide array of self-employability skills among the beneficiaries. However, for a long time the enrolment to technical courses is characterised by low female student enrolment than that of their male counterparts. This study sought to investigate the factors affecting female learners' enrolment in technical courses. The specific objectives in this study were; to determine the effect of financial factors, to establish the effect of cultural factors, to examine the effect of sociological factors, and to assess the effect of role models on female learners' enrolment choices in technical courses. The study adopted a mixed study research design and a sample size of 107. Questionnaires and interview schedules were used as data collection instruments. The data was managed and analysed using SPSS. The study found that 77% of the respondents agreed that financial factors affected female enrolment in technical courses. Other factors that affected the enrolment of female students in technical courses included 77% cultural factors, 85% role models and 79% Sociological factors. The government should increase funding for women's education in technical courses and efforts to fight against retrogressive cultural practices such as FGM and early marriages.

Keywords:

First keyword; Female learners
Second keyword; Technical course'

Third keyword; Enrolment

Fourth keyword; Financial factors

Fifth keyword. Cultural factors

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1. Introduction

Several factors affect an individual's career choices, including the gender role stereotype. These are societal beliefs about the differences between men and women, which can be summed up in two dimensions defining positive personal attributes. They are the communal and argentic dimensions [1]. The communal dimension, which women more than men mostly manifest, describes concern for the wellbeing of others. The argentic dimension depicts a strong and controlling tendency believed by some to manifest more strongly in men than women. With this in mind, the community expects girls to take those careers directly related to nurturing while boys, on the other hand, are expected to take the more serious ones, for example, the sciences and technically based careers [2].

Career choice is mostly based on the social set-up where an individual grew in and how they were indoctrinated to belief in themselves. Youth tend to imitate what they see and find pleasing in society as they grow up; they align themselves with older people in their life who mostly affect their world view of life, like

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parents, teachers, and other important individuals in society; they find pleasure in playing the games that they see family and friends playing [3]. Many young people choose careers because they believe their parents can afford to finance training. Some choose careers based primarily on how much time they want for family and leisure activities, especially young women. For women currently in careers related to science or technology, the path to success is faced with many obstacles. Despite affirmative action efforts for more than fifteen years, women are still under-represented in the physical sciences and equivalent academic positions [4].

Globally, even though tertiary attainment rates of women are now equal to or exceed those of men in America and other developed countries; there is a persistent gender bias in the choice of disciplines. Women still engage in different fields of study than men and are mostly under-represented in the STEM (Science, Technology, Engineering, and Mathematics) fields. At the postgraduate level, the share of women in these fields declines further and yet again in the transition to the workplace. In developed countries, the large majority of degrees in humanities and health are awarded to women (average of 71%), while the majority of degrees in mathematics and engineering degrees are awarded to men (average of 75%) [5]. The gender gap in engineering, manufacturing, and construction degrees is particularly large in Japan, where only 11% of graduates are female. For mathematics and computer science degrees, the largest gender disparity is observed in the Netherlands, with only 10% of female graduates. Indonesia has the most balanced distribution of female and male graduates across the subject areas, with a slightly higher proportion of females graduating in all disciplines [6].

Attracting female learners' to technical fields is not enough to remove gender inequalities in scientific careers: in the academic sector, women tend to be concentrated in the lowest academic ranks, and they progress more slowly than men [7]. The European Commission project "Practicing Gender Equality in Science" (PRAGES), led by Italy's Department for Equal Opportunities, has taken stock of programs and initiatives aimed at promoting gender equality in scientific research within public institutions in Europe, North America, and Australia [8]. The guidelines produced within the project highlight the importance of creating an enabling working environment through the change in the work culture, support of work-life balance for all and early-stage career development, including the gender dimension in the research process itself; and promoting women in scientific leadership positions [9].

In Africa, evidence of the gender gap in the trend and pattern of enrolment in Nigerian universities was observed by different researchers [10]. There was also low evidence of female enrolment in sciences and technology-related courses. Adewara (2011) noted that the participation of females in the study of Sciences, Technology, Engineering and mathematics in Nigerian institutions of higher learning has been discouraging. The females mostly subscribe to social sciences, arts, and humanity courses and those that enroll in sciences are taken as gifted ones. This scenario is not only obtainable in Nigeria. At the higher education level in industrialized and developing countries, women tend to cluster in areas of study, which lead to traditional female careers of teaching, nursing, and others.

Gender imbalance is noticeable in enrolment in different disciplines and programs, especially at the tertiary level. The male/female disparity is witnessed in most science courses, Veterinary medicine, English, and technology-based courses, with technical education favouring males and pure arts courses like English and Linguistics favoring females [11]. In the Kenyan formal education sector, females are under-enrolled from the basic to the higher level. This problem is more pronounced when it comes to technical training institutions. Here, females are extremely under-represented, and the few enrolled tend to be on the traditional feminine courses like Home Economics, secretarial duties, Food Processing, and Tailoring and not the pure science and technology-based courses, which lead to technical occupations. Thus, this is basically to acquire skills that tend to prepare them for the social roles of motherhood and homemaking rather than the technological take-off courses and leadership. Therefore, for the female members of society to take their rightful position in socio-economic development, they need to be encouraged to take courses in science and technology.

1.3 Statement of the Problem

Female learners' low enrolment in Technical (STEM-based) courses is a matter of great concern. Parental attitude, mentality, and encouragement have a great effect on children's career choices. Female carrier choices are further affected by traditional beliefs regarding the ideal gender roles of women and girls in society. Traditionally, the only roles allocated to women are those of wives and mothers. Hence women were viewed as homemakers taking care of children, and men provided for the family needs. Women are perceived as less capable and require the protection and guidance of men.

Ideally, women are equal to men in education and can even outperform them if given a favorable environment to exploit their full academic potential. Nothing should stand between ladies pursuing any career, just as men. Parents and the community should desist from hindering Women from maximizing their potential and treat them equally with the boys, and the house chores should be assigned indiscriminately as this will make them know that they are equal in all aspects. The government must ensure that girls remain in school by all legal means available. Anybody contravening the provisions of the law should be dealt with in

adherence with the said law's provisions. Parents and the entire society should allow children to pursue any career they prefer based on their capability and interest, not their gender.

2. Research Method

The study used the mixed study research design. A mixed study is one that is designed to describe the distribution of one or more variables, without regard to any causal or other hypothesis [12]. The mixed study approach design has been chosen because it allows the researcher to determine the distribution of one or more variables at one particular time by use of research instruments like questionnaires and interview schedules [13]. This allowed the researcher gather to data on the effects of gender mentality on career determination. The mixed study was conducted at Karumo Technical Training Institute. The institution was selected because it gave answers to the study problem because the college is situated in a rural setup but populated with students from the entire Country.

2.1 Target Population

Table 1. Target Population

Category	Target Population
Principal	1
Teaching staff	59
Learners	1040
Total	1100

Source: Karumo Technical Training Institute (2021)

Target population is the entire population or a study group, that a researcher is interested in researching and analyzing who share a common characteristic like age, sex or profession. The study targeted learners' and teaching staff from different departments of Karumo Technical Training Institute. The researcher gathered data from the principal, teaching staff and the learners' in order to get in-depth information for the study. The study target was 107 respondents. The principal and the teaching staff have information on the gender enrolment disparity in various disciplines in the institution.

2.2 Sample Size and Sampling Procedures

Sampling is a process in which a small representation of a large target population is selected to make observations intended to yield knowledge about the population of interest for the purposes of statistical inference. A Sampling frame should have the property that enables the study to identify every single element and include any other study aspect possessed in the sample. A researcher should select a frame with a list of elements of the population preferably the entire population with appropriate contact information. This should be guided by experts in the subject matter under study to ensure the intended information being sort by the researcher was covered during the study period [14].

2.3 Sampling Size

The Krejcie and Morgan formulae (1970) with a total of one principal, 6 teaching staff and 100 students were sampled to form a total target population of 107 respondents. Krejcie and Morgan (1970) formula were used to determine the sampling size:

$$S = X_2NP (1-P) / d_2 (N-1) + X_2P (1-P)$$

S = required sample size

X_2 = the table value of chi-square for one degree of freedom at the desired confidence level

N = the population size

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (0.05)

Table 2. Sample Size

Category	Target Population	Sample size
Principle	1	1
Teaching staff	59	6
learners'	1040	100
Total	1100	107

Source: Karumo Technical Institute (2021)

2.4 Sampling Procedures

Sampling technique is the procedure a researcher uses to gather people, places or things to study [15]. This study employed purposive sampling to select the principal. The principal was selected by virtue of his position; he is the most knowledgeable member of the institution in matters concerning gender disparity during admission. Teaching staffs were selected through convenience sampling where those present during the study were contacted for data collection. Snowball sampling or chain referral sampling were employed

where students referred their colleagues for data collection during the study to ensure none was discriminated.

2.5 Research Instruments

2.5.1 Questionnaire

Two sets of questionnaires were used to gather responses from respondents based on the basis of the research objectives. The research instruments were administered to the target population sampled to collect data on various determinants of female learners' enrolment. The questionnaire items development used both the fixed choice and open-ended formats of questions during the study. The closed-ended items limit the responses from the respondents as they don't allow them to explain their responses. However, the open-ended questions gave the respondents a leeway to elaborate more on the asked questions which gave more personal opinions on the issue of study and that is why these were used. The questionnaire data collection method was used in the study because it is not biased, it is cheap and the respondents gave well-thought-out answers and large samples were used to give more dependable and reliable data. These were administered to students during the study period

2.5.2 Interview Schedule

Interview schedules allow a researcher to get data from the respondents to enable the achievement of the specific objectives of the study [16]. They enable the researcher to standardize the interview so as to ask the same questions in the same manner. Interview schedule helps a researcher to obtain in-depth information from the respondents on a face-to-face interaction enabling the researcher to adapt and or reaffirm the questions as necessary so as to clarify doubts to ensure clear precise answers to the asked questions. An interview schedule involves asking questions, listening to individuals, and recording responses. The interview schedule was used to collect data from the Principal and the trainers

While in the process of data collection, the researcher was keen in order to observe the student population in the institution. Observation is a key tool during data collection as the researcher was able to observe the target populations in their natural setting without them being aware they are being observed.

3. Results and Analysis (10pt)

3.1 Socio-Demographic Characteristics for Learners

The study findings revealed that the majority of learners, 69.0%, were male, while 31.0% were female. Regarding age, 48% of the learners were 21-23 years, 31.0% were 24-26 years, 16.0% were 18-20 years, and only 5.0% were above 27 years. The Department of Electrical & electronics engineering had the majority of research participants at 39.0 percent, followed by the Department of Information & Communication at 29%, the Business & Accounting department at 19 percent, and Building & Civil Engineering Department at 13 percent. Moreover, 47% of the research participants took craft certificates, 28% took artisan courses, and 25% took diploma courses. Table 3 presents this information.

Table 3. Socio-Demographic Characteristics of Learners

Characteristics	Category	Number (n)	Percent (%)
Gender	Female	31	31.0
	Male	69	69.0
	Total	100	100.0
Age	18-20 years	16	16.0
	21-23 years	48	48.0
	24-26 years	31	31.0
	≥27 years	5	5.0
	Total	100	100.0
Department	Building & Civil Engineering Dept.	13	13.0
	Electrical & electronics engineering Dept.	39	39.0
	Information & Communication Dept.	29	29.0
	Business & Accounting department Dept.	19	19.0
	Total	100	100.0
Course taken	Artisan	28	28.0
	Craft certificate	47	47.0
	Diploma	25	25.0
	Total	100	100.0
Number of learners enrolled in each	Business & Accounting Dept.	103	41.4

department			
	Electrical & electronics dept.	73	29.3
	Information & communication	40	16.0
	Building & civil engineering	33	13.3
	Total	249	100.0
Business & Accounting	Female	33	30.8
	Male	70	69.2
	Total	103	100.0
Electrical & electronic	Female	26	35.6
	Male	47	64.4
	Total	73	100.0
Information & communication	Female	19	47.5
	Male	21	52.5
	Total	40	100.0
Building & Civil engineering	Female	8	24.2
	Male	25	75.8
	Total	33	100.0

3.2 Trainers' Socio-Demographic Characteristics

The male trainers were 57.1% (n=4), and the female trainers were 42.9% (n=3). Forty-two point nine percent of the trainers had 11-15 years of teaching experience, 28.6% (n=2) 6-10 years of working experience, 14.3% (n=1) had 5 years and over 16 years of working experience each. The research participants worked in the departments of Business & Accounting, Electrical & electronics, Information & Communication, and Building & Civil engineering. Essentially, 41.3% (n=103) of the enrolled learners were in the department of Business & Accounting, 29.3% (n=73) were in Electrical & electronics department, while 16.0% (n=40) were in Information & communication and 13.3% (n=33) were in Building & Civil engineering. In Business & Accounting department, 30.8% (n=33) were females, while in Electrical & Electronic Department were 35.6% (n=26), Information and technology were 47.5% (n=19) and in Building & Civil engineering were 24.2% (n=8). Besides, 42.9% were taking diplomas and artisan

Table Error! No text of specified style in document.. Socio-Demographic Characteristics of Trainers

Characteristics	Category	Number (n)	Percent (%)
Gender	Female	3	42.9
	Male	4	57.1
	Total	7	100.0
Years of teaching experience	5 years	1	14.3
	6-10 years	2	28.6
	11-15 years	3	42.9
	≥16 years	1	14.3
	Total	7	100.0

3.3 Effect of financial factors on female learners' enrolment in technical courses

3.3.1 Learners' responses

The responses on the impact of parent financial background on female learners' enrolment in technical courses showed that the majority, 42.0 percent agreed, 36.0% strongly agreed, 10.0% strongly disagreed, 9.0% Disagreed, and 3.0% were neutral. On whether the ability to finance education affected female students' enrolment in technical courses, most 43.0% strongly agreed, 34.0% agreed, 11.0% Strongly Disagreed, 7.0% Disagreed, and 5.0% were neutral. On the effect of the availability of grants and sponsorship on female learners' enrolment in technical courses, 50.0% Agreed, 28.0% strongly agreed, 11.0% Strongly Disagreed, 6.0% Disagreed, and 5.0% neutral. On whether learners' interests in technical courses affected female students' enrolment in technical courses, 60.0% strongly agreed, 18.0% Agreed, 9.0% Strongly disagreed, 7.0% and 6.0% Disagreed, and were neutral, respectively.

3.3.2 Mixed statistics - Mean and Standard Deviation on the effect of financial factors

Mixed statistics were used to determine the mean and standard deviation of the responses. On whether parents' financial background affected female students' enrollment, the mean was 3.99, SD 1.345 out of 100 respondents (N)

Table 5. Financial factors - Mean and SD

Financial factors	N	Mean	Standard Deviation
Parent financial background	100	3.99	1.345
Ability to finance education	100	3.91	1.326
Availability of grants and sponsorship	100	3.78	1.236
Learners' interest in technical courses	100	4.13	1.323

On the ability to finance education, the mean was 3.91, SD 1.326, availability of grants and sponsorship Mean=3.78, SD 1.236. Regarding learners' interest in technical education, the mean was 4.13 and SD 1.323 (Table 5).

The study's findings in table 4 discovered that 42.0% agreed and 31.0% strongly agreed that parent financial background affects the enrolment of female learners in technical courses with a mean of 3.789 (Table 5). The multiple regression analysis found that parent financial background positively affected female learners' enrolment in technical courses (Table 5). The findings of this study are similar to a study conducted in China by Li and Qiu (2018), which found that family background seriously affects the enrolment of students in tertiary education. Parenting academic support and behaviors for their children could cultivate learning habits and affect enrolment in technical courses. Besides, the academic performance and enrolment of female students in technical courses could be substantially affected by their families' socioeconomic status.

The study's findings noted that 77.0% of the respondents either strongly agreed or agreed that the ability to finance education affects the enrolment of female students in technical courses (Table 4). It was discovered that ability to finance education positively affected the enrolment of female learners. The study findings were similar to Ouma (2018) and Nguyen *et al.* (2019), who found that the parents' socio-economic status significantly affected the parent's capacity to pay school fees, affecting enrolment. Moreover, the study revealed that low-income families force girls to engage in wage and domestic labor to supplement household income. Besides, the study noted that inability of parents to finance tertiary education forces parents to delay the enrolment of girls due to a gap of financial challenges.

3.3.3 Inferential statistics – multiple regression analysis

The dependent variable included female students' enrolment in the technical courses. Independent variables include parents' financial background, ability to finance education, availability of grants and sponsorships, and learners' interest in technical courses. Multiple regression analysis indicated that the R Square was 0.021, Adjusted R Square was -0.020, R Square Change was 0.021, the F change was 0.513, and the P value was 0.026. The Beta standardized coefficients for parents financial background was 0.099 and P=0.047; ability to finance education $\beta = 0.205$ and P = 0.026; availability of grants and sponsorships $\beta = 0.297$ and P = 0.266 and learners' interest in technical courses $\beta = 0.004$ and P=0.988. Therefore, parents' financial background and ability to finance education had positive Beta coefficients, which positively impacted the enrolment of female learners in technical courses. This was also reflected in the other categories, availability of grants, sponsorships, and ability to finance education positively affected female learners' enrolment.

Table 6. Model summary - financial factors

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.145 ^a	.021	-.020	0.469	0.021	0.513	4	95	0.026	
a. Predictors: (Constant), Learners' interest in technical courses, Parent financial background, Availability of grants and sponsorships, Ability to finance education										
b. Dependent Variable: Gender										

Table 7. Multiple regression Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.680	.160		10.517	.000
	Parent financial background	0.034	0.082	0.099	-0.418	0.047

Ability to finance education	0.072	0.100	0.205	-0.716	0.026
Availability of grants and sponsorships	0.112	0.100	0.297	1.118	0.266
Learners' interest in technical courses	0.001	0.081	0.004	0.016	0.988
a. Dependent Variable: Gender					

The results also revealed that the majority of research participants, 78.0%, strongly agreed and agreed that the availability of grants and sponsorship affects the enrolment of female students in technical courses (Table 4). Multiple regression analysis found that the availability of grants and sponsorships positively affects the enrolment of female learners (Table 7). The findings are similar to a study conducted in South Africa by Fomunyam et al. (2020), which indicated that the availability of grants and sponsorships in higher education improves the enrolment of students because grants subsidize the tuition cost. Moreover, the study discovered that when grants and sponsorships were reduced, it significantly reduced enrolment in educational institutions.

Most of the research participants, 78.0%, either agreed or strongly agreed that learners' interest in technical courses affects female learners' enrolment in technical courses (Table 4). The findings also indicated that learners' interest in technical courses positively affected enrolment in technical courses. The results are similar to research in Tajikistan by Safarmamad (2019), which highlighted that learners' interest in vocational and technical courses affects enrolment. The study noted that learners' perception of securing a job after completion of the courses is one factor determining their interest in particular courses. On the contrary, the researcher noted that a decline in interest in enrolling for vocational education could be attributed to young people being disheartened or discouraged from getting employment after receiving a formal vocational certificate. Moreover, interest may also be affected by the nonexistence of adequate awareness and knowledge on the value and role of qualifications, skills, and training in the new economy. After completing secondary education, learners enroll in technical and vocational education and training (TVET) based on their interests and passions.

4.3.4 Trainers' responses

When trainers were asked about the effect of parents' financial background on the enrolment of female learners in technical courses, 71.4% (n=5) answered strongly agree, and 28.6% (n=2) agreed. On whether the ability to finance education affected the enrolment of female learners' in technical courses, 57.1% (n=4) strongly agreed, while 42.9% (n=3) agreed. Regarding the effect of availability of grants and sponsorships, 42.9% (n=3) strongly agreed, 42.3% (n=3) agreed and 14.3% (n=1) disagreed. When asked whether learners' interest in technical courses affected enrolment of female students in technical courses, 42.9% (n=3) strongly agreed, 28.6% (n=2) agreed, and 28.6% (n=2) strongly disagreed. On whether college offer bursary to female learners, 28.6% (n=2) strongly agree, 28.6% (n=2) agreed, 28.6% (n=2) disagreed and 14.3% (n=1) strongly disagreed.

During the interview, when the principal was asked about the financial factors, he said: *"Finance is a major issue as far as female learners' are concerned because most of them lack money to pay for particular courses. For example, some parents cannot pay for extras required in courses such as Civil Engineering and Building Construction, thus barring their daughters from such courses."*

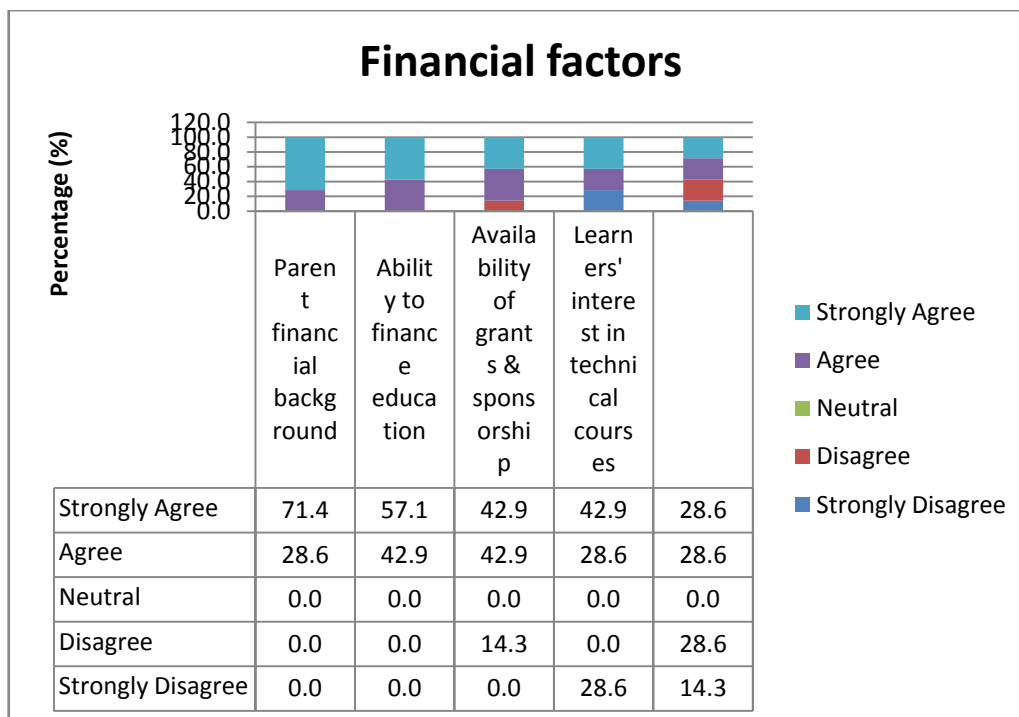


Figure 1 Financial factors - Trainers

4. Conclusion (10pt)

Based on the study findings, Parent financial background influences female learner’s enrolments in technical courses, for example, a wealthy parent will not mind paying for their daughters to study ant technical course, unlike a poor parent. Grant and sponsorship availability affects the female trainee enrolment in technical courses.

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