Mathematics as a prerequisite for admission into universities in Nigeria: a call for awareness creation and attitudinal change

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Abstract

Mathematics is one of the core subjects that determine secondary school students' admissions into Nigeria universities irrespective of the choice of course. However, large percentage of students are still failing mathematics. Students without a pass in mathematics have been finding solace among few courses that do not require a credit or pass in mathematics for admission process in some universities. In recent times, admission criteria are becoming tougher leaving no roomfÖr students without at least a pass in mathematics. This study assessed mathematics as a prerequisite for admission into Nigeria universities. The study employs descriptive survey. JAIVfB brochureforthree recent academic sessions (2015/2016, 2016/2017, 2017/2018) were analyzed for mathematics requiæment for various courses across nine faculties in Nigeria universities. livo research questions were raised for the study. The result shows that the number of courses is increasing, 2015/2016 (618), 2016/2017 (744) and 2017/2018 (761) and the percentage of courses that do not require at least a pass in mathematics is reducing every session, 2015/2016 (10.8), 2016/2017 (6.2) and 2017/2018 (5 5). Based on the findings, students are encouraged to change their attitude towards the learning of mathematics and be more determined to pass the subject in order to meet up with the admission requirement and study their courses of choice in Nigeria universities.

Keywords: Prerequisites, Admission process, Positive attitude, JAMB brochure

Introduction

A student's choice of subject to offer at senior secondary school level depends on certain factors such as the student's interest and ability. More often than not, ability of a student precedes his interest in the choice of subject to offer. It is evident that students with average or below average performance in a subject such as mathematics are often counselled to go to art class, while students with above average performance in mathematics are advised to go to science and social science classes except they show interest in art subject. Mathematics, as a subject, remains one of major determining factor in placing students based on their ability into classes (Alts, Social Sciences and Sciences) in the senior secondary school which will later determine the course such a student would offer in tertiary institution. Mathematics has been seen as a subject that develops an individual to think analytically, develop high level of reasoning ability and to have a better solving skill among others.

Mathematics is a logical, thought-provoking subject that makes great difference in every aspect of human activity like economy, politics, science and technology. It is a precursor of scientific discoveries and inventions (Salman, 2005). Any society that wants to experience a fast-changing development and progress in the area of science and technology, mathematics knowledge is not negotiable. Mathematics is very important; this could be the reason why it is included in school curriculum as a compulsory subject for every child of school age to get the appropriate mathematical skills that will enable him cope with life challenges.

Mathematics' role in producing versatile and imaginative graduates for overall development of every sector in our community cannot be over-emphasized. Knowledge of Mathematics is generally believed to be necessary for the understanding of most other fields in education. One of the major requirements to gain entry into a working place or to seek promotion in a profession or career is a certain level of mathematical literacy. It is glaring that no other subject has such a strong force among the various branches of science. The Science Teachers Association of Nigeria (STAN) referred to Mathematics as the central intellectual discipline of the technologically advanced societies. STAN (1992) concluded that the knowledge of science remains superficial without Mathematics. It therefore shows that the place of Mathematics in Nigeria secondary school curriculum is very important for scientific development. Most universities in Nigeria insist on a pass in Mathematics as a prerequisite for admission into any course of study in law and art-related courses or a credit pass for any science-related courses. Despite its importance, some students are consistently struggling to pass mathematics and as a result, they develop negative attitude to the subject.

Students that are struggling with mathematics often console themselves with the options of staying in art class in order to avoid any course in the university that will require a credit pass in mathematics. In some years past, students were not required to pass mathematics to study art and some social science-related courses in Nigeria universities. Students in this category see mathematics as a nightmare and do not want to have anything to do with mathematics. It is a fact that some universities have provision to admit students for some major courses without a credit in mathematics though with at least a D7 or E8 and not F9. But due to high demand in the university admission and limited number of universities, it has become a needle's eye for camel to go through. The situations with the admission in Nigeria universities in the recent years seem to have taken a new dimension which calls for awareness and attitudinal change among students and their parents. Attitude of students towards mathematics has been considered as one of the factors affecting their performance in mathematics. This also plays a significant role in the choice of course to study in the university. Aiken (1970) found that there is a relationship between attitude towards mathematics and the choice of mathematical courses. Students with good performance in mathematics are eager to study science-related courses, whereas, those with poor performance in mathematics look for art-related courses and also the university that will not require mathematics to study such courses. It is always a herculean task for some students in most cases to secure admission just because of the level of their ability in mathematics, whereas, students with average or

good knowledge in mathematics have a number of courses to choose while seeking admission into any university in Nigeria. Nicolaidou and Philippou (2003) found negative attitudes as a major factor for frequent and consistent failures or problems when dealing with mathematical tasks and these negative attitudes may become relatively permanent. A consistently-poor performance leads many students to give up and look for alternatives to circumvent admission hurdles by looking for courses that will not require mathematics. Several researches have been conducted on various reasons why students are scoring poorly in mathematics and subsequently proffer solutions to improve the performance but the situation has not significantly improved (Eshiwani, 2001 ; Miheso, 2002).

Attitude towards mathematics was described as a positive or negative emotional character towards mathematics (Zan and Martino,2007). Attitude towards mathematics can also be defined as accumulated measure that a student like or dislike mathematics, which can equally show a predisposition to either involve or circumvent any activity that involves mathematics. Similarly, attitude towards mathematics could be considered from a multidimensional view as a multifaceted phenomenon that is characterized by feelings associated with mathematics, opinion towards mathematics and someone behaves to mathematics (Hart, 1989). It also includes the disposition to be afraid of the subject. A student can develop either positive or negative attitude towards mathematics simply because of the past experiences or events that has been associated with it.

Though many students started with a positive attitude with high expectations in mathematics but other factors do creep in which eventually bring some students to the negative attitude they find themselves. Nicolaidou and Philippou (2003) further identified some of the factors that affect initial positive attitude of students towards mathematics, they are: the pressure to perform well, over-demanding tasks, uninteresting lessons and less than positive attitudes on the part of the teachers. Most students hold misconception about the difficult nature of mathematics which has eventually put many students at disadvantage to knowing the subject. This misconception that is negative perception is causing students to have low self-concept in mathematics (Ali 2013; Martha, 2009). Attitude of students in mathematics is formed as a result of influences from environment, especially those that occur in interactions with parents (Jacobs et al., 2005; Cao et al., 2006) and teachers (Gunderson et al., 2012). Bandura (1977) observed that the behaviour of people is regulated based on their judgement of the relationships between situations, actions, and outcomes. People avoid things that have been related with experiences that could cause dislike or disinclination, but like and look for things that have pleasurable associations. At the same time, when teaching strategies are presented in an interesting way, students form positive attitude (Yang, 2015). Students develop negative attitude when teaching strategies are not interesting coupled with negative report that mathematics is a difficult subject.

Attitude of students is developed over a considerable long period of time and have powerful impact on their active engagement, contribution and accomplishment in mathematics. Several research works have shown that student's attitude to mathematics and their achievement are closely interrelated (Abu & Leong, 20 1 4; Alta wallbeh, Soon, Thiam,&Alshourah, 2015; Bayaga,&Wadesango, 2014; Mahanta, 2012; Mensah, Okyere, & Kuranchie, 2013; Wan & Qiping, 2015; Zainal, Harun, & Lili, 2017; Zan, 2013)

Attitudes are not innate but are results from experiences and they can be changed. Students with negative attitude to mathematics may stand the risk of forfeiting opportunity to further their education in Nigeria universities.

In Nigeria, a number of courses is being introduced every year across faculties such as Administration, Agriculture, Arts, Education, Engineering, Law, Medical Sciences, Sciences and Social Sciences among others. Though number of courses across faculties are increasing yet the number of courses that do not require a credit pass in mathematics are reducing (JAMB Brochure 2018). Many

students and their parents are not aware of the consistent reduction in the number of university courses that do not require mathematics, this may pose a threat to admission process for students if they still continue with the same negative attitude to the subject with a wrong assurance that there will definitely be a way out. This study therefore serves as an eye opener to reveal the trend of mathematics requirement in the university admission process in Nigeria.

Statement of the problem

Admission into Nigeria universities was open to every student in some years past with or without a credit or pass in mathematics. This is because there are courses that could be offered without a credit or at least a pass in mathematics. Criteria for admission into universities in Nigeria are being changed from time to time which many students and their parents are not aware of, especially in the area of mathematics as a prerequisite in the admission process, irrespective of the course a student wants to offer in Nigeria universities. Students with adequate information about admission process may have to strategize and have a change of attitude to certain subjects like mathematics. Many art and commercial related students with a few of science students that are seeking admission into Nigeria university are still with the mindset that they can be admitted without a credit in mathematics.

Negative attitude towards mathematics has been identified as one of the reasons why this category of students is not doing well in mathematics. There is therefore a need for a change of attitude for better improvement and subsequently unhindered admission. When both students and their parents are well aware of the true situation about admission process, it will help students to compulsorily develop a positive attitude since their admission depends on it. With the lack of adequate knowledge about the present situation in Nigeria university admission process, many students are bound to lose a year or more while seeking admissions. Thus, the purpose of this study was to assess mathematics as a prerequisite for admission process in Nigeria universities.

Research questions

I. What is the trend of number of courses across nine faculties in Nigeria universities? ii. What is the trend of number of courses that do not require at least a pass in Mathematics for admission into Nigeria universities?

		2015/2016	2016/2017	2017/018
I	Administration	30	40	40
2	Agriculture	63	96	102
3	Arts	75	96	96
4	Education	113	134	
5	Engineering	82	106	106
6	Law	8	8	8
7	Medical Sciences	17	26	26
8	Science	151	151	151
9	Social Sciences	79	87	92
	Total	618	744	761

METHODOLOGY

The study employs descriptive survey. JAMB brochure for three recent academic sessions (2015/2016, 2016/2017, 2017/2018) were analysed for mathematics requirement for courses across nine faculties in Nigeria universities. The analysis took into consideration the waiver section of the brochure for some of the universities that wave general admission criteria. SPSS version 23 was used to analyse the data. The data generated were subjected to descriptive analysis (frequency and percentages).

Result

Research Question 1: What is the trend of number of courses across nine faculties in Nigeria universities?

Table l : The number of courses across nine faculties in Nigeria University over three academic sessions

Table 2.0: Mathematics Admission Requirements for Nigerian Universities

	Faculty	Number of courses available			Courses Needing Mathematics						Total		
					Credit								
		2015/2016	2016/2017	2017/2018	2015/2016	2016/2017	2017/2018	2015/2016	2016/2017	2017/2018	2015/2016	2016/2017	2017/2018
	Administration	30	40	40	25(83.3)	38 (9S)	38 (95)	5(16.7)	2(5)	2(5)	30(lOO)	40(lOO)	40(100)
	Agriculture	63	96	102	63(100)	96(lOO)	102(lOO)				63(lOO)	96(lOO)	102(lOO)
		75	96	96				23(30.7)	54156)	58(60.4)	23(30.7)	S4(56)	58(60.4)
	Education	113	134	140	92(81.4)	124(925)	136(97.1	1410.6)	0(75)	4(2.9)	104192.0)	134(lOO)	140(lOO)
	Engineering	82	106	106	82(lOO)	106(lOO)	106(lOO)				S2(lOO)	106(lOO)	106(lOO)
6	Law							4150)	41 SO)	4150)		4(S0)	4(50)
7	Medical Sciences		26	26	17(100)	26(lOO)	261100)				17(lOO)	26(lOO)	26(lOO)
	Science		151	151	151000)	151(lOO)	151(lOO)				151(lOO)	ISI(IOO)	151000)
9	Social Sciences	79	87	92	69(87.3)	77(88.5)	84191.3)	8(10.1)	10(1 1.5)	8(8.7)	77(97.5)	S7(lOO)	92(lOO)
	Total	618	744	761	499(80.7	618(83S)		52(8.4)	80(10.5)	76(9.99)	551(892)	698	719(94.5)

Table 1.0 shows the number of courses across nine faculties in Nigeria universities. The table reveals the steady increase in number of courses in some faculties across the academic sessions considered. Administration increased from 30 courses in 2015/2016 to 40 courses in 2016/2017 and maintained the number in 2017/2018. Some other faculties that increase steadily are Agriculture, Arts, Education, Engineering, Medical Sciences and Social Sciences. The table further showed that two faculties (Law and Science) maintained the same number of courses 8 and 151 respectively, across the academic sessions considered. The total number of courses across faculties in 2015/2016 was 618, 2016/2017(744) and 2017/2018(761). This clearly showed a steady increase in the number of courses in each academic session. Figure I .0 further shows the trend of number of courses in Nigeria universities.

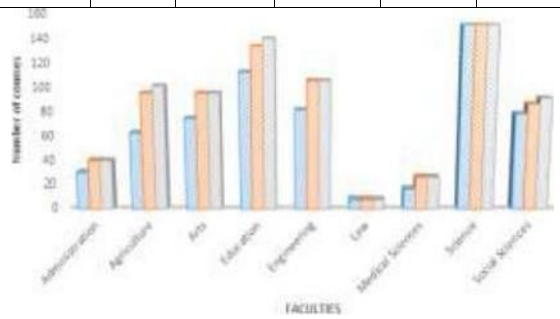
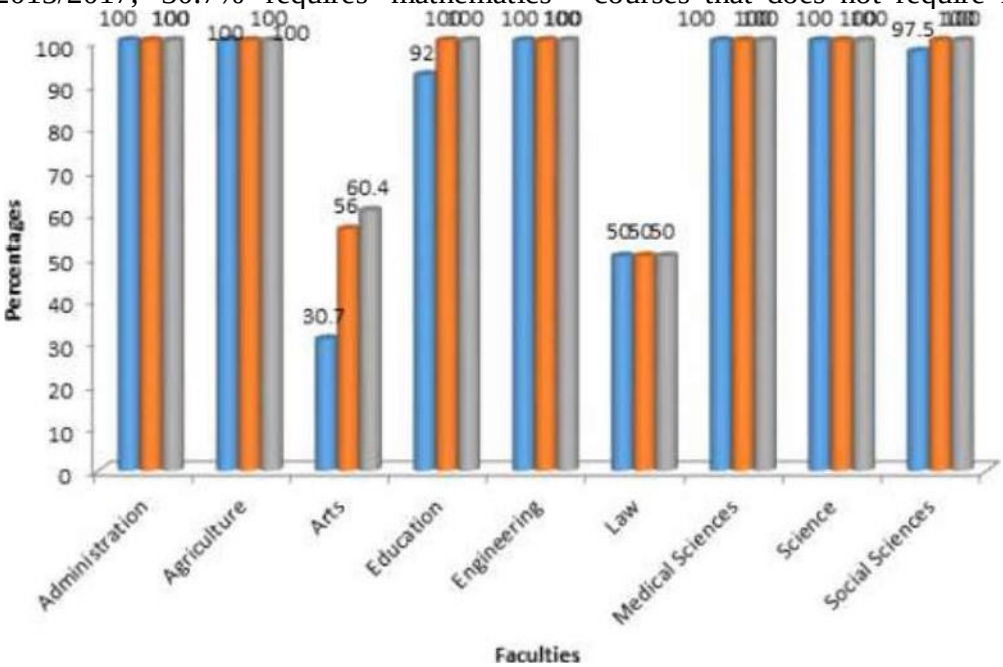


Fig 1.0: Bar chart showing the number of courses across faculties in Nigeria universities

Research Question 2: What is the trend of number of courses that does not require at least a pass in Mathematics for admission into Nigeria universities?

Table 2.0 shows mathematics admission requirement in Nigeria universities. The table reveals that all the courses offered in faculties like Administration (100), Agriculture (100), Engineering (100), Medical sciences (100) and Sciences (lOO) require a credit pass in mathematics for admission. Faculty of Education and Social Sciences had 8.0% and

2.5% courses that could be offered in 2015/2016 respectively without a credit pass in mathematics, but in 2016/2017 and 2017/2018, all the courses in the two faculties require a credit pass in mathematics. In the faculty of Art, in 2015/2017, 30.7% requires mathematics



56% in 2016/2017 and 60.4% in 2017/2018 session. In the faculty of law, 50% of the courses require a credit pass in mathematics across the three sessions considered. In all, 89.2% require a credit pass in mathematics in 2015/2016, 93.8% in 2016/2017 and 94.5% in 2017/2018. Fig 2.0 further shows the trend of courses that require mathematics in Nigeria universities.

- 2015/2016
- 2016/2017
- 2017/2018

Discussion

This study assessed mathematics as a prerequisite for admission into universities in Nigeria. The findings showed that courses in various universities are increasing across faculties. It further reveals that the number of courses that does not require mathematics is reducing every session. It also showed that criteria for admission are getting tougher especially with subject like mathematics being a strong force and a prerequisite for most courses before admission into Nigeria universities. It established the claim as there is no single course in sciences, medical sciences, engineering, administration, agriculture, education and social sciences at present that could be offered in Nigeria universities without at least a pass in mathematics. This implies that science students with a poor performance in mathematics will find it difficult to secure admissions while art related students may equally find admission difficult because of limited courses.

The study revealed a consistent upward review of the demand for mathematics as a prerequisite across the remaining arts and law courses. This implies that in few years to come, there will not be any course in these two faculties that could be offered without at least a pass in mathematics. This could be confirmed from other faculties like Education and Social Sciences, where some courses could be offered about two years ago without a credit in mathematics, but such opportunities are no more available. The demand for higher education is increasing at a geometrical rate while the supply is terribly low. It is indeed a wake-up call to students with wrong premonition that certain courses could be

Fig 2.0: Percentage of courses that required Mathematics for admission in Nigeria Universities

offered in Nigeria universities without at least a pass in mathematics. It is high time for both students and their parents to be fully aware and prepared for this development.

Recommendation

Based on this finding, students and parents should be well informed about the admission process into Nigeria universities especially the place of mathematics as a prerequisite. Many students with negative attitude to mathematics should be encouraged to have attitudinal change to the subject if they are still hoping to gain admission into Nigeria universities. Seminars should be organized from time to time for both students and parents for awareness campaign about the Nigeria university admission process especially, as regards mathematics. The need to develop a good attitude and better performance in mathematics should be emphasized which can help students to have a wider opportunity in the admission process. Other stakeholders such as school counsellors, administrators who can directly engage students with negative attitude to mathematics in counselling process should be encouraged to do so.

Conclusion

Many students missed admission into Nigeria universities yearly as a result of lack of vital information. Though changes are envisaged periodically, as a result of our dynamic society, nevertheless, stakeholders should be kept abreast of the vital information that are capable of defining admission process. In this regard, some of the people directly concerned like students and their parents will make necessary preparation to meet up.

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