

Academic Motivation among College Students with Math Anxiety: Basis for an Enhancement Program

Rosemarie M. Adao, Maureen B. Bueno, Jovelyn M. Persia, Lida C. Landicho

Psychology Department, College of Education, Arts and Sciences, Lyceum of the Philippines University
Batangas City, Philippines

Date Received: February 11, 2015; Date Revised: July 2, 2015

Abstract - *This study aimed to examine the academic motivation of the students who have fear or who are anxious in Mathematics at Lyceum of the Philippines University-Batangas. Five hundred fifty five (555) students randomly selected by the researchers answered the Math Anxiety questionnaire. Among them, one hundred (100) students are found to have Math Anxiety and those students become involved in the study. The study used quantitative questionnaire which are Math Anxiety Scale and Academic Motivation Scale. Findings revealed that the students with Math Anxiety are extrinsically motivated as identified and extrinsic motivation introjected in Course. Females are more motivated than males.*

Keywords: *academic motivation, math anxiety, gender, course, age*

INTRODUCTION

Mathematics education is a necessity in almost all careers especially in the fields of technology, commerce, science, and economics and other related living and learning aspects of life (Reyes & Castillo, 2015). Academic problems of college students come in various forms such as difficulty in math subject, lack of motivation and study habits, strict teachers and failed major examinations (Laguador, 2013a). Everyone is involved in shaping the values of the students towards an end of achieving the character and wisdom of a champion (Bulaklak & Pilobello, 2014). It cannot be denied that most of the prospective college students are unprepared for learning mathematics (Patena & Dingalasan, 2013). Mathematics Anxiety is prevalent among the college students population (Betz 1978) cited in the journal of 2007. In our school, many learners have already experience mathematics anxiety. The avoidance of mathematics and the decline in mathematics

achievement reported consequences of being anxious towards mathematics. The researchers observe that the feeling of tension and anxiety interfere with manipulation and solving the mathematical problems in a wide variety of ordinary life and academic situations (Suinn 1988). Many students who suffer from mathematics anxiety have little confidence in their ability to do mathematics and lead to take the minimum numbers of required mathematics courses which has greatly limited their career choice option. It is a common fact that most of the college students tend to choose courses on the basis that the particular course has less mathematics subjects and that the students tend to consider that mathematics is a very hard subject (Alday & Panaligan, 2013). Possessing the right attitude in solving math problems would help the students' motivation to solve more problems in a certain major examination and achieve higher grade than just obtaining passing grade (Laguador, 2013b).

It further contended that expectance motivation was a predictor of a mathematics achievement. This influence is understandable since students with high motivation usually enjoy doing mathematics, stick up problems until they are solved and become absorbed in their mathematical problem solving activities. On the other hand, academic performance is based on how an individual is anxious in solving mathematics. It tells when the student has high anxiety in mathematics, his/her performance in academic is low and sometimes it is a reason in career decision making of what course he has to take up.

OBJECTIVES OF THE STUDY

The main objectives of this study are: (1) to determine the respondent's Academic Motivation, (2) to correlate the Academic Motivation and selected Demographic Profile of the respondents in terms of sex, age, and course, and (3) to propose an action plan that will help the students in coping with their anxiety.

Theoretical Basis

Fishbein's Expectancy - Value Theory

Research on math anxiety has been limited by the lack of an integrative theoretical framework for conceptualizing relations among self-perception, affective, and performance variables (Reyes, 1984). The researchers based their study on expectancy-value theories of achievement motivation. Expectancy - Value Theory was originally created in order to explain and predict individual's attitudes toward objects and actions. Originally, the work of psychologist Martin Fishbein, states that attitudes are developed and modified based on assessments about beliefs and values. Primarily, the theory attempts to determine the mental calculations that take place in attitude development. Expectancy-value theory has been used to develop other theories and is still utilized today in numerous fields of study.

The framework shows the relation between Mathematics Anxiety, Academic Motivation and Demographic Profile (course, age, and Sex) among College Students in Lyceum of the Philippines University-Batangas and through this, the Action plan was proposed.

METHOD

The researchers conducted a study in order to determine the academic motivation among college students with math anxiety from Lyceum of the Philippines University-Batangas. This portion contains the research design, instruments used, and measures, subject of the study, data gathering procedure and data analysis.

Research Design

In the study conducted, the researchers used quantitative method in measuring the academic motivation from the students of LPU-Batangas with Math Anxiety. Quantitative method refers in which events can be quantified so that the data end up being numbers.

Participants

The researchers randomly choose participants from the 1st year and 2nd year students of Lyceum of the Philippines University- Batangas from different courses who are currently enrolled in Math subject and non-Math Subjects but it has Math concepts. Out of 555 students only 100 students participated.

The Demographic Profile based on Sex illustrated the number per sex of the participants involved in this study. It randomly chose participants with the total of

100. The male has percentage of 28 while the female has the highest percentage of 72.

The demographic profile based on age of the participants involved in this study has the total of 100 participants; the majority ranging from the age of 16 years old which is 45 percent of the participants. It is followed by the participants ranging from 17 years old which is 37 percent, 18 years old which is 8 percent, 15 years old which is 4 percent, 19 years old which is 3 percent, 24 years old which is 2 percent and lastly, ranging 1 percent from the age of 14 years old.

The demographic profile based on the course illustrate the program being taken by the participants involved in this study. As the objective requires that the participants should have mathematics subject in their curriculum in order to participate in the said research. The highest percentage of the participants came from the College of Allied and Medical Professions (CAMP) which has 31 percent. Followed by the College of International and Hospitality Management (CIHM) which has 30 percent, College of Education, Arts, and Sciences (CEAS) which has 17 percent, College of Business Administration and College of Computer Sciences which has the same percentage of 9. Lastly, students coming from the College of Dentistry (DDM) has 4 percent.

Procedure

The researchers submitted the questionnaires to the adviser for comments and suggestions regarding the format and item content. The adviser made suggestions about the questionnaires and it served as the guidelines before it was distributed to the target respondent.

The researchers composed a consent letter to students who were willing to participate in the said study. The researchers randomly chosen from 1st year and 2nd year students from different colleges who were currently enrolled in Math subjects and non-Math subjects but has Math concepts.

The researchers gave the questionnaire about Math Anxiety Scale to those students who were willing to participate. For the students who have found out with Math Anxiety, the researchers asked them if they are willing to answer another form of questionnaire which is Academic Motivation Scale.

Data Analysis

The data were analyzed through quantitative techniques. The researchers used standardized questionnaire. Math Anxiety Scale and Academic

Motivation Scale are both standardized questionnaire that the researchers used to measure the Academic Motivation of students with Math Anxiety. Statistical analysis was applied to compute the score from the questionnaire.

RESULTS AND DISCUSSION

Table 1. Means of the Subscales of Academic Motivation of Students with Math Anxiety

Variables	Mean
Intrinsic Motivation	
I.M to know	23.6800
I.M toward Accomplishment	21.6100
I.M to experience stimulation	20.7900
Extrinsic Motivation	
E.M identified	24.5600
E.M introjected	24.3400
E.M external Regulation	24.7100
A Motivation	8.4900

Note: IM=Intrinsic Motivation; EM= Extrinsic Motivation

Based from the computed mean, the highest Academic Motivation of the respondents with Math Anxiety is Extrinsic Motivation external regulation with the mean of 24.7100 while the lowest Academic Motivation with Math Anxiety is A Motivation with the mean of 8.4900.

Yee (2006) found out that students were extrinsically motivated to study mathematics, but the relationship between extrinsic motivation and

achievement was weak. However, there was a significant positive correlation between intrinsic motivation and achievement. This is contrary to the beliefs of many educators and parents in Singapore who believe in extrinsic rewards and punishments to encourage better achievement.

Note: the researchers did not found a study about academic motivation of Filipino Students with Math Anxiety.

The table 2 shows the Mean, frequency, p-value, eta², and the measure of significance using two tailed test. The subscale of Academic Motivation which is Intrinsic motivation to know shows a significance in Sex with the p-value of .001 It relates to several constructs such as exploration, curiosity, learning goals, intrinsic intellectuality, and finally the Intrinsic motivation to learn. (e.g., Gottfried, 1985) cited in the journal of 2010. It can be defined as the fact of performing an activity for the exploring, or trying to understand something new., in Intrinsic Motivation towards accomplishment shows also a significance in Sex with a p-value .057 it can be defined as the fact of engaging in an activity for the pleasure and satisfaction experienced when one attempts to accomplish or create something, while Extrinsic Motivation Identified shows a significance in Sex with the p-value of .004 it is the extents that the behavior becomes valued and judged important for the individual, and especially that it is perceived as chosen by oneself.

Table 2. Comparison of Math Anxiety and Academic Motivation when Grouped according to Sex (N = 100, $\alpha = 0.05$)

Variables	F	p-value	eta ²	Interpretation
Math Anxiety Academic Motivation	.850	.359	.009	Not Significant
I.M to Know	12.701	.001	.115	Significant
I.M Toward Accomplishment	3.695	.057	.036	Significant
I.M to experience stimulation	.940	.335	.009	Significant
E.M identified	8.890	.004	.083	Significant
E.M introjected	5.347	.023	.052	Significant
E. M External regulation	5.852	.017	.056	Significant
A Motivation	14.694	.000	.130	Not Significant

Note: I.M= Intrinsic Motivation; E.M= Extrinsic Motivation

Table 3. Comparison of Math Anxiety and Academic Motivation when Grouped according to Course (N = 100, $\alpha = 0.05$)

Variables	F	p-value	eta ²	Interpretation
Math Anxiety Academic Motivation	.546	.741	.028	Not Significant
I.M to Know	2.002	.085	.096	Not Significant
I. M Toward Accomplishment	.523	.758	.027	Not Significant
I.M to experience stimulation	.939	.459	.048	Not Significant
E.M identified	2.776	.022	.129	Significant
E.M introjected	2.579	.031	.028	Significant
E. M External regulation	1.919	.098	.093	Not Significant
A Motivation	1.784	.124	.087	Not Significant

Note: IM=Intrinsic Motivation; EM= Extrinsic Motivation

The internalization of extrinsic motives becomes regulated through identification, on the other hand the Extrinsic Motivation Introjected shows a significance in Sex with a p-value .023, the individual begins to internalize the reasons for his or her actions/ however, this form of internalization, while internal to the person, is not truly self-determined since it is limited to the internalization of past external contingencies and last the Extrinsic Motivation External Regulation also shows a significance in Sex with a p-value of .017 and the individual behavior is regulated through external means such as rewards and constraints. For correlation of Math Anxiety and Academic Motivation as to age, see on Appendix H because there is no significance relationship between the Academic Motivation of the students with Math Anxiety on Age.

Table 3 shows the Mean, Frequency, p-value, eta² and the measure of significance using two tailed test. The subscale of Academic Motivation which is Extrinsic Motivation Identified shows significance in Course with the p-value of .022. It is the extents that the behavior becomes valued and judged important for

the individual, and especially that it is perceived as chosen by oneself, and then the internalization of extrinsic motives becomes regulated through identification. On the other hand, the Extrinsic Motivation Introjected shows also significance in Course with the p-value of .031. It is the individual begins to internalize the reasons for his or her actions/ however, this form of internalization, while internal to the person, is not truly self-determined since it is limited to the internalization of past external contingencies. And the other subscales of academic motivation are not significant in course.

According to the research conducted a valuing of education, and an interest in learning. Academic motivation has been linked to various education outcomes across the age span, from early elementary school to college students. Pintrich and De Groot linked intrinsic motivation and autonomous forms of extrinsic motivation to positive academic performance. Student motivation has been found to be a predictor of course attendance, course grades, and persistence in program of the study.

Table 4. Proposed Program Design

Specific Objectives	Program	Target Persons	Responsible Persons	Incentives
To give more exercise/ practice and set of computation Of mathematics problems	Examination and Quizzes	Students with Math Anxiety	Department Chairman-Math	Medal Certificate Of Participation
To give tutorial and Remedial Classes	Special Class	Students with Math Anxiety	Department Chair and Math Teacher Counselling and Testing Center	
To include seminar and workshop	Seminar and Training	Students with Math Anxiety	(CATC), Department Chair-Math	Certificate of Participation

CONCLUSIONS AND RECOMMENDATIONS

The highest academic motivation of the respondents with Math Anxiety is Extrinsic Motivation External Regulation, its behaviour is regulated through external means such as rewards and constraints. Students with math anxiety are extrinsically motivated identified and extrinsically motivated introjected. And females are highly motivated than males. College of Education Arts and Sciences (CEAS) have the highest academic motivation among all colleges. Developing the students with the right attitude towards Mathematics as early as first year would prepare them to a more solid foundation of personality that they could be used as strong defence from all the challenges of the degree program they were enrolled (Laguador, 2013c).

It is recommended that Math professor should innovate the teaching of Mathematics to enhance the intrinsic motivation. Students must always be motivated by their teachers to have regular consultation who need more assistance and guidance (Laguador, 2013d). Male students should be given enough priority to make them interested and motivated to learn mathematics. The instructors and professors must improve more their teaching methods for the improvement of the learning of the students of Lyceum of the Philippines University-Batangas.

REFERENCES

- Alday, R.B. & Panaligan, A.B. (2013). Reducing Math Anxiety of CCS Students through E-Learning in Analytic Geometry, *Educational Research International*, 2(1): 76-90
- Bulaklak, E. M. & Pilobello, B. I. (2014). Observed Classroom Practices and Academic Behavior in Physical Education 1 of Freshman Psychology and Education Students, *Asia Pacific Journal of Education, Arts and Sciences*, 1(5), 144-148
- Laguador, J.M. (2013a). Academic Problems and Negative Attitude of Engineering Students towards Engineering Program, *International Journal of Management, IT and Engineering*, 3(7): 495-505
- Laguador, J.M. (2013b). Freshman Computer Engineering Students' Attitude Capability in Solving Solid Mensuration Major Exam Problems, *International Journal of Social Science & Interdisciplinary Research*, 2(9): 1-11
- Laguador, J. M. (2013c). Students' Interest in Engineering and Average Final Grade in Mathematics as Factors in Program Retention, *IAMURE International Journal of Multidisciplinary Research*, 5, 72-86, doi: <http://dx.doi.org/10.7718/iamure.v5i1.615>
- Laguador, J.M. (2013d). Engineering Students' Level of Study Habits and Factors Affecting Them, *International Journal in IT and Engineering*, 1(3): 1-13
- Patena, A.D., Dingalasan, B.L.H. (2013). Students' Performance on Mathematics Departmental Examination: Basis for Math Intervention Program, *Asian Academic Research Journal of Social Science & Humanities*, 1(14): 255-268
- Reyes, M. D. & Castillo, A. C., (2015), Test Anxiety and College Students' Performance on Mathematics Departmental Examination: Basis for Mathematics Achievement Enhancement, *Asia Pacific Journal of Education, Arts and Sciences*, 2 (1), 62-69
- Yee, Lim S, (2006). Mathematics Attitudes and Achievement of Junior College Students in Singapore. Retrieved September 16, 2012 from www.merga.net.au/documents/MERGA33_Lim.pdf