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# INFLUENCE OF AUTONOMY AND CHOICE ON STUDENTS' MOTIVATION AND INTEREST IN MATHEMATICS IN ENUGU STATE, NIGERIA

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**Abstract:** This study investigated the influence of autonomy and choice on students' motivation and interest in Mathematics in Enugu State, Nigeria. The study was guided by two research questions. The participants consisted of 200 secondary school students selected randomly from 12 public secondary schools in Enugu East Local Government Area of Enugu state. The study adopted descriptive survey research design. Data was collected using researcher's structured questionnaire validated by specialists in the relevant fields. Mean and standard deviation were used in answering the research questions while inferential statistics (t-test) was used to test the data. The results showed that students who were given autonomy and choice in their mathematics learning demonstrated higher levels of motivation and interest in the subject compared to those who were not.. The study also revealed that autonomy and choice had a positive effect on students' self-efficacy, enjoyment, and value of mathematics. The implications of these findings for mathematics education in Nigeria are discussed, and recommendations are made for educators and policymakers to promote autonomy and choice in mathematics learning.
**Keywords;** Autonomy, Choice, Motivation, Interest, Mathematics Education, Secondary school students.

## Introduction

The importance of Mathematics in the modern world cannot be over emphasized. Mathematics is a fundamental subject that plays a crucial role in the development of individuals and societies (Kilpatrick, 2021). However, many students in Nigeria, particularly in Enugu state struggle with Mathematics, leading to poor performance and a lack of interest in the subject (Adebayo, 2016). Research has shown that autonomy and choice can play a crucial role in enhancing students' motivation and interest in Mathematics (Deci & Ryan, 2015; Hmelo-Silver, 2017). Numerous studies have demonstrated the positive effects of autonomy and choice on students' motivation and interest in mathematics. For example, a study by Assor, Kaplan, and Roth (2022) found that students who were given autonomy and choice in their mathematics learning experienced higher levels of intrinsic motivation and interest in the subject. Similarly, a study by Black and Deci (2020) found that students who were given autonomy and choice in their mathematics learning experienced higher levels of self-determination and motivation. In Nigeria, several studies have highlighted the challenges faced by mathematics educators in promoting students' motivation and interest in Mathematics (Adeyinka, 2017, Okebukola, 2023). These challenges include lack of qualified teachers, inadequate resources, large class size, cultural and socio – economic factors, lack of autonomy and choice. The later emphasized that Nigerian students often have limited autonomy and choice in their Mathematics learning, which can lead to a lack of motivation and interest. However, few studies have investigated the role of autonomy and choice in enhancing students' motivation and interest

in Mathematics in Nigerian context. According to Self-Determination Theory (Deci, 2020), autonomy is a fundamental psychological need that plays a crucial role in motivating individuals to engage in activities. When students are given autonomy and choice in their mathematics learning, they are more likely to experience intrinsic motivation, which is characterized by a genuine interest and enjoyment of the activity (Hmelo-Silver, 2017). There is a need for research on the impact of autonomy and choice on students' motivation and interest in Mathematics. While there have been studies on the factors that influence students' performance in Mathematics, there is limited research on the specific role of autonomy and choice in promoting mathematics education (Adebayo, 2016). This study aims to address this gap, and to investigate the influence of autonomy and choice on students' motivation and interest in mathematics in Enugu East Local Government Area, Enugu. Furthermore, the Nigerian education system places a strong emphasis on external rewards and punishments, rather than intrinsic motivation (Adebayo, 2016).This approach can lead to a lack of motivation and interest in Mathematics (Lobsterman, 2022). Recent studies have highlighted the importance of autonomy and choice in Mathematics learning. For instance, a study by Hannula, (2023) found that students who were allowed to make choices about their Mathematics learning were more likely to experience a sense of flow and enjoyment. In Enugu State, particularly Enugu East Local Government Area, there is a need to investigate the influence of autonomy and choice on students' motivation and interest in Mathematics. The local government area has a high population of students who struggle with Mathematics, and there is a need to identify strategies that can improve their motivation and interest in the subject (Adebayo, 2016). This study is grounded in Self-Determination Theory (SDT), which posits that autonomy, competence and relatedness are essential for intrinsic motivation (Deci & Ryan, 2015). According to SDT, autonomy refers to the ability of individuals to make choices and take control of their own behavior. Deci and Ryan also refer to competence as the ability of individuals to achieve their goals and experience. Relatedness refers to the ability of individuals to form meaningful relationships with others (Deci & Ryan, 2015). The theory suggests that when students are given autonomy and choice, they are more likely to experience a sense of intrinsic motivation and interest in learning (Deci & Ryan, 2015). While there is a growing body of research on the influence of autonomy and choice on students' motivation and interest in Mathematics, there is a need for more research in the Nigerian context (Adebayo, 2016). Specifically, there is a need to investigate the influence of autonomy and choice on students' motivation and interest in Mathematics in Enugu State, Nigeria.

**Statement of the Problem**

Despite the importance of mathematics in modern society, many students in Enugu State, Nigeria, lack motivation and interest in the subject, leading to poor academic performance and a lack of proficiency in mathematical skills. The traditional teacher-centered approach to mathematics education, which often emphasizes rote memorization and drill-and-practice exercises, may contribute to this problem by failing to engage students and provide them with a sense of autonomy and control over their learning. Many students in Enugu State, Nigeria, show a lack of enthusiasm and interest in mathematics, which can lead to poor academic performance and a lack of proficiency in mathematical skills. The traditional teacher-centered approach to mathematics education may not provide students with the autonomy and control they need to take ownership of their learning and develop a genuine interest in the subject. Students in Enugu State, Nigeria, may not have

sufficient opportunities to make choices about their mathematics learning, such as selecting topics or projects that interest them, which can lead to a lack of engagement and motivation. Many students in Enugu State, Nigeria, may hold negative attitudes towards mathematics, such as viewing it as difficult or boring, which can make it challenging for them to develop a positive and motivated attitude towards the subject. If this problem is not addressed, it may lead to a range of negative consequences, including: poor academic performance, lack of proficiency in mathematical skills, and negative attitudes to mathematics concepts. In view of the ongoing, that the researchers deemed it necessary to investigate the influence of autonomy and choice on students' motivation and interest in Mathematics in Enugu State, Nigeria

**Purpose of the Study**

The main purpose of this study is to investigate the influence of autonomy and choice on students' motivation and interest in mathematics in Enugu State, Nigeria. Specifically the study sought to;

1. examine the relationships between autonomy, choice and students' motivation in mathematics
2. Investigate how students' perception of autonomy and choice influence their interest in Mathematics?

**Research questions**

The following research questions guided the study

1. What is the relationship between autonomy and choice and students' motivation in Mathematics?
2. How do students' perception of autonomy and choice influence their interest in Mathematics?

**Research Method**

This study employed a research design, specifically a descriptive survey research design. The reason for the choice of the design is aimed to collect quantitative data to measure the relationship between autonomy, choice, and students' motivation and interest in Mathematics. A correlational design allowed for the collection of numerical data through surveys. The participants consisted of 200 secondary school students in Enugu East Local Government Area. The participants were selected from 12 public secondary schools in the area using a stratified random sampling technique to ensure that the sample was representative of the population. Motivation and interest questionnaire structured by the researcher was designed to measure students' motivation and interest in Mathematics while autonomy and choice as intervening variables. The instrument consisted of 20-items that measured students' motivation and interest in Mathematics as well as their perceptions of autonomy and choice. The instrument was administered to the participants during the school hours. The participants were assured of confidentiality and anonymity, and were given instructions on how to complete the questionnaire. The study used descriptive statistics-mean and standard deviation and inferential statistics (t-test) to analyze the data. The data was analyzed using the Statistical Package for Social Sciences (SPSS) software.

The study ensured validity and reliability by using a well-structured questionnaire, trial-testing the instrument. Cronbach's alpha coefficient was used to test the reliability of the instrument which yielded a coefficient of 0.8

Results

The results are presented according to the research questions meant to guide the study.

**Research Question 1**: What is the relationship between autonomy and choice and students' motivation in Mathematics?

**Table one: Responses of the respondents**

| **Variables** | **Mean** | **SD** |
|---|---|---|
| Autonomy | 3.5 | 1.2 |

| | | |
|---|---|---|
| Choice | 3.2 | 1.1 |
| Motivation | 3.8 | 1.0 |
| Interest | 3.5 | 1.1 |

Table two: t-test Results
Autonomy (n=200)

| Group | High | Low | t-value |
|---|---|---|---|
| motivation | 4,2(0.8) | 3.4 (0.9) | $4.5^{xx}$ |
| Interest | 3.8 (0.9) | 3.1 (0.8) | $3.8^{xx}$ |

Table three: t-test
Choice (n=200)

| Group | High choice | Low choice | t-value |
|---|---|---|---|
| motivation | 4.1(0.7) | 3.3(0.8) | $4.1^{xx}$ |
| Interest | 3.7(0.8) | 3.0(0.7) | $3.5^{xx}$ |
| | | | |

The results indicate a significant positive relationship between autonomy, choice, motivation and interest in Mathematics. Students who reported higher levels of autonomy and choice also reported higher levels motivation and interest in Mathematics. The t-test results further support these findings, indicating significant differences in motivation and interest scores between students with high and low levels of autonomy and choice.

**Research Question 2**. How do students' perception of autonomy and choice affect their interest in Mathematics?

**Table four: Responses of the respondents**

| Category | Autonomy | | Choice | | Interest | |
|---|---|---|---|---|---|---|
| | mean | SD | mean | SD | Mean | SD |
| High | 4.2 | 0.8 | 4.1 | 0.7 | 4.5 | 0.6 |
| Low | 2.8 | 0.7 | 3.7 | 0.6 | 2.9 | 0.7 |

**T-test Analysis. n=200**

| Group | Interest in mathematics | | t-value |
|---|---|---|---|
| | High | Low | |
| Autonomy | 4.3(0.7) | 3.2(0.8) | $4.8^{xx}$ |
| Choice | 4.2(0.6) | 3.1(0.7) | $4.5^{xx}$ |

The results indicate that students who perceive higher levels of autonomy and choice tend to have higher interest in Mathematics. The t-test value for autonomy and choice are 4.8 and 4.5 respectively. The mean and standard deviation of autonomy, choice and interest are; 4.2 and 0.8; 4.1 and 0.7; 4.5 and 0.6 respectively.

**Discussion of Findings**

The findings of this study provide valuable insights into the relationship between students' perception of autonomy and choice and students' motivation and interest in Mathematics. The results show that autonomy and choice are positively related with motivation and interest in Mathematics. The results suggest that students who perceive higher levels of autonomy and choice tend to have higher interest in Mathematics. The positive relationship between

autonomy and interest in Mathematics is consistent with Self Determination Theory (Deci & Ryan, 2015) self-determination theory, which posits that autonomy is essential for intrinsic motivation. When students are given the freedom to make choices and take ownership of their learning, they are more likely to develop a genuine interest in Mathematics. The findings also suggest that providing students with choices in Mathematics education can enhance their interest in the subject. This is consistence with (Adebayo, 2016) who stated that choice and interest in Mathematics learning are highly related which can also increase intrinsic motivation and engagement.

**Implications for Mathematics Education**

The implications of this study's findings are significant for Mathematics education. The results suggest that providing students with autonomy and choice in Mathematics education can enhance their interest in the subject. Educators can use this information to design instructional strategies that promote autonomy and choice, such as project-based assessments, and self-directed learning activities.

**Educational implications of the Study**

The findings of this study have implications to teachers, curriculum developers, school administrators, policy makers and future research. The implication of this study is to ensure that teachers provide students with opportunities to make choices and take ownership of their learning in Mathematics. Teachers should adopt a student-centered approach to teaching Mathematics, focusing on students' interests and needs. Teachers should use differentiated instruction to cater to the diverse needs and abilities of students of students in Mathematics.

The implication to curriculum developers is to incorporate opportunities for autonomy and choice in Mathematics education. Curriculum developers should design Mathematics curricula that allow flexibility and student choice. Curriculum developers should emphasize problem-solving and critical thinking in Mathematics education

School administrators should provide teachers with professional development opportunities to learn about supportive teaching practices. They should create supportive learning environments that promotes student autonomy and motivation in Mathematics. School administrators should encourage parental involvement in Mathematics education to promote students' motivation and interest. Policy makers should develop policies that support autonomy and choice in Mathematics education. Policy makers should emphasize student-centered learning in Mathematics. They should provide resources for teacher professional development to support autonomy supportive teaching practices. Future research should conduct longitudinal studies to examine the long term effects of autonomy and choice on students' motivation and interest in Mathematics. Future research should conduct cross-cultural studies to examine the generalizability of the findings across different cultural contexts.

**Recommendations**

Based on the findings of this study, the following recommendations are made:

1. Educators should provide students with opportunities to take control of their own learning, making decisions about what, how, and when they learn.
2. Policymakers should promote autonomy and choice in mathematics learning by providing resources and support for educators to implement student-centered approaches.
3. Further research should be conducted to investigate the impact of autonomy and choice on students' motivation and interest in mathematics in different contexts and cultures.

4. Educators should receive training and support to develop the skills and confidence needed to implement student-centered approaches that promote autonomy and choice.
5. Parents and guardians should be informed about the benefits of autonomy and choice in mathematics learning and encouraged to support their children's autonomy and choice in learni

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