STUDENT-BASED FACTORS AS CHALLENGES TO THE LEARNING OF MATHEMATICS IN SECONDARY SCHOOLS

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Abstract
This paper analyses the factors of family background, study habits, motivation, attitude and entry behavior as student based challenges to the effective learning of mathematics by secondary school students in Egor Local Government Area of Edo State and their perceived solutions to these challenges. The sample for the study consisted of three hundred and twenty four mathematics students who were randomly selected from the fifteen public schools in Egor Local Government Area of Edo State. Questions were raised and principal component factor analysis (PCFA) was used to analyse the data. Based on the findings, it was recommended among others that provision of learning materials, high contribution of study habits and motivation of students are needed for students to surmount challenges in the learning of mathematics in secondary schools.

Keywords: Learning, challenges, mathematics

Introduction
In the quest for national development, growth and it’s sustainability, the role of science, technology and mathematics cannot be overstressed. These are important components of the wall dividing poverty and prosperity. Iyobhebhe (2002). Hence mathematics apart from being an intellectually stimulating discipline is regarded as one of the pre-requisite subject for all course of study in education from the primary to the secondary stage of education.

According to Hom (2013) mathematics is the science that deals with the logic of shape, quantity and arrangement. Kalantis & Cope (2012) sees it as the building block for all we do in our daily lives including mobile devices, architecture (ancient and modern), art, money, engineering and even sports. Courant Robbins (2010) opined that it is the science of abstract objects that relies on logic rather than on observation as its standard of truth yet employs observation, simulation and even experimentation as means of discovering truth. Thus mathematics is regarded as the Queen of science. “Friedrich Gauss (1777-1855).

It may be studied in its own right as pure mathematics or applied to other discipline such as physics, chemistry and engineering (applied mathematics). The vital vote played by mathematics in contemporary society has accorded it a mandatory subject. It is in the realization that it helps students with logical thinking and the ability to solve problems, in order to produce a new generation of adults who are better at solving problems in the world.

Hence it became necessary that in Nigeria, most government policies on education have always involved how to make mathematics a subject of interest of learning for students and teaching for teachers. A lot of concern were made and with it came reviews of abolishing traditional mathematics to modern mathematics, recruitment of mathematics teachers, training of mathematics teachers. Despite these measures, students still find mathematics as a challenge. While few students positively acknowledge it, Batanero, Burril & Reading (2008) opine that recent survey conducted by researchers revealed that there is the need for increased mathematical skills at secondary schools level to improve mathematical literacy in young students around the world as well as awareness of the related challenges in training and supporting mathematics teachers. There has also been the concern that students performance in the subject has continue to decline.

The conceptual framework of this study is the piaget theory of cognitive development piaget (1983) and the constructivist’s theory, Glasserfeild (1989). The piaget’s theory holds that mathematical understanding in young children is closely associated with sensory perception and concrete experiences while the constructivist’s theory holds that human construct their own knowledge from daily life
experience. The constructivists are of the view that learners’ prior knowledge influences the information which the individuals perceives and how it is interpreted.

According to research carried out by Susan Hull, a Gatsby fellow working at Wilberforce College. And that of Hull and Dr Malcom Swan from Nottingham University, mathematics is far more successful if learners are actively engaged and encouraged to think mathematically and to see links and connections.

There are factors involved in the challenges that tend to hinder the required performances of students in mathematics. This involves a two way approach which means that the government has been involved in planning strategies for high performance in mathematics and there still persist high failure rate. Then these factors can be addressed directly to those students involved with a view to seek solutions from them on how these challenges encountered can be tackled to achieve a high performance rate in mathematics learning.

Learning in this case is not seen as a hand-over or intake of knowledge but as an active construction process. Thus, the student is the one who is responsible for his or her learning process. Teacher can only encourage, assist and prompt the learning activities in mathematics. Learning takes place on the basis of already existing knowledge.

A students prior or entry behavior has to be taken into account seriously, students construct their own personal interpretation and meanings of imparted knowledge through observation and experience Kalantis & Cope (2012) Hence the knowledge of the students will not mirror that of the teacher exactly, thus the researcher believes that this study draw strongly from these theories and suggest that students who are the principal recipient of knowledge should be asked on their perceived views and solutions to challenges of mathematics challenges.

It is known that mathematics is a highly structured subject because whatever is learned at a higher level is dependent on the foundation on what has been learned at a lower level. In other words, it is sequential and consequent upon prior learning obtained. Obodo (2002) opined that the researches carried out have shown that curriculum contents not completed have left many students hanging in the balance as most aspects not fully understood by students or taught to them will hinder their full assimilation and consequent expansion of knowledge in mathematics. Thereby making them have wrong disposition towards mathematics.

While students background, motivation, entry behavior study habits, attitude were shown as challenges by students. These overstretched problems which cannot be managed by authority and accepted by educational clients has led to frequent absenteeism, poor performance and constant students dropout. Awwalu (2012). Research on attitude has a long history in mathematics education. This construct finds it origin in the field of social psychology. Allport (1935) it plays a crucial role in learning mathematics Neale (1969). It is necessary to detect those factors which are associated with mathematics achievement, particularly the factors that can be influenced and are amenable to change by educational interventions. According to Reezigt (1999). Student’s achievement is influenced strongly by students factors, social background, motivation, attitude, entry behavior and also by the way students spend their time during lessons and by the way they use opportunities to learn.

From the foregoing, a student is a scholar, learner and one who studies, wikitionary (2012). Having a student view about a course content influence their understanding and learning of that subject. Many students thinks and say mathematics is difficult. It was observed that student have to contend with different representation such as formulae, calculations, graphs and conceptual explanation at the same time. Moreover they have to make transformation among them. “Imogie ( 2008) sees learning as a relative stable change in behavior as a result of experience”. Since learning is not seen as a handover or intake of knowledge but as an active construction process. Thus the student is the one who is responsible for his or her learning process. The results from various studies have shown that home background of students is correlated to their mathematics learning in school Lamb & Fullarton (2000). Attitude is a critical construct related to learning, students with positive attitudes tend to achieve higher Winheller, Hattie & Brown (2013).
Statement of the problem

So having students views about their challenges and difficulties in mathematics can provide valuable information to the course tutors and authorities in preparing the curriculum choosing textbooks and employing the curriculum in a way that lessens students challenges in understanding and learning mathematics. The students views and perceived solutions to these challenges could go a long way in assisting students surmount these challenges.

This study is significant to secondary school students in mathematics as it will help them analyse their views on challenges encountered in learning mathematics and thereby proffer solutions to them. It will assist teachers to understand students better and assist the authority to reappraise the curriculum in association with provision of facilities on ground to improve learning in mathematics by students. According to Agogo (2009) mathematics taught to students should be relevant to their entry knowledge for better assimilation.

Research design

The research design used for this study was descriptive survey as it involves the analysis of current prevailing issues.

The population of this study consisted of all mathematics students in the fifteen public schools in Egor Local Government Area of Edo State. A sample size of 324 students of mathematics was selected using simple random sampling technique.

Instrumentation

The instrument used for this study is a twenty six item questionnaire which is a likert – type four point scale, graduated from SA (Strongly Agreed); A (Agree); D (Disagree) SD (Strongly Disagreed). It is made up of five sub units with six items on each sub heading. The subheadings are socio-economic background of students, study habits, entry behavior, motivation and attitudes respectively. Spaces were provided for ten perceived solutions.

Validation of instrument

The instrument validity was determined by expert judgement. Two experts in curriculum and instructional technology and one expert in the department of mathematics were presented the instrument who certified it valid.

Reliability

The instrument was administered to thirty secondary school students as a pilot study and the data obtained was analysed using the cronbach Alpha formula and a reliability coefficient of 0.769 was obtained thereby establishing the instruments internal consistency.

Administration of instrument

The instrument was administered by the researcher with the aid of research assistants.

Result

Using factor analysis, data collected and analyzed, are presented in the following tables

Research Question 1: what are the underlying factors, that make up challenges, to the learning of mathematics?

Table 1: Principal component factor Analysis of items that make up challenges for secondary school students.

<table>
<thead>
<tr>
<th>Variable student factors</th>
<th>Total items</th>
<th>No. of items accepted as challenges</th>
<th>No. of items not accepted as challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio – economics background</td>
<td>06</td>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td>Study habits</td>
<td>05</td>
<td>05</td>
<td>-</td>
</tr>
<tr>
<td>Entry behavior</td>
<td>05</td>
<td>02</td>
<td>03</td>
</tr>
<tr>
<td>Attitude</td>
<td>05</td>
<td>04</td>
<td>01</td>
</tr>
<tr>
<td>Motivation</td>
<td>05</td>
<td>03</td>
<td>02</td>
</tr>
</tbody>
</table>
According to the data in table 1, for students socio economic background 3 item were viewed as challenges while the other 3 items were not viewed as challenges. For study habits the 5 items were viewed as challenges and for entry behavior, 2 items were seen as challenges while 3 items were not challenges to mathematics students, 4 items in attitude were viewed as challenges and I was not viewed as a challenge. And for motivation 3 items were not seen as challenges to the effective learning of mathematics in secondary school in Egor Local Government Area of Edo State. Hence overcoming these challenges identified, will help students surmount challenges in learning mathematics.

Research question 2: what are the solutions to the challenges of effective learning of mathematics by secondary school student?

Table 2: Perceived solutions as proposed by mathematics students

- More and better teaching aids and materials should be provided
- Students should be given regular home – work
- Teacher should always give immediate feedback to students
- Students should be well motivated positively
- More and professional mathematics teachers to be made available in schools.
- Mathematics should be taught in a conducive environment.
- Use of proper teaching methods.

Discussion of findings

The result of this study revealed that emphasis on provision of materials and aids for learning mathematics by parents, good study habits, motivation, will enhance performance in mathematics. This findings supports the findings of koballa (2006) that attitude is a pre-disposition towards things, events or ideas, so if a good disposition is inherent, it is likely to boost learning. And that learning how to study or develop good study habit is a lifelong process, if the time is efficiently spent studying course content. It is also in agreement with the work of Lamb and Fullarton (2000) who opined that good background correlated to mathematics achievements in school.

The study further reveals solutions as proposed by students to the effective learning of mathematics in secondary school from table II that more and better teaching aids to be provided, more qualified and professional teachers to be made available and students should be motivated. This study supports the findings of Kalantis and cope (2012) who saw education as a process of behavior modification, pedagogy in this sense is a process of stimulus followed by response and reinforcement. When students are motivated by reward either in gifts, grade and commendation they are likely to reinforce learning in mathematics.

Conclusion:

Based on the findings, it was concluded that provision of learning materials by parents high contribution of good study habits, positive attitude of students and motivation are needed for students to surmount challenges in the effective learning of mathematics. Recruitment of more professional mathematics teachers and provision of infrastructural facilities are useful in enhancing performance in mathematic. Information and communication technology should also be well utilized for mathematics learning.

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