

## **The Role Of Parental Support On Science Self-Efficacy Among Secondary School Students In Muranga, Kenya**

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### **ABSTRACT**

The paper explored parental involvement factors that affect 498 secondary school students' science self-efficacy in Murang'a County Kenya. The choice of determining future engagement in the science disciplines in the world of work rests on self-confidence in science. Inferential statistics were determined by Pearson's correlation coefficient, analysis of variance, and multiple linear regression analysis. The findings established instrumental assistance and verbal encouragement as positively influencing students' science self-efficacy, career modeling had an insignificant effect while emotional support was found to have a negative relationship with students' science self-efficacy. The results reveal that the emotional status of students was a predictor of the development of confidence in science-related tasks.

**Key Words:** Science self-efficacy, Parental support, Instrumental assistance, Career modeling, Emotional support, Verbal encouragement.

### **INTRODUCTION**

Literature on career development has identified parents' support of their children's science self-efficacy as essential in developing young people's future careers in science. Engineering self-efficacy increased among college students in Southwest USA, with parental encouragement (Garriott, Navarro, et al., 2017). Similarly, García-Pérez et al., (2020) cite that parental support influences a certain level of emotional stimulation contributing to strong performance in science-related fields among both genders. Parents' provision of environments that included encouragement, positive guidelines, and demonstration of skills and behaviors, contributed to Indonesian high school students' certainty in decision making. Parents' moderated

actions surpassed peer influences (Qudsyi et al., 2020). Exposure to activities such as science congress, the museum, nature trails, and robotics in public schools in Malaysia, was found to stimulate students' efficacy in science more effectively than learning science in the classroom (Halim et al., 2021). While students in Kenya who viewed themselves as very confident in their sciences had better science performance (Aurah, 2017).

Parents' role in the development of students' self-efficacy has been overlooked by education systems globally. Bandura, (1993) explains that successful performances increase self-efficacy beliefs, whereas failure weakens them. Students' self-efficacy similarly develops by observing people they consider role models. Likewise, social encouragement from significant others sustains the sense of self-efficacy, whereas, the physiological and emotional status, where there is a reduction of stress and anxiety, enhances self-efficacy. In the USA, parents feel that schools have monopolized their children's educational experiences and they are not given a forum to participate (Peiffer, 2015). Their role has been relegated to basic parenting practices and providing learning activities at home. Parent support in Indonesia lacks emotional and psychological support which would otherwise enhance self-efficacy. Furthermore, close parent-student relationships are demanding and often increase student anxiety and stress (Robih et al., 2017). Similar situations exist in Africa and in Kenya, where parents are hardly consulted by teachers in students' educational decisions. In Murang'a County, related studies show that parental support involves principally material support and encouragement. In addition, school dropouts, teenage pregnancies, child labor, and absentees, are attributed to parental negligence and parental influence (NCPD, 2017)

Parental participation and empowerment are integral factors in the execution of the Competency-Based Curriculum (CBC) in Kenya. The transition of primary grade 6 learners into junior secondary school is coupled with students' decisions on subject pathways into STEM, social sciences and languages, sports, performing, and visual arts. Parental support will consequently be crucial to the student's ability to select these pathways (KICD, 2017). According to the social cognitive career theory (SCCT), specific forms of parental assistance enable decisions on career pathways (Lent et al., 2002a). This study, in consideration, explored parental factors namely emotional support, instrumental support, career modeling, and verbal encouragement in relation to students' development of self-efficacy in science.

## **THE OBJECTIVE OF THE STUDY**

The research objective guided the study

- i. To determine the relationship between parental support and students' science self-efficacy.

## **HYPOTHESES OF THE STUDY**

H<sub>01</sub>: There is no significant relationship between parental support and students' science self-efficacy.

To enhance the testability of the hypothesis, the following additional hypotheses were developed

H<sub>01.1</sub>: There is no significant relationship between instrumental assistance and students' science self-efficacy.

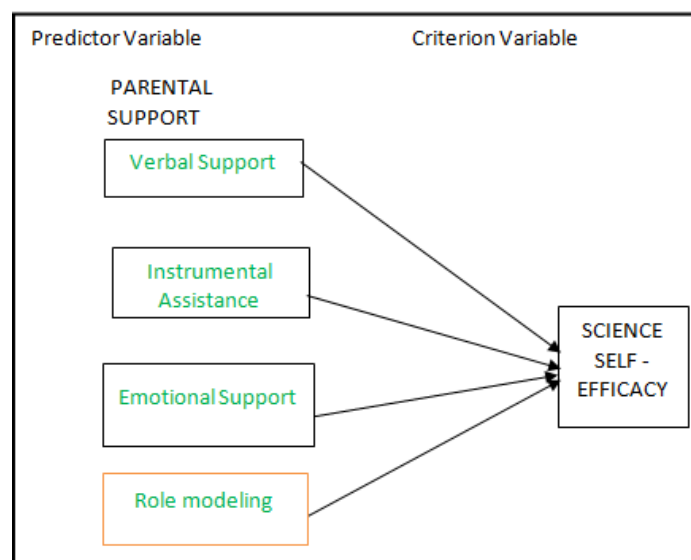
H<sub>01.2</sub>: There is no significant relationship between career modeling and students' science self-efficacy.

H<sub>01.3</sub>: There is no significant relationship between verbal encouragement and students' science self-efficacy.

H<sub>01.4</sub>: There is no significant relationship between emotional support and students' science self-efficacy.

## **THE CONCEPTUAL FRAMEWORK**

Figure 1.1 shows science self-efficacy as the criterion variable and parental support factors as predictor variables. The study identified four levels of parental support including emotional support, verbal encouragement, instrumental assistance, and role modeling. The researcher theorized associations between parental support factors with students' science self-efficacy.



**Figure 1.1. A conceptual framework representing the relationship between study variables.**

## **THEORETICAL FRAMEWORK**

The study adopted Social Cognitive Career Theory (SCCT) proposed by (Lent et al., 2002b) to bring to perspective the relationship between the study variables. The theory is significant in providing substantial descriptions of the interactions between the contextual factor, parental support, and cognitive factor, self-efficacy, in prompting career decision-making among students. Contextual factors include positive supports and difficulties that may affect students' ability to make a career decision. Students' career decisions are impacted by cognitive factors such as efficacy beliefs. The critical facets such as mastery of academic tasks, observation of success in academic tasks, receipt of affirmation from parents and teachers, and firm belief in success, reduce stress and anxiety. As competence in science subjects corresponds with increased belief in success, lack of self-confidence prompts students to avoid science subjects. High science self-efficacy in students motivates career choices in science courses as revealed by Sha et al. (2016) and Aurah (2017).

## **RESEARCH DESIGN**

A correlational research design was used in the study. Kothari and Garg (2018) point out that the design enables for determination of possible associations among variables that cannot be manipulated. The design thus was appropriate as parents' support factors and students' self-efficacy were already established and could not be influenced by the researcher.

### **Study Population**

Public secondary schools in Murang'a County were grouped into Girls' schools, Boys' schools, and Co-educational schools. Students in Form three classes in the sampled schools were found suitable for participation in the study as they had decided on their choice of subjects, which enable for their career pathways, post-secondary.

### **Sample size**

A sample size of 498 form three students were selected using the proportionate stratified formula. Eighty-two (82) students were randomly sought from two boys' schools, ninety-six (96) participants from the two girls' schools, one hundred and sixty one (161) boys and one hundred and fifty nine (159) girls from 17 coeducational schools. The study sample size is represented in Table 1.

**Table 1 Study sample size**

School Type	Gender				Total	
	Male		Female		No	%
	No	%	No	%		
Boys' Schools	78	15.66	-	-	78	16.18
Girls' Schools	-	-	92	18.47	92	19.08
Co-educational	158	31.73	154	30.92	312	64.73
Total	236	47.39	246	49.39	482	100.00

**RESEARCH METHODOLOGY AND INSTRUMENTS**

The study used a questionnaire consisting of The Career-related parent support scale (CRPSS) (Turner et al., 2003) to establish the parents' support and the Science Self-Efficacy Scale. The CRPSS consisted of four aspects of parental support measured; instrumental assistance, career modelling, and verbal encouragement comprised of seven items each in the questionnaire and emotional support, six items. Higher scores on a five-point Likert scale indicated enhanced provision of parent support. The current study established Cronbach Alpha scores as instrumental assistance 0.678, career modeling 0.772, verbal encouragement 0.515, and emotional support 0.716. The overall Cronbach's alpha of 0.741 was established for the questionnaire and this was within the accepted level of internal reliability (Bryman, 2008),

Science self-efficacy was tested by five items, on a Likert scale (1= no confidence to 5= complete confidence). The scale was adapted from previous research (Pajares, 1996); (Britner & Pajares, 2001) , 2006; Chen & Usher, 2013) and was freely available. The items were modified from "how confident are you that you will get a grade A in science"? to read "I will get an average of grade A in science subjects at KCSE". Scores of 4 and 5 on the Likert scale for grades A, B and C indicate high science self-efficacy, while high scores for grade D and E indicated low science self-efficacy. The present study established a reliability coefficient of 0.575 for the science self-efficacy scale .For a scale with fewer than five items, a Cronbach's alpha value of greater than 0.5 is treated as acceptable. Dall'Oglio et al. (2010) claim that a 0.5 Cronbach alpha can be legitimate and acceptable on a short scale.

**Data collection and analysis**

The study questionnaire was administered in boys’ schools, girls’ schools, and coeducational schools, to consenting students, randomly selected from the form three secondary school academic level. Equal participants of each gender were selected from each coeducational school. Students were informed of the intent of the research and were guided on how to fill the questionnaire. Data collected was coded and analyzed using Pearson Product-Moment Correlation Coefficient ANOVA and Multiple linear regression.

**RESULTS**

The results are presented in the Table 2.

**Table 2 Correlation between Students’ Science Self-Efficacy and Parental Support**

<b>Domains of Parental Support</b>	<b>Science Self-efficacy</b>
Instrumental assistance (IA)	.107*
Career modeling (CM)	.027
Verbal encouragement (VE)	.185**
Emotional support (ES)	-.043
Parental Support	.101*

Note \*\*  $p < 0.01$  \*  $p < 0.05$

Table 2 reveals that instrumental assistance and verbal encouragement domains had a significant positive linear relationship on students’ science self-efficacy given by  $r = .107$ ;  $p = .018$  and  $r = .185$ ;  $p = .000$ , respectively. The first and the third supplementary hypothesis were rejected. The results also revealed that career modelling ( $r = .027$ ;  $p = .549$ ) had insignificant positive correlation on students’ science self-efficacy. The second supplementary hypothesis, there is no significant relationship between career modelling and students’ self-efficacy, was accepted. However, emotional support ( $r = -.043$ ;  $p = .349$ ) had insignificant negative linear relationship with students’ science self-efficacy. The fourth supplementary hypothesis, that there is no significant relationship between emotional support and students’ science self-efficacy was accepted. Collectively, parental support had a significant positive relationship ( $r = .101$ ;  $p = .027$ ) on students’ science self-efficacy. The four variables collectively had significantly correlated

with students’ science self-efficacy. The study hypothesis that there is significant relationship between parental support and student’s science self-efficacy was accepted.

Multiple linear regression analysis was used with Instrumental Assistance (IA), Career Modelling (CM), Verbal Encouragement (VE) and Emotional Support (ES) as predictors of students’ science self-efficacy. The results are presented in the Table 3.

**Table 3 ANOVA for Students’ Science Self-Efficacy and Levels of Parental Support**

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	2.442	4	.610	9.101	.000 <sup>b</sup>
Residual	31.993	477	.067		
Total	34.435	481			

R= 0.266      R<sup>2</sup>=0.071       $\Delta$ R<sup>2</sup>= 0.063

Note. N=482.

The regression equation was significant,  $F(4, 477) = 9.101, p = .000$ . This meant that the four variables collectively had significantly predicted students’ science self-efficacy. The study went further to investigate the predictive values of each of the four domains parental support and student’s science self-efficacy. The results are presented in the Table 4

**Table 4 Beta coefficients for students’ career decision, instrumental assistance (IA), career modeling (CM), verbal encouragement (VE) and emotional support (ES)**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.539	.097		26.225	.000
Instrumental Assistance	.023	.019	.056	1.199	.231
Career Modelling	.017	.016	.050	1.084	.279
Verbal Encouragement	.118	.022	.290	5.255	.000
Emotional Support	-.078	.019	-.229	-4.190	.000

Note N=482

Results presented in table 4 showed that while acting simultaneously, Instrumental Assistance ( $\beta = .023, p = .231$ ) and Career Modelling ( $\beta = .017, p = .279$ ) were statistically insignificant positively predictor of students' science self-efficacy. Verbal Encouragement ( $\beta = .118, p = .000$ ) was found to predict students' science self-efficacy positively and significantly. Emotional support on the other hand negatively and significantly predicts students' science self-efficacy.

## **DISCUSSION OF THE RESULTS**

The objective of the study was to determine the association between parental support and students' science self-efficacy. The current study results showed a significant positive relationship between parental support and students' science self-efficacy ( $r = .101; p = .027$ ). These results agree with studies carried out by Garriott, Hultgren, et al., (2017), which established that parent support in academics significantly impacts the students' attitude towards science subjects. Garriott et al. (2017) also established that parental support was significantly related to engineering self-efficacy. The results contradict Kazi and Akhlag (2017) study on university students whose academic qualifications determined their courses. Parents had insignificant influence and were superseded by other factors such as social media and peers.

The results of this study determined that instrumental assistance and verbal encouragement had a positive significant relationship with science self-efficacy, while career modeling indicated an insignificant positive association with students' confidence in their science subjects. Instrumental assistance did not predict the students' confidence in science subjects. Emotional support as well showed an insignificant and negative relationship with students' confidence that they will pass science subjects. The results confirm that parents' support in enhancing students' confidence in their science subjects is biased to verbal encouragement and provision of activities that enable the acquisition of science skills.

The instrumental assistance domain of parental career support had a significant positive relationship with students' science self-efficacy. The result implies that students who increasingly received instrumental assistance from their parents increased their science self-efficacy. Comparably, the results of Halim et al., (2018) showed significant correlations ( $r = .24$ ) between parents' provision of instrumental support and student confidence in making decisions in science. When parents assist in selecting science subjects, participating in the students' homework, and facilitating science-related activities outside the school, the adolescents' science self-efficacy is heightened.

Current results on verbal encouragement had a significant positive relationship with students' science self-efficacy. Verbal encouragement was also a significant predictor of students' science self-efficacy. The findings contradicted results from a study done by Garriott et al. (2017), which



established that self-efficacy was not significantly predicted by verbal encouragement ( $\beta = .12, p > .05$ ). Another study (Qudsyi et al., 2020) found that parents encouraging, reinforcing, and providing conducive environments had the most substantial influence on student decision-making. Additionally, negative reinforcement by parents unfavorably affected students' self-beliefs influencing them to seek advice from peers. Nevertheless, parental guidance was superior to that of the students' friends. The current study results show parental encouragement to perform well in sciences and attain good science grades. Students with increased science self-efficacy are more likely to perform better in science and to select science-based careers.

There was an insignificant positive relationship between career modeling and students' science self-efficacy ( $r = .027; p = .549$ ). Parental help in modeling the students' future careers had a positive and insignificant relationship with science self-efficacy. Career modeling also was not a predictor of students' science self-efficacy. The current study results agree with Garriott et al. (2017), where parental role modeling had an insignificant influence on engineering student self-efficacy. Halim et al., (2021) found parents, mass media and STEM activities provided role models for students inspiring interest and self-efficacy in science careers. Njagi & Mwanja, (2017) described parents as being absent and hence inadequate familial role models. Additionally, the parents' professions were not admirable to students. Parents have been mentioned as providing role models for their children; however, the specific nature of self-efficacy demands role models specializing in the sciences.

Emotional support had an insignificant negative relationship with students' science self-efficacy ( $r = -.043; p = .349$ ). Likewise, emotional support was insignificant in influencing the science self-efficacy in engineering students in a study by Garriott et al. (2017). However, in this study, emotional support negatively and significantly predicts students' science self-efficacy. The result implies that as parents provided more emotional support, science self-efficacy among students diminished. Students rely on their emotional states to determine their capabilities, states García-Pérez et al., (2020) contending that negative emotions increased anxiety and reduce science self-efficacy of students in Spain. Demanding science subjects further increased anxiety and stress in the students. Qudsyi et al., (2020) observed punishment by parents resulted in negative emotions that hindered students' confidence in decision making. The findings resultant in Muranga, explained Njagi & Mwanja, (2017) study are probably due to parents dictating, resulting in negative feelings towards learning and occupations.

## **CONCLUSION**

This indicates that parents career support had a significant role in the development of the students' science self-efficacy. The parents' emphasis on the importance of science subjects to the students' future career was significant. Verbal encouragement and instrumental assistance

had positive significant correlations with science self-efficacy. Verbal support had the highest correlation indicating parents talked about science subject and science related careers with their children. Career modelling had a positive insignificant correlation with students' science self-efficacy while emotional support had an insignificant negative correlation. The provision of emotional support though insignificant is negative to development of students' self-efficacy. The findings enlighten on the type of parental support provided to students and the specific areas that require to be improved on to enhance on student confidence in their science subjects

### **RECOMMENDATIONS**

- i. Educators and heads of secondary schools to improve the uptake and performance of science subjects in Murang'a County, greater emphasis needs to be placed on each of the four components of parents' support.
- ii. Programs could be developed by educational organizations to enhance students' self-efficacy toward science fields with the incorporation of parents' support.
- iii. Further research on the four parental support areas and science self-efficacy can be done in varying contexts in Kenya providing grater insights

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