


The impact of STEM education and career counsellors' role in secondary schools in Anambra State

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ARTICLE INFO	ABSTRACT
<p>Keywords: <i>Counsellors' Roles, Junior secondary school, Career Choice, Career Development, Education, Science, Technology, Engineering, Mathematics</i></p> <p><i>Received: 02, Mar. 2026</i> <i>Revised: 12, Mar. 2026</i> <i>Accepted: 23, Mar. 2026</i></p> <p>©2026 Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International</p> 	<p><i>The selection of a program of study or an appropriate career in line with personality is crucial in determining the individual's future. Imagine if an individual with deep interest and tendency to draw and paint was instructed to perform routine work on machine, would invite a conflict within him. Inconsistency in personality with the selection of program of study resulted in the student becoming less motivated and interest in continuing the learning session. Personalities are also being able to become legitimate predictors of individual work performance. Some countries have adopted STEM policies in their education system. Many policies, initiatives, training and funds are for STEM development aimed at expanding science, technology, engineering, and mathematical workforce. This education investment also aims to create a larger, more diverse group of talent pursuing technical careers. Counsellors are among those who should actively involve in supporting and promoting STEM Education in school. This study investigated the roles that can be played in promoting STEM education by counsellors across the secondary schools in the six educational zones in Anambra State. The study used a mixed research method in analyzing the research problem across the six education zones in the state. Population of the study consists of guidance and counsellors in the 781 secondary schools comprising 257 public and 524 private across the six education zones in Anambra State. The research sampled 275 secondary schools comprising 135 public and 140 private using stratified and simple random sampling techniques. Data was analyzed using nested analysis approach. The analysis is considered as nested in a way that it combines descriptive quantitative analysis with an in-depth thematic qualitative analysis. The research employed Dedoose qualitative research software to analyzed the data collected from the field. Thematic coding was applied in gathering the themes. Six themes emerged from the data The theme are counsellor must be (i) well-versed in STEM, (ii) giving information and understanding of STEM to students. (iii) instill students' interest, (iv) knowledgeable of stem career prospects, (v) knowledgeable in career psychometrics tests, and (vi) be prepared with students' personallity issues. The study conclude that the role of a counsellor in school is extremely important to support and promote STEM Education. The findings shows a significant relationship between counsellors' roles, and the development of STEM policy among counsellors in the sampled secondary schools in the study area. The research concluded that the role of a counsellor in school is extremely important to support and promote STEM Education in the six education zones in Anambra State. Based on the findings, this study recommends that governments at all levels, stakeholders in private sector and non-government organizations should organize capacity building workshops for junior secondary school STEM subjects' teachers, as well as counsellors across the six education zones in Anambra State in order to facilitate the teaching and learning of STEM subjects across the junior secondary schools in the state and , Nigeria at large.</i></p>

INTRODUCTION

Each individual is unique and has different personality, which illustrates the individual's interest and tendency towards something. Ones personality involves his future such as the selection of a program of study which is certainly related to the determination of a person's career field. This is because every individual will find a career that suits his personality where he is able to demonstrate his abilities and skills, and has the opportunity to show his excellence (Mohd; Salleha, & Mustapha, 2020). The selection of a program of study or an appropriate career in line with personality is crucial

in determining the individual's future. Imagine if an individual with deep interest and tendency to draw and paint was instructed to perform routine work on machine, would invite a conflict within him. Inconsistency in personality with the selection of program of study resulted in the student becoming less motivated and interested in continuing the learning session. Personalities are also being able to become legitimate predictors of individual work performance (Hough, & Ones, 2018).

In today's world of the twenty-first century, the Education Policy of most countries began to focus on the STEM (Science, Technology, Engineering & Mathematics) approach. The term STEM began in the early 90's in the United States in US government policies (Koehler; Binns, & Bloom, 2019). The definition of Integrated STEM as: "Teaching and learning of content and practice of science that incorporate the elements of Science and Mathematics by integrating Engineering and Engineering Design practices through the relevant Technology. Engagements in STEM-related initiatives provide various opportunities for counselors, and have direct impact on their work. Counselor has additional role in career planning, so counselors must have the skills, knowledge, and necessary skills to facilitate in career counseling. With the knowledge gained through the STEM professional development, school counselors have the opportunity to gather teachers and administrators to create opportunities for career awareness for their school staff, students, and families. School counselors can continue to develop career courses and encourage potential students through career-related opportunities. On the reforms in this education system, the School Counselor should facilitate the planning of student courses in preparing for the STEM career world. School counselors should take part in student placement and have a direct opportunity to assign students to take courses that fit the career personality and academic achievement (Akos; Shoffner, & Ellis, 2019). School counselors normally help students develop self-esteem and form realistic attitudes about the future career. The influence of school counselor's in career counseling is very important, that the level of student's confidence in their abilities in mathematics and science predicts their interest in the STEM career path (Akos et al., 2019).

School counselors also need to integrate STEM knowledge into the interests of the students. Counselors should focus on positive attitudes and help students identify higher aspirations in seeing the opportunities of STEM education (Maher, & Abu-Hilal, 2021). With these interests, counselors can help students develop their own learning experiences and skills that drive them towards their career choices. School counselors need to improve the orientation of the students' goals while working toward raising the potential of students who are likely to succeed in the areas of critical needs, such as mathematics and science (Trusty, & Niles, 2020). The delivery of information focused by STEM is indispensable for school counselors as they may not have experience in the subject and / or interest in STEM or career-related matters (Feller & Thomas, 2019). Many school counselors today may not be exposed to STEM focus during their studies, and the knowledge of counselors on current career development may be limited (Wyrick, 2018). Counselors improve on their own knowledge, so that they can lead others; teachers, administrators and students, by sharing the latest information and promote STEM focus at school. School counselors should use their rising knowledge to support students access to more intensive career counseling, more challenging mathematical and science courses, and more exposure to STEM-related programming. The counselor also needs to give an understanding of the active parent in setting the career goals of children by instilling the importance of career exploration (Jacobs; Chhin, & Bleeker, 2020). Given the strong impact of parental support on the student's decision to continue STEM careers, counselors can use their skills and vision to share information and become parental advocates on the most effective way to determine their children's career in the STEM-based field.

Counselors can easily integrate various online resources for assimilation into career-related discussions. Resources provide activities to engage students in career search, teacher-use activities, movie clips related to STEM's career options and opportunities, STEM projects for student engagement, and many websites for students / parents and school counselors. These resources help

counselors increase the domain of new knowledge in empowering their knowledge. The counselor should take the opportunity to maximize STEM's career knowledge by leveraging some of the websites developed to get career information based on STEM (Feller & Thomas, 2019), such as career opportunities, STEM-related program listings for undergraduate programs, games that allow students to explore their career and job opportunities, and other career development resources.

The STEM Careers Inventory provides a self-directed assessment using Holland's (1959) RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) codes to help individuals identify and explore STEM fields (Shatkin & Umar, 2018). Counselors also need to be proficient in career counseling. The inherent inconsistency between the personality pattern and the selected course of study causes some students to learn under stress (Mahfar, Zaini, & Nordin, 2021). Thus, the question arises whether the student is really interested in the selection of the previously created program in line with his or her personality or simply fulfilling the criteria of academic achievement to qualify. The alignment of personality with the environment of program selection will affect the success of a career (Bretz, & Judge, 2018). And career choice must be in line with one's career interests because the choices they make are for their future. He added that this would be a problem if the choices were made unsuitable for his personality and he could cause tiredness and disappointment and cause the individual's performance to be disrupted (Lia & Adewale, 2022).

The theoretical framework underpinning this study is the Holland's Career Theory. According to Holland (1985), personality patterns are aimed at describing individual personality profiles of Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E) and Conventional (C) personality characteristics. The 'R' personality tends to generate more technical, practical and hard-working skills that are abstract. 'I' Personality is more analytical, critical, and logical and tends to find a solution to a scientific problem. Individuals with 'A' personality are more creative and tend to be in the art, language, painting, music and writing aspects. The 'S' personality has a tendency in social activities and has good interpersonal and communication links. While 'E' personalities are more in leading, coaxing and directing and manipulating others for specific purposes and interests. Finally, 'C' personality has the tendency to do activities involving file management, data processing, report preparation and structured work capability. So for the excellent and potential students in STEM-related careers are students with Investigative personality (I) with CRI, RIA, ECR equivalents. However, career personalities can still be shaped and polished.

This study is important as it examines how STEM education and career counseling jointly influence students' academic and career outcomes in junior secondary schools in Anambra State. In contrast, Obikezie et al. (2023) focused mainly on instructional strategies without addressing career guidance. Similarly, Ezeanyagu et al. (2023) emphasized motivation and self-esteem but overlooked structured counseling roles. In a related study, Enemuio et al. highlighted computer literacy without linking it to career pathways. Globally, James and James (2026) and Akşit et al. (2026) stressed access and trends in STEM, revealing gaps in localized counseling support that this study seeks to address.

Research Question

One research question guided the study. What are the roles of educational counselors in promoting and supporting STEM Education across the junior secondary schools in the six education zones in Anambra State?

2. METHODOLOGY

The study used a mixed research method in analyzing the research problem across the six education zones in the state. Population of the study consists of counselors in the 781 secondary schools comprising 257 public and 524 private schools across the six education zones in Anambra State. The research sampled 275 junior secondary schools comprising 135 Public and 140 private using stratified and simple random sampling techniques. Qualitative research design was adopted for

the study. Data collected was analyzed using nested analysis approach. The analysis is considered as nested in a way that it combines descriptive quantitative analysis with an in-depth thematic qualitative analysis. The survey questionnaires were administered through face-to-face interviews. The survey consists of demographic data as well as open ended questions on what are counselor's role in promoting and supporting STEM education in schools. The research employed Dedoose qualitative research software to analyzed the data collected from the field. Thematic coding was applied in gathering the themes, and six themes emerged from the data. The themes are counsellor must be (i) well-versed in STEM, (ii) giving information and understanding of STEM to students, (iii) instill students' interest, (iv) knowledgeable of stem career prospects, (vi) knowledgeable in career psychometrics tests, and (vii) be prepared with students' personal issues.

3. RESULTS AND DISCUSSION

Table 1: Socio-Demographic Characteristics of Respondents (N=275)

		N	%
AGE-GROUP	20-35	135	46
	36-50	112	40
	51-65	28	14
GENDER	MALE	25	10
	FEMALE	250	90
EDUCATIONAL QUALIFICATIONS	NCE	110	40
	B.ED	151	55
	M Ed	4	1
	Others	10	4

Source: Author's Computation (2023)

Table 1 shows that out of 275 respondents, a majority 135 (46%) were between 20 - 35 years of age. The analysis revealed that majority 151(55%) of the teachers had qualification of B. ED, while about 40% (110) had NCE.

Research Question: What are the roles of educational counselors in promoting and supporting STEM education across the junior secondary schools in the six educational zones in Anambra State?

Table 2: Analyses of the roles of educational counselors in promoting and supporting STEM education across junior secondary schools in Anambra State (N=275)

S/N	STEM THEMES	N	%
1	Well-versed in STEM education	62	23
2	Giving information and understanding of STEM education to students	31	11
3	Instill students' interest	35	13
4	Knowledgeable of STEM career prospects	45	16
5	knowledgeable in career psychometrics tests	47	17
6	Be prepared with students' personal issues	55	20

Source: Author's Computation (2023)

Following the research question of this study, six themes emerged from the data. The themes are counsellor must be (i) well-versed in STEM, (ii) giving information and understanding of STEM to students, (iii) instill students' interest, (iv) knowledgeable of stem career prospects, (v) knowledgeable in career psychometrics tests, and (vi) be prepared with students' personal issues.

Counselors must be well-versed in STEM education

Table 2 depicts that 62 respondents representing 23% said that counselors must be well-versed in STEM education. Counselors need to have clear knowledge and understanding of STEM education. Counselor's confidence level will increase as their knowledge evolves, so counselors need to find support structures and activities (Akos et al., 2019). Among the activities to develop understanding and knowledge are STEM professional development training, information with STEM-related careers, attending conference on STEM, and network with counselors and agencies. Information from this understanding will help students to understand, and see the potential and opportunities in this STEM education. As co-workers, counselors can also give enlightenment and understanding to academic teachers in ways and methods to integrate sole subjects and STEM. For example, they can help teachers to examine teacher's interactions with students on subjects of interest, support research activities in subjects related to STEM, work with teachers to identify issues and problems, and develop support systems for inquiries. This idea is mentioned by some of the respondents in this study, among are: "The counselor should increase knowledge in the four areas. Counselors need to be knowledgeable about the aspects emphasized in the STEM education system. The counselor must well-versed about STEM education in order to give correct information to students and later instill the interest in them. Counselors need to be proficient and knowledgeable in STEM education to enable STEM related information to be communicated effectively. Counselors must master about the STEM education in order to provide early and advanced information to students on STEM. Counsellors should be well-understanding on STEM, the importance and the benefits in order to convey the information to students".

Educational counselors must give information and understanding of STEM to students

Table 2 also shows that 31 participants denoting 11% were of the view that the counselor must give information and understanding of STEM education to the students. School counselors also need to integrate STEM knowledge into the interests of the students. Counselors should focus on positive attitudes and help students identify higher aspirations in seeing the opportunities of STEM education (Maher, & Abu-Hilal, 2021). With these interests, counselors can help students develop their own learning experiences and skills that drive them towards their career choices. The role of the counselor in STEM education is to give understanding and knowledge about the STEM education, and focuses on the readiness of students to face challenges in the STEM career especially in research activities involving the mastery of 21st century skills. The role of counselors in STEM education is to attract and encourage students' interest towards science, technology, engineering and maths subjects.

Educational counselor must instill students' interest

Educational counselors are expected to instill students' interest in STEM by identifying their strengths and guiding them toward suitable career paths. This finding agreed with Muogbo et al. (2025), who reported that experiential learning significantly enhances students' interest in computer studies. In a related study, Enem et al. (2025) found that technological gamification improves both achievement and interest, supporting the counselor's role in engaging learners. In contrast, Okafor (2017) emphasized scientific literacy as the primary driver of technological achievement rather than counseling. Similarly, Nnodum and Obibuba (2026) and Obibuba and Emeka (2026) focused more on behavioral modification than interest development, highlighting a gap this study addresses.

Counselors must be Knowledgeable of STEM career prospects

Counselors' knowledge of STEM career prospects is essential for guiding students toward informed future choices and building self-esteem. This finding agreed with Smith et al. (2026), who observed that students' career aspirations depend on exposure and guidance, highlighting the counselor's role in shaping interest. In a related study, Oguejiofor and Onyiorah (2023) showed that

background factors influence career interest, suggesting counselors can bridge such gaps. Similarly, Onyiorah (2023) emphasized professional competence in effective guidance delivery. In contrast, Okoro et al. (2025) focused on skill acquisition for self-employment, indicating a narrower scope compared to comprehensive STEM career counseling.

Educational counselors must be knowledgeable in career psychometrics tests

School counselors should take part in student placement and have a direct opportunity to empower students to take courses that fit the career personality, and student careers (Akos et al., 2019). Career choice must be in line with one's career interests because the choices they make are for their future (Lia & Adewale, 2022). He added that this would be a problem if the choices were made unsuitable for his personality and he could cause tiredness and disappointment and cause the individual's performance to be disrupted. So, counselor must be knowledgeable in running and analyzing career psychometrics tests, such as Self-Directed Search (SDS), Vocational Preference Inventory (VPI), Strong-Campbell Interest Inventory (SCII) and others.

Counselors must be prepared with students' personal issues

It was indicated 55 study participants representing 20% said that students will encounter their personal issues in studying STEM such as career-personality mismatch, parents' demands, study skills, academic achievement, college enrolment etc. The counselor must aware with the disturbed students and offer helps. Aggressive and consistent outreach program is essential to help these students.

CONCLUSION

This research investigated the roles that can be played by counsellors across the junior secondary schools in the six educational zones in Anambra State. The study used a mixed research method in analyzing the research problem across the six education zones in the state. The research employed Dedoose qualitative research software to analyzed the data collected from the field. Thematic coding was applied in gathering the themes. Six themes emerged from the data. The themes are counsellor must be (i) well-versed in STEM, (ii) giving information and understanding of STEM to students, (iii) instill students' interest, (iv) knowledgeable of stem career prospects, (vi) knowledgeable in career psychometrics tests, and (vii) be prepared with students' personal issues. We conclude that the role of a counsellor in school is extremely important to support and promote STEM Education. The results from the study findings show a somewhat significant relationship between counselors' roles and the development of STEM policy among counselors in the sampled secondary schools in the study location. The research concluded that the role of a counsellor in school is extremely important to support and promote STEM Education in the six education zones in Anambra State.

Based on the findings, the following recommendations were made:

1. As key players in developing the future workforce, Counselors need culturally relevant interventions informed by career theory and research to increase equitable opportunities in STEM for all individuals across the life span.
2. The counselors must be well-educated in STEM Education in order to give information and understanding to the students.
3. Counselors must also be knowledgeable in STEM-related career prospects and career development so the counselor can instill students' interest in STEM education.
4. Counselor must also know how administer psychometrics tests especially for career choice and career development so the students can have aligned personality and career choice.
5. Governments at all levels, stakeholders in private sector and non-government organizations should organize capacity building workshops for junior secondary school STEM subjects'

teachers as well as counselors across the six education zones in Anambra State in order to facilitate the teaching of STEM subjects across the junior secondary schools in the state and Nigeria at large.

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