

PREDICTING THE ROLE OF ATTITUDE AND SUBJECTIVE NORMS ON YOUTH INTENTION TO STUDY MATHEMATICS EDUCATION IN NIGERIA

Abdullahi Muhammad

Department of Mathematics, School of Secondary Education (Science),
Federal College of Education (Technical) Gusau, Zamfara State, Nigeria
Corresponding email: 107abdul@gmail.com,

Abstract

Due to serious concern and demand for trained mathematics teachers, research into mathematics teachers' continuance intention has recently emerged as an important issue in education. This study adopted Theory of Reasoned Action (TRA) model with the main aim of developing a structural model that would explain and predict factors influencing Nigeria Certificate in Education (NCE) mathematics students' of colleges of education continuance intention to study mathematics education in the northwest, Nigeria. A correlational research design was used in the research. Proportionate stratified random sampling technique was employed to select 366 respondents out of a total population of 2761 NCE III mathematics students based on the Cochran formula. The instrument used for this study was a questionnaire titled Youth Intention Questionnaire (YIQ). A pilot study was conducted, the Cronbach alpha reliability value of the questionnaire for the pilot was 0.816. Data obtained were analyzed using SPSS version 25. The findings of this study revealed that attitude toward learning mathematics and social influence were found to have statistically significant effects in the intention of youth (COE students) to study mathematics education. Implications for the study and recommendations were stated.

Keywords: Youth Intention, mathematics Education Students, Learning Attitude, Subjective Norms Colleges of Education

Introduction

It is obvious that Mathematics has a distinguishing and vital role in developing human minds. Research have showed that children who had experience to early good mathematics knowledge benefited more from brain activity enhancement, which have been demonstrated to improve students' ability to perform certain academic tasks (Ayub, Yunus, Mahmud, Salim & Sulaiman, 2017). Mathematics learning is a continue process throughout one's life from childhood to adulthood due to its significant qualities and the development of individual's capability (Muhammad, Ayub, Suleiman & Abdul Manaf, 2021). The objective of teaching mathematics is to provide students with the mathematical knowledge and skills desired in everyday life to solve problems and develop plans based on problem-solving approach. In recognition of its importance to the Nigerian Government, mathematics is a compulsory subject at primary and secondary school level in Nigeria, and a credit pass in the subject is pre-requisite for admission to study at Nigerian tertiary institutions of learning (FGN, 2013).

Colleges of Education (COEs) in Nigeria are higher institutions that are saddled with the responsibility of training pre – service teachers in various courses including mathematics. COEs awards Nigeria Certificate in Education (NCE) to their students after minimum of three - year satisfactory training. NCE teachers are trained to teach in pre – primary, primary schools and junior secondary schools for some few courses depending on the demand (FGN, 2013). The mission of colleges of education in Nigeria is to produce highly motivated and trained Nigeria Certificate in Education (NCE) teachers worthy of character and learning through effective teaching, research, and public service for the Basic Education system (NCCE, 2012). In recent times, the enrolment and desire to

accept mathematics as a course of study by students at tertiary institutions and COEs in particular in Nigeria has not been encouraging (Muhammad, Ayub, Suleiman & Abdul Manaf, 2021; Salman, Yahaya & Adewara, 2011). Many studies conducted before focused on instructional strategies for teaching mathematics to the neglect of influencing factors to continuance intention of studying mathematics (Muhammad, Alkali & Hassan, 2021). In Nigeria, several studies revealed that student's attitudes toward learning mathematics is generally negative, and this negative attitude contributed to their low desire to accept mathematics as a course of study at the tertiary institutions (Suleiman & Muhammad, 2016; Salman, *et al* 2011). Based on this, many students have perceived mathematics as a very difficult school subject to study due to the negative impression they have had from their past generations who have had bad experience with unqualified mathematics teachers (Muhammad *et al*, 2021; Dauda, Jambo & Umar, 2016). That mathematics is the most difficult subject in school, it is not meant for everybody and not everyone passes it. Therefore, many students do not concentrate in learning the subject and spend little time practicing the subject (Dauda, *et al*, 2016).

Despite the numerous research heavily done on continuance intention (intention to continue studying a course as a chosen career) in other part of the world like America, south Africa England, such claims have yet to be given much attention in Nigeria. Conducting a study on youths' intention to study mathematics education in Nigeria is necessary as it will the mathematics educator, researchers, and stake holders in education to understand the influencing factors to youth intention to continue to study mathematics education. With the model Theory of Reasoned Action (TRA), which was adapted as the base conceptual framework to determine whether attitudes towards studying mathematics and subjective norms (social influence) have any influence on youths' intention to study mathematics education. The results of this study would assist mathematics educators in developing meaningful strategies, and in paying more attention to the relevant determinants that meet youths' expectations on mathematics learning in order to entice/encourage more of them to choose mathematics education as their future career; subsequently, improving the enrolment of mathematics education programme in our tertiary institutions of learning.

In Nigeria, the age for youths is defined as those persons between 15 and 40 years old same as in Malaysia (Yunus, 2007 cited by Ismail and Lim, 2018). However, the United Nations defines 'youth', as those persons between the ages of 15 and 25 years old (UNESCO, 2017). For this reason, students of college of education falls within the age bracket of youth.

The way students perceived a subject determines their success or failure in the subject. In Nigeria many students perceived mathematics as very difficult subject because of the negative impression passed down to them by their families, teachers, friends or senior colleagues (past generations) who had bad experience with unqualified mathematics teachers (Dauda, Jambo, & Umar, 2016) That mathematics is the most difficult subject in school, it is not meant for everybody and not everyone pass it, based on this students do not concentrate in learning the subject and spent little time to practice it (Dauda *et al*, 2016). From above literature it is clear that social influence and attitude toward learning mathematics greatly affect students' intention to further their studies in mathematics. However, students' attitude toward learning mathematics is an important determinant of their success in future career and continuance intention. The current study intents to investigate whether colleges of education mathematics students' intention to further their

studies in mathematics are equally influenced by subjective norm (families, teachers, friends or senior colleagues) and attitude toward learning mathematics.

Attitude toward Studying Mathematics

Attitude towards Mathematics is a positive or negative feeling towards Mathematics (Muhammad, Alkali & Hassan, 2021) or by a more multifaceted definition, it is “an aggregated measure of a liking or disliking of Mathematics, a tendency to engage in or avoid mathematical activities, a belief that one is good or bad at Mathematics and a belief that Mathematics is useful or useless” (Muhammad et al, 2021). Students’ beliefs about the utility of Mathematics influences their attitude towards Mathematics and mathematical problem solving. Attitude towards Mathematics is influenced by many factors, which are categorized in three groups: factors related with the student, factors related with the school and teacher, and factors related with the environment and the society. Factors associated with the students include their mathematical results, their past experiences (Maio, Maio, & Haddock, 2010), their extrinsic motivation (Tahar et al, 2010),

A positive attitude is important as studies revealed that there is a relation between students’ performance and their attitude to Mathematics (Muhammad, Ayub, Suleiman & Abdul Manaf, 2021; Marchis, 2011; Mohd, Mahmood & Ismail, 2011). Students with a positive attitude towards Mathematics have better problem-solving skills and like to solve more non-routine problems, they put more effort in solving a problem and they give up later in case of an unsuccessful problem solving (Marchis, 2015). Attitudes toward mathematics can be positive or negative. Positive attitudes toward mathematics may increase the tendency of the individual to continue to learn about mathematics, to regularly take advanced courses in mathematics and to choose a career or work that requires mathematics or mathematics related skills. Negative attitudes toward mathematics may increase low self-confidence and low motivation which influence career options and guide away from the field of mathematics. Negative attitudes towards mathematics may weaken students' performance in mathematics classes, reduce career options, and promote unwanted behaviour toward any activities that include mathematical operations, whether be it simple arithmetic operations or complex problems (Aljaberi, 2014). Research in the area of attitudes towards mathematics confirms the importance of developing positive behaviours towards mathematics at early age and links positive attitudes towards mathematics with good performance in mathematics (Muhammad et al, 2021). Evidence suggests that mathematics is often considered a masculine domain (Ernest, 2004) and previous studies revealed that students have relatively positive attitudes toward mathematics (Muhammad, Ayub, Suleiman & Abdul Manaf, 2021; Tezer & Karasel, 2010; Fan, Quek, Yan, Mei, Lionel & Yee, 2005).

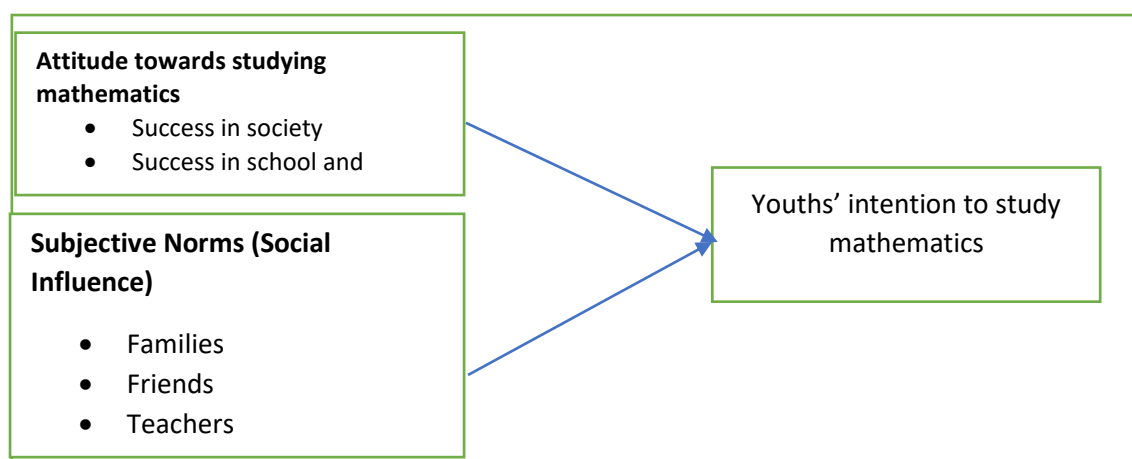
Subjective Norms

Subjective norms are explained as the influences of social environment (social groups) on individuals that impact on their behaviour or intentions. Accordingly, these social groups play a crucial role as it is assumed to be a function of social pressures on how others think an individual should or should not perform a certain behaviour or action. Hacıömeroğlu (2018) concluded that subjective norms played a more significant role in influencing youths’ intentions to enroll in mathematics classes. With closer investigation, it was found that family was the most influential factor, followed by friends. Burrus & Moore

(2016) examined the ability of mathematics belief and attitude to predict ACT mathematics test scores. The result revealed that attitude toward mathematics subjective norm and intention were all significantly correlated with mathematics course grade. In another, study by Turan, Çelik, & Turan (2014) examined whether adolescents' career exploration is predicted by perceived social support (subjective norm), participants for this study were 718 7th, 8th and 9th grade students. Results revealed that perceived family social support, and perceived friends' social support and perceived significant other social support correlated significantly with career exploration. Finding also showed that perceived family social support, and perceived friends' social support and perceived significant other social support were significant predictor of career exploration.

Theoretical Framework

Theory of Reasoned Action (TRA) is mainly concerned with behaviour. Based on Ajzen's (1985) TRA model, an individual behavioural intention is instigated by a function of two determinants: namely attitude towards behaviour and subjective norms. By focusing on attitudes and subjective norms, the TRA provides a framework for classifying and measuring the fundamental reasons for a person's intent to behave or not behave in a certain manner. Many researches conducted in different field of studies have also reported significant effects of these two determinants (Attitude and subjective norms) on behavioural intentions (Ismail & Lim, 2018; Cesareo & Pastore, 2014; Amin & Chong, 2011; Lada, Tanakinjal & Amin, 2009). Attitudes towards behaviour is the individual's positive or negative evaluation of performing the behaviour and is determined by salient beliefs that the behaviour leads to certain outcomes (Ajzen, 1985). Subjective norms are explained as the perceived opinions or expectations of pertinent (important) others about the actions being performed along with intentions to comply with these expectations (Fishbein & Ajzen, 1975). According to the TRA, an individual has a sense of belief about whether or not these persons or group of persons would approve or disapprove the behaviour. In many situations, more than one reference groups are to be considered (Fishbein & Ajzen, 1975). In line with the concept of the TRA, this study also focuses on a person's intention to behave in a certain way, youths' intention to study mathematics education. Hence, to understand the behavioural intent of youth, which is seen as the main determinant of behaviour, the TRA was utilized. The TRA looks at a person's attitudes towards the intended behaviour as well as the subjective norms of influential people/groups of people that could influence behaviour.



Adapted from Ismail and Lim 2018

Fig. 1: Research Framework

Researcher Hypotheses

- H₀₁: There is no any significant influence of Youths' attitudes towards studying mathematics on their intention to continue to study mathematics education.
- H₀₂: There is no any significant influence of Subjective norms (Social influence) on youths' intention to study mathematics education

Methodology

This study employed a correlational research design to obtain a self-report of NCE Mathematics Students of Colleges of Education in the northwest, Nigeria in relation to their opinions about certain factors influencing their intention to continue to further their study in mathematics after their NCE program. According to Creswell (2012) correlational design is a procedure in quantitative research in which researchers measure the degree of association or relation between two or more variables using the statistical procedure of correlation analysis. Correlational design provides an opportunity for the researcher to predict relationship among variables. Another justification for the use of correlational design in this study is that the method allows for generalization of findings from the sample to the target population of the study (Fraenkel *et al.*, 2016).

The population of this study is 2,761 NCE III mathematics students from 12 Colleges of Education. Out of the 12 colleges of education five (5) are federal owned colleges of education with a population of 890 NCE III mathematics students while the remaining seven (7) are state owned colleges of education with a population of 1,871 NCE III mathematics students in the northwest geo – political zone, Nigeria. Therefore, the population of this study is 2,761 NCE mathematics students. Therefore, the sample size, recommended by Cochran was used for the purpose of this study because as stated by Salkind (1997) the sample is adequate for minimizing the associated error and will equally cater for the problem of non-returned of questionnaire or incomplete response. Therefore, 339 respondents were randomly selected from all the 12 colleges of Education in the Northwest geo-political zone in Nigeria using proportionate stratified random sampling techniques.

This study intends to examine factors influencing youths' intention to study mathematics education. For the purpose of this study, respondents are NCE students within the age of 18 to 26 years old. The demographic profile of the respondents is displayed in Table 1.

Table 1: Demographic profile of the respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	256	75.5
	Female	83	24.5
Age	18 – 20	97	27.7
	21 – 23	176	51.9
	Above 23	69	20.4

Instrumentation

A questionnaire titled Youth Intention Questionnaire (YIQ) was administered to collect relevant information from NCE mathematics combination students through personal visit to all the colleges of education and distributed the questionnaires to the randomly selected students who shown interest to participate voluntarily and respond to the instrument. All measurement statements in the questionnaire were adapted from the previous studies. The questionnaire was adapted from different authors (Marchis 2015; Wu & Zhang 2014; Roca, Chiu, and Martinez 2008; Bhattacharjee 2001; Richard et al, 2012 & Lamb, Annetta, and Meldrum 2012) after written permission was granted by the original authors of the instruments. The instrument has two sections. The first section consists of five questions with regards to the background information of the respondents with two closed ended questions (name of institution and gender) and three open ended questions (age of the respondent, state of institution and respondents 'course of study). The second section consisted of 22 questions to measure the three constructs of the study. All the three constructs in the second section of this questionnaire were rated using a 5-point Likert scale, labeled as 1 (strongly disagree), 2 (disagree), 3 (somewhat agree), 4 (agree) and 5 (strongly agree). The construct of attitude towards learning mathematics has 7 items, subjective norms have 7 items and intention to further study of mathematics (Continuance intention) has 8 items. It was then given to expert in Mathematics Education from Faculty of education Federal University Gusau for validation after amendments were made.

To ensure reliability of the instrument {questionnaire} a pilot test was conducted prior to the actual study with 50 (14.8%) mathematics students selected from three colleges of education in the northwest geo- political zone. Namely, Federal college on Education Zaria, Kaduna State with 17 students, Zamfara state college of education Maru Zamfara state with 13 students and Shehu Shagari College of education Sokoto, Sokoto state with 20 students. The Cronbach's alpha value of the pilot study revealed acceptable value of 0.789.

Results

Ho₁: There is no any significant influence of Youths' attitudes towards studying mathematics on their intention to continue to study mathematics education.

Table 2: Mean and Standard deviation of the Constructs

Construct	Mean	Standard Deviation
Youth Intention	3.8625	.56349
Attitude	2.8837	.75766
Subjective Norm	3.2343	.82447

The overall mean of attitude toward learning mathematics by colleges of education mathematics combination students is 2.88 (SD = 0.76) this revealed that colleges of education mathematics students have moderate positive attitude toward studying mathematics as it would improve their daily life activities, future ambition, and job opportunities. For subjective norm (social influence) in learning mathematics by COE mathematics students, the mean value is 3.23 (SD = 0.83) meaning that COE mathematics students learning of mathematics is influenced by friends, parents and teachers because their mean response is greater than criterion means of the scale. Generally, the mean for

the continuance intention of COE mathematics students toward learning mathematics is 3.86 (SD = 0.56) revealing that COE mathematics students have high positive intention toward learning mathematics.

Table 3: Correlation between independent and dependent variable

	Attitude	Subjective Norm
Youth Intention to study Mathematics Education	.115*	-.139*
	P <.05	P <.05

On the correlation coefficient between independent variables and dependent variable Table 3 reveals the Pearson correlation between attitude toward learning mathematics and subjective norm as independent variables and Youth intention to study mathematics education as the dependent variable. There was a positive correlation between attitude toward learning mathematics with youth intention to study mathematics education ($r = .115$; $p < .05$) and a negative correlation between subjective norm (social influence) with intention colleges of education mathematics students to study mathematics education ($r = -.139$; $p < .05$).

Table 4: ANOVA

Model	Sum of Squares	df	Mean square	F	Sig
Regression	4.253	2	2.127	6.933	.001
Residual	103.068	336	.307		
Total	107.322	338			

To identify those factors that affect students' attitudes towards learning mathematics among colleges of education mathematics students in the northwest, Nigeria. A stepwise multiple regression was conducted. Table 5 reveals the statistics test of significance at $\alpha = .05$ ($F(2, 336) = 6.933$, $P = 0.001$).

H_{02} : There is no any significant influence of Subjective norms (Social influence) on youths' intention to study mathematics education.

Table 5: Model summary

R	R Square	Adjusted Square	R Std. Error of the Estimate	Durbin-Watson
.199	.040	.034	.55385	2.015

Table 5. Indicated the multiple correlation coefficient values was .199 revealing 4.0% of the variance of the students' intention to study mathematics education among colleges of education mathematics students accounted from attitude toward learning mathematics and subjective norm (social influence).

Table 6: Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.916	.115		25.333	.000
Attitude	.108	.040	.145	2.670	.008
Norm	-.113	.037	-.165	-3.033	.003

Based on the result presented in Table 6. The two hypotheses formulated were answered and were all found significant. The two supported hypotheses are the influence of attitudes toward learning mathematics on youth (students') intention to study mathematics ($\beta = .115$, $t = 2.670$, $P = .008$) supported, and the influence of friends, parents, and teachers (subjective norm) on youth' intention to study mathematics ($\beta = -.113$, $t = -3.033$, $P = .003$) supported. Furthermore, the most significant contributor to students continue intention to study mathematics education among colleges of education mathematics students is attitude toward learning mathematics. The construct contributed 4.0% of the variance in COE mathematics students continue intention to study mathematics education.

Discussion

Mathematics is made a compulsory subject to all students from primary to senior secondary schools in Nigeria, and a credit pass in the subject is a pre-requisite requirement for getting admission to study any science course and some Arts and Humanity courses in Nigerian tertiary institutions of learning (FGN, 2013). This is due to the realization of the importance of mathematics in the nation-building by the government of Nigeria. However, literature have shown that student's attitude toward this important subject (mathematics) is generally negative (Awofola & Ojaleye, 2018; Suleiman & Muhammad 2016; Din, Ayub & Tarmizi, 2016; Salman, Yahaya and Adewara 2011). This study investigated factors that influence colleges of education pre-service mathematics teachers' intention to study mathematics education, the selected factors for this study were attitude toward learning mathematics and subjective norm (social influence). The study revealed that COE students' continued intention to study mathematics education is positively affected by their attitude toward learning mathematics and has significant impact on students' (youth) continued intention to study mathematics education, this finding is in harmony with the extant of literature that revealed the influence of attitude of students on their learning intention and achievement (Awofola & Ojaleye, 2018; Suleiman & Muhammad 2016; Din, Ayub & Tarmizi, 2016; Salman, Yahaya and Adewara 2011). The implication of negative or poor attitude of colleges of education mathematics students who are within the age of youth in Nigeria is that the dream of Nigeria in becoming self-reliant nation may not be actualized (FGN 2013).

On the relationship, the Pearson's correlation analysis showed that attitude toward learning mathematics and subjective norm have a significant relationship with youth intention to study mathematics education. This indicated that once youth have positive attitude in their mathematics learning, also having the belief that learning mathematics is important to their daily life activities and listen to the advice of people they think are important to them pertaining mathematics learning. Then they would develop a positive

intention toward learning the subject. This may lead to the attainment of sustainable national developmental goals (the nation-building by the government of Nigeria).

Conclusion

In sum, the analysis concluded that attitude toward learning mathematics and subjective norm influenced youth intention to study mathematics with attitude toward learning mathematics having the highest influence. This finding is in line with the findings of many earlier studies among others are Ismail and Lin (2018) in which, their findings revealed that attitude toward studying music and subjective norm are positively related to youths' intention to pursue music education. The result of this study also confirms that the Theory of Reasoned Action (TRA) model adopted is a valid model for determining youth intention to study mathematics education.

Recommendations

The following recommendations were put forward by the researcher, based findings of this study.

- i. The government of Nigeria (federal and state) and ministry of education should introduce some courses that will expose the importance of mathematics to students, right from basic education level. As this will help more students to understand the relevance of mathematics to other field of study and their daily life which will certainly improve their attitude toward learning the subject. Also building confidence in them to learn mathematics.
- ii. Curriculum implementers who are lecturers should try to instill positive attitude and confidence of learning mathematics in their students so that they can be seeing themselves as capable of handling any mathematical activity that comes their way. This can no doubt go a long way in changing their thinking and intention toward learning mathematics positively.
- iii. Community leaders and well to do individuals should support and encourage youth to study mathematics education by given them scholarship.

Implication of the Study

The implication of this research findings is that the study revealed that attitude and subjective norm (social influence) are not the major predictors to youth intention to study mathematics education because attitude toward learning mathematics being the major contributor accounted for only 4% of the variance while subjective norm accounted for only 3.7% variance. Considering the contribution of the two constructs it is evident that what was left on accounted is much more than what was accounted by the two constructs. Therefore, among other recommendations there is need to study other predictor like perceived usefulness, enjoyment, motivation and so on, to see whether they may account for more variance.

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