

The Impact of Academic Motivation on Student's Academic Achievement and Learning Outcomes in Mathematics among Secondary School Students in Paddiruppu Educational Zone in the Batticaloa District, Sri Lanka.

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Abstract

The objective of the study was to investigate the relationship between student's Academic Achievement (AA) and learning outcomes (LO) of mathematics as on impact of Academic Motivation (AM) among the junior secondary students in type II School in Paddiruppu Educational zone, Batticaloa district. The study was carried out on 300 junior secondary students randomly selected (grade 9 which are transformation group from junior secondary to senior secondary grade10) from 10 semi-urban and rural type 2 schools, and schools were stratified randomly selected from Paddiruppu Educational zone. The age ranged from between 13.5 and 14.5years (who were stayed in grade 9, the year of 2016). Other variables considered in the study are extent of AM at two levels that is highly motivated and less motivated students.

This research is an ex-post facto design in the sense that the researcher does not have direct control over independent variable because their manifestations have already occurred or because they are inherently not manipulable. The investigator therefore examined the impact of AM (independent variable) on type II schools grade 9 (early adolescence) students AA in Mathematics (dependent variable). In an effort to achieve this, study investigated the impact of AM on student's school AA in mathematics in secondary type II schools using AM for academic performance scale (MAPQ) as a measuring instrument and achievement test in mathematics were gathered through mid year examination test in mathematics, in July 2016.

Two hypotheses were tested for significant at 0.05 level and using t-test and analysis of variance (ANOVA). Results showed that gender difference were significant when (t. calculated value =8.9; t critical value 1.96; df= 284; at 0.05 level) impact of AM on AA was compared in male and female students. Also other result indicates significant difference when (t. calculated value=7.9 ; t critical value 1.96 ; df= 284 ; at 0.05 level) extent of motivation was taken as variable of interest on AA in mathematics based on the degree of their motivation, suggestions and recommendations on students, parents government, counsellors, educational stakeholders etc, were discussed.

Keywords: Academic Motivation (AM); Academic Achievement (AA); Learning Outcome (LO); Secondary type II School; Junior Secondary Students; Mathematics.

Introduction and Background of the Study

In the contemporary Sri Lanka, greater emphasis is being placed on Industrial and Technological development (contribution of developed countries, i.e specially Japan and China). As a result students are being encouraged to take up science subjects. One subject that cut across all the science is mathematics. Today, mathematical methods pervade literally every field of human endeavour and play a fundamental role in economic development of a country. In our march towards scientific and technological advancement, we need nothing short of good performance in mathematics at all levels of schooling. Unfortunately performance of students in mathematics at the end of secondary education has not improved in the past decade.

Various factors have been adduced for poor performance of students in mathematics. The interest of students in mathematics have been related to the volume of work completed, students task orientation and skill acquisition, students personality and self-concept, feeling of inadequacy (Callahan, 1971), motivation, self-confidence, and anxiety(Aiken, 1976), shortage of qualified mathematics teachers (Ohuche, 1978 ; Ale, 1989), poor facilities and equipment and industrial materials for effective teaching (Oshibodu, 1984 ; Odogwu, 1994), use of traditional chalk and talk method (Oshibodu, 1988), large pupils to teacher ratio(Alele-Williams,1988) mathematics fright/phobia(Georgewill,1990) and so on. Wentzel (1998) stated that interest in activities tends to increase the likelihood that individuals formulate goals relating to that activity and invest time and effort to achieve them.

Moreover, individual characteristics such as intelligence, cognitive styles, and personality play an important role in learning and instruction as does the context of learning. Other research findings have shown that individual students' characteristics variables such as motivational orientation, self-esteem and learning approaches are important factors influencing academic achievements. In the effort to improve students cognition and affective outcomes in mathematics and/or school learning, educational psychologists and mathematics educators, have continued to search for variables (personal and environmental) that could be manipulated in favour of academic gains. Of all the personal and psychological variables that have attracted researchers in this area of educational achievement, motivation seems to be gaining more popularity and leading other variables.

Review of the Literature

The issues of academic motivation (AM) of students in education and the impact on academic achievement (AA) are considered as an important aspect of effective learning outcome (LO). However, a learner's reaction to education determines the extent to which he or she will go in education. The impact of academic motivation on education of mathematics of a child cannot be undermined. That is why Hall (1989) believes that there is a need to motivate students so as to arouse and sustain their interest in learning mathematics. "Academic Motivation raises question on why people behave in the way they do it". An individual could therefore, from psychologists' point of view, be seen as politically, socially and academically motivated depending on the motivate behind his or her activities.

Based on the foregoing, research on mathematics academic achievement should be considered a continuous process until there is evidence of improvement in interest and performances of the learners in the subject particularly the secondary school students. Essentially therefore, the present study is an effort in this direction. Hence the study investigates the impact of motivation on student's academic achievement.

The experimental researchers carried out by some researchers have tremendously improved the knowledge about the motivate to achieve (Gesinde, 2000). Academic motivation could be seen as self-determination to succeed in whatever activities one engages in, be it academic work, professional work, sporting events, among others. Gesinde (2000) posits that the urge to achieve varies from one individual to the other, while for some individuals need for achievement is very high whereas for others it may be very low. However, there are high

achievers and low achievers. What is responsible for the variation could be the fact that achievement motivation is believed to be learnt during socialization processes and learning experiences. As a matter of fact this varies from one individual to the other. Gesinde (2000) asserts further that, those who have high achievers as their models in their early life experience would develop the high need to achieve, while those who have achievers as their models hardly develop the need to achieve.

Human being are said to be extrinsically or intrinsically motivated. Intrinsic motivation is said to be derived internally in the job itself. It is that which occurs while a person is performing an activity in which he takes delight and satisfaction in doing. Intrinsic motivation is seen as internal rewards, while extrinsic motivation is incentive or rewards that a person can enjoy after he finishes his work. Okoye (1983) opined that motivation holds the key to the understanding of human behaviour. According to him, motivation explains why one individual dodges work, another works normally satisfactorily enough to reach the height, while yet others resort to illegal and unconventional methods of achieving social, academic, economic and political recognition. He added that motivation should be carefully manipulated whether in the work situation or study situation, so that our students are neither under motivated or over motivated but appropriately motivated so as to be useful to themselves in their society and the world at large.

Akinsola (1994) investigated the relationship among college students' learning and performance goal orientation, drawing on questionnaire data from ages 17-22 of college students' total 312. It was reported that students who had a learning profile motivation had completed more semesters. They concluded that the younger students who were externally motivated tended to possess more irrational beliefs while other internally motivated students tended to be more involved in learning.

George wills (1990) hypothesised that conceptions of success of achievement goal affect both the inclination to and actual performance. This was tested in a sample of 673 Chinese adolescents. Sex differences were found in the conception of success. As part of larger project concerned with motivation factors in educational attainment Sinna et.al. (1998) focussing on Asian girls, 985 secondary school students in London and England found that Asian students of both sexes rated parents and friend as more important in contributing to academic success. Yoloye (1976) carried out a descriptive survey on the cause of poor academic achievement in Northern Nigeria. He reported that majority of the children who

were labelled as backward or unintelligent to school were good, but they were handicapped by physical characteristics such as defective vision, learning defect and other preventable diseases. Bridgeman (1978) reported that standard school achievement test is somewhat predictive of later academic performance.

Bank and Finlapson (1980) found that successful students were found to have significantly higher motivation for achievement than unsuccessful students. Moreover, (Johnson, 1996; Skaalvik and Skaalvik, 2004) revealed significant relationship between academic performance and motivation. In Nigeria, a study carried out by Akinsola (1994) on academic motivation using 276 students revealed that there is an agreement between academic performance and motivation.

Objective of the Study

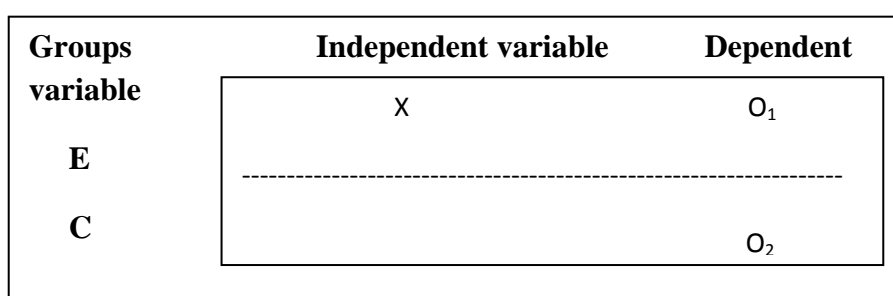
The study sought to explain learning outcomes in senior secondary mathematics in terms of academic motivating students towards academic gains in the subject.

Hypotheses

1. **Hypotheses H_0** – There are no significant relationship between the impact of motivation and academic performance of male and female students in mathematics.
2. **Hypotheses H_0** – There are no significant relationship between the academic performance and highly motivated and lowly motivated students in mathematics achievement test.

Methodology

The causal-comparative model was used by investigator this ex post facto design research investigation. Using this model, the investigator hypothesizes the independent variable and then compares two groups, an experimental group (E) which has been exposed to the presumed independent variable X (Motivation) and a control group (C) which has not. (The dashed line in the model shows that the comparison groups E and C are not equated by random assignments).



O₁ – Academic Achievement O₂ – Learning Outcomes in Mathematics

1. Research Design

This study used the survey design which involves the collection of data at current status for description of phenomena, without deliberate effort to control the variables. The study adopted the expo-facto type using the descriptive survey design type. This research is an ex-post facto design in the sense that the researcher does not have direct control over independent variable because their manifestations have already occurred or because they are inherently not manipulable. The investigator therefore examined the impact of academic motivation (independent variable) on type II schools grade 9 (early adolescent) student academic achievement in Mathematics (dependent variable).

2. Population and Sample

A simple survey design was adopted for this study. The study was directed at the population of senior secondary type II School; grade 9 (early adolescent) students in Paddiruppu zone. The target population for the study comprised all the students in junior secondary students in grade 9 in Paddiruppu educational zone. This zone is one of the 14 zones in eastern province in Sri Lanka. It has cultural and educational similarities with the other zone in the eastern province of Sri Lanka. The schools in Paddiruppu zone were stratified into semi-urban and rural schools. There is no urban school situated in this zone. A stratified random sample of 10 type 2 schools (5 semi-urban and 5 rural schools were used) was selected for this study. A stratified random sample procedure was used to select semi-urban and rural type 2 school from the list of schools in the Paddiruppu zone. Equal number of semi-urban and rural schools was chosen. From each of these selected schools, 30 students were randomly selected to make a total of 300 respondents that constituted the sample for this study and included male and female students. The average age of the students is 14.0 (early adolescent). The schools situated in area served by semi-urban and rural were considered by Piradesasaba. Other variables considered in the study are extent of motivation at two levels that is highly motivated and less motivated students.

3. Instrumentation

The following research instruments were selected and used in the study. The main instrument for collecting data was a questionnaire. The questionnaire was selected as the chief method because of its many advantages. It gives maximum coverage of the field of study, in comparison with other tools of student's motivational aspects. A modified instrument tagged Motivation for Academic Performance Questionnaire (MAPQ - Standard) was used to gathered data on the study. Items in the instrument were adapted from Motivation for Occupational Preference Scale (MOPS - Standard) by Bakare, (1977) and Motivation for Academic Study Scale (MASS - Standard) by Osiki, (2001). The instrument was divided into two parts. It consists of section A which is made up of 10 questions dealing with the participants demographic information like sex, age, class, name of school etc; while the section B contain the items. It was a thirty items scale of likert type question format (five point scale) with response ranged from strongly agree 5, to strongly disagree 1. To ascertain the reliability of the instrument after modification, it was administered on 25 respondents who were secondary type II School students selected from another two secondary type II schools which were not part of the study sample. The reliability co-efficient yield an $r = 0.79$ through cronbach alpha. All the items in the instrument were really very relevant to the content of the study. Data on academic performance were gathered through mid year examination test in mathematics, in July 2016. This common examination mathematic question paper has been prepared and constructed by special mathematic consultant (In Service Advisor - ISA), resource centre, batticaloa district. The reliability of the instrument was found to be 0.81 using test re-test reliability method of two weeks interval.

Data Collection, Analysis and Results

All the 300 participants were administered the Motivation for Academic Performance Questionnaire (MAPQ). The mathematics teachers in the participating schools assisted during the administration of the instruments. Instruction on how to respond to the questionnaire was read to the participants. This ensures its proper filling. Data collection was done immediately after the administration and all the response sheets were retrieved from the respondents. Out of 300 questionnaires administered, 286 were valid for the analysis on the study. After completed this activities the respondents mathematics achievement marks (Mid year zonal examination, in July 2016) received from respective subject teacher according to the marks schedule, who were participated this study.

Data collected on the study were analysed using inferential statistics which includes; student t-test and analysis of variance (ANOVA). Specially, the study provided answers to two research hypotheses. The sequence of the presentation of the results is in accordance with that of the hypotheses. In this study, two null hypotheses were tested for significance level at 0.05 margin of error. The results of the study were presented in tables below.

The first hypothesis states that there is no significant relationship between the impact of motivation and academic performance of male and female students in mathematics. Table 1 presents the results of the analysis conducted on the impact of academic motivation on academic achievement in mathematics based on gender. The results clearly reveals that significance relationship exists in the academic achievement of male and female student in mathematics with, t. calculated value = 8.9; t. critical value = 1.96; df= 284; at 0.05 level. Which means this hypothesis is rejected.

Table 1: t – test showing the mean difference in the impact of academic motivation on academic achievement of male and female students in mathematics.

Gender	N	M	SD	Df	t – calculated value	t- critical value	Decision
Male	129	36.62	13.79	284	9.16	1.96	S*
Female	157	42.48	15.47				

S* - Significant at 0.05.

The second hypothesis states that there is no significant relationship between the academic performance and highly motivated and lowly motivated students in mathematics achievement test. Table 2 shows academic achievement measured alongside extent of motivation. The results reveals that there is significant relationship between in the academic achievement of highly motivated and lowly motivated students in mathematics with, t. calculated value = 7.9; t critical value = 1.96; df= 284; at 0.05 level.

Table 3 shows that significance on gender and academic achievement as clearly stated. The calculated F-ratio is 21.67.

Table 2 : t – test showing mean difference summary of academic achievement of Highly motivated and Lowly motivated students in mathematics.

Variables	N	M	SD	Df	t -	t-	Decision
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					calculated value	critical value	
HMS	121	34.73	19.84	284	7.9	1.96	S*
LMS	165	13.92	9.63				

S* - Significant at 0.05

HMS – Highly Motivated Students, LMS – Lowly Motivated Students.

Table 3: ANOVA Source Table of Summary of Gender Difference and Academic Achievement in Mathematics.

Source of Variation	SS	Df	MS	F-ratio	F-critical
Between	231269	1	86385	21.67	3.63
Within	14655	284	34.52		
Total	245924	285			

S* - Significant at 0.05

Discussion, Suggestion and Recommendation

1. Discussion

The result of the first hypothesis, which compares the impact of academic motivation on academic achievement of secondary type II school students in mathematics using gender as a variable of interest is found to be significant. The finding shows that motivation has impact on academic achievement of secondary type II school students in mathematics with respect to gender. This finding is in disagreement with Siana et.al, (1998) findings that Sri Lankan students of both sexes rated parents and friends as more important in contributing to academic success. The variation in the present result on this study and that of Siana et.al, (1998) may be connected with the issue of environment. While the present study was conducted in Batticaloa, Sri Lanka. His study was conducted in Asia. Meanwhile, one thing that should be very clear is the fact that success in school subject or academic generally depend on many motivating factors. The issue of gender is part of it likewise parental involvement/support and or peer influences. All these should not be underrated because they are factor that can make or mar student achievement in school.

The result of the second hypothesis shows that secondary type II School students differ significantly in their academic achievement based on the extent to which they are motivated.

The results reveal that highly motivated students perform better academically than the lowly motivated students. This finding corroborates that of Bank and Finlapson's (1980) finding who stressed that successful students have significant higher motivation for achievement than unsuccessful students. Similarly, the report by Johnson (1996) that academic achievement is highly correlated with student's motivation lends a good support to the present findings. With reference to the position of (Ayotola, 1998), that when pupils express lack of interest in the subject, it affects the way they react or listen to the teacher. It can be said interest and attitude of learner towards a particular subject matters a lot. This is because these two constructs according to the author are high motivating factor which can lead to better achievement on the part of the learner. Good attitude and better interest learners display particularly in mathematics serve as an encouragement even to the teacher. And this can help the teacher a lot to disseminate his teaching to the best of his ability and knowledge making use of all available resources rather than resorting to the use of chalk and talk when learners show no interest or negative attitude. Moreover, when the students display good attitude and better interest in mathematics, the teacher is motivated and this may cause him to forget whatever hindrances to the teaching of the subject from his own part. Good impartation of mathematics knowledge on the part of the teacher ; couple with student's interest in the subject and the display of positive attitude as earlier pointed out, are good motivating factors which when combine together is assumed will result to better achievement in mathematics.

2. Suggestions

From all views, discussed in the literature review, some of the suggestions use can bring out as ways of motivating students to learn are;

- Make mathematics teaching interesting.
- Individual differences in ability, background and attitude must be taken into consideration.
- Enhance learners feeling of esteem by arranging varieties of learning experiences according to Biehler and Snowman (1986); "Try to send your students away from your institution anxious to use what they have been taught and eager to learn more by associating subjects with liked and admired situations, things or individuals and also arranging conditions so that students feel comfortable when in the presence of a subject".

All these suggestion must however be transformed into actual practice within the framework of the school curriculum. More especially, with the case of mathematics education, these suggestions could be guidelines in deciding the types of methods/strategies or instructional materials/media, which could be used in motivating pupils to learn mathematics.

3. Recommendation

The findings reported in this study justify the importance of motivation to academic performance. The findings have implications for the teachers of mathematics that they should try as much as they could to motivate their students during the course of instructions. The parents as well as the government should engage in programmes that can motivate the students to improve their academic performance. It is therefore, hoped that these findings will serve as resource materials for mathematics educators, mathematicians, school authorities psychologists, counsellors, government, parents and significant others who are connected with the academic progress of the students.

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