International Research Journal of Mathematics, Engineering and IT
Vol. 3, Issue 10, October 2016 IF- 3.563 ISSN: (2349-0322)
© Associated Asia Research Foundation (AARF)
Website: www.aarf.asia Email : editor@aarf.asia , editoraarf@gmail.com

ACHIEVEMENT MOTIVATION AND ACADEMIC PERFORMANCE IN MATHEMATICS IN SELECTED HIGHER EDUCATION OMANI CLASSROOMS

Reynaldo O. Cuizon
Faculty of Foundation Studies, Gulf College
Oman.

ABSTRACT

Attendance and participation indicate achievement motivation, which is posited as a determinant of performance. Previous studies showed that students' academic performance in Mathematics is low and declining. Whether this condition is affected by achievement motivation remains a gap. Thus, this study determined such correlation utilizing cross sectional approach in terms of the number of contacts, retrospective in terms of the reference period, and non-experimental type of investigation. Employing purposive sampling in selecting Mathematics classes of a school in the Sultanate of Oman, and intact group sampling in selecting the individuals as subjects ,it was found that for every unit change in the achievement motivation in terms of the daily class attendance, there is a positive corresponding change in the academic performance in mathematics at a moderate high strength; that participation in Mathematics drill contributes in the overall influence of achievement motivation but singly found not significantly correlated with the academic performance; and that 40% influence on the latter can be attributed to excluded variables. Class attendance policies and strategies, encouragement not coercion technique in Math drill participation, and research on other possible determinants of academic performance in Mathematics are recommended.

Keywords: Achievement motivation, academic performance, higher education classroom, descriptive-correlation - cross sectional – retrospective method, purposive and intact group sampling, Sultanate of Oman

Introduction

The importance of learning mathematics has always been proven time and again. Mathematics as knowledge-discipline and a thinking-skill have become a matter indisputable in the ever changing global environment. It holds a great role in the production of accurate facts and presentation of appropriate figures using numerical descriptions, in the conveyance of information relevant to human development and progress, and in the prediction of events favorable or unfavorable to people's lives. Above this, the importance of mathematics is substantiated by its daily practical use of individuals in different walks of life (Padmavathy and Mareesh, 2013).

Despite the wide utilization and unquestionable value of mathematics in various human conditions, the achievement motivation and performance in mathematics especially among young generation of learners have been alarming than ever (Zakaria, Chin, and Daud, 2010). In Malaysia for instance, the achievement in mathematics has been unfavorable – describing for instance the lower secondary assessment trend as small fluctuation in percentage from year to year (citing Sabri, 2006). Likewise, despite the superiority of the Japanese students in mathematics as compared with their counterparts from Sweden, Australia, England and the United States, Japan recognizes the need to enhance the mathematical interest and abilities of their students. Indeed, learning schemes such as Lesson Study strategy are continuously and enthusiastically discovered and rediscovered through research by Japanese teachers in order to improve mathematics classroom practices and to address low performance (Fernandez and Yoshida, 2012).

The low performance in mathematics can be mainly attributed to, among others, the perception of students that it is a difficult and boring subject. With this, schools are challenged to eradicate teachers' disappointment in teaching mathematics and to overcome students' boredom and weak performance in this field (Zakaria, Chin, and Daud, 2010 citing Keefe, 1997).

There are students considered weak in mathematics. They are students with mathematical learning disabilities (Geary, 2010 and Toll, *et al.*, 2011), with mathematical difficulties (De Smedt and Gilmore, 2011), and who persistently have low performance in mathematics though not attributable to intelligence but to memory delays and deficits that

appear to be specific to mathematics learning (Geary, 2011). Such condition can still be remedied.

The remediation in terms of improving the interest and achievement of learners with mathematical disability is entrusted in the hands of the teachers. The latter are expected to understand that teaching the subject is not simply dispensing rules, definitions and procedures for students to memorize. It is rather anchored on achievement motivation driven intrinsically and extrinsically (Padmavathy and Mareesh, 2013). Likewise, teaching mathematics challenges the teachers to create strategies that engage students in the learning activities, and to provide opportunities that drive students to discuss ideas and explain procedures. In Japan, the students have more opportunities to learn mathematics by having more time or hours to participate in mathematical activities as compared to students from countries mentioned earlier. In this assertion, two points are secured namely, achievement motivation to learn the subject, and students' presence and engagement. These two variables are considered in the Performance Theory which states that motivation, opportunity and capability are determinants of [work] performance (Ivancevich, et. al., 2008; and Ivancevich, 2001). The same is true in achievement motivation theory where what drives people do what they do is emphasized. Accordingly, people who focus on attaining success through own efforts than relying on chances, who calculate the risk involved and pick situations where feeling is anticipated slightly, and who articulate the result of the situation within a reasonable time are actually achievement motivated people (McClelland, 2015).

Achievement motivated people are identified and noticed because of their persistence and consistency in attending classes and participation to math activities. In other words, these variables indicate achievement motivation (Stanca, 2006). Do these indicators affect academic performance in mathematics? In what degree?

Apart from finding answers to the questions mentioned, the association of the variables involved in the above-mentioned theories needs to be affirmed if not, refuted. The achievement motivation and academic performance variables correlated in this study are delimited in the Mathematics subject and classroom milieu. The first variable is indicated by class daily attendance and by participation in math drill activities, while the second is by summative test scores. The exclusion of the opportunity and capability variables from performance theory presented earlier as applied in this study is based on the assertion that

though mathematical learning difficulty and disability is associated with persistent low performance in mathematics, such performance is not attributable to intelligence which can be measured by capability variable (Geary, D. C. (2011).

In addition, the dearth in terms of having substantial information about achievement motivation and performance of Omani students in mathematics calls for scientific exploration and publication. It is in the light of the forgoing challenges namely, determining the correlation and degree of influence of achievement motivation, affirming or refuting performance theories, and addressing the research gap concerning mathematics among Omani students that this study correlating achievement motivation with academic performance was pursued.

Statement of the Problem

1. To determine the respective level of achievement motivation indicated by daily class attendance and participation in Math drill activity, and of academic performance in Mathematics indicated by summative test scores.
2. To determine the significance of the correlation between the indicators of achievement motivation and academic performance in Mathematics.
3. To determine the predictive power and combined degree of influence of the indicators of achievement motivation as determinants of academic performance in Mathematics.

Hypothesis

Achievement motivation indicated by daily class attendance and participation in Math drill activities does not significantly correlate with academic performance of students in mathematics indicated by the summative test scores.

Method

Research Design

This study used the quantitative research method particularly the descriptive-correlation because the causality of the phenomenon is looked into (Kumar, 2014). In this

study, the inference of the correlation between independent and dependent variables is verified without direct intervention. According to Escalona (2005), and Asaad (2008), it is descriptive study when quantitative data were collected to answer questions via questionnaire survey if not, from existing secondary data. This study applies correlation method because the significance and extent of the relationship of two quantifiable variables and the degree of the influence of the independent variable are determined (Subong, 2005).

Based on the number of contacts, this study is a cross sectional study type because it utilizes the collected secondary data of the subjects involved at a single point of time or during the relatively brief time period (Johnson and Christensen, 2008). It measures change and relationship using two data collection points (Kumar, 2014). This means that this study has at least two cross-sectional studies, at two points in time, on the same population. The specific studies involved here are the levels of achievement motivation and academic performance in mathematics.

Based on the reference period, this study is considered a retrospective study design. It is one because it investigates a phenomenon that happened in the past (Kumar, 2014). This study utilizes the data of the phenomenon that transpired during the second semester of the school year, and then the study per se is undertaken during the summer time thereafter.

Based on the type of investigation, this study is a non-experimental in nature because it traced the cause starting from the effects involving the variables under study. It is one because the assumed cause has already occurred. Likewise, here the cause, with hindsight is linked to the outcome (Kumar, 2014). Non-experimental research is a systematic empirical investigation where the researcher does not have direct control of independent variables because inherently they cannot be manipulated (Johnson and Christensen, 2008).

Research Subjects

The subjects of the study are the Omani students of Gulf College who took up Mathematics course within the school year 2015-2016. Selected specifically are those who belonged to IFP 220 and IFP 223 batches of mathematics classes.

Research Locale

This study is conducted in Gulf College which is located in Maabella, Sultanate of Oman. It has more than 6,000 Omani students. It is a private higher educational institution offering internationally recognised and innovative academic degrees. It undertakes educational programs that are based on the needs of the students and are aligned with the employment opportunities especially in the local market. It vows to observe and uphold academic excellence in the global point of view. Through this effort, Gulf College envisions to participate in the development of higher education locally and internationally in general and in the production of qualified manpower in particular.

Gulf College offers mathematics in its faculty of Foundation Studies. It takes in the operations of whole numbers, fractions, algebraic expressions including the advanced level such as quadratic equation and logarithms. It also takes in statistical measures up to the level of graphical presentation and interpretation of data. In order to learn all these topics, students who are taking up the course are expected to attend the daily classes for more than three months, and are encouraged to participate in math drill activities. Above these, the students are required to take and pass in the summative test before considered to higher level.

Sampling Technique

This study employed the purposive sampling technique in the selection of the group students among the classes taking up Mathematics course. Such technique is a non-probability sampling type of selecting the respondents of the study. According to Subong (2005), in purposive sampling, the researcher chooses the subjects according to purpose. In this study, the purpose of the researcher was to make use of the data generated from his own classes in order to either affirm or negate an existing theory about the determinants of performance specifically in mathematics. The data referred to by the researcher are the attendance data, exercises and drill participation data, and summative test score data. In other words, the two classes in mathematics course are selected on the bases of opportuneness since said classes are handled by the researcher.

In terms of the selection of the individual subjects, the study employed intact group sampling. It is one of the non-probability sampling types. It is using samples that are

already-formed groups. In the case of this particular study, the already-formed group of individuals are the students of two different classes. The validity of results from this sampling technique is defined by the process by which the group was formed. This particular sampling technique highlights that the total enumeration of all the students in the entire class can already represent the population as compared to having fewer number of samples from a more specific area covered by the general characteristic of the population (Basic Tools of Research: Sampling, Measurement, Chapter 6, Ret. 2016). In other words, the entire number of students in IFP 220 and 223 mathematics classes, which are the sample groups, can already stand in for the whole population that is the entire mathematics classes officially registered within the school year covered in the study.

In terms of the number of mathematics class samples and individual student samples, this study employed the convenient and universal sampling techniques respectively. Choosing the mathematics class included in this study is based on easy accessibility of the researcher, known type and qualification of samples, and greater probability of approval in terms of relevance to the educational institution where the study is conducted. Employing the universal sample conforms to the assertion that findings generated from larger samples are more reliable and accurate. Indeed, the more samples utilized, the closer the findings are to truth (Kumar, 2014) simply because such is limiting if not, eradicating the influence of outliers (Unite for Sight, Ret. 2016). In this regards, there is 44 total number of students included in the study.

Research Instrument

This study makes use of existing secondary data generated from the records of the mathematics classes that are included in the study. These existing data comprise the daily attendance of the students, mathematical exercise outputs, and the summative test results. Specifically, it utilizes the number of class sessions the students attended, the number of times participated in drill activities, and the total scores obtained in the summative examination. The following respective scales are followed in terms of measuring the level daily class attendance, participation in Math drill activity, and academic performance in Mathematics:

1. Daily Class Attendance

Scale	Descriptive Level	Descriptive Interpretation
41 – 50	Very high	The students have great achievement motivation in terms of attendance to class sessions
31 – 40	High	The students have adequate achievement motivation in terms of attendance to class sessions
21 – 30	Moderate	The students have limited achievement motivation in terms of attendance to class sessions
11 – 20	Low	The students have little achievement motivation in terms of attendance to class sessions
0 – 10	Very low	The students have no achievement motivation in terms of attendance to class sessions

2. Participation in Math drill Activity

Scale	Descriptive Level	Descriptive Interpretation
41 – 50	Very high	The students have great achievement motivation in terms of participation in math drill activities
31 – 40	High	The students have adequate achievement motivation in terms of participation in math drill activities
21 – 30	Moderate	The students have limited achievement motivation in terms of participation in math drill activities
11 – 20	Low	The students have little achievement motivation in terms of participation in math drill activities
0 – 10	Very low	The students have no achievement motivation in terms of participation in math drill activities

3. Academic Performance in Mathematics

Scale	Descriptive Level	Descriptive Interpretation
81 – 100	Very high	The students have excellent academic performance in terms of summative test score
61 – 80	High	The students have very good academic performance in terms of summative test score
41 – 60	Moderate	The students have good academic performance in terms of summative test score
21 – 40	Low	The students have poor academic performance in terms of summative test score
0 – 20	Very low	The students have very poor academic performance in terms of summative test score

In order to interpret the relationship among study variables, this research is guided by the following table of categorization as suggested by Asaad (2008):

Computed *r*	Descriptive Interpretation
+/- 1.00	Perfect correlation
Between +/- 0.75 – +/- 0.99	High correlation
Between +/- 0.51 – +/- 0.74	Moderately high correlation
Between +/- 0.31 – +/- 0.50	Moderately low correlation
Between +/- 0.01 – +/- 0.30	Low correlation
0.00	No correlation

Data Analysis Tools

This study utilized the following statistical tools:

1. Descriptive statistics deriving the mean, to determine the level of achievement motivation in terms of daily class attendance and participation in math drill activities. Likewise, it is used to determine the level of the academic performance in mathematics in terms of

summative test score. The mean is used to measure the central tendency of a given set of data (Subong, 2005). In this study, the first and second statements of the problem are answered through the use of this statistical tool.

2. Bivariate correlation specifically the Pearson Product Moment Correlation Coefficient, to determine the significance and the strength of the correlation between the independent (achievement motivation) and dependent variables (academic performance in mathematics) as well as the degree of influence of the first on the latter (Asaad, 2008).

Conceptual Framework

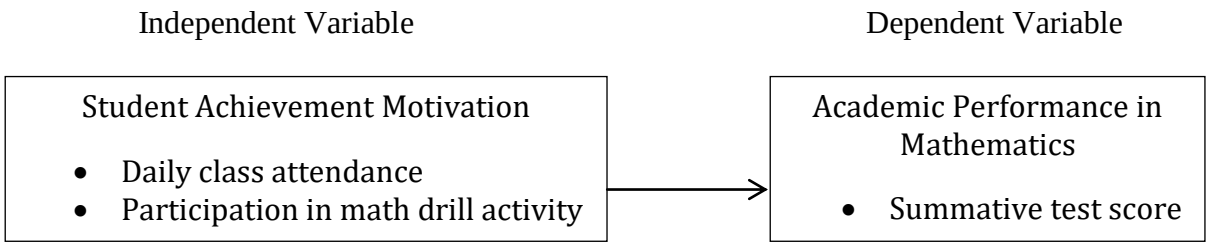

Figure 1.0

Definition of Terms

The independent and dependent variables are operationally defined as used in this study namely:

1. Achievement motivation in Mathematics, as the student's recurrent need and drive to improve personal past and present performance. It is specifically indicated by the desire to attend the daily class sessions in Mathematics and to participate in the math drill activities undertaken during the class sessions inside the classroom.

2. Academic performance in Mathematics, as the learning and accomplishment of the students in mathematics ultimately measured by their individual summative test mark.

Delimitation and Limitation of the Study

This study is delimited to daily class attendance and participation in Math drill activity, and to summative test score. Other indicators of achievement motivation and academic performance are excluded. It is also delimited to IFP 220 and 223 classes of Gulf

College for SY 2015-2016. Students from other schools, batches, and school years are excluded. Further, the possibility of cheating during examination which might had caused variations in the hard data is counted as part of the limitation.

Results

Levels of Achievement Motivation and Academic Performance in Mathematics

Table 1.1 shows the level of achievement motivation of the students in the selected Mathematics classes of the Faculty of Foundation Education of Gulf College. The table shows two indicators of achievement motivation variable namely, the daily class attendance and the participation in the math drill activities. The first indicator is described as in high level (mean=23.77). It denotes that the students possess adequate achievement motivation manifested in their sufficient daily class attendance. Separately, the second indicator of achievement motivation is likewise described as in high level (mean=13.25). It specifies that the students acquire adequate achievement motivation as manifested in their adequate participation in math drill activities.

Table 1.1. *Level of Achievement Motivation*

Achievement Motivation	***SD***	***M***	**Description**
Daily Class Attendance	7.11	23.77	High
Participation in Math Drill	6.46	13.25	High

In as far as the measure of spread of the two indicators is concern which is illustrated by their respective standard deviations, the second indicator (SD=6.46) is considered more compact than the first (SD=7.11). This means that the number of math drill activities participated in by the students are more concentrated at the high level than the number of math class sessions attended by the students which is more spread and scattered away from the same level.

Academic Performance in Mathematics

Table 2 shows the academic performance of the students in Mathematics specifically in terms of the scores they obtained in the summative test. The table shows a moderate level (mean=58.09) in academic performance in Mathematics. It is interpreted that the students have good academic performance in said course.

Table 1.2. *Academic Performance in Mathematics*

Academic Performance	***SD***	***M***	**Description**
Summative Test Score	22.95	58.09	Moderate

Correlation between Achievement Motivation and Academic Performance

Table 2 shows the correlation between the respective indicators of achievement motivation as independent variable and the academic performance of the students in Mathematics as dependent variable. The achievement motivation variable is indicated by the daily class attendance and participation in math drill activities. It is portended as shown that the daily class attendance and academic performance has a significant positive correlation (*p*-value=0.004 @ 0.05 alpha level). On the other hand, the correlation (*p*-value=0.088 @ 0.05 alpha level) between participation in math drill activities and academic performance is found not significant.

Table 2.0. *Correlation*

Independent Variable	**Student Academic Performance in terms of Summative Test Scores**		
	***r*-value**	***p*-value**	**Interpretation**
Daily Class Attendance	0.518	0.004	Significant
Participation in Math Drill Activities	0.294	0.088	Not significant

The preceding assertion is reinforced by the strength of the correlation and the linear relationship between the independent and dependent variables that is determined by the correlation coefficient ***r*** values shown for each indicator. It is revealed that the correlation between daily class attendance and academic performance of students in Mathematics is moderately high (*r*-value=0.518). On the other hand, there is a low correlation (*r*-value=0.294) between participation in Math drill activities and the academic performance of students in mathematics.

Predictive Power and Degree of Influence of Achievement Motivation

Table 3 shows the degree of influence of the independent variable on the dependent variable. It specifically shows a multiple correlation coefficient (R squared value = 0.601) which indicates that the daily class attendance and participation in math drill activities as indicators of achievement motivation have a combined influence of 60% on the academic performance of the students in mathematics. Furthermore, based on the values of coefficient of determination shown in the table for daily class attendance (*r* square value = 1.67), the participation in math drill activities (*r* square value=1.04), and the constant (*r* square value=4.51), the model is constructed that is SAP=1.67 DCA + 1.04 PMD + 4.51. Based on the attained level of significance (*p*-value=0.088 and *p*-value=0.589 @ 0.05 alpha level) respectively for participation in math drill activities and for constant variables, it is found that the coefficients of said variables are not significant in the entire equation model. They contribute in the overall influence of achievement motivation on the academic performance in mathematics; however singly these do not significantly influence the latter. Thus, it can be hinted that the daily attendance alone as indicator makes the entire achievement motivation variable a determinant of academic performance in mathematics.

Table 3: *Predictive Power and Degree of Influence*

Independent Variables	**Student Academic Performance in terms of Summative Test Scores**			
	Coefficient	***p*-value**	**Interpretation**	**R Square**
Daily Class Attendance	1.67	0.004	Significant	
Participation in Math Drill	1.04	0.088	Not significant	.601
Constant	4.51	0.589	Not significant	

SAP = 1.67 DCA + 1.04 PMD + 4.51

Degree of combined influence of two indicators of the independent variables on the dependent variable is 60.1%.

DISCUSSION

The significant impact, predictive power, and combined degree of influence of achievement motivation indicators as determinants of academic performance particularly in Mathematics remain unidentified. More intensely, there is a dearth of scientific pursuits along this concern particularly based on the analysis of data obtained from Omani adult students as subjects. Categorically, achievement motivation is indeed a cultural issue, and academic performance is a state concern. The essence of achievement is culturally viable since the motive of the students for achieving is rooted in culture (Trumbull and Rothstein-Fisch, 2011), and the essence of academic performance is educationally defined challenging teachers to involve students towards excellence (Awan, et. al., 2011). Hence, this paper helps address the gap of undefined strength of correlation between achievement motivation and academic performance in Mathematics specific to the purposively selected Omani classrooms.

Consequently, this study reveals firstly that, between the two indicators of achievement motivation variable namely, daily class attendance and participation in the Math drill activities, the former is found to have rather a significant positive correlation at moderately high strength with the academic performance of students in Mathematics indicated by summative test scores. It simply puts that the more students attend classes in Mathematics the likely they obtain better academic performance in the subject. Such change-effect on the dependent variable is not true with the participation in the Math drill activity variable. In other words, participating or not in Math drill activities has no bearing in the increase or decrease of the academic performance.

The correlation result of this study supports the finding of a longitudinal research stating that motivation predicts the long term growth of student's achievement in Mathematics (Murayama, et al., 2013), and affects the academic achievement in general (Yusuf, 2011). It also supports the assertion in a cross-sectional type of research with 120 respondents which stated that there is a positive relationship between achievement motivation

and academic performance however disagrees with another finding stated that the correlation is not significant (Emmanuel, et. al., 2014). Likewise, the finding of this current study agrees that motivation factors have positive significant effect on academic performance but argues on the finding that the strongest effect on academic performance was participation in Math activities specifically measured by time spent on homework. (Singh, et al., 2002).

Furthermore, this present study supports that, with the use of fixed effects framework and instrumental variables strategy, and through quasi-experimental method, consistent positive indication and statistically significant relationship between student attendance and academic performance based on math test results for elementary and middle school levels is found (Gottfried, 2010). Using qualitative information, lecture attendance matters in the development of academic performance and thus absenteeism hinders the latter (Moore, et al., 2008; and Moore, 2003). In addition, attendance has a significant impact on academic performance (Shendell, et. Al, 2004) though has smaller impact (Stanca, 2006). When tested with the students in introductory science course, it was established that class attendance is a significant factor of academic performance (Moore, et al., 2003). Similarly, when studied in lecture classes, attendance is positively correlated with academic performance. However, employing experimental and archival methods, it was ascertained that classes with no attendance policy showed no improvement in academic performance (Golding, 2011).

This present study opposes the finding of an ANOVA controlled study stating that neither student academic achievement motivation in particular nor student social achievement motivation have any significant influence on student academic performance (Onete, et. al., 2012). Such previous study result was only based on a survey design (expo-facto) while this recent one is based on actual count of number of attendance and participation as measure of achievement motivation, and of the summative test scores as measure of academic performance. Nevertheless, the previous study had total number of respondents (750) more than this recent one.

Secondly, the predictive model ascertained in the study signified that both the coefficients of the constant and participation in Math drill variables contribute in the overall influence on the academic performance in Mathematics. However, values of these contributing elements alone either individually or collectively, do not significantly affect the change in the academic performance in Mathematics.

Thirdly, this study ascertained that, with the total 60% degree of influence of its indicators combined, the achievement motivation of students at a high level influences the academic performance in mathematics at a moderate level. Apparently, the joint high level of daily class attendance and participation in math drill activities cultivates moderate level in the academic performance in mathematics. Moreover, the remaining 40% influence on the academic performance in mathematics can be attributed to other variables not covered in this study. One example indicator of achievement motivation variable is cognitive test anxiety. A study asserted that the moderate level of physiological component of test anxiety relate with higher exam performance. This supports the assertion that cognitive test anxiety exerts a significant stable and negative impact on academic performance (Cassady and Johnson, 2002). Anxious students are not motivated and this inversely affects their academic performance.

There are other various critical indicators used to determine the prevalence of achievement motivation. Some are considered classical in nature such as the personality and the situational characteristics. For instance, using such indicators in cross-cultural groups it was concluded achievement motivation should be understood in terms of the sociocultural context rather than in the personality context (Maehr, 1974). However, the personality as an indicator of achievement motivation was found to be insignificant even in the three criterion groups of successful people who were found high in achievement motivation (Lynn, 1969).

In the recent years, achievement motivation evolved into something with probably more concrete and complex indicators. For instance, it is indicated by the discrepancy between normative state versus various situational state, and discrepancy between relative dominance of success-oriented versus failure-oriented evaluative disposition. The first involves matters such as difference between ideal and real self, and the actual and desired possession. The second may depend on the structure and quality of time experience and on the relative perception of success and failure. Likewise, it involves among others, the degree of excellence preferred (Heckhausen, 2013). Aside from the social frame as external modulation of achievement motivation, the cognitive process had also been found to describe said variable. A study suggested that the brain areas that play significant role in the external modulated motivation also contribute to self-fulfilment achievement motivation and competitive achievement motivation (Takeuchi, et al., 2014).

The achievement motivation theory traces its origin in "motive." This theory has been a work in progress. It is developing. Its construct has been expanded even to something which relates the structure of thinking up to the dynamics of feeling and action (Weiner, 1985). Its composition goes out from just within the constructs including self-efficacy, intrinsic and extrinsic motivation, and interest (Wigfield and Eccles, 2000) up to a more specific matters about hope of success and fear of failure and even fear of success, and from just contained in power and affiliation (McClelland, 2015). It has also been proven that specifically, emotion moves student's self-regulated learning and motivation which further positively influences academic performance (Mega, 2014).

Apart from achievement motivation, other influencing variables may be considered. For instance, the Facebook Use for Learning Activities is correlated with academic performance that is indicated by grade point average (Kirschner and Karpinski, 2010); the moral education and self-control, social skills, and parent training components are correlated with academic performance (Maguin and Loeber, 1996); self-discipline outdoes the intelligence quotient as variable in predicting academic performance (Duckworth and Seligman, 2005); and personality indicated by ability, work orientation, and personality research better predicts academic performance than experience while studying (Csikszentmihalyi and Wong, 2014). Also, the academic performance of students was regressed on epistemological factors – the less students believed in quick learning, the higher the GPA they earned (Schommer, 1993).

Conclusion

Based on findings, it is concluded:

1. that the students have adequate achievement motivation and very good academic performance in mathematics.
2. that for every unit change in the achievement motivation in terms of the daily class attendance, there is a positive corresponding change in the academic performance in mathematics; and that the participation in math drill as indicator of achievement motivation contributes positively in the change in academic performance in mathematics however it alone, does not significantly influence the latter. and

3. that 40% influence on academic performance in mathematics can be attributed to other variables not covered in this study.

Recommendations

Based on the conclusions, it is recommended:

1. that educational institutions may define policies and create strategies to increase the daily class attendance of the students particularly in learning mathematics.
2. that teachers may encourage but not compel students to participate in math drill activities.
3. that teachers may conduct researches employing other possible determinants of academic performance in mathematics such as the teaching aspect specifically teaching strategy, teaching performance, teaching hours, teaching schedules, teaching materials, and more.

REFERENCES

Asaad, Abubakar S. (2008). Statistics made simple for researchers. Manila, Philippines. Rex Bookstore, Inc.

Awan, R. U. N., Noureen, G., & Naz, A. (2011). A Study of Relationship between Achievement Motivation, Self Concept and Achievement in English and Mathematics at Secondary Level. *International Education Studies*, *4*(3), 72-79.

Basic Tools of Research: Sampling, Measurement, Distributions, and Descriptive Statistics. Chapter 6. Retrieved 21 July 2016 from http://www.cios.org/readbook/rmcs/ch06.pdf

Cassady, J. C., & Johnson, R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary educational psychology*, *27*(2), 270-295.

Csikszentmihalyi, M., & Wong, M. M. H. (2014). Motivation and academic achievement: The effects of personality traits and the quality of experience. In *Applications of Flow in Human Development and Education* (pp. 437-465). Springer Netherlands.

De Smedt, B., & Gilmore, C. K. (2011). Defective number module or impaired access? Numerical magnitude processing in first graders with mathematical difficulties. *Journal of experimental child psychology*, *108*(2), 278-292.

Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological science*, *16*(12), 939-944.

Emmanuel, A. O., Adom, E. A., Josephine, B., & Solomon, F. K. (2014). Achievement motivation, academic self-concept and academic achievement among high school students. *European Journal of Research and Reflection in Educational Sciences Vol*, *2*(2).

Fernandez, C., & Yoshida, M. (2012). *Lesson study: A Japanese approach to improving mathematics teaching and learning*. Routledge.

Geary, D. C. (2010). Mathematical disabilities: Reflections on cognitive, neuro-psychological, and genetic components. *Learning and individual differences*, *20*(2), 130-133.

Geary, D. C. (2011). Consequences, characteristics, and causes of mathematical learning disabilities and persistent low achievement in mathematics. *Journal of developmental and behavioral pediatrics: JDBP*, *32*(3), 250.

Golding, J. M. (2011). The Role of Attendance in Lecture Classes You Can Lead a Horse to Water…. *Teaching of Psychology*, *38*(1), 40-42.

Gottfried, M. A. (2010). Evaluating the relationship between student attendance and achievement in urban elementary and middle schools an instrumental variables approach. *American Educational Research Journal*, *47*(2), 434-465.

Heckhausen, H. (2013). *The anatomy of achievement motivation* (Vol. 1). Academic Press.

Ivancevich, J.M. (2001). Human resource management. New York, USA. McGraw-Hill

Ivancevich, J.M., Konopaske, R. and Matteson, M.T. (2008). *Organizational behavior and management.* United States. McGraw Hill; p 109

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook® and academic performance. *Computers in human behavior*, *26*(6), 1237-1245.

Lynn, R. (1969). An achievement motivation questionnaire. *British Journal of Psychology*, *60*(4), 529-534.

Maehr, M. L. (1974). Culture and achievement motivation. *American Psychologist*, *29*(12), 887

Maguin, E., & Loeber, R. (1996). Academic performance and delinquency. *Crime and justice*, 145-264.

Mega, C., Ronconi, L., & De Beni, R. (2014). What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *Journal of Educational Psychology*, *106*(1), 121.

McClelland, D. C. (1987). *Human motivation*. CUP Archive. Retrieved on July 8, 2016 from https://books.google.com.om/books?hl=en&lr=&id=vic4AAAAIAAJ&oi=fnd&pg=PR3&dq=achievement+and+motivation+theory+Book+by+david+mcclelland+&ots=Ar1Q1I00a5&sig=I4r54BJBrahR666-iK3srNGGSko&redir_esc=y#v=onepage&q=achievement%20and%20motivation%20theory%20Book%20by%20david%20mcclelland&f=false

MCCLELLAND, D. (2015). ACHIEVEMENT MOTIVATION THEORY. *Organizational Behavior 1: Essential Theories of Motivation and Leadership*, 46.

MCCLELLAND, D. (2015). ACHIEVEMENT MOTIVATION THEORY. *Organizational Behavior 1: Essential Theories of Motivation and Leadership*, 46.

McNeil, N. M., & Alibali, M. W. (2005). Why won't you change your mind? Knowledge of operational patterns hinders learning and performance on equations. *Child development*, *76*(4), 883-899.

Moore, R. (2003). Attendance and performance. *Journal of College Science Teaching*, *32*(6), 367-371.

Moore, R., Jensen, M., Hatch, J., Duranczyk, I., Staats, S., & Koch, L. (2003). Showing up: The importance of class attendance for academic success in introductory science courses. *The American Biology Teacher*, *65*(5), 325-329.

Moore, S., Armstrong, C., & Pearson, J. (2008). Lecture absenteeism among students in higher education: a valuable route to understanding student motivation. *Journal of Higher Education Policy and Management*, *30*(1), 15-24.

Murayama, K., Pekrun, R., Lichtenfeld, S., & Vom Hofe, R. (2013). Predicting long-term growth in students' mathematics achievement: The unique contributions of motivation and cognitive strategies. *Child development*, *84*(4), 1475-1490.

Onete, U., Edet, P. B., Udey, F. U., & Ogbor, B. P. (2012). Academic performance: A function of achievement motivation among education students of cross river university of technology, Calabar. *Review of Higher Education in Africa*, *4*.

Padmavathy, R. D., & Mareesh, K. (2013). Effectiveness of Problem Based Learning In Mathematics. *International Multidisciplinary e-Journal*, *2*(1), 45-51.

Schommer, M. (1993). Epistemological development and academic performance among secondary students. *Journal of educational psychology*, *85*(3), 406.

Shendell, D. G., Prill, R., Fisk, W. J., Apte, M. G., Blake, D., & Faulkner, D. (2004). Associations between classroom CO2 concentrations and student attendance in Washington and Idaho. *Indoor air*, *14*(5), 333-341.

Singh, K. (2011). Study of achievement motivation in relation to academic achievement of students. *International Journal of Educational Planning & Administration*, *1*(2), 161-171.

Singh, K., Granville, M., & Dika, S. (2002). Mathematics and science achievement: Effects of motivation, interest, and academic engagement. *The Journal of Educational Research*, *95*(6), 323-332.

Stanca, L. (2006). The effects of attendance on academic performance: Panel data evidence for introductory microeconomics. *The Journal of Economic Education*, *37*(3), 251-266.

Subong, P. E. Jr. (2005). *Statistics for research: Applications in research, thesis and dissertation writing, and statistical data management using spss software.* Manila, Philippines: Rex Bookstore.

Takeuchi, H., Taki, Y., Nouchi, R., Sekiguchi, A., Kotozaki, Y., Miyauchi, C. M., ... & Kunitoki, K. (2014). Regional gray matter density is associated with achievement motivation: evidence from voxel-based morphometry. *Brain Structure and Function*, *219*(1), 71-83.

Tall, D., & Razali, M. R. (1993). Diagnosing students' difficulties in learning mathematics. *International Journal of Mathematical Education in Science and Technology*, *24*(2), 209-222.

Toll, S. W., Van der Ven, S. H., Kroesbergen, E. H., & Van Luit, J. E. (2011). Executive functions as predictors of math learning disabilities. *Journal of Learning Disabilities*, *44*(6), 521-532.

Trumbull, E., & Rothstein-Fisch, C. (2011). The intersection of culture and achievement motivation. *School Community Journal*, *21*(2), 25.

Unite for Sight. Global Health university website. Retrieved on July 9, 2016 from http://www.uniteforsight.org/research-methodology/module2

Weber, K. (2005). Problem-solving, proving, and learning: The relationship between problem-solving processes and learning opportunities in the activity of proof construction. *The Journal of Mathematical Behavior*, *24*(3), 351-360.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological review*, *92*(4), 548.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary educational psychology*, *25*(1), 68-81.

Yusuf, M. (2011). The impact of self-efficacy, achievement motivation, and self-regulated learning strategies on students' academic achievement. *Procedia-Social and Behavioral Sciences*, *15*, 2623-2626.

Zakaria, E., Chin, L. C., & Daud, M. Y. (2010). The effects of cooperative learning on students' mathematics achievement and attitude towards mathematics. *Journal of social sciences*, *6*(2), 272-275.

Zaslavsky, O. (2005). Seizing the opportunity to create uncertainty in learning mathematics. *Educational Studies in Mathematics*, *60*(3), 297-321.

Curriculum Vitae of the Researcher

REYNALDO O. CUIZON, PhD
Mobile Number: 09212086018 (Philippines), 96973969 (Oman)

Reynaldo O. Cuizon is a PhD in Educational Leadership. He is a lecturer of Mathematics in the Faculty of Foundation Studies of Gulf College, Sultanate of Oman; a research panel (DOST, Philippines), and a member of the South East Asian Association for Institutional Research (SEA-AIR), and International Association of Scholarly Publishers, Editors, and Reviewers, Inc. (IASPER).

He was the director for Qualitative Research, member of the Quality Management Council and Internal Quality Audit Team, faculty of the Graduate School and the College of Teacher Education of the University of Mindanao, Philippines. He was a consultant of Plan International and World Food Program for Typhoon Pablo (Bopha) survivors, and Department of Education for K-12 book writing.

He authored books on Teaching Roles (2013), Principles of Teaching (2010), and published researches like Gross Domestic Product Forecasting Using Box-Jerkins Methodology (2014), Capability, Culture and Passion for Research (2010), and Cultural Practices of Sama Tribe and Community Based Forest Management (2007). He was awarded Best Research Presenter (2013), Filipino Researcher of the Year (2012), Globe's Best Oral Research Presenter (2012), and Most Publishable Research (2009) by IAMURE and Philippine Association for Institutional Research (PAIR), respectively.