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INFLUENCE OF PARENTAL INVOLVEMENT ON UNDERGRADUATE STUDENTS' CAREER CHOICES IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) IN SOUTHWEST, NIGERIA

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ABSTRACT
The study aimed to examine the influence of parental involvement on undergraduate students' career choices in science, technology, engineering and mathematics (STEM) fields in Southwest Nigeria. From the overarching research objective, four specific objectives and four research questions were developed. A concurrent mixed-methods research design utilizing both questionnaires and interviews was employed. Questionnaire data were analyzed using simple percentages while content analysis was employed in analyzing interview responses. The findings indicated students had positive perceptions of how their parents' expectations of STEM careers influenced their decision to choose a STEM field. Parents were found to actively seek out information about STEM topics in different contexts for their children. They also looked for STEM-related activities and new experiences, viewed challenges as learning opportunities, and sought ways to encourage STEM pursuits. Parents accepted new STEM experiences for their kids. Additionally, parental support was seen to increase students' interest in STEM careers. Students enjoyed the theoretical aspects of STEM subjects and explored different approaches to learning STEM courses. In conclusion, both parental involvement and individual interest in STEM fields played crucial roles in career choice. It was recommended that parents make continued efforts to encourage and genuinely support their children's/wards' goals in STEM fields. Overall parental socialization seemed to shape career selection in STEM domains.

Keywords: Parental Involvement, Undergraduate students, career choice, STEM

Introduction

The career dreams of young people, particularly the undergraduates, can be shaped from an early age by the encouragement and guidance of involved parents. Extensive parental participation in a child's academic journey through involvement in school, assisting with assignments, discussing and future careers, can significantly increase the likelihood that the student will seriously contemplate and ultimately choose to enter a career in science, technology, engineering or mathematics (Nwani *et al.,* 2022; Adekoya *et al.,* 2023). Parenting entails several decision-making processes, and as a result, parents want their children to excel. Oftentimes, parents' aspiration for excellence exerts stress on their children or wards to achieve and succeed, resulting in significant stress. The strategy taken by parents determines whether children will explore a wide range of prospective jobs or conform to their parents' preferred route (Adikwuand Ereka, 2023; Egbo *et al.,* 2023). Choosing a career is a complex choice for students since it determines the precise profession they choose to pursue for the rest of their lives. Selecting the most appropriate degree may present a difficult quandary for every student since it requires careful consideration of his or her future career. Some students have a comprehensive comprehension of the particular topic they want to pursue, while others lack this expertise.

Parental involvement encompasses the proactive participation and active engagement of parents or carers in their children's education, growth, profession selection, and overall well-being. Children and teenagers today encounter significant and intricate issues, with a focus on the effect of parents on their professional decision-making, prompting this research. Hence, in the absence of adequate direction, young children may fail to achieve their life aspirations. It is an undeniable reality that the majority of young individuals have difficulties when it comes to selecting a profession and connecting their particular talents, interests, and abilities to potential career paths (Tochukwu, *et al.,* 2023).

Satar *et al.,* (2020) provided a description of parental participation as a dynamic interaction between parents, children, and schools, whereby various resources such as human, financial, and social are used. The practice entails the active participation of parents in frequent two-way communication, as well as the provision of contextual information on their children's academic pursuits and other school-related activities. Parental participation encompasses several aspects such as school governance, volunteering, and facility supply (Clinton & Hattie, 2013; Ugwu, 2021).

Parents inherently have a significant influence on the development of their children's personality and conduct, perhaps without being aware of it. From an evolutionary standpoint, parents exert their influence via the allocation of time and effort towards their children, hence increasing the likelihood of the children effectively coping with the difficulties encountered in life (Dorot & Davidovitch, 2023). Furthermore, in accordance with Bandura's Social Cognitive Theory, children imitate certain parental behaviours and acts. This means that parents who maintain frequent and close communication with their children should exhibit a significant level of responsibility.

The process of making career decisions is a pivotal and crucial event in an individual's life. An individual's success, fulfillment, and happiness are contingent upon the precision with which they choose their vocation (Ugwu *et al.,* 2021; Tochukwu, *et al.,* 2023).There is need to note that the choice of a career is not only vital to an individual's way of life but also has a significant role in their mental and physical health, as well as that of their families. A considerable proportion of students have a tendency to seek assistance from their parents about career-related issues. Parents who have little exposure to information and minimal experience in higher education may not be able to provide much assistance to their children when it comes to career-related problems (Tochukwu, *et al.,* 2023; Ugwu *et al,* 2022). Mbagwu and Ajaegbu (2016) argued that children with highly educated parents were less prone to encountering challenges while making professional decisions, in contrast to those whose parents had a lower level of education.

Chen (2021) demonstrates that fathers prioritise the career advancement of their sons above their daughters. Furthermore, male pupils are more likely to acquire skills associated with their father's occupation compared to other occupations, as demonstrated by Chen (2021). Furthermore, Profeli *et al.* (2013) and Makinde *et al.* (2022) showed that mothers are more likely than fathers to engage in supportive communication to influence their daughters' professional choices. The paper by Zhu, *et al.* (2022) revealed that the influence of mothers in terms of education and career-related support had a greater impact on females compared to boys. Saleem et al. (2014) state that men were more inclined to endorse professional paths related to computers and technology, whereas mothers were shown to have a significant impact on their children's overall career trajectory and academic pursuits without specifically endorsing a particular occupational field.

Lingappa*et al.,* (2022) demonstrate that children of self-employed parents who possess an entrepreneurial and sophisticated mindset have a stronger inclination towards pursuing independent careers rather than working as employees. This highlights the disparity in their attitude and their confidence in human capabilities.Sawitri and Creed (2022) demonstrate that when parents and their children have congruent work-related beliefs, they have aligned objectives and comparable approaches. Consequently, adult children are more likely to choose a similar career path as their parents and cultivate a sense of self-assurance in their professional endeavours.

Parents act as exemplars for their children in terms of their perspectives on employment. Therefore, the varied values held by parents have an impact on the development of their adult children's perspectives on the world and their attitudes towards career choice in STEM (Profeli et al., 2013).Parents that support their children in pursuing STEM careers can boost their self-esteem and enthusiasm in their skills. Evidence abound that parental involvement plays a beneficial function in shaping students' interests, and strong interests have an effect on kids' academic success.

Nigerian graduates encounter the challenge of unemployment in a fast-evolving job market that is characterised by technical progress. Insufficient career information on

work opportunities, students' lack of awareness regarding career choices in STEM, and parents' inaccurate information due to their limited understanding of available careers mostly cause the issue at hand, which is exacerbated by economic uncertainty. The parental background, conversely, often has the greatest influence on kids' job selection (Ochiaka *et al., 2023;* Ugwu, Onayinka & Sanni, 2024). Parents often exert influence on their children to choose family vocations and other careers, regardless of whether the children possess the necessary talents, interests, values, preferences, and personalities that are crucial factors in making career decisions.

Consequently, the child's inability to focus on the parents' requirements may hinder their ability to adapt favourably to their job. The selection of a profession sometimes poses a recurring dilemma for students in modern culture. Hence, it is not unusual for pupils to get employment that does not align with their aptitudes. Occasionally, people engage in employment with entirely false intentions. Typically, work discontent is the ultimate outcome. As a result, individuals quickly develop delusions and feelings of depression, which in turn result in frustration, malfunction, and inefficiency. In the long term, all of this leads to a national economic disaster.

Consequently, it is crucial to investigate the matter of career selection and the influence that parents have on this decision. This issue has significance due to the potential lack of awareness among parents about the significant effect their norms, beliefs, and gender roles have on their children's career choices. Parental influence on students' profession choices may either provide possibilities or offer barriers for students as they navigate the process of exploring different career options. Hence, this study fills the gap by exploring the influence of parental involvement on undergraduate students' career choice in STEM in southwest, Nigeria.

Objective of the Study

The study's broad objective is to explore the influence of parental involvement on undergraduate students' career choice in STEM in southwest, Nigeria, while specific objectives are to;

i. examine the influence of perceived parental expectationon the undergraduate career choice in STEM in southwest, Nigeria;
ii. assess the role of parents' occupation on undergraduate students' career choice in STEM in southwest, Nigeria;
iii. investigate the parents' world views and values regarding gender roles and career paths in STEM among undergraduate students in southwest, Nigeria; and
iv. assess the influence of undergraduate student interest on their decision to pursue a career in STEM in southwest, Nigeria.

Research Questions

To direct the study, the following queries are posed.

1. What is the influence of perceived parental expectation on the undergraduate career choice in STEM in southwest, Nigeria?
2. What is the role of parents' occupation on undergraduate

students' career choice in STEM in southwest, Nigeria?

3. What is the parents' world views and values regarding gender roles and career paths in STEM among undergraduate students in southwest, Nigeria?
4. What is the influence of undergraduate student interest on their decision to pursue a career in STEM in southwest, Nigeria?

Research Method

The study employed concurrent mixed-methods design. All undergraduate students offering STEM-oriented courses in southwest Nigeria formed the target population. Purposive sampling procedure was used to select two out of six states in southwest. They are: Osun and Oyo States, respectively. The two federal universities in the sampled states were purposively sampled. Multistage sampling technique was embraced to select seventy-five (75) undergraduate students per sampled university totaling one-hundred and fifty participants. Five parents were purposively sampled for the In-depth Interview (IDI) and a well-structured questionnaire and interview guide were used. Expert from the Educational Measurement and Evaluation validated this instrument. The internal consistency reliability coefficient of 0.72 was obtained with the aid of Cronbach Alpha reliability technique. The Statistical Package for Social Science (SPSS) tools was used. The quantitative data collected were analysed using descriptive statistics. The responses from the interview were thematically analysed.

Presentation of Results

Research Question I: What is the influence of perceived parental expectation on the undergraduate career choice in STEM in southwest, Nigeria?

Table 1: Descriptive statistics showing how parental expectations from STEM profession influence their children STEM-related career options as perceived by undergraduates' students.

Items on influence of parental expectations on children STEM-related career	SA	A	D	SD	Mean	Standard Deviation
My parents believe that I ought to pursue a profession in STEM.	(80%)	(20%)	0(0%)	0(0%)	3.44	0.08
I feel pressured to follow my parents' advice when it comes to choosing a career in STEM.	0(0%)	0(0%)	(80%)	(20%)	2.05	0.06
I listen to my parents' advice when it comes to choosing a career.	(80%)	(20%)	0(0%)	0(0%)	3.44	0.08
I'm encouraged by my parents to pursue a career in the STEM industries.	(60%)	(40%)	0(0%)	0(0%)	3.32	0.07
The support of my parents increases my enthusiasm in pursuing a career in STEM	(80%)	(20%)	0(0%)	0(0%)	3.44	0.08
My parents have shown me where I can obtain information on colleges that offer STEM careers	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
My parents have assisted me in understanding the demanding task surrounding career choice in STEM field.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09

SA = Strongly Agree, A = Agree, D = Disagree and SD = Strongly Disagree
N = 150. Decision Criteria: Positive perception = 3.00 - 4.00 Negative Perception = 0.1 - 2.9

Table 1 indicated the perception of sampled undergraduate students on how their parents' expectations from STEM profession influence their STEM-related career options. The empirical findings indicated that (80%) and (20%) strongly agree and agree that their parents were of the view that they ought to pursue a profession in STEM-oriented field; listen to their parents' advice when it comes to choosing a career; and the support received from their parents increased their enthusiasm in pursuing a career in STEM, respectively. However, the mean value of 3.44 indicated that undergraduates' students had positive perception that their parents' expectations on STEM career go a long way in the decision to choose career option in STEM which reflected in the decision criterion regions.

Also, 80% of the participants disagreed that they feel pressured to follow their parents' advice when it comes to choosing a career in STEM, while, 20% strongly disagree with the proposition. The mean value of 2.05 exhibited that the respondents had negative perception towards the item. Finally, 100% strongly claimed that their parents have shown them where he/she can obtain information on colleges that offer STEM careers; and have assisted them in understanding the demanding task surrounding career choice in STEM field, respectively. The mean value of 3.58 indicated that the respondents had positive perception towards the assertion.

Table 2: Descriptive statistics showing how parental expectations from STEM profession influence their children STEM-related career options as expressed by parents.

Statements	SA	A	D	SD	Mean	Stand. Dev.
I actively look for as much information as possible regarding STEM in different circumstances for my kids.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
I would seek out STEM-related activities or new experiences wherever I went for my children.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
In the field of STEM, I view difficult circumstances as teaching opportunities for my kids.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
I am always looking for ways to push kids in STEM.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
I readily accept new STEM-related experiences for my children.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09

N = 150. Decision Criteria: Positive perception = 3.00 - 4.00 Negative Perception = 0.1 - 2.9

The empirical outcomes from table 2 indicated that all the five sampled parents strongly agreed that they actively look for as much information as possible regarding STEM in different circumstances for their kids; seek out STEM-related activities or new experiences wherever they went for their children; view difficult circumstances as teaching opportunities for their kids; and always look for ways to push kids in STEM-oriented field; and accept new STEM-related experiences for their children, with mean value of 3.58 falling within the positive decision criterion, respectively.

Research Question II: What is the role of parents' occupation on undergraduate students' career choice in STEM in southwest, Nigeria?

Executive Interview: When it comes to choosing a career, do you feel the need for your child in choosing a career in STEM field that is similar to your own?

Two out of five participants said that they do not expect their children to select a similar career in STEM-field with them. They claimed that they would give their wards opportunity to decide on the particular STEM-field that interest him or her before offering suggestions if the need arises. The remaining participants concurred that they would like their wards to select a career in STEM-field, that is, exactly similar to theirs. They said that doing this would help them to share experience with him/her and give him/her some of the materials used (Executive Interview Report, 2023).

Research Question III: What is the parents' world views and values regarding gender roles and career paths in STEM among undergraduate students in southwest, Nigeria?

Executive Interview: As a parent, what is your world view about gender role towards children's career selection in STEM field?

All the participants said that they prefer engineering-oriented STEM field for their male children and health-oriented STEM field for their female counterparts. However, it has been said that the participation of women in the field of science is often limited by several variables, including familial obligations, classroom instruction, attitudes, and cognitive capabilities. Furthermore, the constraint on female participation in STEM subjects might be attributed to the scarcity of career prospects and inadequate assistance. The individuals held the perspective that female students are more inclined to engage in reading instructions and documenting experimental results, in contrast to male students who are more likely to actively use equipment and supplies throughout the course of doing experiments (Executive Interview Report, 2023).

Research Question IV: What impact does a student's interest in STEM have on the STEM careers they choose?

Table 3: Descriptive statistics showing the impact of student's interest in STEM careers.

Interest in STEM	SA	A	D	SD	Mean	Stand. Dev.
Science, technology, engineering, and mathematics are all fields that are valuable and interest me.	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
My parent's support has increased my interest in career choice in STEM	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
I enjoyed the aspect of STEM subjects such as working in laboratories, experiments etc.	(80%)	0(0%)	(20%)	0(0%)	3.44	0.08
I enjoy the theoretical aspects of STEM subjects	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09
I try different approaches to find out best way of study	(100%)	0(0%)	0(0%)	0(0%)	3.58	0.09

N = 150. Decision Criteria: Positive = 3.00 - 4.00 Negative = 0.1-2.9

The empirical findings indicated that all the respondents, that is, (100%) strongly concurred that the STEM all fields that are valuable and interest them; parent's support has increased their interest in career choice in STEM; enjoy the theoretical aspects of STEM subjects; and explore different approaches to find out best way of study STEM-oriented course, having the mean value 0f 3.58 falling within the positive

decision region respectively. Similarly, the outcomes indicated that (80%) of the participants strongly agreed that they enjoyed the aspect of STEM subjects such as working in laboratories, experiments among other, while (20%) disagree with the statement.

Executive Interview

Executive Interview: What expectations do you have about your children career selection in STEM field?

The first male participant said that his expectations about his child's career selection in STEM field are basically to have Medical Doctors among children. Such that if any of the family members feel indisposed, such a child who specialises in medicine will be able to give such a person necessary medical treatment and attention. Aside this, having a medical doctor would promote the name of the family (Executive Interview Report, 2023).

The second participants claimed that her own expectation concerning her intention in career selection in STEM-field is to make her child secure an employment/job after graduate. She claimed that STEM field especially Pharmacy is highly lucrative field in STEM. She opined that her child after graduation from the University can establish his own business by registering a pharmacy firm and start creating jobs for the needed individual. This respondent attributed job benefits to STEM-oriented field (Executive Interview Report, 2023).

The remaining three participants said that they develop expectations in career selection in STEM-field especially in ICT for their children because the role being played by ICT experts cannot be overemphasized. They claimed that every activity in both developing and developing societies is tending towards ICT. And that those who are expertise in this area of STEM-field will always be reckoned with both now and in the near future (Executive Interview Report, 2023). They further claimed that industries in advanced societies specially manufacturing ones are fully automated. They referenced use of tram as an automated transport system in UK, adoption of contactless cards to make transaction among other. They agree that the existence of wider-gap between the level of adoption of AI in business between developed countries and developing ones account for the level with which the business in developing societies like Nigeria would invest in ICT for them to grow (Executive Interview Report, 2023).

Executive Interview Item 4: Do you have the best knowledge of your child's interests and abilities in career choice in STEM field?

The first three participants interview said that they possess the best and adequate knowledge of their children interest and abilities in career choice in STEM-field right from his/her first day in high schools. The first respondents claimed that his child is good at mathematics while in high school and that is reason, he suggests that he should study mathematics at university level. This is because the interest he develops in mathematics at high school would go a long way in enhancing his performance at higher education. The second participant claimed that his child is academically sound in chemistry at high schools and has developed interest in the subjectright from his first year in high school. The third participant said that her child is good at ICT because he is ongoing computer

training. This would serve as a basis upon which other skills would be built for while securing admission into higher institution. The remaining two participants claimed that they do not have adequate knowledge about their child' abilities and interests in career selection in STEM-field ((Executive Interview Report, 2023).

Executive Interview: Do you normally find the time to help your child explore careers in STEM field?

All participants claimed that they do not usually find time to help their children in exploring careers in STEM-field. They said that these children have access to so many channels where relevant information about the trending STEM-oriented careers is available. They went further to say that these children are the ones updating them about the latest development in almost all fields STEM inclusive (Executive Interview Report, 2023).

Executive Interview: What do you see to implementation of the STEM approach in campuses at this time in your university?

All participants claimed that the implementation of the STEM approach in campuses is given utmost priority in developing societies like Nigeria. They cited that some public-owned Universities are basically established to offer courses on STEM-oriented only. These Universities include: Ladokun Akintola University, Ogbomoso, Oyo State; Federal University of Health Science, Ila-Orangun, Osun State, Federal University of Technology, Akure, Ondo State, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria among others. All respondents were of the view that STEM-approach in campuses would give room for problem-solving skills and development among undergraduate students as well as place thinking and exploration in a central part of their lives (Executive Interview Report, 2023).

Executive Interview: What are the factors that hinder the implementation of the STEM approach in learning on campus at this time in your university? Give at least two reasons.

All participants pointed at one factor or the other. It is inferred from their claim that the factors that hinder the effective implementation of STEM-approach in campuses in developing societies like Nigeria are multidimensional in nature. These factors according to them consist of personal traits of instructors, internal variables, external factors, and design considerations, respectively.

One male participant said that the instructors responsible for teaching STEM-focused courses had fundamental teaching abilities in STEM subjects, but they would benefit from further enhancing their skills and knowledge, particularly in the area of developing appropriate instructional activities. A female participant said that instructors encounter instructional difficulties, such as the segregation of topics and texts, a lack of adequate assessment tools for STEM, and concerns about students' academic development throughout the adoption of STEM education.

According to the remaining three participants, the unsuccessful implementation of STEM practices can be attributed to various factors. These factors include inadequate instructional resources for STEM subjects, a scarcity of trained

STEM teachers, a dearth of committed facilities for STEM education, insufficient possibilities for professional growth in STEM, a lack of recorded requirements and curriculum for STEM, restricted access to technological advances, and a shortage of time allocated for teaching STEM-related subjects (Executive Interview Report, 2023).

Discussion of Findings

The empirical findings indicated that the parents under investigation had positive perception towards their children career choice in STEM. As they give their children advise and all forms of supports needed not only to select career in STEM but also excel. The empirical outcomes also indicated that the parents actively seek out STEM-related activities or new experiences wherever they go for their children; they see challenging situations as teaching opportunities for their children; they constantly search for ways to push their children toward STEM-oriented fields; and they accept new STEM-related experiences for their children. This is to infer that it is critical that parents support their children's academic and professional goals and communicate the importance of education and its correlation with future success. Salvatierra and Cabello (2022) corroborated this by submitting that the STEM activities can promote parent involvement and have a good impact on kids' STEM learning. According to Šimunović and Babarović (2020), the family component in STEM education presents an underutilized resource with the potential to boost students' achievement and motivation. Ekeng *et al.* (2022) concurred that parental involvement in their kids' profession choices had a big impact on their success

The empirical findings indicated that kid's interest in STEM filed played a crucial role in their career choice in STEM-oriented field. This interest has made them to enjoy the theoretical aspects of STEM subjects; and explore different approaches to find out best way of study STEM-oriented course, as well as enjoy the aspect of STEM subjects such as working in laboratories, experiments among other. Hendrawijaya (2022) acknowledged that parental involvement positively affects students' development of interest, and a strong interest has an effect on kids' academic success. Hsieh & Yu, (2022) concurred that external variables that come from socialising agents like parents, friends, and teachers also have an impact on students' interest in STEM fields.

The empirical outcomes indicated that personal traits of instructors, internal variables, external factors, and design considerations were identified as some of the challenges confronting effective implementation of STEM courses in Nigerian Universities. The study indicated that instructors encounter instructional difficulties, such as the segregation of topics and texts, a lack of adequate assessment tools for STEM, and concerns about students' academic development throughout the adoption of STEM education. Lack of qualified STEM-based teachers is one of the main challenges the country faces in implementing STEM education. Teachers still lack a foundational understanding of STEM subjects. Teacher readiness and knowledge are closely associated. Teachers' preparedness level is considered to be below par when they are observed to be having difficulty with the subject and pedagogical expertise of STEM education. Nigeria has a dismal record when it comes to STEM

education because it is among the least STEM literate nations in the world. This is a serious issue since a nation's ability to expand economically and remain competitive depends on its STEM education system. Baskaran and Abdullah (2023) agreed that the biggest challenge teachers have when integrating STEM instruction is school infrastructure. Many schools still lack functional technology and reliable internet to support instructors in using online platforms to provide STEM programs as well as a lack of awareness of the curriculum that incorporates STEM education.

Conclusion

The study concluded that parental involvement and kids' interest have a long way to go in STEM-field career choice and decision before and after admission into university. Both school-based and home-based involvement have greater effect on kid' STEM-field decision.

Recommendations

Based on the outcomes, the following recommendations are made:

i. Parents should value their children's differences since a home environment that values individuality and independence would greatly benefit the child's professional growth in STEM.
ii. Parents should start studying their children and wards from an early age because a child's potential and eventual profession are frequently identified in these formative years of life. This may encourage parents to refrain from dictating to their children what to do for a living.
iii. Lastly, more gradual interventions that begin earlier in school life are required if the goal is to influence students' career aspirations. These interventions ought to interact with the developmental events that shape students' self-concept, such as human relatedness, family science capital, role models, and individualized learning opportunities, in addition to offering rich information on STEM careers.

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