PARENTAL ENGAGEMENT AS A CORRELATE OF IN-SCHOOL ADOLESCENTS' INTEREST IN STEM FIELDS IN KWARA STATE

BY

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Abstract
This study investigated parental engagement as correlate of in-school adolescents' interest in STEM fields in Kwara State. This study employed a descriptive research design of a correlational type. The population for this study comprised all junior secondary school students in Kwara State. The target population comprised all junior secondary school in Ilorin. There were 79 public secondary schools in Ilorin. Simple random sampling technique was used to select 10 students in 25 schools bringing the total number of respondents to 250. An adapted questionnaire titled "Questionnaire on Parents Engagement and Adolescent Interest in STEM" (QPEAI_STEM) was used to collect the data. The findings showed that the level of parental engagement among In-school Adolescents in Kwara State was relatively low. There was significant high positive relationship between Parental Engagement and Adolescents' Interest in STEM fields in Kwara State. The study recommended that educational psychologist and teachers should raise awareness about the significance of parental involvement in STEM education and address any existing barriers to foster a supportive environment for adolescent learners in the region. The state government should develop comprehensive strategies aimed at enhancing STEM engagement, providing hands-on experiences, and showcasing the relevance and real-world applications of STEM disciplines to inspire and cultivate interest among in-school adolescents in Kwara State.

Keyword*: Parental Engagement, STEM, Adolescents' Interest*

Introduction

The exploration of parental engagement role in shaping adolescents' interest in Science, Technology, Engineering, and Mathematics (STEM) fields stands as a crucial area for study in the context of Kwara State, Nigeria. This correlation takes on a unique and complex dimension, illustrating the intricate connection between parental psychology and its impact on adolescents' academic pursuits. Unraveling the influence of parental engagement on in-school adolescents' interest in STEM fields holds the potential not only to illuminate teachers and educational psychologist but also to profoundly influence individual achievements of adolescents and societal advancement. This research tries to understand how parental engagement influences the interest of adolescents pursuing STEM disciplines within Kwara State's educational landscape.

Parental engagement refers to the active and positive involvement of parents or caregivers in a child's education, development, and well-being (Goodall & Montgomery, 2014). It encompasses a wide range of actions, behaviors, and interactions that parents undertake to support their child's learning and growth. This involvement can take various forms, including but not limited to, assisting with homework, attending school events, communicating with teachers, participating in school activities, providing emotional support, fostering a conducive home environment for learning, advocating for their child's needs within the educational system, and instilling values that promote education and curiosity (Novianti & Garzia, 2020). Jeynes (2018) stated that parental engagement is considered a crucial factor in a child's academic success, social development, and overall well-rounded growth.

It is an established fact that parental engagement plays a pivotal role in shaping a child's academic success and overall development (Wilder, 2014; ; Novianti & Garzia, 2020). This involvement encompasses a spectrum of activities, from basic interactions at home to active engagement in school-related matters. At its core, Fajoju et al. (2016) highlighted that parental involvement serves as a catalyst for a child's academic motivation and achievement. Studies consistently demonstrate that when parents actively participate in their child's education by

providing a supportive home environment, monitoring homework, and engaging in conversations about school, children tend to exhibit higher levels of motivation, improved behavior, and enhanced academic performance (Kimathi, 2014; Shah et al., 2016; Liu et al., 2020) . This involvement fosters a sense of accountability and instills the value of education from an early age.

In addition, Olaosebikan and Olusakin (2014) emphasized that parental involvement goes beyond academic support; it significantly influences a child's socioemotional development. When parents engage with educators and participate in school activities, it reinforces a collaborative partnership between home and school, creating a conducive environment for a child's holistic growth (Ugwuanyi et al., 2020). This collaborative approach not only positively impacts a child's social skills and emotional well-being but also contributes to a more comprehensive and enriched learning experience (Rentzou & Ekine, 2017). However, the impact of parental involvement is not uniform and can be influenced by various factors. Socioeconomic status, cultural norms, and parental education levels have been shone to significantly shape the extent and nature of involvement (Povey et al., 2016). In some cases, barriers such as time constraints, language barriers, or lack of resources can impede parents' ability to actively engage in their child's education, leading to disparities in educational outcomes (Robinson & Harris, 2014).

Furthermore, the quality of parental involvement matters as much as the quantity. Merely being physically present or overseeing academic tasks without emotional support or understanding a child's individual needs might not yield the desired outcomes. Park and Holloway (2013) submitted that authentic engagement, where parents actively communicate, show genuine interest, and provide guidance tailored to their child's unique strengths and weaknesses, holds greater significance. As a result, the study of Barger et al. (2019) suggested that parent involvement is critical in stimulating adolescents' interest into STEM-related field.

The terms in-school adolescents' interest in STEM connote young adolescent curiosity, enthusiasm, and motivation towards engaging with and pursuing studies or activities related to these fields within an educational setting (Taskinen et al., 2013). It encompasses a positive inclination, eagerness to learn, and a genuine passion for exploring various aspects of science, technology, engineering, or mathematics subjects offered within their secondary school curriculum (Mohr-Schroeder et al., 2014). This interest may manifest through active participation in STEM-related classes, clubs, projects, competitions, or extracurricular activities, as well as a desire to pursue further education or careers in STEM disciplines. In-school adolescents' interest involves exploring various factors influencing their engagement and motivation in STEM. Psychological theories, such as Self-Determination Theory (SDT) and Social Cognitive Theory (SCT), offer insights into understanding these interests.

Self-Determination Theory posits that individuals are motivated by three innate psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2017). In the context of STEM, fostering a sense of autonomy by allowing students to explore, experiment, and discover within these subjects has been shown to enhance their interest (León et al., 2015). Sergis et al. (2018) stated that providing choices and control over learning materials or projects can increase intrinsic motivation as well as ensuring a sense of competence through achievable challenges and acknowledging their progress in STEM fields is crucial. The study of Rosenzweig and Wigfield, (2016) indicated that adolescents are more likely to be interested in STEM if they feel capable and competent in these areas. Lastly, relatedness, feeling connected to others especially parents with similar interests, can significantly impact their engagement (Estell & Perdue, 2013). Thus, Howard et al. (2016) stated that building a supportive STEM community within schools can boost interest by fostering a sense of belonging and collaboration according to the Self-Determination Theorist.

Furthermore, another theory that could be used to explain adolescent interest in STEM contexts Social Cognitive Theory. Social Cognitive Theory emphasizes the role of observational learning, self-efficacy, and outcome expectations in shaping interests and behaviour (Schunk & DiBenedetto, 2020). Adolescents' exposure to relatable role models, such as successful scientists or engineers, can positively influence their interest in STEM (Aish et al., 2018). Additionally, developing self-efficacy, belief in one's capability to succeed, in STEM subjects is vital. Lent et al., (2018) noted that encouraging small successes, providing constructive feedback, and offering opportunities for skill development can boost students' confidence in their STEM abilities. Furthermore,

positive outcome expectation believing that engaging in STEM will lead to desirable outcomes like future career success or societal contribution, can fuel interest and commitment (Bradford et al., 2015).

However, Rosenzweig and Wigfield (2016) summited that challenges persist in cultivating sustained interest in STEM fields among adolescents. The complexity of STEM subjects and the perception of these disciplines as difficult or inaccessible can be daunting, leading some students to lose interest or confidence in pursuing them. Also, parental perceptions and stereotypes surrounding STEM disciplines often shape adolescents' interest in these fields (Šimunović & Babarović, 2020). Prevailing gender stereotypes, for instance, might deter girls from pursuing STEM due to the misconception that these fields are primarily male-dominated (Wang & Degol, 2013).

Parental involvement seems to play a significant role in shaping adolescents' interest in STEM. Numerous studies suggest that parental engagement, encouragement, and attitudes towards STEM subjects significantly influence adolescents' perceptions and eventual choices regarding these disciplines (Lloyd et al. 2018; Wang & Sheikh-Khalil 2014; Regan & DeWitt, 2014). However, the impact of parental involvement on adolescents' STEM interest is complex and multifaceted, encompassing both positive and negative aspects.

On the positive side, studies have suggested that supportive parental engagement in STEM can serve as a catalyst for adolescents' interest and success in these fields (Simpkins et al., 2015; Dou et al., 2019). Parents who demonstrate enthusiasm for STEM subjects, offer resources, and engage in discussions or activities related to science and technology create an environment that fosters curiosity and exploration (Young et al., 2017). Additionally, parental encouragement and support in the form of providing educational materials, arranging visits to science museums, or enrolling adolescents in STEM-related programs can significantly influence their attitudes and engagement with these subjects (Xie et al., 2015). Moreover, parental involvement can help shape positive beliefs and attitudes towards STEM careers, reinforcing the value and relevance of these fields in the future (Banerjee, 2016).

However, the impact of parental involvement in STEM on adolescents can also have limitations and challenges. Some studies suggest that parental influence, if overly directive or pressurizing, might lead to counterproductive outcomes (Mohr-Schroeder et al., 2014). High levels of parental pressure or expectations in STEM can create stress and anxiety in adolescents, potentially diminishing their interest in these subjects (Chachashvili-Bolotin et al., 2016). Furthermore, the lack of parental knowledge or confidence in STEM topics might inadvertently transmit negative attitudes or beliefs about these fields to adolescents, hindering their interest and confidence (Mau & Li, 2018).

Dotterer (2022) investigated parent involvement, expectancy values, and STEM outcomes among underrepresented adolescents. This research used data from the High School Longitudinal Study: 2009 (HLS: 2009) to explore connections between parental engagement and underrepresented students' confidence, perceived value, interest, and performance in STEM fields. Using MPlus, both immediate and long-term models were employed to investigate if parental involvement in 9th grade could predict interest and performance in STEM directly and indirectly through self-confidence and perceived value. The immediate models indicated a significant correlation between parental engagement in STEM and young individuals' belief in their STEM capabilities, which subsequently related to their interest and performance in STEM. Long-term models demonstrated that parents' involvement in STEM during 9th grade predicted the belief in adolescents' STEM capabilities in 11th grade, subsequently impacting their overall performance in STEM courses. Parental involvement in STEM was consistently more strongly associated with self-confidence than perceived value. These findings imply that parental engagement in STEM contributes to adolescents' confidence in their STEM skills, but might not necessarily influence their perceived value of STEM subjects.

In addition, the study of Šimunović and Babarović (2020) investigated the structure of middle school students' interest in STEM careers and how parental engagement in STEM-related behaviors influenced this interest. The research involved 488 students reporting their eighth-grade interest (average age: 14.48 years), with parental data collected approximately 15 months earlier. Parents (also 488 in number) reported on their encouragement of their child's STEM pursuits, provision of STEM resources, and their own involvement in STEM activities. Additionally, students' grades in STEM subjects were gathered at the end of seventh grade. The findings

indicated that, at this age, students distinguished between their interest in science and engineering-technology career paths. Boys exhibited higher interest in STEM than girls, specifically in the engineering-technology domain. Previous achievement in STEM subjects predicted interest in science but not in engineering-technology. Once accounting for gender and STEM performance, parental support equally predicted both types of STEM interest for both genders. However, parents tended to report more involvement in STEM practices concerning their sons compared to their daughters. The results were discussed within the context of children's development of STEM career interest and existing gender-based patterns in familial STEM socialization. The study also deliberated on implications for interventions and curricula in the STEM field.

Also, Ochoa (2021) explored the potential link between increased levels of parental involvement and heightened student STEM efficacy. It closely followed the Hoover-Dempsey Model of Parental Involvement Processes, indicating that methods of parental involvement act as pathways through which parental factors, such as self-efficacy, influence academic outcomes like student self-efficacy. The research also investigated parental efficacy and the impact of immersion classes on parental involvement. By adjusting the data for non-normally distributed parental involvement measures, the analysis revealed significant correlations between four parental involvement variables and three student efficacy variables when considered as sets. The Hayes Process Macro for SPSS identified direct effects of parent efficacy on student efficacy in mathematics but not in science or technology/engineering. while no significant mediation relationships were found between the variables, parental efficacy significantly correlated with three parental involvement mediators, encouragement, instruction, and modeling, while reinforcement was notably linked to student efficacy in math.

Statement of the Problem

In Kwara State, there seems to exist a significant gap in fostering adolescent interest in STEM, which may be primarily due to insufficient parental involvement. Regardless of the importance of STEM education for future employability and innovation, many in-school adolescence lack adequate exposure and encouragement at home, leading to disinterest in these fields. Parents often prioritize traditional career paths or are unaware of the opportunities STEM fields offer, resulting in minimal support or encouragement for their children to pursue these subjects. This seemingly lack of parental engagement in nurturing STEM interest perpetuates a cycle where students remain unaware or unenthusiastic about STEM disciplines, hindering their potential and the region's capacity for technological advancement and competitiveness on a global scale.

Despite the acknowledged significance of parental influence on adolescents' academic interests (Dotterer 2022**;** Šimunović & Babarović 2020; Ochoa 2021). There remains a gap in literature to understand, the specific correlations between parental involvement and the cultivation of interest in STEM among adolescents within the context of Kwara State. This study centers on delineating the extent and nature of parental involvement and its direct impact on adolescents' inclination and enthusiasm towards STEM subjects in this particular region. Therefore, this study investigated parental involvement as correlate of in-school adolescents' interest in STEM fields in Kwara State.

Purpose of the Study

The main purpose of this study is to examine parental involvement as correlate of in-school adolescents' interest in STEM fields in Kwara State. Specifically, the study investigated:

1. the level of parental engagement among in-school adolescents' in Kwara State
2. the level of In-school Adolescents' Interest in STEM Fields in Kwara State.
3. relationship between parental involvement and in-school adolescents' interest in STEM fields in Kwara State.

Research Questions

1. What is the level of parental engagement among in-school adolescents in Kwara State?
2. What is the level of In-school adolescents' interest in STEM fields in Kwara State?
3. Is there significant relationship between parental involvement and in-school adolescents' interest in STEM fields in Kwara State?

Research Hypothesis

Ho_1: There is no significant relationship between parental engagement and in-school adolescents' interest in STEM fields in Kwara State.

Methodology

This study adopted a descriptive research design of a correlational type. The population for this study comprised all junior secondary school students in Kwara State. There were 535 secondary schools and 29,677 students in Kwara State (National Bureau of Statistics, 2023). The target population comprised all junior secondary school in Ilorin. There were 79 Public secondary schools in Ilorin (Kwara State Ministry of Education, 2021). Simple random sampling technique was used to select 10 students in 25 schools bringing the total number of respondents to 250.

An adapted questionnaire titled "Questionnaire on Parents Engagement and Adolescent Interest in STEM (QPEAI_STEM)" was used to collect data. The questionnaire was divided into three sections – A, B and C. Section "A" was used to elicit the demographic features of the respondents. This included gender. Section "B"; was used to elicit response on students' parental engagement. Parental Engagement Inventory, developed by Dotterer 2022 was adapted using 4-point Likert scale and coded as; Strongly Disagree (1), Disagree (2) Agree (3) and Strongly Agree (4) were used as the scale of measurement. Section C was used to elicit information on adolescent interest in STEM field. Adolescent interest inventory, developed Olaosebikan and Olusakin (2014) was adapted for the study. 4-point Likert scale method of 4=Very True of Me, 3= True of Me, 2= Rarely True of Me, 1= Not True of Me suggested by the developers as the scale of measurement.

Face and content validity was conducted under the supervision of two educational psychologists and two research measurement experts in the Department of Social Sciences of Education, Faculty of Education, University of Ilorin. After which the instrument was administered on a set of 50 students, who were not part of the targeted population of the study but with similar characteristics, to test for reliability. After the instrument was received, Cronbach Alpha was used to check the reliability coefficient to determine if the instrument was reliable or not using split-half reliability method. Parental Engagement had a reliability coefficient of 0.69, Vocational aspiration inventory had a reliability coefficient of 0.73 and Adolescent interest in STEM field inventory had a reliability coefficient of 0.71, which made the instrument reliable for use.

The researcher administered the questionnaire on the students following all research ethics procedures. The researcher sought the permission of the school management before administering the questionnaire assuring them of confidentiality and animosity. Furthermore, no respondent was compelled to give response to the instrument; the distribution of the instrument was determined by the willingness of the respondents. Also, in the administration of the questionnaire as regard to this study, the right of the respondents was put into utmost consideration and was not be infringed upon. The respondents were asked to make a tick (√) where necessary. Copies of the questionnaires were filled and collected immediately to forestall any attrition.

Percentage and frequency count were used to answer research questions 1 and 2. Research question 3 was converted into hypothesis and the hypothesis was tested using Pearson Product Moment Correlation (PPMC) statistic at 0.05 level of significance.

Result

Answering the Research Questions

Research Questions 1: *What is the level of parental engagement among in-school adolescents' in Kwara State?*

To answer the research question, the items on parental engagement were summed and subjected to percentage analysis. The minimum, maximum and range score obtainable from the respondents were 33, 62 and 29 respectively. The range was divided by the three levels (high, average and low) and the cut off range scores were 33-43, 44-52 and 52-62 categorized as low, average and high level of parental engagement respectively. The result is presented in Table 1.

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Table 1
level of parental engagement among In-school Adolescents' in Kwara State

Levels	Cutoff Range	Frequency	Percentage (%)
Low	33-43	105	42
Average	44-52	80	32
High	47-62	65	26
Total		**250**	**100.0**

Result in Table 1 reveals the level of parental engagement among In-school Adolescents' in Kwara State. As shown in the table, 105(42%) of the respondents got low score, 80(32%) of the sampled respondents got average score and 65(26%) of the respondents got high score. This means that the level of parental engagement among In-school Adolescents' in Kwara State was relatively low.

Research Questions 2: *What is the level of in-school adolescents' interest in STEM Fields in Kwara State?*
To answer the research question, the items on In-school Adolescents' Interest in STEM Fields were summed and subjected to percentage analysis. The minimum, maximum and range score obtainable from the respondents were 26, 69 and 43 respectively. The range was divided by the three levels (high, average and low) and the cut off range scores were 33-43, 44-52 and 52-62 categorized as low, average and high level of parental engagement respectively. The result is presented in Table 2.

Table 2
Level of In-school Adolescents' Interest in STEM Fields in Kwara State

Levels	Cutoff Range	Frequency	Percentage (%)
Low	26-40	123	49.2
Average	41-55	76	30.4
High	56-69	51	20.4
Total		**250**	**100.0**

Result in Table 2 reveals level of in-school adolescents' interest in STEM Fields in Kwara State. As shown in the table, 123(49.2%) of the respondents got low score, 76(30.4%) of the sampled respondents got average score and 51(20.4%) of the respondents got high score. This means that level of In-school Adolescents' Interest in STEM Fields in Kwara State was relatively low.

Hypothesis Testing
Ho_1: There is no significant relationship between Parental engagement and In-school Adolescents' Interest in STEM Fields in Kwara State.

In order to test the hypothesis, responses of students that addressed parental engagement and In-school Adolescents' Interest in STEM Fields were collated on a statistical coding sheet. The set of data was subjected to Pearson Product Moment Correlation (PPMC) statistic to determine the degree of association. The result was depicted in Table 3.

Table 3
Parental engagement and in-school adolescents' interest in STEM Fields in Kwara State

Variables	r - cal.	p-value	Remark
Parental Engagement			
	0 .781	0.000	Significant
Adolescents' Interest in STEM			

Table 3 reveals the r-calculated value (0.371) and the p-value (0.000) of Adolescents in Kwara State. Since the calculated p-value (0.000) was less than 0.05 level of significance value (0.00<0.05). This means that the null hypothesis was rejected, meanwhile the r-calculated value of 0.371 was moderately positive; hence, there was significant highly positive relationship between Parental Engagement and Adolescents' Interest in STEM field in

Kwara State.

Discussions of Findings

The finding of the study demonstrated that the level of parental engagement among In-school Adolescents' in Kwara State was relatively low. This finding raises concerns about the potential impact on students' academic and career trajectories, particularly in STEM fields. Limited parental involvement in fostering interest and support for STEM education might hinder students' motivation and access to resources critical for success in these domains. This finding aligns with a study by Thomas et al. (2020) that highlighted the correlation between low parental engagement and reduced academic outcomes, particularly in STEM subjects. The scarcity of parental involvement in Kwara State might signify a lack of awareness about the importance of STEM education or barriers preventing parents from actively engaging in their children's learning experiences, potentially hindering students' pursuit of STEM-related opportunities and career pathways.

Furthermore, the study shows that the level of In-school Adolescents' Interest in STEM Fields in Kwara State was relatively low. The discovery raises concerns about the region's potential to cultivate future professionals in science, technology, engineering, and mathematics. This finding suggests a lack of enthusiasm or motivation among students in these critical domains, potentially indicating a gap in exposure, resources, or engagement with STEM-related subjects. The study's alignment with research by Staus et al. (2020) underscored the significance of low interest in STEM fields among adolescents and its repercussions on future career choices and educational pursuits. In Kwara State, this low interest might signify a lack of awareness or inadequate exposure to the diverse and rewarding aspects of STEM careers, possibly limiting students' future academic and professional opportunities in these fields.

Finally, the study revealed that there was highly significant positive relationship between Parental Engagement and Adolescents' Interest in STEM field in Kwara State. This finding underscores the pivotal role of parental involvement in fostering enthusiasm and motivation among students for STEM disciplines. This finding suggests that when parents actively engage and support their children in STEM-related activities and discussions, it positively influences adolescents' interest in these fields and vice versa. This aligns with a study by Šimunović and Babarović (2020) that emphasised the influential role of parental encouragement and involvement in shaping adolescents' attitudes and aspirations toward STEM careers. In Kwara State, this robust connection emphasizes the potential for parental engagement to serve as a catalyst in nurturing a culture of STEM interest among adolescents, thereby highlighting the importance of involving parents as key influencers in promoting STEM education and career pathways for their children.

Conclusion

The correlation between parental engagement and in-school adolescents' interest in STEM fields in Kwara State highlights a crucial relationship crucial for fostering enthusiasm and motivation among students in these critical domains. This connection underscores the pivotal role parents play in shaping and influencing adolescents' attitudes, motivations, and aspirations toward STEM disciplines. The findings suggest that there is a significant positive relationship between parental involvement and adolescents' interest in STEM fields. This underscores the importance of promoting and encouraging parental engagement as a means to inspire and cultivate interest among adolescents in Kwara State towards pursuing STEM education and future career paths in these fields.

Recommendations

The following recommendation was put forward based on the findings;

1. Educational psychologist and teachers should raise awareness about the significance of parental involvement in STEM education and addressing any existing barriers to foster a supportive environment for adolescent learners in the region.
2. The state government should develop comprehensive strategies aimed at enhancing STEM engagement, providing hands-on experiences, and showcasing the relevance and real-world applications of STEM disciplines to inspire and cultivate interest among in-school adolescents in Kwara State.
3. School management and authorities should further strengthen and encourage parents to be involve in their children schooling to enhance adolescents' interest and engagement in STEM fields.

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