PARENTAL PREDISPOSITION TO EDUCATION INFLUENCING FEMALE ENROLMENT IN ENGINEERING AND TECHNOLOGY IN ANGLO-SAXON STATE UNIVERSITIES IN CAMEROON

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Abstract:
Parental predisposition to education extends beyond the engagement with schools to the home life, and the expectations of values for education that are communicated directly or indirectly to children. The objective of this study is to assess the influence of parental predispositions to education on female enrolment in Engineering and Technology programmes in the Anglo-Saxon state universities of Cameroon. The study used an explanatory sequential mixed method research design, and a multi-stage sampling technique was used to randomly select 276 respondents from the universities of Bamenda and Buea. Both quantitative and qualitative data were collected using structured questionnaires and interview schedules with 10 parents whose children are admitted to engineering and technology programs in these English-speaking state universities. Content analysis was used to analyse the qualitative data. Descriptive statistics, point biserial and binary logit regression analysis were used to analyse the quantitative data and to test the hypothesis at p<.05 level of significance. The findings revealed that parental predisposition to education correlates significantly to students’ enrolment in engineering and technology. The null hypothesis was rejected and it was recommended that parents should engage prominently in children’s education through the provision of support both at home and in school.

Keywords: parental predisposition to education, home tutoring, provision of resource material, provision of pocket allowance, Anglo-Saxon State University of Cameroon

1. Introduction

The underrepresentation of women in university engineering and technology programs in Africa cannot be attributed solely to a lack of cognitive ability or cultural beliefs. Home
background factors such as parental predisposition to the education of the child are also vital. Msoula (2010) affirms that the home environment refers to all the objects, forces, and conditions in the home which influence the child physically, intellectually and emotionally. The underrepresentation of women in traditionally male-dominated fields such as STEM can constitute a self-fulfilling prophecy for subsequent generations, as girls have little opportunity to interact with women working in these fields and who could inspire them. Exposing female students to successful or admirable women scientists as well as peers who are engaged in science disciplines could help to break this vicious circle that engineering and technology is a male domain.

Ensuring girls have equal access to engineering and technology education and ultimately a career in these disciplines is imperative. From the standpoint of human rights, all people are equal and should have equal opportunities studying and working in the field of their choice and the inclusion of women in these domains promote scientific excellence and also reduce potential bias. This can also be achieved if parents’ predisposition to education such as the provision of educational material, provision of pocket allowances, home tutoring and parenting style are properly implemented within the family.

1.1 Background to the Study
Parental predisposition to education is unequivocally essential to students’ academic achievement. Hill et al., (2010) posit that parental involvement in education has been seen as parents’ interactions with schools and with their children to promote academic success. Cotton and Wikelund (2005) suggest that parents and family members’ involvement in their children’s education not only lead to better attendance, daily performance on home/school works, faster speed of reporting difficulties and improved students’ behaviour but it increases better academic outcome. Students’ motivation in a learning situation is directly or indirectly based on parents’ involvement and roles they play in their education, a role which is culturally derived and depend upon the family system structure of the individuals (Rodriguez, 2002). Hill and Craft (2003) found out that parental involvement was associated with academic outcomes because it increased the academic skills, social-emotional competencies of students. According to Hill and Craft, the strongest positive influence of parents’ involvement is academic socialization in which parents define the value of education to their children and link school work to students’ interests or goals at home. Interestingly, for secondary school students, parental assistance is positively associated with their achievement (Henderson et al., 2007).

Although parents engaged in their children’s schooling in one form or another, their involvement is basically being limited to home activities by some researchers (Nyarko, 2011). However, the new era in English speaking regions of Cameroon where more parents attend PTA meetings, school visits and recreational events are emerging efforts that can bring differential learning opportunities among students. More so, empirical studies have reported parental involvement in their children’s education varies
with socio-demographic factors and economic circumstances of parents (Schmitt and Kleine, 2010).

1.2 Objective of the Study
The specific objective of the study is to:
- Assess the influence of parents’ predispositions to education on female enrolment in Engineering and Technology programmes.

1.3 Research Question
- How does parental predispositions to education influence female enrolment in Engineering and Technology programmes?

1.4 Research Hypotheses
The hypotheses were stated in null and alternate forms and tested at p<0.05 level of significance. Therefore, the following hypotheses were formulated:

   Ho: There is no significant relationship between parents’ predispositions to education and female enrolment in Engineering and Technology.

   Ha: There is a significant relationship between parents’ predispositions to education and female enrolment in Engineering and Technology.

2. Literature Review
Three theoretical perspectives were used to justify the findings of this study. Bioecological theory of human development (Bronfenbrenner, 1994) provided the theoretical framework for the present study because it considered the subject of human development and the impact of environments (in this context the home environment) on a person’s growth (academic development). The theory of self-efficacy (Bandura, 1977) also contributed to the findings of this study as it is a social cognitive theory that is context-specific and can be used as an instrument for testing competence and to determine if an individual will persist in and succeed at a given goal. Similarly, Eccles’ expectancy-value theory (Eccles et al., 1983) focused on the influence of parental socialization with their children. This theory is widely used in academic contexts and has been used to explain how parents shape children’s self-perceptions about their abilities in mathematics and sciences.

The theories emphasized that an individual’s behaviour is influenced by the environment and people around him/her. The study findings showed that parental predisposition to education such as the provision of resource materials, extra lessons for their children and provision of pocket money had positive effects on students’ enrolment into engineering and technology programmes. The bioecological theory of human development (mesosystem), verbal persuasion in self-efficacy and expectancy theory holds to the view that children’s educational process should involve informal interaction with the home not only on planned cognitive transmission alone. The authors of these
theories emphasized that there must be a motivating factor during the interaction of parents and their children even if all other factors are present the child will be determined to engage in his/her task with enthusiasm. Besides, everyone has the potential to achieve and make a contribution to society if their needs are promptly fulfilled.

Several studies conducted by Hill and Craft (2003), Hill et al., (2004), Sheldon and Epstein (2002) and Cotton and Wikeland (2005) indicate that parents and family members’ involvement in their children’s education not only lead to better attendance, daily performance on home/school works, faster speed of reporting difficulties and improved students’ behavior but it increases better academic outcome. Parents’ involvement is a valuable component of student’s educational success at school (Henderson and Mapp, 2002; Patriakakou et al., 2005; Henderson et al., 2007) and parental involvement is differentially associated with achievement based on whether parents have high or low social status (Fan and Chen, 2003; Hill et al., 2004; Hill and Tyson, 2007; Epeisten, 2002; Fan and Chen, 2003; Seginer, 2006). Interestingly, for secondary school students, parental assistance is positively associated with their achievement (Henderson et al., 2007).

Hochschild (2003) and Eamon (2005) stated that low-level home commitment prevents children’s access to resources, motivation, and incentives. Barry (2006) found that increased family activities such as parents attending school activities, spending time with the child, going on vocation and fun activities can increase test scores. Parents can therefore target the cognitive behaviour of their children through family involvement in order to motivate their learning (Wolters, 2004). Cotton and Wikeland (2005) observe that children do well in examinations when parents are intensively involved in their education. Hill et al. (2004) affirm that it is the parents’ interest in education that makes them actively involved in matters affecting their children’s education. Further study findings show that students value their education when their parents show interest in their education (Domina and Knipprath, 2005). Sheldon (2003) however shows that minimal resources of parents are one of the limiting factors why they are less involved in their children’s education.

Although parents engaged in their children’s schooling in one form or another, their involvement is basically being limited to home activities with the exception of Parents Teachers Association and open days in most schools in Cameroon. Few parents rarely contact the teachers of their children to find out their progress in the core sciences and the difficulties that could be handled at home. More so, empirical studies have reported parental involvement in their children’s education varies with socio-demographic factors and economic circumstances of parents (Schimpl-Neimanns, 2000; Georgiou, 2007; Schmitt and Kleine, 2010).

3. Methodology

This study adopted an explanatory sequential mixed method research design and the study population was all first-year undergraduate students in the programmes of
engineering and technology of the Anglo-Saxon State Universities in Cameroon and parents who have children admitted in the colleges and faculties of engineering and technology. A targeted population of all the undergraduate students (year 1, 2, 3 & 4) for the academic year 2019/2020 and an accessible population of all the first-year undergraduate students (level 200) enrolled in engineering and technology-related programs were involved in the study. The year one students were chosen because they just completed high school and still have a lot of affections towards the family and are still influenced by their parents. 10 parents who have children in the colleges of engineering and technology were interviewed. The purpose was to investigate their involvement and predisposition to the education of their children.

A sample of 276 respondents was randomly selected from the engineering and technology programmes of the two Anglo-Saxon State Universities. The colleges and faculties of engineering and technology involved in this study include Colleges of Technology of the University of Bamenda and Buea, Faculty of Engineering of the University of Buea and the National High Polytechnic Institute of The University of Bamenda. Data collected focused on the parental predisposition to education. The gathered data were compiled and coded in the Microsoft Excel spreadsheet and analyzed using the Statistical Package for Social Science (SPSS). Descriptive statistics were produced which included; frequencies, percentages, means, and standard deviations. The statistical analysis technique used to test the hypothesis was the point biserial correlation analysis test which in this circumstance uses the Pearson product-moment approach where the independent variable is continuous data and the dependent variable is dichotomous. A paired sample t-test was used to check whether or not the effect of parental predisposition to education on enrolment in the engineering and technology programmes significantly differs between male and female gender groups. The binary logit regression was used to show the cause-effect relationship between the dependent and the independent variables.

4. Results and Discussions

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Modalities</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you rely on your school for learning materials during your high school</td>
<td>No</td>
<td>174</td>
<td>63.0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>102</td>
<td>37.0</td>
</tr>
<tr>
<td>Frequency at which you receive required learning materials from parents/guardians</td>
<td>Never</td>
<td>15</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Almost never</td>
<td>70</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>58</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>Usually</td>
<td>133</td>
<td>48.2</td>
</tr>
<tr>
<td>Frequency at which you receive pocket allowance from parents/guardians</td>
<td>Never</td>
<td>24</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>Almost never</td>
<td>107</td>
<td>38.8</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>62</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>Usually</td>
<td>83</td>
<td>30.1</td>
</tr>
<tr>
<td>Average amount of weekly pocket allowance received from parents/guardians</td>
<td>Minimum</td>
<td>191</td>
<td>69.2</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>85</td>
<td>30.8</td>
</tr>
</tbody>
</table>
For parents’ predisposition to children’s education, Table 1 above reveals that the majority of the children (63%) did not rely on school for learning materials during their high school while 37% relied on school for learning materials.

The majority of the respondents (48.2%) indicated that they usually receive required learning materials from parents/guardians, followed by those who said they almost never (25.4%) receive required learning materials from parents/guardians, then those who sometimes (21%) receive required learning materials from parents/guardians and lastly those who never (5.4%) receive required learning materials from parents/guardians.

For the frequency at which they received a pocket allowance from parents/guardians, the majority of them (38.8%) indicated that they almost never received a pocket allowance from parents/guardians while 30.1% of them usually receive, 22.5% of them sometimes received and 8.7% of them never received. Among them, 69.2% which is a majority indicated that they receive just the minimum possible amount as average weekly pocket allowances from parents/guardians while 30.8% of them indicated that they received maximum amounts. Also, the majority of the respondents (63%) indicated that they are willing to request a change in the amount of pocket allowance given to them while 37% of them indicated that they are not willing to request any change in their pocket allowances if given the opportunity. Feijo (2006) stated that various aspects of the family’s economic, social and cultural conditions such as social support have a consistent impact on the literacy performance of students in all countries. Students whose parents have given them such opportunities and who are exposed to more educational, social and cultural resources at home tend to have higher levels of literacy performance. Similarly, parents may negatively affect their children’s academic achievement by denying them access to such vital resources (Eamon, 2005). Therefore, children perform poorly in schoolwork or even drop out of school when they are deprived of essential school needs.

For parents’ engagement of children for extra lessons outside the normal school curricular activities, the majority of the respondents (50.7%) indicated that their parents never engaged them in any of such lessons while 49.7% of them indicated that their Parents engaged them in extra lessons outside the normal school curricular activities and for the methods of engagement, 21.4% of them were engaged during holidays at home,
17.8% of them were engaged during weekends, 8% of them were engaged both at home and in school while 5.4% of them were engaged only in school.

For study groups, the majority of the respondents (64.5%) indicated that they did not have a study group out of school periods, while 35.5% of them indicated that they had a study group out of school periods. This is in accord with the vicarious learning process and the enactive mastery learning in Bandura’s self-efficacy theory of learning. Learners are able to work on their own (64.5%) after their classroom sessions and to follow the footsteps of the performances of their peers. Home tutoring (35.5%) has proven to yield positive results on students’ performance in the discipline they initially could not perform well. Mestry and Grobler (2007) reported that parental involvement like the engagement of children in private lessons and extra-curricular activities increased academic success. Interview conducted with parents portrayed that students who received extra lessons in school are assumed to have better chances for excellent performance in their examinations since they might be better prepared through organized extra lessons with their teachers. Parents also agreed that the provision of study materials and their engagement of children for extra classes out of school periods with close supervision of the activities are likely to encourage the female children to enrol in engineering and Technology compared to when such facilities were not provided to them.

4.1 Hypothesis

**H₀:** There is no significant relationship between parents’ predisposition to education and female enrolment in Engineering and Technology.

**H₁:** There is a significant relationship between parents’ predisposition to education and female enrolment in Engineering and Technology.

The independent variable in this hypothesis is parents’ predisposition to education, 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 six questionnaire items that measured the parent’s predisposition to education 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 2: Point Biserial Correlation Analysis for the Relationship between Parents’ Predisposition to Education and Female Enrolment in Engineering and Technology Programmes

<table>
<thead>
<tr>
<th>Group</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>201</td>
<td>0.0803589</td>
<td>0.0699517</td>
<td>0.991737</td>
<td>-0.2183 - 0.0575787</td>
</tr>
<tr>
<td>Females</td>
<td>74</td>
<td>0.2288903</td>
<td>0.1158482</td>
<td>0.996564</td>
<td>-0.00199 - 0.4597754</td>
</tr>
<tr>
<td>combined</td>
<td>275</td>
<td>0.0028573</td>
<td>0.0603441</td>
<td>1.000694</td>
<td>-0.11594 - 0.1216543</td>
</tr>
<tr>
<td>diff</td>
<td>-275</td>
<td>-0.3092491</td>
<td>0.1350252</td>
<td>-0.57507 - 0.0434261</td>
<td></td>
</tr>
</tbody>
</table>

The paired sample correlation Table 3 reveals that all the relationships between female enrolment in engineering and technology programmes and parental predisposition to education have positive correlation coefficients as all the indicators of PPE are below 0.5. The significance values show that female enrolment in engineering and technology programmes

Table 2 above reveals a correlation coefficient for the relationship between parents’ predisposition to education and Female Enrolment in Engineering and Technology Programmes as -0.1373. The negative sign reveals that parents’ predisposition to education is negatively associated with Female Enrolment in Engineering and Technology Programmes. Therefore, parents’ predispositions to education have a weak negative relationship with Female Enrolment in Engineering and Technology Programmes. The t statistic for the correlation is -2.29 and the p-value is 0.021 (less than 0.05). This indicates that the association is significant meaning that parents’ predisposition to education has a negative significant relationship (at 5% level) with Female Enrolment in Engineering and Technology Programmes. Thus, we reject the null hypothesis and retain the alternative thereby concluding there is a significant relationship between parents’ predisposition to education and Female Enrolment in Engineering and Technology Programmes.

4.2 Paired Sample T-Test Showing the Impact of Parental Predisposition to Education on Female Enrolment in Engineering and Technology Programmes

The process of this analysis started with the construction of composite indices for Parents Predispositions to Education (PPE) using the Principal Component Analysis (PCA) dimension reduction methodology. The construction of these indices was necessitated by the fact that all the specific variables were multifaceted and their various indicators were numerous to deal with. The table below shows the paired sample correlations capturing the relationship between Female Enrolment in Engineering and Technology Programmes (FEETP) and parental predisposition to education.
programmes is significantly associated with parents’ predisposition to education (at 5% level). The next result presented for paired sample t-test is to check whether or not the effect of parental predisposition to education on enrolment in the engineering and technology programmes significantly differ between male and female gender groups. The findings are presented in Table 4 below.

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>T</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair FEETP–PPE</td>
<td>.26811594</td>
<td>1.03622325</td>
<td>.06237331</td>
<td>.14532611</td>
<td>.39090578</td>
<td>4.299</td>
<td>275</td>
</tr>
</tbody>
</table>

The findings presented in the table above reveal that the t statistics are significant at 1% level of significance revealing that the effect of parents’ predisposition to education on enrolment in the engineering and technology programmes significantly differ between male and female gender groups. This implies that home factors significantly discriminate children by gender groups in their enrolment in engineering and technology programmes.

Table 5: Binary Logit Regression Showing the Impact of Parental Engagement on Female Enrolment in Engineering and Technology Programmes

<table>
<thead>
<tr>
<th>Variables</th>
<th>Indicators</th>
<th>(Log Odds)</th>
<th>(Odd Ratios)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEETP</td>
<td>FEETP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parents engagement</td>
<td>Yes</td>
<td>0.700***</td>
<td>2.013311***</td>
</tr>
<tr>
<td></td>
<td>(0.143)</td>
<td>(.2876122)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>-3.019***</td>
<td>.0488659***</td>
</tr>
<tr>
<td></td>
<td>(0.660)</td>
<td>(.0322644)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1,353</td>
<td>1,353</td>
<td></td>
</tr>
</tbody>
</table>

Note: 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 variables and the dependent, binary logit regression analysis was also used to show the cause-effect relationship between the dependent and the independent variables. 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 contains both the log odds and the odd ratios. Also, this technique further gives the possibility of testing the impact of specific indicators of the independent variables (provision of pocket allowance, resources at school, social amenities at home, extra lessons, home tutoring) on the dependent.

Finally, parental engagement (involvement) in the education of the children relates positively with female enrolment in engineering and technology programmes.
Thus, parents who involve more in the 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.

5. Conclusions

Students who had adequate and better opportunities for learning such as recreational facilities and school materials did better in examinations than their counterparts who lack them. Similarly, students who received extra lessons both at home and in school had better performance in those disciplines they faced difficulties. These extra lessons also help them improve in their performance in mathematics and sciences which are the core subjects for someone to get enrol in engineering. Overall, students whose parents had given them more opportunities for educational, social and cultural resources at home and school demonstrated higher levels of curiosity and academic motivation. Parents’ involvements in education were important in predicting positive effects on female students’ academic achievement in the science domain and subsequent enrolment in engineering. The Pearson product-moment analysis using point biserial predicted a significant relationship between parents’ predisposition to education and female enrolment in engineering and technology. Consequently, female children who do not have the strong support of parents who value education will find it difficult to endure the hurdles in sciences and will eventually fail to enrol in engineering and technology. Thus, strong support from parents to children particularly the female girl child in education is far better than no or lack of support. When access to family educational and social welfare resources are limited, students (particularly the female students because of their basic needs) suffer and lag behind in their academic achievement and eventual low enrolment in engineering and technology programs.

6. Recommendation

Given the economic potentials of parents in terms of occupational opportunities in this study, parents are advised to form cooperative societies that will assist in supporting their children’s education and other family welfare. Parents should further be educated through Parents Teacher Association (PTA) meetings on positive parental roles that enhance their children’s motivation to study sciences and to enrol in engineering and technology which is the backbone of any developing country. Scholarships should be instituted in schools to encourage female students who perform exceptionally well in mathematics and sciences in order to motivate both the smarter and average female students in the field of engineering and technology. Besides, school libraries should be equipped with up-to-date scientific textbooks to ease studies by the students.
Conflict of Interest Statement
The authors declare no conflicts of interests.

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References


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