

## Family Structure and Female Enrollment into Engineering and Technology Programmes in English Speaking State Universities of Cameroon

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### Abstract

This study seeks to find out the influence of family structure composition and gender beliefs on female enrolment in to Engineering and Technology programmes in the English-speaking state universities in Cameroon. The methodology used in this study was an explanatory sequential mixed method design where data were collected from 276 students from the two universities and an interview administered to 10 parents whose children are enrolled in any engineering or technology department within the two English speaking state universities in Cameroon. The data collection instrument was a structured questionnaire administered to the students and an interview guide administered to the parents. The data collected were analyzed descriptively and Point Biserial Correlation Analysis was also used to find the relationship between Family Structure Composition and Female Enrolment in Engineering and Technology Programmes. Paired Sample T-Test was also used to find out if gender within the family has an impact on enrolment in engineering and technology programmes and finally a Binary Logit Regression was used to show the impact of family structure on Female Enrolment in Engineering and technology Programmes. Findings from this study indicates that there is a weak relationship between family structure composition and female enrolment in engineering and technology. Indicating that performance in sciences and subsequent enrolment in engineering and technology by female students are supported by other factors other than the family structure. Paired sample T-Test and Binary logit regression analysis indicates a strong family belief system that female children should pursue the art discipline and this beliefs had a significant impact on female enrolment in engineering and technology fields. Parents should be encouraged to devote the same amount of their resources in educating their girl child as they do for the male children. House chaos and other constrains should be adequately managed within the family during school periods and negative family beliefs that have an impact on the schooling of the girl child should be avoided.

### Introduction:

Education is sin-qua-none to the development of any society and educational stakeholders such as the government, parents, teachers and civil societies have a vital role in implementing the

educational policies of a nation. The process of educating the society could be formal or informal where the informal education involves the families. Families constitute the society and their structure defines a society. Family can be polygamous,

monogamous, nuclear, extended family, step family, single-parent family, adopted family and foster family and their contribution towards a child's education mostly depends on the type of family structure the child belongs to (Meleen, 2019). Hence, parents are very influential in assisting their children acquire formal education as well as encouraging the female girl child enroll in the science and engineering fields.

In recent years, technology and engineering have been invading all domains of activity in the modern world, with prevalent roles in national economic development. Resources have also been allocated in many parts of the world for developing curricula in school science and the need for more scientists and engineers have developed more recently. These needs can be attained when the influence of the family in the learning trajectory of children is supported. Family structures are crucial to some extent for children's academic progress. The family acts as a socializer and provides vital support in financial, social, emotional and educational support. Clearly, if the participation of females in engineering and technology has to be improved upon, then both formal education and home factors influencing learning have to be considered.

### **Research Objectives:**

#### **Main Objective:**

The main objective of this study is to investigate the impact of family structure on female enrolment in Engineering and Technology programmes in the English speaking state universities of Cameroon.

#### **Specific Objectives:**

The specific objectives of the study are to:

1. Find out the influence of family structure composition on female enrolment in to Engineering and Technology programmes.
2. Find out how enrolment in to engineering and technology programme is affected by gender within the family structure

### **Research Questions:**

#### **Main Research Question:**

What is the impact of family structure on female enrolment in Engineering and Technology programmes in the English speaking state universities of Cameroon?

#### **Specific Research Questions**

1. How does family structure composition affect female enrolment in to Engineering and Technology programmes?
2. How is enrolment into engineering and technology programme affected by gender within the family structure?

### **Research Hypotheses**

The hypotheses were stated in null and alternate forms and tested at  $p < 0.05$  level of significance.

**Ho1:** There is no significant relationship between the family structure composition and female enrolment in Engineering and Technology

**Ha1:** There is a significant relationship between the family structure composition and female enrolment in Engineering and Technology.

**HO2:** There is no significant relationship between gender and enrolment in engineering and technology programme

**Ha2:** There is a significant relationship between gender and enrolment in engineering and technology programme

### **Literature review:**

Parental involvement in education has been examined by several researchers (Fan & Chen 2001; Singh et al., 1995, Agborbechem, 2015) as a construct consisting of four dimensions: parent-child communication about school, home structure/supervision, parental participation in school-related activities, and parental aspirations / expectations.

The family structure in this study dwells on the family size, sibling order, dependency ratio and marital status which influence female enrolment and persistence in mathematics and science both at

the secondary and tertiary level. Children brought up in various family structures have varied educational consequences. Literature shows that a child's emotional, psychological and educational wellbeing is influenced by the combine action of the family; parenting styles, structures type, family cultural status, and family size (Jeynes, 2002; Eamon, 2005). Studies comparing different family structures and students' achievement levels show that family structures have clear educational advantages over one another (Coleman *et al.*, 2000).

This is particularly associated with family structure, level of resources and its deprivation, which centred on parental investment in education, based on family size and welfare responsibilities. Frazer *et al* (2004) and Hayes and Bronzaft (2006) found that family factors such as sibling order have relationship to academic achievement. Similarly, children from single parents usually develop less concentration and greater social and psychological problems in school (Eamon, 2005). Additionally, literature on children's family structures reveal that the age gaps between parents and the age at which a mother gives birth affects the children's academic achievement either positively or negatively (Laosa, 2005). Adewale (2002) point out that in rural communities there is large family size due to polygamy and uncontrolled birth which are associated with illiteracy and such families often are characterized by low nutritional status, health problems which in turn influence students' academic success and students' dropout from school.

It is acknowledged (Sun and Li, 2008) that family changes at any given time such as remarriages, increase in family size, changes in family income, and divorce affect family resources and children's educational engagement. Phenomenon like increase in the number of dependents in a household and the number of dependents who are schooling introduce changes in family resources, rules, and parenting practices which might adversely affect children in school by adjusting to their new family environments and cope with such

challenges. The type of family that a child comes from either monogamous or polygamous family usually has an impact on the child academic performance. Polygamous family is peculiar to Africa in general and most especially in rural areas in Cameroon. According to Gottfried *et al.* (2004), polygamous family is common among well-educated families as well as among poorly-educated families. He added that it is equally common among professional and managerial fathers on the top of the occupational hierarchy although to unskilled workers polygamous is prominent. Children from larger families are found to do worse than children from smaller families as revealed by Lacovou (2001) in Muthoni (2013). He found out that child lower down the birth order do worse than those higher up the birth order. The reason could stem from the fact that the parents are able to carter for a small family and are able to provide for their needs.

#### **Empirical Review:**

In a study conducted by Astone & McLanahan (1991) cited in Muthoni (2013) about the relationship between family structures and student achievement in high school revealed that children who lived with single parents or stepparents during their teenage years received less support and help with school work than children who lived with both natural parents. According to a multivariate study by Fantuzzo, Tighe, and Childs (2000), three types of parental involvement were examined: home-based involvement, school-based involvement, and home-school conferencing. There were higher levels of home-school conferencing and home-based involvement in two-parent families where there was a married couple than in single-parent households.

Studies conducted by Muthoni (2013) on African populations indicated that children from two-parent homes do better than children from single-parent homes on a variety of social indicators. Muthoni found that African children living with one parent were less likely to be in school at age 17 than their two-parent counterparts. A recent longitudinal study found that African children in

two-parent homes had significantly higher math and reading scores and lower behavioural problems than did children in single-parent homes. Many researchers also argued that the consequences of single-parent homes were mainly related to the economic standing of the single-parent home and others argued that the studies did not account for important aspects of family functioning (Scott and Black, 2009) as cited in Muthoni (2013).

Family size in this context refers to the total number of children in the child's family from either monogamous or polygamous homes. The result of the study conducted by Kim (2008) indicates that, factors such as the rapid increase of single parent families directly affects student achievement in the classroom. Kim (2008) studied 11,500 kindergarten students and found that those students who lived in a married household scored higher levels on the reading comprehension exams than those of both single parent households and step-parent households (where either parent is the step parent). Additional results found to be significant comparing family demographics and student achievement. Kim (2008) reported that children ages 6-11 spend more time on school work in households with both biological parents, high school student living with their biological parents were more likely to complete an algebra course than high school students of single mothers, students who experienced a divorce during their academic career had a sharp drop in their grade point averages and have an increased risk of having to repeat a grade and students who live with a biological mother and a cohabitating boyfriend show even higher levels of drop out, lower grades, lower test scores and behaviour problems at school than just single mothers living alone. Findings from these studies indicate that married couples have more influence on the education of their children and especially of their female girl child than single-parents, guardians and foster parents. Kim (2009) expanded on an earlier study of the effects of family demographics on student achievement at the middle school and high school levels to see what impact family demographics have on a student entering college. Kim (2009) found that students

who enter college with both parents intact and residing at home will be more likely to graduate with a degree than those students living in any other type of household. College attendance and completion was reported as being much lower among single parent households or blended households when compared to married households. The education of the child especially the girl child can be jeopardize with the single-parent home than with the married couples home.

The rate of single parenthood is alarming in Cameroon as more and more divorces are witness nowadays. In addition, many more single parents are involved in long days at work and thus are rarely involved in helping their children in school activities at home because they get exhausted after work.

Research on the effects of sibling's size and position has been based on a theory of the allocation of parental resources. The size of the family in which a child grows affects his intellectual development. In a large family a child may not be given maximum attention especially in his academics and the provision of needed resources. It is typical of children from fondoms and palaces in Cameroon where the family size is very large and survival of the fittest is the order. The issue of home works, payment of school fees, attending Parent Teachers Associations and many more may not be convenient for the Fons, chiefs, and sub-chiefs as they have to cater for many children. While children are well catered for and perform better in small size family due to parental involvement and motivation.

#### **Expectancy-value Theory.** Eccles et al. (1983)

Eccles' expectancy-value theory (Eccles et al., 1983) is a contemporary theoretical perspective on parental socialization influence on children's motivation in achievement settings. Widely used in academic contexts, this theory has been used to explain how parents shape children's self-perceptions about their abilities in mathematics and sciences, and the links parental socialization practices with children's motivational



characteristics. This theory proposes that parents play a fundamental role in providing achievement experiences for their children. Parents perform these tasks in relation to their own belief systems, and these belief systems are reflected by their expectancies, values, and gender-related beliefs. In turn, children's belief systems are shaped through the combination of the experiences provided for them by their parents and through the feedback that they receive from their parents.

Parental value refers to the perceived relative importance to parents of various achievement domains. Achievement domains can include academics, sport, music, and performing arts. The study focuses on the value parent's place on academics (engineering and technology) as an achievement domain for her child. According to Eccles' (1993) the greater the value that is ascribed to a particular achievement domain, the more frequent will be the opportunities provided by the parent to their children within that achievement domain. Therefore, when parents value the importance of engineering and technology within their community and as a career worth pursuing, they will provide the necessary requirements needed for the female student to enrol into such programme. Similarly, parents who pay very little attention on the education of their children especially the girl child misses the opportunity of orienting them to a better career in education. Expectancy-value theory help us understand individual differences within the same family in the socialization process. Eccles (1993) argued that in accordance with this socialization history, the child will typically adopt both parents' expectancies

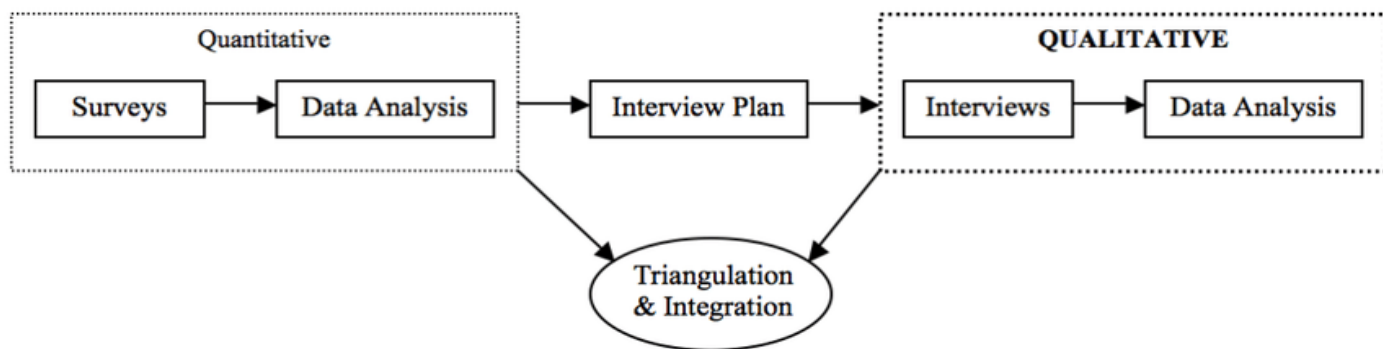
about his or her ability or competence, as well as the parents' values about the relative importance of differing achievement domains. The most important socialization component of the model is precisely that children are likely to adopt their parents' beliefs and that their motivation in various domains will reflect a belief system that originated with their parents. If children believe that they are highly competent in a given area, they are more likely to be motivated in that area of achievement. This theory is consistent with current motivational theories that emphasize self-efficacy (Bandura, 1977) in that greater perceived ability is believed to predict greater motivation. Eccles' (1993) theory also contains a third related element that pertains to the influence of possible gender-related parental beliefs. The theory was initially used to help explain possible gender differences in academic achievement relative to stereotyping.

**Methodology:**

**Research Design:**

This study uses an explanatory sequential mixed methods research design to address the concern of family structure and females enrolling in the fields of engineering and technology in the English speaking state universities of Cameroon.

Creswell (2004) posits that explanatory sequential mixed method design is one in which the researcher first conducts quantitative research, analyzes the results and then builds on the results to explain them in more detail with qualitative research. The explanatory sequential mixed method developed below was used;



**Figure 1: Explanatory sequential mixed method design**

Source: Adapted from Creswell (2004 p. 40).

The explanatory sequential mixed method research design is characterized by three phases: Phase 1 is the collection and analysis of quantitative data from the student respondents using questionnaires followed by step 2 which is the collection and analysis of qualitative data from the parents using interview and phase 3 is the merging and synthesis of both the quantitative and qualitative analysis to draw conclusions.

### **Population of the Study:**

A target population of all the undergraduate students (year 1,2,3 & 4 approximately 3000 students) of the two state universities enrolled in Engineering and Technology for the academic year 2023/2024 and an accessible population of all the first year undergraduate students (level 200) enrolled in engineering and technology related programs. The year one students are chosen because they just completed high school and still have a lot of affections towards the family and are still influence by their parents. They can easily report on their family structure factors that impacted their secondary and high school trajectory.

### **Sample and Sampling Technique:**

The study employed the use of two sampling techniques namely the purposive sampling and simple random sampling techniques to select the students. This purposive sampling focus on two levels;

**Level 1:** The selection of the Anglo-Saxon state universities in Cameroon which are the universities of Bamenda and Buea. The choice of these two universities is because there is a high degree of certainty that the following disciplines; Engineering and Technology are functional with a significant number of English teaching staff as well as adequate infrastructure and resources which the private English universities in Cameroon lack. These universities are the only English speaking state universities which are aimed at fostering the Anglo-Saxon culture of education.

**Level 2:** The selection of students involved only students that have done sciences at the high school

and are currently enrolled in the Engineering and Technology programmes. They are randomly selected and are students of the following schools and faculties; College of Technology (Focus on ICT and electrical engineering) and National Higher Polytechnic institute (NAHPI) in the University of Bamenda, Faculty of Engineering Technology (FET) and College of Technology (COT) in the University of Buea.

Given that 897 students enrolled in Engineering and Technology programmes for the two state universities during 2023 to 2024 academic year. Krejcie and Morgan's (1970) table on determining the sample size for a research activity proposed that for a target population of 897, the study should use about 269 students' respondents as the accessible population. Given the anxiety shown by the students during the survey to answer the questionnaire, a sample of 276 student respondents took part in the survey

### **Results and Discussion:**

#### **Descriptive analysis of family structure composition:**

The study objective seeks to compare family structure composition and female student enrolment in engineering and technology. This view agrees with the report of OEDD/UNESCO (2003) that family characteristics are a major source of disparity in students' educational outcomes.

#### **Family Structure:**

In relation to family structure composition, that majority of the respondents (66.3%) came from monogamous homes, 26.8% of them came from polygamous homes and 6.9% of them came from single parenthood. For life as a family, majority of them (48.6%) came from nuclear family settings, 29.7% came from extended family settings, and 21.7 came from family compound setting. In relation to parenting styles, majority of the respondents (74.3%) came from homes with both parents, 21.4% came from homes with single parents while 4.3% grew up with adopted parents. For the family bread winner, majority of them

(98.2%) indicated that it is either their mother or their father who is the bread winner of the family while only 1.8% indicated that both parents are bread winners of their families. On the part of the number of dependent children, the findings reveal that majority of the respondents (51.9%) indicated that they have between 1 to 5 dependent children in their family households, followed by those with 6-10 dependent children (31.5%), then those with no dependent child (10.9%), those with above 15 dependent children (1.8%) and those with 11 to 15 dependent children (3.9%). The interview trend on family structure composition indicated that female children from larger household sizes are less likely to enrol in Engineering and Technology than those from households with fewer children. This is justified by the fact that larger household sizes require more income for education and thus, parents tend to ration their meagre income to send mostly only males to Engineering and Technology which entails more cost and then the rest, mostly the females go for the arts. The effect of family type on female enrolment in Engineering and Technology depends on the intimacy of the girl child with the parents and with the single parenting, the child mostly enrol in what the single parent tells her, for monogamy she enrolls for what both parents advise her to do mostly while for polygamy, children mostly enrol in the field recommended to them by their mothers since they are mostly closer to their mothers than their fathers. On the part of

parenting style, female children from authoritarian parents tend to enrol more in Engineering and Technology than children from democratic parents.

**Hypothesis one:**

**Ho1:** There is no significant relationship between family structure composition and female enrolment in Engineering and Technology

**Ha1:** There is a significant relationship between family structure composition and female enrolment in Engineering and Technology

The independent variable in this hypothesis is family structure composition, while the dependent variable is female enrolment in Engineering and Technology. The scores of the independent variable were got from the responses recorded from the four questionnaire items that measured the family structure composition which were used to form a composite index score by the use of Principal Component Analysis (PCA). The scores of the dependent variable were got from a questionnaire item measuring enrolment of students in Engineering and Technology. The statistical analysis technique used to test this hypothesis was the Point Biserial. The point Biserial test in this circumstance uses the Pearson Product Moment approach where the independent variable is continuous data and the dependent variable is dichotomous

**Table 1: Point Biserial Correlation Analysis for the Relationship between Family Structure Composition and Female Enrolment in Engineering and Technology Programmes**

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Males	201	-0.0300099	0.0697717	0.989185	-0.16759	0.1075727
Females	74	0.0672073	0.1199061	1.031472	-0.17177	0.3061799
combined	275	-0.0038496	0.0602886	0.999773	-0.12254	0.1148381
diff		-0.0972172	0.1360636		-0.36508	0.1706502
$r_{pb}$	-0.0432					
t-stat	-0.71					
P-value	0.500					

Table 1 above shows a correlation coefficient for the relationship between family structure composition and Female Enrolment in Engineering and Technology Programmes as -0.0432. The negative sign reveals that family structure composition negatively associate with Female Enrolment in Engineering and Technology Programmes while the magnitude of the coefficient reveals that the relationship between family structure composition and Female Enrolment in Engineering and Technology Programmes is weak. Therefore, family structure composition has weak negative relationship with Female Enrolment in Engineering and Technology Programmes. The t statistics for the correlation is -0.71 and the p-value is 0.500 (not less than 0.5). This indicates that the association is insignificant meaning that family structure composition has negative and insignificant relationship (at 5% level) with Female

Enrolment in Engineering and Technology Programmes. Thus we reject the alternative hypothesis thereby concluding there is an insignificant relationship between family structure composition and Female Enrolment in Engineering and Technology Programmes.

**Paired Sample T-Test Showing the Impact of family structure on Female Enrolment in Engineering and technology Programmes**

The process of this analysis started with the construction of composite index for Family Structure Composition (FSC) using the Principal Component Analysis (PCA) dimension reduction methodology. The table below shows the paired sample correlations capturing the relationship between female enrolment in engineering and technology programmes and the various family structure index constructed.

**Table 2: Paired Samples Correlations**

		N	Correlation	Sig.
Pair 1	FEETP & FSC	276	.041	.500

The paired sample correlation table above reveals that it is insignificantly associated with family structure composition. This implies that family structure has no significant impact on female enrolment in engineering and technology programmes. This paired sample correlation does not give information on the nature of the relationship (be it direct or inverse) and based on that further correlation analysis (Point Biserial) was conducted.

**Hypothesis two:**

**HO2:** There is no significant relationship between gender and enrolment in engineering and technology programme

**Ha2:** There is a significant relationship between gender and enrolment in engineering and technology programme

The next result presented is for the paired sample t-test to check whether or not the effect of family structure on enrolment in the engineering and technology programmes significantly differ between male and female gender groups. The findings are presented in table 3 below.

**Table 3: Paired Samples T-Test**

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	FEETP – FSC	.26811594	1.07739193	.06485137	.14044772	.39578416	4.134	275	.000



The findings presented in table 3 reveal that the T statistics for family structure and the respective significant values ( $<0.01$ ) is significant at 1% level of significance revealing that the effect of family structure composition on enrolment in the engineering and technology programmes

significantly differ between male and female gender groups. This implies that family structure significantly discriminate children by gender groups in their enrolment in engineering and technology programmes.

**Table 4: Binary Logit Regression Showing the Impact of family structure on Female Enrolment in Engineering and technology Programmes**

VARIABLES	INDICATORS	(Log Odds)	(Odd Ratios)
		FEETP	FEETP
Parents' Education	fathers education	0.0336 (0.0275)	1.034163 (.0284141)
	mothers education	0.123*** (0.0261)	1.130352*** (.0295106)
Family Type	Single Parenthood	0.0273 (0.341)	1.027677 (.3504709)
	Monogamous	-0.150 (0.168)	.8609687 (.1443177)
Live as a Family	Compound Family	-0.275 (0.196)	.7596139 (.148641)
	Nuclear Family	0.134 (0.163)	1.143722 (.1865423)
Parenting Style	Single Parent	-1.048*** (0.319)	.3506633*** (.1120091)
	Both parents	-0.760*** (0.293)	.4676105*** (.1368217)
Dependency	Number of Dependent	-0.0473*** (0.0176)	.9537972*** (.0167566)
Parents engagement	Yes	0.700*** (0.143)	2.013311*** (.2876122)
	Constant	-3.019*** (0.660)	.0488659*** (.0322644)
	Observations	1,353	1,353

Standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Given that point Biserial correlation analysis only gave us information about the nature, strength and significance of the relationship between the different independent and the dependent variables, Binary Logit regression analysis was also used to show cause-effect relationship between the dependent and the independent variables since the study is an impact study. Binary logit was preferred over other techniques because the dependent variable is dichotomous and the categories are truly discrete (male=0, female=1). The regression table presented contain both the log odds and the odd ratios.

The results reveal that, controlling other effects, difficult house chores reduces the likelihood of female enrolling in engineering and technology programmes compared to their male counterparts. The log odds of -0.0248 indicates that increase in difficult house chores reduces the log odds in favour of females enrolling in engineering and technology programmes by 0.0248 compared to the males. This effect is however, insignificant revealing that house chores does not significantly impact female enrolment in engineering and technology programs.

Also, increase in the belief that females are supposed to be home makers positively affect likelihood of females enrolling in engineering and technology programmes. Specifically, the log odds of 0.0106 reveals that increase in the belief that females are supposed to be home makers increases the log odds in favour of female enrolling into engineering and technology programmes by 0.0106 compared to the males.

Furthermore, increase in the belief that females are supposed to pursue arts courses rather increases the likelihood of females enrolling in engineering and technology programmes compared to the males. The findings specifically shows that an increase in such beliefs increases the log odds in favour of females enrolling in engineering and technology programmes by 0.444 compared to that of the males. This effect is significant at 1% level of significance revealing that the belief that females are supposed to pursue arts courses instead of

engineering and technology is a family cultural indicator that significantly affects female enrolment in engineering and technology programmes compared to the males.

The family cultural factors that girls are rarely challenged both in school and at home positively affect the likelihood of females enrolling in engineering and technology programmes compared to their male counterparts. Specifically, the findings suggest that increase in the belief that females are rarely challenged increases the log odds in favour of female enrolment in engineering and technology programmes by 0.445 units compared to the males and this effect is significant at 1% level of significance. This implies that the belief that female are rarely challenged to work hard significantly affect female enrolment in engineering and technology programmes compared to male enrolment.

Furthermore female children from single parenthood compared to polygamous homes have 0.0273 units higher log odds in favour of them enrolling in engineering and technology programmes compared to males while female children from monogamous homes compared to polygamous have 0.150 unit lower log odds in favour of their enrolment in engineering and technology programmes compared to their male counterpart. The effect of family type is however, insignificant.

For life as a family, female children from compound families compared to those from extended families have 0.275 lower log odds in favour of them enrolling in engineering and technology programmes than the males while female children from nuclear families compared to extended families have 0.134 higher log odds in favour of their enrolling in engineering and technology programmes than males. The effect of life as a family is also insignificant.

In relation to parenting style, the findings reveal that female children from single parents and those from families with both parents compared to adopted parents are less likely to enrol in

engineering and technology programmes. Specifically, the findings show that compared to adopted parents, female children from single parents and also both parents have 1.048 and 0.760 lower log odds in favour of them enrolling in engineering and technology programmes compared to the males. This implies that female children living with adopted parents compared to those living with their parents (be it single or both parents) are more likely to enrol in engineering and technology programmes compared to the males. Both effects are significant at 1% level of significance and thus parenting style significantly affect female enrolment in engineering and technology programmes.

On the part of dependency, number of dependent children in the home relates negatively with female enrolment in engineering and technology programmes. Thus increase in the number of dependent children in a home reduces the log odds in favour of female enrolment in engineering and technology by 0.0473 units compared to the males and the effect of dependency on female enrolment in engineering and technology is significant at 1% revealing that dependency has a significant impact on female enrolment in engineering and technology programmes.

Finally, parental engagement (involvement) in education of the children relates positively with female enrolment in engineering and technology programmes. Thus parents who involve more in education of the children compared to those that do not increase the log odds in favour of female enrolment in engineering and technology programmes compared to the males by 0.700 units and this effect is significant at 1% level of significance. This implies parents' involvement significantly increase female enrolment in engineering and technology programmes.

In sum, the family cultural indicators that significantly impact female enrolment in engineering and technology are the belief that females are supposed to pursue but arts courses and the belief that girls are rarely challenged. For family structure composition parenting style

(single and both parents compared to adopted parents) and number of dependent children in the home significantly impact female enrolment in engineering and technology programmes.

### **Conclusion:**

The study findings on family size and dependency ratio suggest that though having few household sizes encouraged good academic performance, however, supports given to students whether in large or small families increased their academic achievement chances in sciences disciplines. But, following the results of the data collected for this study, there is a weak relationship between family structure composition and female enrolment in engineering and technology. Indicating that performance in sciences and subsequent enrolment in engineering and technology by female students are supported by other factors other than the family structure which include family size, family types and sibling order. Yet, study findings on sibling order suggest that students were sibling dependents. Half of the respondents indicated living with dependents in the same home thus could benefit from the coaching of other siblings that are older and in higher classes. There was also a significant indication that family beliefs on the male child to be enrolled in the engineering and technology than the female girl child. Overall finding from this study indicates that sibling order and dependent children had no impact on female enrolment in engineering and technology programmes.

### **Recommendations:**

Based on the finding of this study, it is recommended that parents should consistently assist their children especially the girl child to pursue their studies in the science domain which paves the way for them to enroll in the engineering and technology programmes at the tertiary level of education.

Parents should be encouraged by teachers and school administrators of their children through Parent Teacher Association meetings on how to monitor the progress of their learning. Parents

alongside their children should be schooled on the importance of performing well in the science subjects and the numerous job possibilities available in this domain. Parent-teacher relationship should be encouraged as this will pave a way for the teacher to advise the parents on the progress of their child especially in the science domain.

Finally, that state through the ministry of social affair should be able to advise her citizens on the importance of a reasonable family structure and its implications to the education of their children especially their girl children.

### References.

1. Adewale, A. M. (2002). Implication of parasitic infections on school performance among school-age children. *Ilorin Journal of Science Education*, 1(2): 78 - 81.
2. Agborbechem, P. T. (2015). Challenges of Public examinations in diverse cultural settings in Cameroon. *Journal of Educational Policy and Entrepreneurial Research*, 2(12), 32-4.
3. Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioural change. *Psychological Review*, 84(2), 191-215.
4. Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 2<sup>nd</sup> ed. London: SAGE Publications.
5. Eamon, M. K. (2005). Social demographic, School, Neighbourhood, and Parenting Influences on Academic Achievement of Latino Young Adolescents. *Journal of Youth and Adolescence*, 34(2): 163 – 175.
6. Eccles, J. S. (1993). School and family effects on the ontogeny of children's interests, self-perceptions, and activity choices. In Jacobs, J. (Ed.), *Nebraska Symposium on Motivation, 1992: Developmental perspectives on motivation*. 145–208. Lincoln: University of Nebraska Press.
7. Eccles, P. J., Adler, T. F., Futterman, R., Goff, S. B. and Kaczala, C. M. (1983). Expectancies, values, and academic behaviours. In Spence, J. T. (ed). *Achievement and Achievement Motivation*. 75–146. San Francisco: Freeman.
8. Fan, X. and Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, 13, 1-22.
9. Fantuzzo, J., Tighe, E. and Childs, S. (2000). Family involvement questionnaire: A multivariate assessment of family participation in early childhood education. *Journal of Educational Psychology*, 92(2), 367-376.
10. Frazer, A. M., Brockert, J. E. and Ward, R. H. (2004). Association of Young Maternal Age with Adverse Reproductive Outcomes. *New England Journal of Medicine*, 332(1): 1113 – 1117.
11. Gottfried, E. A., Fleming, S. J. and Gottfried, W. A. (2004). Role of Parental Motivational Practices in Children's Academic Intrinsic Motivation and Achievement. *Journal of Educational Psychology*, 86, (1), 104-113.
12. Hayes, R. F. and Bronzaft, A. L. (2006). Birth Order and Related Variables in an Academically Elite Sample. *Journal of Individual Psychology*, 135: 214 - 231.
13. Jeynes, W. H. (2002). Examining the Effect of Parental Absence on the Academic Achievement of Adolescents: the challenge for controlling Family Income. *Journal of Family and Economics*, 23(2): 189 – 210.
14. Kim, C. (2008). *Academic success begins at home: how children can succeed in school*. Washington, D.C.: Heritage Foundation.
15. Krejcie, R. V. and Morgan D., W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30, 607-610. Retrieved on 20/08/2019 from, [https://home.kku.ac.th/sompong/guest\\_speaker/KrejcieandMorgan\\_article.pdf](https://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf).
16. Laosa, L. M. (2005). *Effects of Preschool on Educational Achievement*. London: Pearl Ltd. 1-14.



17. Meleen, M. (2019). Pros and Cons of the Nuclear Family. <https://family.lovetoknow.com>
18. Muthoni, K. L. (2013). *Relationship between family background and academic performance of secondary schools students: a case of Siakago Division, Mbeere North District, Kenya*. Kenya: Acta Press.
19. Sun, Y. and Li, Y. (2008). *Post-divorce family stability and the growth-curves of adolescents' academic performance*. Proceedings of the 38 International Institute of Sociology World Congress, Budapest, Hungary. 12 - 15 August, 2007. 120pp.
20. Singh, K., Bickley, P. G., Trivette, P., Keith, P. B. and Anderson, E. (1995). The effects of four components of parental involvement on eighth-grade student achievement: Structural analysis of NELS-88 data. *School Psychology Review*, 24, 299-317.