Computer Utilization and Mathematical Achievement among College Students of Samar State University

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***Abstract*—** This study attempted to investigate to find out whether there exists a relationship between the level of computer utilization of the student- respondents and their level of achievement in mathematics. The student – respondents were the 349 college students chosen using stratified random sampling using degree program pursued as the basis for the stratification from the SSU during the school year 2013 – 2014. The study utilized a descriptive – correlational research design, used a constructed survey questionnaire as the principal data gathering instrument. Another instruments was the pre- validated 60 items mathematics achievement test taken from books which is used to measure the students achievement in logic, geometry, algorithm, mathematical analysis, probability and statistics, and discrete mathematics. The validation was conducted in order to determine whether the test items adapted from the books were suited to the level of the mathematical ability of the respondent to the students in EVSU Tacloban City and after the administration of the first and second administration of the questionnaire and the tests the correlation coefficient was computed and was posted at 0.886, which indicated that the test was both reliable and valid. Descriptive as well as inferential statistical tools were used to compute, analyse and interpret the data of the study. These statistical tools used were frequency count, percentage, mean, range, weighted mean, Pearson Product moment Coefficient of Correlation (Pearson r) and Fisher's t – test. Based on the data analysis results revealed that 1) the respondents' possess characteristics, which are present in college students enrolled in degree programs in colleges in Samar State University (SSU) Catbalogan City, Samar in terms of age, sex, average family income, etc. 2) the respondents are moderately knowledgeable as to basic computer concepts, moderately skilled in computer utilization, utilized computer on average of three times a week and used computers both for math related learning and other used. 3) respondents have "good" mathematics achievement based on the 60 items test. 4) computer utilization of the respondents is not significantly related to their mathematics achievement. 5) The computer utilization of the respondents and the varieties reveal significant relationships for some of the varieties such as for knowledge of basic computer concepts, degree program pursued and mathematics subjects taken are significantly related; possession of the respondents of basic computer skills in related to computer attitudes as measured by computer anxiety, computer confidence, computer liking and computer usefulness; frequency of utilization is related to average family income, educational attainment of the father, degree program pursued, average grade in math, and number of computer subjects taken. The type of computer utilization is related to average family income and degree program pursued. 6) The respondents math achievement is related to average family monthly income, degree program pursued, mother educational attainment, and number of math subjects.

***Keywords*—** computer utilization, college students, mathematics achievement**.**

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I. Introduction

Nowadays, computers are fast becoming a standard resource in communication, transportation, business, medicine and education with an increasing utilization and reliance on computers, residential networks and access to the internet by people. Consequently, the invasion of computers has created higher expectations in people's lives, from how they communicate with other people to how they are educated in school.

Inevitably, the ability to use a computer has become as much an expectation of adult society as the ability to read and write. Thus, every sector of society supports an increasing demand for people with knowledge and aptitude for modern technology (Judy and D' Amico, 1998 24). It is important, then, for people of today to gain the necessary knowledge, which will allow them to use a computer with some proficiency. This expectation is extended to the educational institution – that is, administrators, teachers and students are expected to gain a certain degree of computer proficiency.

This necessities focusing attention on the school's capacity to provide updated and responsive education to students amid an increasing demand to integrate computer technology, which needs immediate attention. Computer technology is a must especially in updating instructional materials, teaching strategies and even in developing more convenient and speedier day – to – day operations of the educational institution – from enrolment to assessment of fees, to payment of fees and to library automation.

This aspiration finds support from the United States National Council of Teachers of Mathematics (US – NCTM), which stated that technology is essential in teaching and learning and its influences mathematics that is taught and enhances students' learning (Leongson and Limjap, 2003: 1)

In responding the challenge, the Philippines' Commission on Higher Education (CHED) established the Long Term Higher Education Development Plan (LTHEDP) from 2001 to 2010 based on recommendations from the recent studies brought about by economic and technological changes in global scale. The LTHEDP served for the educators to re – engineer the educational system toward excellence and quality, access and equity, relevance and responsiveness, efficiency and effectiveness (Long Term Higher Education Development Plan 2001 – 2010, Ogena, Foreword).

Information and Communication Technology (ICT) has reshaped the educational landscape especially on how educational institution should operate including how subjects like mathematics should be taught with technology offered by computers, CD – ROM, video tapes, satellites and various

audio visual equipment which complement, and supplement traditional print education materials and methods.

This aspiration to integrate computer technology in education implies that the benefits of computer literacy should be captured more effectively in the field of education at all levels since there is an alarming observation that Filipino students are lagging behind their Asian counterparts. In facts, there is a strong perception that the students excel in knowledge acquisition but fare considerably low in lessons requiring higher order thinking skills (Leongson and Limjap, 2003. 1).

This sorry state in Philippine education is evident in the performance of students in national and international surveys in mathematics, as indicated in the 2000 National Secondary Achievement Test (NSAT), which revealed that students gave correct answers to less than fifty percent of the questions in mathematics. Similarly, in the May 2004 High School Readiness Test, grade six graduates of public elementary schools in the registered low scores in the mathematics test (deped-rsd@pacific.net.ph).

Alarmed at such a disappointing situation, educators encouraged researches to address the problem on low academic performance of students. These researches have focused attention, however, on structural factors such as the capacity of the school to provide adequate textbooks, and the adequacy of physical facilities such as classrooms and equipment and laboratories (Leongson and Limjap, 2003: 1).

What they failed to emphasize is the importance of re-engineering the educational system by integrating computer technology in education in education through the development of computer – aided instructional materials and other related computer applications. The apprehension for such integration may come from the fact that it would necessitate a certain degree of computer proficiency on the parts of the administrators, teachers and students through frequent utilization of computer.

Meanwhile, it will not require a study to make an observation that the utilization of computer by the students is limited to internet usage in terms of chating, facebook, e – mailing, twitter, instagram, snapchat, video games and exploring the internet for non – educational purposes. In order to capture the productive output of computer utilization, education stakeholders should ensure that it should be applied to worthwhile educational purposes such as its application to the study of mathematics, specifically in the areas of logic, algorithm, mathematical analysis, probability and statistics, geometry and discrete mathematics.

Students who are taking up mathematics subjects face the challenge of possessing not only knowledge of the subject matter but also the application of said knowledge of the subject matter but also the application of said knowledge to other domains or field of study, including learning computers in subjects such as Statistics which is requires the use of Microsoft Excel, Statistical Package for Social Science (SPSS) and other application programs like R program. It is this for reason that a question as to whether there is a significant relationship between computer utilization and mathematics achievement become of interest to the researcher.

The researcher, being an instructor in Mathematics, wanted to determine the possibility of a relationship between computer utilization and the students' mathematical achievement. Inasmuch as there is as yet no prior study on the extent of influence computer utilization has on the students' mathematics achievement in Samar State University (SSU), Catbalogan City, Samar, the researcher has no factual evidence on the possible link between the two varieties. However, the researcher was able to gather data on the mean of computer subjects taken by some students and the mean of the mathematics subjects taken by the same students.

As far as the Bachelor of Science in Computer Engineering (BSCE) students are concerned, the mean of the grades in mathematics subjects of the third year students was posted at 3.0 or 75 whereas the mean of the grades in computer subjects taken was posted at 2.3. In like manner, the Bachelor of Science in Information Technology (BSITech), third year students had a mean for their mathematics subjects taken posted at 2.4 while the mean for computer subjects posted at 2.3.

The data of the mean of the grades in mathematics subjects taken and computer subjects show a fluctuation – that is, either the mean in mathematics subjects is higher than that of the computer subject, and conversely. Since there is as yet no prior study which would show whether there is a significant relationship between computer utilization and mathematics achievement of college students of Samar State University, the researcher conceived of this investigation to provide baseline information on the possible influence computer utilization has on students' Mathematics achievement.

Statement of the Problem

The study determined the relationship between computer utilization of college students in Samar State University (SSU), Catbalogan City, Samar, and their achievement in Mathematics for the school year 2013 – 2014.

Specifically, this sought answers to the following questions:

1. What is the profile of the college students enrolled during the school year 2013 – 2014 in Samar State University (SSU), Catbalogan City, Samar in terms of the following:
1.1 age and sex;
1.2 average family income per month;
1.3 Parents educational attainment;
1.4 Degree program pursued;
1.5 Mathematics subjects taken;
1.6 Computer subjects taken;
1.7 Relevant computer training and seminars attended and
1.8 attitude towards computer?

2. What is the level of computer utilization of the student – respondents' based on the following:
2.1 knowledge of basic computer concepts;
2.2 possession of computer skills;
2.3 frequency of utilization, and
2.4 type of utilization?
3. what is the level of mathematical achievement of the students – respondents along the following areas:
3.1 logic;
3.2 geometry;
3.3 algorithm;

3.4 mathematical analysis;
3.5 probability and statistics and discrete mathematics?
4. Is there a significant relationship between the students – respondents' computer utilization and their mathematics achievements?
5. is there a significant relationship between the students – respondents' computer utilization and each of the following variates:
5.1 age and sex;
5.2 average family income per month;
5.3 parents' educational attainment;
5.4 degree program pursued;
5.5 Mathematics subjects taken;
5.6 computer subjects taken;
5.7 relevant computer training and seminars attended, and
5.8 attitude towards computer?
6. Is there a significant relationship between the level of mathematics achievement of the student – respondents' and each of the following variates:
6.1 age and sex;
6.2 average family income per month;
6.3 parents' educational attainment;
6.4 degree program pursued;
6.5 Mathematics subjects taken;
6.6 computer subjects taken;
6.7 relevant computer training and seminars attended, and
6.8 attitude towards computer?
7. What implications for improvement in mathematics curriculum may be derived from the finding of this study?

Hypotheses

The following hypotheses were tested in this study:

1. There is no significant relationship between the student – respondents' computer utilization and their mathematics achievement.
2. There is no significant relationship between the student – respondents' computer utilization and each of the following variates:

2.1 age and sex;
2.2 average family income per month;
2.3 parents' educational attainment;
2.4 degree program pursued;
2.5 Mathematics subjects taken;
2.6 computer subjects taken;
2.7 relevant computer training and seminars attended, and
2.8 attitude towards computer.

3. There is no significant relationship between the level of mathematics achievement of the student – respondents and each of the following variates:
3.1 age and sex;
3.2 average family income per month;
3.3 parents' educational attainment;
3.4 degree program pursued;
3.5 Mathematics subjects taken;
3.6 computer subjects taken;
3.7relevant computer training and seminars attended, and
3.8 attitude towards computer.

Methodology

The Respondents of the Study

This investigation about the relationship between computer utilization and achievement in mathematics involved third, fourth and fifth year students of the College of Education, College of Arts and Sciences, College of Industrial Technology, College of Engineering and College of Nursing of Samar State University (SSU) main Campus, and the college of fisheries and Marine Sciences of Samar State University (SSU) Mercedes Campus, enrolled during the school year 2013 – 2014. As respondents. The study did not include first and second year college students in the sense that for some of the courses such as Bachelor of Secondary Education and bachelor of Elementary Education, the students are not yet taking up higher mathematics subjects such as logic, algorithm, discrete mathematics and computer subjects.

To determine the sample size out of the total student population, Sloven's formula(Santos, et al1998. 11). The student – respondents of the study were the 349 college students chosen using stratified random sampling using degree program pursued as the basis for the stratification from the Samar State University (SSU) during the school year 2013 – 2014.

Research Design

The study utilized a descriptive – correlational research study design to determine the relationship between the students' level of computer utilization and their level of mathematics achievement.

The descriptive method was used to explain the personal characteristics of the respondents of the study in terms of their age and sex, average family income per month, parents educational attainment, degree program pursued, mathematics subject taken, computer subject taken, relevant computer trainings and seminars attended, and attitude towards computer, student – respondents' level of computer utilization in terms of their knowledge on basic computer concepts, possession of computer skills, frequency of utilization, and type of utilization, and their level of mathematical achievement along logic, geometry, algorithm, mathematical analysis, probability and statistics, and discrete mathematics.

Correlational analyses were made to determine the relationships between (a) the student – respondents' computer utilization and their mathematics achievement, (b) the student – respondents' computer utilization and their personal variates such as their age and sex, average family income per month, parents educational attainment, degree program pursued, mathematics subject taken, computer subject taken, relevant computer trainings and seminars attended, and attitude towards computer, and (c) the level of mathematics achievement of the student – respondents' and their personal variates.

The student – respondents' level of computer utilization was determined in terms of four indicators, namely, (a) knowledge on basic computer concepts, (b) possession of computer skills, (c) frequency of utilization, and (d) type of utilization.

The level of mathematical achievement was determined through the students' scores in the Mathematics Achievement Test inclusive of six areas, to wit: (a) logic, (b) geometry, (c)

algorithm, (d) mathematical analysis, (e) probability and statistics, and (f) discrete mathematics.

Research Instrument

To obtain the needed data of this study used a constructed survey questionnaire as the principal data gathering instrument. Another instruments was the pre- validated 60 items mathematics achievement test taken from books which is used to measure the students achievement in logic, geometry, algorithm, mathematical analysis, probability and statistics, and discrete mathematics. The validation was conducted in order to determine whether the test items adapted from the books were suited to the level of the mathematical ability of the respondent to the students in Eastern Visayas State University (EVSU) Tacloban City and after the administration of the first and second administration of the questionnaire and the tests the correlation coefficient was computed and was posted at 0.886, which indicated that the test was both reliable and valid.

Statistical Tool

Descriptive as well as inferential statistical tools were used to compute, analyse and interpret the data of the study. These statistical tools used were frequency count, percentage, mean, range, weighted mean, Pearson Product moment Coefficient of Correlation (Pearson r) and Fisher's t – test.

Data Gathering Procedure

The researcher started gathering the needed data by requesting permission from the President of the Samar State University (SSU), Catbalogan City, Samar follow her the conduct of the study among college students. Upon his approval, the researcher got the list of enrolees per college from the University Registrar Office, inclusive of school year 2013 – 2014, to proceed with the sampling of the respondents of the study.

Then, the researcher communicated with the deans of the different colleges to ask for permission to conduct the study among the students of their respected colleges. After their approval was obtained, the researcher distributed the questionnaire as well as the Mathematics Achievement Test among the respondents, hopefully, during their classes to ensure the presence of the respondents during the data collection period. The respondents were given considerable amount of time to answer the instruments of the study. After which, the researcher personally retrieved the answered instruments to ensure 100 percent retrieval.

Before proceeding with the tallying of the data, the researcher went over the student – respondents' permanent records at the University Registrar's Office to get information about their mathematics as well as computer subjects taken.

Finding

The following were the salient findings of the study:

1. The student – respondents are characterized by having a mean age of 20.08 years old, majority of them are females, with average income of Php. 9,240.00, having parents who are at least high school graduates enrolled in different courses offered in SSU, taking the math subjects specified in their curriculum pursued, have computer subjects as specified in their curriculum and majority of them had no training in computers excepts those who are taking courses related to computers and those with applications of computers in their course. The respondents are slightly anxious towards computers, as indicated by the mean rating of 3.92 and highly confident based on the obtained mean value of 4.00 liked much computers as indicated by the mean obtained of 3.79 and perceived computers as very useful as indicated by the mean obtained of 4.02.

2. Students' level of computer utilization in terms of knowledge of basic computer concepts the mean score obtained is eight out of the 20 items interpreted as moderately knowledgeable. As possession of basic computer skills, the respondents obtained a mean of 3.16 interpreted as moderately skilled. As to frequency of utilization the obtained mean is 3.15 interpreted as frequent as three times a week; as to type of utilization the obtained mean is 4.00 interpreted as moderately useful.

3. The students respondents level of math achievement along the following areas based on the mean obtained for the ten items test for each area are: logic – 3, geometry – 5, algorithm – 5, math analysis – 5, probability and statistics – 5, and discrete math – 5.

4. The relationship between mathematics achievement and the respondents' computer utilization are as follows;

4.1 For math achievement and knowledge of basic computer concepts the computed r = -0.0688 and the computed t = -1.285, the relationship is not significant;

4.2 For math achievement and possession of basic computer skills, the computed r = - 0.0224 and the computed t – value is -0.417, the relationship is not significant based on the computed t – value;

4.3 For math achievement and frequency of utilization, the computed r = 0.0389 with the computed t – value of 0.7259, this t – value is not significant.

4.4 For math achievement and type of computer utilization, the computed r – value is 0.0075 and the computed t – value of 0.1398, this r – value is not significant based on the computed t – value.

5. The relationship between respondents' computer utilization and student – related variates give the following results:

5.1 The relationship between knowledge of basic computer concepts and the variates. For the variates age, sex, educational attainment of the parents, relevant computer training attended, and attitudes of the respondents towards computers with respect to computer anxiety, computer confidence, computer liking and computer usefulness obtained an r – value which is computed t – value is less than the critical t – value which is interpreted as not significant relationships. For the variates – average family monthly income, degree program pursued, mathematics subjects taken and computer subjects taken by the respondents, the obtained r – value are -0.1730 for degree program and -0.1719 for math subjects taken, these r – value have the following corresponding t – value 3.2724

and -3.2724 which is absolutely value is greater than the critical t – value of 1.96 at 0.05 level of significance, with df = 347(two- tailed), this shows that these two variates are significant;

5.2 The relationship between possession of the respondents of basic computer skills and the variates which is significantly related to the possession of the respondents of the basic computer skills is attitudes of the respondents with respects to computer anxiety, computer confidence, computer liking, and computer usefulness, the obtained r – value are0.3984, 0.4371, 0.3768 and 0.4011 respectively, which corresponding t – value obtained are 8.0917, 9.05772, 7.5722 and 8.1567, the t – value are higher/greater than the critical t – value of t – value of 1.96, $\alpha = 0.05$ at df = 347(two –tailed);

II. Conclusions

The following conclusions were based on the findings of the study:

1. The respondents' possess characteristics, which are present in college students enrolled in degree programs in college in Catbalogan City, Samar in terms of age, sex, average family income, etc.
2. The respondents are moderately knowledgeable as to basic computer concepts, moderately skilled in computer utilization, utilized computers on the average of three times a week and used computers both for math related learning and other used.
3. The respondents have good mathematics achievement based on the 60 items test.
4. The computer utilization of the respondents is not significantly related to their mathematics achievement.
5. The computer utilization of the respondents and the varieties reveal significant relationships for some of the varieties such as for knowledge of basic computer concepts, degree program pursued and mathematics subjects taken are significantly related; possession of the respondents of basic computer skills in related to computer attitudes as measured by computer anxiety, computer confidence, computer liking and computer usefulness; frequency of utilization is related to average family income, educational attainment of the father, degree program pursued, average grade in math, and number of computer subjects taken. The type of computer utilization is related to average family income and degree program pursued.
6. The respondents math achievement is related to average family monthly income, degree program pursued, mother educational attainment, and number of math subjects.

III. Recommendations

The following are the recommendations based on the findings of the study:

1. There is a need for the teacher/instructor teaching computers to see to it that the students should at least know the basic knowledge of computer concepts and have basic computer skills.
2. Mathematics teachers/instructor should give exercises/lessons utilizing the computer to free their students to be able to utilized computer thus they will acquire knowledge and possess skills for utilizing computers.
3. Computers teachers/instructors should assess the knowledge of their students in basic computer concepts and also assess them as to possession of basic computer skills so that their students will have no anxiety, develop self- confidence toward computer utilization and should guide them in their type of computer utilization and frequency of utilization.
4. Computers teachers/instructors should see and talk with the parents of their students as to working together for enhance performance in computer utilization of the students.
5. Mathematics teachers/instructors should consider their students computer knowledge and skills before giving them problems in which they will use the computers. This will lead to students' letting others solve for their math problems if they don't know how to use the computer to solve their problem.
6. The Internet Hub in which students have internet account should program the students' utilization of their computer time, and should assess the students in their computer utilization just in case, they need assistance.
7. All teachers should encourage students to utilized computer since, this technology is available and to be competitive in their study and future works, they have to learn to utilized the computers, however, they should be cautioned of all the ill – effects of these media.
8. Another research should be conducted to validate the findings of the study.

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