

**EXTENT OF TECHNOLOGY INTEGRATION IN TEACHING
STATISTICS: ITS IMPLICATION TO STUDENTS'
ACHIEVEMENT**

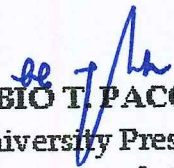
**A Thesis
Presented to
The Faculty of College of Graduate Studies
Samar State University
Catbalogan City**

**In Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Teaching
Major in Mathematics**

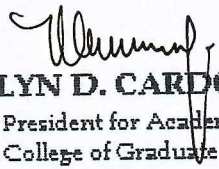
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
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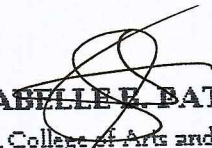

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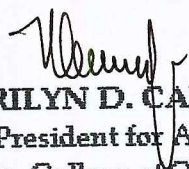

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ACKNOWLEDGMENT

I thank all those who in one way or another contributed in the completion of this thesis. First and foremost, I give thanks to God for protection and ability to do work

I would like to express my deepest gratitude to my adviser, Dr. Eusebio T. Pacolor, whose expertise, understanding, and patience, added considerably to my graduate experience.

I would like to thank the other committee members, Dr. Florabelle B. Patosa, Dr. Jose S. Labro and Dr. Ronald L. Orale for the assistance they provided at all levels of the study.

A very special thanks goes out to Dr. Marilyn D. Cardoso, whose motivation, encouragement and challenges brought this work towards a completion. Dr. Cardoso is the one who truly made a difference in my life. It was under her guidance that I developed focus and became interested in vision and human factors. She provided me with direction, technical support and became more of mentor, friend, and mother, than a professor and a superior. It was through her persistence, understanding and kindness that I completed my graduate degree. I doubt that I will ever be able to convey my appreciation fully, but I owe her my eternal gratitude.

I would like to thank Dr. Redentor S. Palencia, for taking time out from his busy schedule just to share his insights and expertise in doing research.

A special thanks to **Dr. Lanie M. Pacadaljen**, for unending support extended to me and serve as my external reader despite her busiest schedule.

Appreciation also goes out to **Prof. Nathalie Ann C. Alaga**, **Prof. Julita Dela Cruz**, and **Prof. Arriane Rose Tafalla** for encouragement and editing assistance.

Thanks also goes out to **Prof. Mae V. Canal**, for her suggestions, advises, encouragement, and generosity.

I am also grateful to **Ms. Jane Mendiola**, a special friend of mine, for giving me assistance and unending support during my data gathering at **SSU-Mercedes campus**.

My deepest gratitude to **Northwest Samar State University** for allowing me in the conduct of validation of my instrument, more specifically to **Madam Roa**.

I am also deeply thankful to my informants. Their names cannot be disclosed, but I want to acknowledge and appreciate their help and transparency during my study. Their information have helped me complete this thesis.

My deepest thanks to my ever dearest family for the support they provided me through my entire life and in particular, I must acknowledge my precious gems: **my husband and children**, without whose love and inspiration, I would not have finished this thesis.

Emma

DEDICATION

I dedicate this thesis to my family, especially...

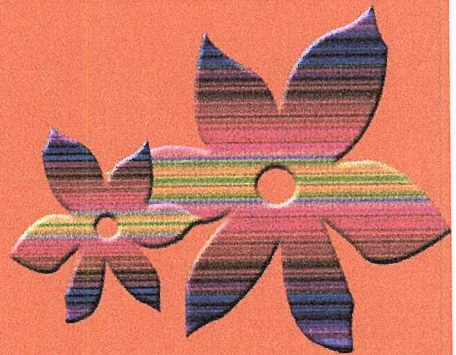
To **Oliver** for the love, care, and patience;

To **Francis Leonard and Emman Jade** for they are my
source of strength and inspiration;

To **Nanay and Tatay** for instilling the importance of hardwork;

To **Eday, Encie, Manoy, Baby, Nonoy and Intoy** for being there
for me in good and bad times.

EMMA



ABSTRACT

This study determined the extent of technology integration in teaching selected topics in Basic Statistics and its implication to students' achievement during first semester, SY 2014-2015. The study utilized the descriptive-correlational research design using the questionnaire as the main data gathering instrument. The students' achievement level revealed a mean of 70.00 with a standard deviation of 4.31. The result of the correlational analysis between the students' achievement level and their course profile registered a correlation coefficient of 0.225. When tested for its significance using p-value, the p-value (sig.) was pegged at 0.003 which was lesser than the level of significance of 0.05. Thus, the hypothesis involving relationship between these two variables was rejected. Meanwhile, between students' achievement level and the rest of the students' profile were accepted. The students' achievement level did not correlated significantly with age, sex, year level, attitude towards ICT, ICT literacy, extent of ICT utilization, and availability of personal computer. This means that the students' achievement level was not affected by the abovementioned students' profile variates. Meanwhile, students' course correlated significantly. This further means that those students enrolled in non-technical courses had high level in achievement in statistics, while, those students enrolled in technical courses tend to have low achievement level. This implies, that students in non-technical courses focuses more in the academic subjects or have more mathematics subjects offered than those in technical courses, moreover, those students in technical courses focuses more in the manual content-learning target.

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Chapter 1

THE PROBLEM AND ITS SETTING

Introduction

In the advent of technology and its gaining popularity in the 21st century, it is hard to imagine teaching statistics today without using some form of technology.

Indeed, technology has led to numerous changes in statistical practice. Many problems that were previously intractable analytically now have approximate solutions, many assumptions that were made so that statistical models could be simplified and usable no longer need to be made. For example, an entire “resampling statistics” (Good, 2006) now competes with model-based inferential models in practice, while appearing more intuitive to students (http://www.amstat.org/education/gaise/GAISEPreK-12_Full.pdf). Another example is the use of statistical tables such as the z and t tables, which are no longer needed to determine rejection regions or estimate p -values when statistical software and calculators produce more accurate results much more quickly. In fact, many statistics educators now argue that previously standard topics in an introductory course (e.g., short-cut methods for calculating standard deviation) are no longer necessary to discuss in class. Finally, technology provides ways for us to visualize and explore data that have led to new methods of data analysis.

Moreover, Chance, et al (2007), pointed out that technology expanded the range of graphical and visualization techniques to provide powerful new ways to assist students in exploring and analyzing data and thinking about statistical ideas, allowing them to focus on interpretation of results and understanding concepts rather than on computational mechanics (https://www.dartmouth.edu/~chance/teaching_aids/IASE/IASE.book.pdf). He also stated that technology revolution had a great impact on the teaching of statistics. This is not surprising, given that technology has changed the way statisticians work and has therefore been changing what and how to teach. The Guidelines for Assessment and Instruction in Statistics Education (GAISE) curriculum framework for Pre K-12 states that "advances in technology and modern methods of data analysis of the 1980s, coupled with data richness of society in the information age, led to the development of curriculum materials toward introducing statistical concepts into the school curriculum as early as the elementary grades. Moreover, GAISE directly recommends the use of technology for developing understanding of statistical concepts and analyzing data in teaching statistics.

However, technology has an impact on education only if it is used appropriately. That is, effective utilization requires thoughtful and deliberate planning as well as creativity and enthusiasm. It is important to remember that the focus of instruction should remain on the content and not the tool, and to

choose technology that is most appropriate for the student learning goals, which could involve a combination of technologies.

Furthermore, though research supports the use of technology to facilitate and improve the learning of statistical concepts, Chance et al (2007) cautions that statistics educators need a system to critically evaluate existing software from the perspective of educating students and to produce future software more adequate both for learning and doing statistics. He pointed out that while technology allows for more student-driven and open-ended explorations, this may not happen right away, as student's first need to become familiar with the tool and how to use it. Sometimes students become overwhelmed or lost in the details of the instructions or programming commands and do not see the bigger statistical ideas being developed. For example, in exploring sampling distributions, they focus on how many trials to include in the simulation rather how the sample size affects the resulting empirical distributions. Teachers therefore need to carefully structure explorations so that even while learning to use software, students are able to focus on the concepts rather only paying attention to the technology or blindly following a list of commands. In this way, students may discover and construct meanings for the big ideas of statistics as they are guided through the series of investigation. Without this careful guidance, students may only be paying attention to the software and not to the statistical problem or content (Collins, Brown, & Newman 1989).

Meanwhile, integration of technology into teaching has many reasons to consider. Morehead and La Beua (2008) pointed that the greatest inhibitor to technology integration is time. It takes many hours of use and planning to learn the possibilities of a computer software application and have time to explore possibilities for integration, that is, teachers' knowledge of the software application is limited consequently; applying it to a meaningful learning context in the classroom is a difficult task. It is a process that needs direction and support and must have a collaborative effort using the combined knowledge base of classroom teachers, administrators, curriculum support personnel and technology facilitators. Therefore, lack of support, time, leadership, and collaboration and knowledge of the curriculum content leads to lack of efficacy teachers has regarding how to integrate technology into the classroom.

Moreover, Brush (2006) revealed that the lack of specific technology knowledge and skills, and technology-related-classroom management knowledge and skills has been identified as a major barrier to technology integration. In addition to the lack of technology knowledge and skills, teachers are unfamiliar with the pedagogy of using technology (Hughes, 2005). According to him, teachers need to have a technology-supported-pedagogy knowledge and skills base, which they can draw upon when planning to integrate technology into their teaching. He classified technology-supported-pedagogy into three categories in which technology functions as: 1) replacement which involves technology serving as different means to the same instructional goal; 2)

amplification which involves the use of technology to accomplish tasks more efficiently and effectively without altering the task, and finally, 3) transformational which has the potential to provide innovative educational opportunities by recognizing students' cognitive processes and problem-solving activities.

Wiggins and McTighe (cited by Morehead and La Beua, 2004) stated that the evolution of technology created other challenges for teachers as they struggled to keep them with the speed of technology changes. That, the evolution of the computer, the demands of society, the school community, and the political control of education by textbook companies blurred the teachers' conceptions of the purpose of technology in teaching.

Another inhibitor of technology use was the problem of the technology in classrooms and laboratory failing to function (Becker, 2004). According to him, teachers did not have the knowledge to make repairs, and computers sat lifeless.

In connection to the different concepts of technology integration for instructional purposes that were presented, the largest problem that remains in education today is connecting technology to curriculum content and to the learning processes. Indeed statistics is an important component in the general education courses of higher education programs as it plays a vital role in the goal of developing competent professional who can take active roles in the generation, communication and expansion of knowledge through research in their respective fields. As universities are expected to produce through research

the necessary knowledge-base upon which the socio-economic, scientific and technological systems of professionals of the country are grounded, it is important to develop well-informed and statistically competent professionals through a coherent statistics education.

Hence, the researcher was challenged to examine the extent of technology integration by the teachers in teaching selected topics in Basic Statistics relative to students' achievement level in Samar State University to be able to design learning experiences that effectively integrate technology in building conceptual understanding of statistical concepts.

Statement of the Problem

This study determined the extent of technology integration in teaching selected topics in Basic Statistics and its implication to students' achievement during first semester, SY 2014-2015.

Specifically it sought to answer the following questions:

1. What is the profile of the teachers teaching Basic Statistics along:
 - 1.1 Demographic characteristics
 - 1.1.1 age;
 - 1.1.2 sex;
 - 1.1.3 civil status;
 - 1.1.4 average family monthly income;
 - 1.2 Professional characteristics

- 1.2.1 academic degree obtained;
- 1.2.2 teaching experience;
- 1.2.3 seminars/trainings attended related to teaching statistics;
- 1.2.4 attitude towards ICT;
- 1.2.5 ICT literacy
- 1.2.6 workload and number of preparation
- 1.2. extent of ICT utilization;
- 1.3 environmental characteristics;
 - 1.3.1 availability of internet;
 - 1.3.2 computer-student ratio;
 - 1.3.3 statistical software utilized;
 - 1.3.4 other technology infrastructure, and
 - 1.2.5 other IMs used?
- 2. What is the profile of students in Basic Statistics along:
 - 2.1 age;
 - 2.2 sex
 - 2.3 course;
 - 2.4 year level;
 - 2.5 attitude towards ICT
 - 2.6 ICT literacy;
 - 2.7 extent of ICT utilization, and

2.8 availability of personal computer?

3. What is the extent of technology integration by the teachers in teaching selected topics in Basic Statistics?
4. Is there significant relationship between the extent of technology integration by the teachers in selected topics in Basic Statistics and their profile variates?
5. What is the students' achievement level in selected topics in Basic Statistics?
6. Is there a significant relationship between the students' achievement level on the selected topics in Basic Statistics and their profile variates?
7. Is there significant relationship between the teachers' extent of technology integration in teaching selected topics in Basic Statistics and the students' achievement level?
8. What implications can be derived from the findings of the study?

Hypotheses

The following hypotheses were tested in the study.

1. There is no significant relationship between the extent of technology integration by the teachers in selected topics in Basic Statistics and their profile variates?

2. There is no significant relationship between the students' achievement level on the selected topics in Basic Statistics and their profile variates?

3. There is no significant relationship between the teachers' extent of technology integration in teaching selected topics in Basic Statistics and the students' achievement level?

Theoretical Framework

This study takes firm hold on the Reflective Thinking Model theory of Taggart (2005) and Outcomes-Based Education (OBE) (Killen, 2000).

In particular, this study was anchored to the Reflective Thinking Model Theory of Taggart (2005) which provides the motivation from the teacher's perspective on organizing content and learning experiences with different levels of technology use. This model provides a hierarchical framework involving three levels; namely: 1) **technical level**, technology integration is more teacher-directed with focus on teacher competency in using various forms of available technology towards meeting intended learning outcomes; 2) **contextual level**, the course design is characterized by collaborative and situational analysis where students evaluate alternative technology products and practices, relate the statistics content to real life contexts and their own professional needs, and use technology for analysis, clarification and validation of statistical methods and principle, and finally 3) **dialectical level**, the teacher designs, the statistics curriculum for

optimal integration of various forms of emerging technologies in the context of real world problems towards independent learning, individual autonomy and self-understanding through disciplined inquiry and critical evaluation of various perspectives in doing statistics with consideration of ethical and social issues.

Hence, in teaching statistics with technology, reflective practice may be viewed as a way to move out from the rut of automation and routine technology applications in order for teachers to achieve a higher level of awareness on the kinds of decisions they make as they teach with technology, and of the value and consequences of particular instructional decisions.

Concurrently, Outcomes-Based Education theory supports the main theory as a student-centered approach to education that focuses on intended learning outcomes resulting from instruction and as a process that involves the restructuring of curriculum, assessment and reporting practices in education to reflect the achievement of high order learning and mastery. This study focused on the following OBE premises: All students can learn and succeed but not on the same day and not in the same way, takes into account differences in learners' learning rates and learning style. Side by side with the goals of statistics education are the intended learning outcomes for students which must be significant to students' lives and society and must meet high standards or expectations for success. Another premise in OBE is that, successful learning promotes even more successful learning, successful learning rests on students having strong cognitive and psychological foundation of their prior learning

success. This entails that when learners become successful in one learning activity, they become confident and gain courage for success in other activities. In this study, it is applied in the design of learning activities with extended opportunities for successful learning primarily driven by technology. The last OBE premise states that, schools control the conditions that affect directly successful learning, a curriculum is developed and then given to schools to implement. In the present study, schools should arrange their conditions to be conducive for learning for the learners to learn and succeed.

The study was anchored also to another theories such as on the side from constructivist perspective of learning with technology, suggests that the more opportunistic and effective uses of technologies in classrooms are those where learning is achieved with the aid of technology, and the resulting environment is one where technology supports and scaffolds the learning rather than being the object or derivative of the learning. In support, Jonassen (2000) also developed the idea of mindtools: computer based tools and learning environments that have been "adapted or developed to function as intellectual partners with the learner in order to engage and facilitate critical thinking and higher-order learning. According to him, the role of a mindtool is to extend the learner's cognitive functioning during the learning process, and to engage the learner operations while constructing knowledge that they would not have been able to accomplish otherwise.

Further from the behaviorist perspective, use of technology mirrors traditional classroom practice: users are relatively passive, the content and interaction between the user and the software are predetermined, and there is a limited repertoire of acceptable responses. Technology integration from this perspective is commonly used to increase student motivation. Jonassen argues that technology integration can increase achievement because it leads to automaticity of lower-level skills through extended practice. He also states that a computer that is endlessly patient with the learner monitors this practice. Additionally, in the tutorial form of computer-assisted instruction, the computer provides additional information to the learner if an incorrect answer is supplied. This continues until the learner is successful.

The organizing framework of the essential principles mentioned above was shown in Figure 1.

Conceptual Framework

As illustrated in figure 1, this study as conceptualized on the scheme includes the research environment, the variables to be assessed and the analysis in order to arrive at findings or results.

The base frame of the study shows the locale and participants of the study which were teachers and students in Basic statistics in Samar State University during first semester, SY 2014-2015.

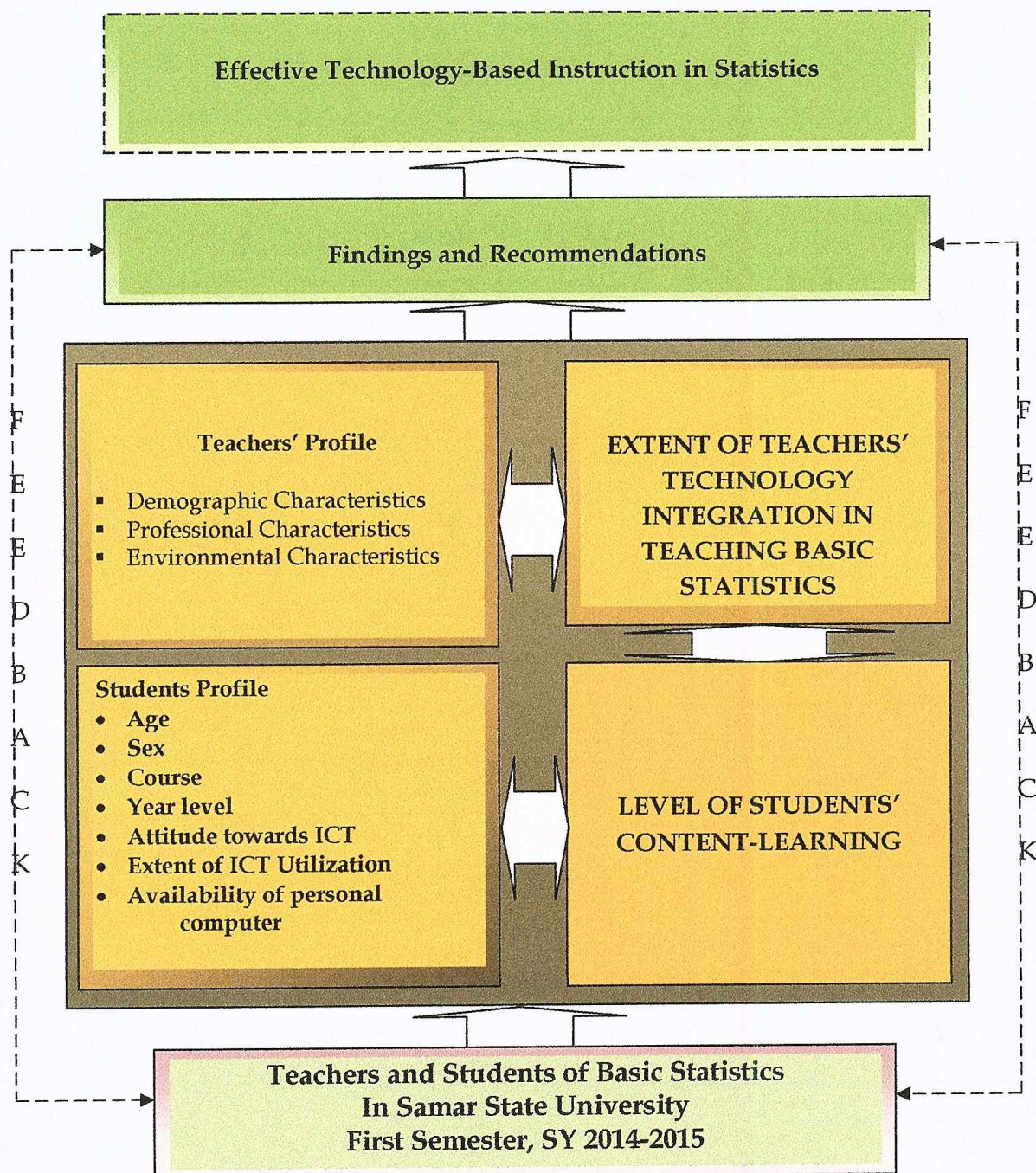


Figure 1. The Conceptual Framework of the Study

The arrow head that points upward suggests the flow of the assessment made by the teachers of their extent of technology integration in teaching statistics in selected topics in Basic Statistics as represented by four big boxes.

The first leftmost box was the teachers' profile with a double headed arrow connected with the box of extent of technology integration by the teachers in teaching selected topics in Basic statistics illustrating that there was an analysis that were undertaken. In this aspect, technology integration focuses more on teacher competency in using various forms of available technology towards meeting intended learning outcomes. Likewise, the students' profile from the leftmost box was connected to the box of students' achievement level showing a correlational analysis was done. On the same manner, at the contextual manner of technology integration, the double headed arrow between the extent of technology integration by the teachers in teaching selected topics in Basic Statistics and the students' achievement level indicates relationship. At this stage, students were evaluated by its achievement in Basic Statistics through collaborative and situational analysis. The arrow head points to findings and implications which surfaced improved achievement in Basic Statistics with effective technology integration in teaching statistics in as much as the dialectical level of technology integration in teaching was experienced.

Significance of the Study

This research study would benefited by the students, statistics teachers, the administrators, and the future researchers. Specifically, it would be of great use to them in terms of the following:

Students. The findings of the study would help students to acquire the necessary skills and knowledge in statistics needed for the twenty first century. More specifically, it could support and enhanced student's learning and could provide them unique opportunities to do mathematical tasks in new ways that may have foster learning and development. Moreover, it would enable them to appreciate learning that involves integrated data management and research skills, as well as communication, problem-solving, decision-making and other real life skills needed to cope with the global demands of the 21st century workplace.

Teachers. The findings of the study would help them designed learning activities that guide and scaffold student interaction with technology. Further, they could gradually encourage students to conduct and make sense of their own explorations, with less and less guidance and structure, while focusing on the overall larger statistical concept as they gain confidence with the tool and fluency with the statistical language.

Administrators. The findings of the study would be used as basis for restructuring curricula and classroom facilities. Furthermore, it would helped

planners deliver effective in-service education programs, could increase the likelihood that technology and materials resources would lead to success.

To the future researchers. The result of the study could be used as research background moving toward studying technology integration in the schools with more mixed-methods research that combines the strengths of qualitative and quantitative approaches.

Scope and Delimitation

This study dealt on the extent of technology integration in teaching selected topics in Basic Statistics its implication to students' achievement. Factors are those of teachers' demographic profile; professional characteristics; environmental characteristics; frequency of using technology for instructional purposes in statistics; students' profile, and students' achievement.

The participants of this study were the teachers teaching Basic Statistics and students who were also officially enrolled in Basic Statistics subject during the first semester SY 2014-2015. Out of the eight colleges of SSU, there were only three colleges who were considered in the study, namely, SSU Mercedes Campus, College of Arts and Sciences (CAS), and the College of Industrial Technology (CIT). There were only three teachers involved in the study, that is, one teacher in each college while there were 92 students. More specifically, 76 students from the CIT, nine from the CAS and seven students from the SSU-Mercedes campus.

A major limitation of the study was that the topic, technology integration, is very broad and cannot be fully covered in one study. Therefore, this study concentrated on computer use with that could or should be commonly used in teaching statistics. Limiting this study to this technology does not rule out the importance and impact that other technologies play in the teaching process.

Another was the number of teacher-participants was small, which limits the generalizability of the results of the study. The selection of the teacher-respondents was based on class schedule during first semester, SY 2014-2015.

The study was conducted during the second semester, SY 2014-2015

Definition of Terms

For better understanding of the study by the readers, the following terms were hereby defined.

Achievement This connotes to final accomplishments of something noteworthy, after much effort and often in spite of obstacles and discouragements (<http://dictionary.reference.com/browse/achievement?s=t>). In this study, this refers to the learning acquired on the selected topics in Basic statistics in connection to a real life situation with the integration of technology in the teaching and learning process.

Attitude This refers to a settled way of thinking or feeling about something, typically one that is reflected in person's behavior (<http://www.thefreedictionary.com/>). Operationally, it was defined as the way

of thinking by the teachers and students with regards to teaching and learning statistics using computer.

Information Communication Technology (ICT). This term was conceptually defined as a categorical term sometimes used (particularly in Europe) to refer the combined fields of computing and communications. More commonly, "information technology" (IT) is used in this sense, since the latter term, by definition, includes both types of technology (<http://www.merriam-webster.com/dictionary/information%20technology>).

Frequency distribution This refers to a tabulation or grouping of data into appropriate categories showing the number of observations in each group or category (Altares, et al, 2005).

Measures of central tendency. This refers to a value intended to indicate the center of the scores in a collection of data (Triola, 2013).

Measures of variation. This refers to any of several measures designed to reflect the amount of variability for a set of scores (Triola, 2013).

Other positional measures. This refers to the values that divide a set of data into equal parts (Altares, et al, 2005).

Software. This refers to system and application software. It includes the operating system and all the utilities that enable computer to function (www.oxforddictionary.com/definition/english/technology). Also, it includes programs that do real work for users. For example, word processors, spreadsheets, and database management systems.

Statistical software. A model base management system produces mathematical models, and can change and store (www.oxforddictionary.com/definition/english/technology). In this study, it refers to computer programs that perform functions helpful in teaching and learning statistics such as, SPSS, SAS and Minitab.

Technology. This refers to the application of scientific knowledge for practical purposes, especially in industry (www.oxforddictionary.com/definition/english/technology). In this study it refers to the machinery and device used in teaching statistics. More specifically, it refers to computer used in teaching statistics.

Technology integration. This term conceptually defined as the use of technology tools in general content areas in education in order to allow students to apply computer and technology skills to learning and problem-solving ([http://www.merriam-webster.com/dictionary/information % 20 technology](http://www.merriam-webster.com/dictionary/information%20technology)). Operationally, it is viewed as the use of computing devices such as desktop computers, laptops, handheld computers, software, or internet in statistics for instructional purposes in the selected topics in Basic Statistics.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter includes the review of related literature and studies which were considered pertinent and relevant to the study. The researcher reviewed a number of published and unpublished articles, books, magazines, and on-line references. These references had undergone perusal and concepts organizing, which contributed the ideas and other information vital to this study.

Related Literature

Teachers play an important role in teaching/learning paradigm shift. Be it the “sage on the stage” or the “guide on the side” the teacher is undoubtedly a critical factor determining the level of success for any technology-based project (Groff and Mouza, 2008). They state that the teacher is the decision maker/director who has the greatest influence in classroom events. Hence, it is a fact that teachers are at the center of curriculum change and they control the teaching and learning process (Abubakar et al, 2009). According to Abubakar, teachers must understand the potential role of technology in education; that they should become effective agents to be able to make use of technology in the classroom.

In connection to Abubakar’s claim, there is a distinction between digital native and digital-immigrants teachers and learners. According to Kervin (2008),

the term digital native refers to a generation that has grown up in the age of digital technology (computers, video games, digital music players, video cams, cell phones) and because of this possesses an ease with the use of technology that can be compared to a linguistic native's comfort their mother tongue. This generation of learner multi-tasks efficiently, works quickly, and favours interactivity while learning. On the other hand, digital immigrant is someone who was not raised in a digital environment but still uses and adopts many aspects of technology (Prensky, 2001). This terms gained significance in education when Prensky made a claims that educational systems were not meeting the needs of digital native students.

Jukes and Dosaj (2003), pointed out the key differences between digital native learners and their digital immigrant teachers. That is, digital native learners: prefer receiving information quickly from multiple multimedia sources; prefer parallel processing and multi-tasking; prefer processing pictures, sounds and video before text; prefer random access to hyperlinked multimedia information; prefer to interact/network simultaneously with many others; prefer to learn "just-in-time"; prefer instant gratification and instant rewards, and prefer learning that is relevant, instantly useful and fun. Meanwhile, digital immigrant teachers: prefer slow and controlled release of information from limited sources; prefer singular processing and single or limited tasking; prefer to provide text before pictures, sounds, and video; prefer to provide information linearly, logically and sequentially; prefer students to work independently rather

than network and interact; prefer to teach “just-in-case” (it’s on the exam); prefer deferred gratification and deferred rewards, and prefer to teach to the curriculum guide and standardized tests. In this case, Bennett et al (2008) argue that Prensky and other are creating an academic moral panic – a state in which the reaction is more severe than the problem – by suggesting that the neurological gap between instructor and students is creating a crisis in our schools.

On the other hand, Tchantchane and Fortes (2011) pointed out that integration of technology is an essential tool for effective delivery of teaching for all levels of education. Further, Thomas and Hong (cited by Neiss, 2005) developed the concept of teachers such pedagogical technology knowledge (PTK), and recently known as (TPCK). From this concept, technology has been an important instrument for learning statistics, hence teachers must also develop an overarching conception of their subject matter in teaching with technology (Neiss, 2005). Integration of technology in teaching is about the content and effective pedagogy. In the case of Statistics, the substantial change in teaching statistics created strong synergies between technology, pedagogy, and content (Moore, 1997). According to him, requiring students to work in groups and discussing their works orally and in writing, various diagnostic tools to analyze data, and computer-intensive practice facilitates student learning.

In addition, National Council of the Teachers in Mathematics has this technology principle “Technology is essential in teaching and learning, it

influences the mathematics that is taught and enhances learning" (NCTM, 2000). It further explained that technology such as calculators and computers are reshaping the mathematical landscape and encourage school mathematics to reflect the changes. In this principle, with the use of technology appropriately and conscientiously, students can learn mathematics more deeply, speculate and make inferences and be able to work at higher levels of generalization or abstraction (NCTM, 2000). These principles suggest therefore that technology plays a very important role in the learning curve of the students. Similarly, the American Statistical Association (ASA) supported the principle the use of technology for developing conceptual understanding and analyzing real data (GAISE, 2007).

According to Dias and Atkinson (2001), integrating technology into curricula with the intent of positive influencing teaching and learning has been in a state of evolution over the past 20 years. Driven primarily by hardware and software evolution, accessibility to computers in educational settings, and popular instructional technology trends, technology integration has covered the continuum from instruction on programming skills, self-directed drill and practice, interactive learning software, testing, instructional delivery augmentation, and internet-based accessibility to information, communication, and publication (Dias & Atkinson, 2001).

According to Chance (2007), technology has been and will continue to be a major factor in improving student learning of statistics. However, effective

utilization of technology requires thoughtful and deliberate planning as well as creativity and enthusiasm. He also stated that despite of the endless capabilities that technology offers, instructors should be careful about using sophisticated software packages that may result in the students spending more time in learning to use the software than applying it. Similarly, Neiss (2005), pointed out that technology has been an important instrument for learning statistics, hence teachers must also develop an overarching conception of their subject matter in teaching statistics, that is, "by the time students finish their encounters with statistics, they become informed citizens who are able to: comprehend and deal with uncertainty and variability, and statistical information in the world around them, and participate actively in an information-laden society, and contribute to or take part in the production, interpretation, and communication of data pertaining to problems they encounter in their professional life".

According to Liang (2000) computer programs showed students attracted to the interactive computer programs designed for business statistics course, students were motivated to attend classes when computer programs are applied to teaching. In addition, students were able to understand confusing topics, and felt that teaching them to use computer facilities really improves their own abilities to apply similar programs in analyzing real-world problems.

However, successful implementation of ICT requires strategic planning (Nyambane, 2014). As Wagner et al., (2005) observes, "Research suggests that simply putting computers into schools is not enough to impact student learning.

Despite successful efforts to acquire computer hardware and raise the student to computer ratio, there has been less success in identifying, which computer skills should be taught in school and how computers can be used in teaching and learning (Dooling, 2000). Moreover, while different forms of technology tools are virtually available in the World Wide Web to provide extended learning outcomes, the reality of Philippine conditions in terms of available physical facilities, teacher preparation in technology integration and other administrative barriers need to be considered. Also, despite the tremendous push for educators to integrate technology into classrooms, many have yet to do so and struggle to find consistent success with technology-based instruction.

Hence, the focus of this technology integration literature search and discussion in this study is the extent of technology integration by the teachers in teaching statistics.

Mumtaz (2009), made a distinction between non-manipulative and manipulative teacher factors. Non-manipulative factors are factors that cannot be influenced directly by school, such as age, teaching experience, computer experience of the teacher or governmental policy and the availability of external support for school.

Moreover, on the report by the National Center for Education Statistics (2000), indicated that teachers with fewer years of experience were more likely to use computers in their classes than teachers with more years of experience. Then,

one of the factors that determine the extent to which teachers use computers in their classes may be the number of years they have been teaching.

On the other hand, Venkatesh and Morris (2000) investigated about age and gender differences in the overlooked context of individual adoption and sustained usage of technology in the workplace using the Theory of Planned Behavior (TPB). They studied on user reactions and technology usage behavior over a 5-month period among workers being introduced to a new software technology application. The results showed that the decisions of men and younger worker were more strongly influenced by their attitude toward using the new technology. Meanwhile, Albirini (2006) found that age was not a significant factor in relation to teachers' attitudes towards ICT. Ali et al, (2013), revealed that male teachers used more ICT in their teaching and learning processes than their female counterparts. The National Center for Education Statistics, (2000) reported that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching.

Attitude is a predisposition to respond favorably or unfavorably to an object, person, or event (Nyambane and Nuzuki, 2014). According to them, to successfully initiate and implement educational technology is school's program depends strongly on the teachers' support and attitudes. They further states that it is believed that if teachers perceived technology programs as neither fulfilling

their needs nor their students' needs, it is likely that they will not integrate the technology into their teaching and learning.

Mumtaz (2009) classified manipulative factors to the attitudes of teachers towards teaching and ICT, ICT knowledge and skills of teachers, commitment of the school towards the implementation process and availability of ICT support. Kane (2002), through her assessment of available research, asserts that "teachers' personal beliefs, perceptions, attitudes and orientations are correlated with teaching practices. She concluded that the decision to incorporate new pedagogy into teaching is attributed to the instructors' feelings about themselves and what they have previously learned. Thus, one can extrapolate that if instructor has a positive attitude or orientation towards technology they will be more inclined to incorporate it into their teaching.

Similarly, Hew and Brush (2007), mentioned that among the factors that influence successful integration of ICT into teaching are teachers' attitude and beliefs. Also, Tella (2007) found that computer use was predicted by intentions to use and that perceived usefulness was also strongly linked to these intentions. If teachers' attitudes are positive toward the use of educational technology then they can easily provide useful insight about the adoption and integration of ICT into teaching and learning processes.

On the same manner, Becta (2004) claims that one key area of teachers' attitudes towards the use of technologies is their understanding of how these technologies will benefit their teaching and their students' learning. Although

teachers felt that there was more than enough technology available, they did not believe that they were being supported, guided, or rewarded in the integration of technology into their teaching (Scheopp's, 2005). According to Empirica (2006), teachers who are not using new technology such as computers in the classroom are still of the opinion that the use of ICT has no benefits or unclear benefits.

Effective adoption and integration of ICT into teaching in schools depends mainly on the availability of ICT resources such as hardware, software, etc. Karagiorgi (2005), states that without adequate hardware and software, there is little opportunity for teachers to integrate technology into the curriculum. But, even in cases where technology is abundant, there is no guarantee that teachers have easy access to those resources. Access to technology is more than merely availability of technology in school; it involves providing the proper amount and right types of technology in locations where teachers and students can use them (Fabry and Higgs, 1997).

Meanwhile, Nyambane (2007), pointed out that availability of ICT resources, perceived ability to use ICT and having basic skills to operate it may increase teachers satisfaction with modern technologies which may in turn motivate teachers to integrate ICT in teaching.

Becker's (2000) report indicated that classroom access to local computer clusters or hubs were more frequently used in teaching and learning than computing laboratories. Similarly, Yildirim (2007) found that access to

technological resources is one of the effective ways to teachers' pedagogical use of ICT in teaching.

Angeli and Valanides (2009), revealed that, teachers' computer and software knowledge helps them figure out the affordance of the technology and how particular software might be beneficial to student learning.

Pelgrum (2001), pointed out that the success of educational innovations depends largely on skills and knowledge of teachers. Also, he found that teachers' lack of knowledge and skills was the second most inhibiting obstacle to the use of computers in schools. Similarly, Knezek and Christensen (2000) hypothesized that high levels of attitude, skill and knowledge (proficiency), and tools (level of access) would produce higher levels of technology integration that will reflect on student achievements positively. Their model postulated that educators with higher levels of skill, knowledge, and tools would exhibit higher levels of technology integration in the classroom.

Teachers' self-confidence reported to have greater effect on the use of ICT (Nyambane, 2007). He also posited that teachers' confidence in using ICT to teach is linked to accessibility to resources and teacher competence. According to Liaw, et al (2007), teachers' computer-self-efficacy influences their use of ICT in teaching and learning. Similarly, Yuen and Ma (2008) revealed that Hongkong teachers' implementation of ICT was depended on simplicity of computer use and perceived teachers' self-efficacy. Jones (2004), teachers feel reluctant to use computer if they lack confidence. "Fear of failure" and "lack of ICT knowledge"

(Balanska et al, 2007) have cited as some of the reasons for teachers' lack of confidence for adopting and integrating ICT into their teaching. Meanwhile, Becta (2004), stated that many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do.

The above citations were of great help to the current study as it gave insights and provides a meta-analysis on the success factors for technology integration in teaching statistics.

Related Studies

Several related studies are reviewed by the researcher and summarized hereunder:

In the study of Reston (2011) entitled "An Outcome-Based Framework for Technology Integration in Higher Education Statistics Curricula for Non-Majors" stated that from the international perspective, technology has virtually pervaded almost all facets of teaching and learning statistics. Moreover, he also stated that in the reality of statistics education in the Philippines shows that it was lagged behind – with most classes similar to those offered 10 or 20 years ago. On the same manner, in a paper presented to the Commission on Higher Education (CHED) in 2010, former president of the Philippine Statistical Association (PSA) Isidro David posited that the of introductory statistics is plagued with many problems, including lack of teacher preparation and quality textbook and the

dominance of traditional formula-based teaching approaches with little or no student engagement and technology integration (Edullantes, 2006). In addition, a review of locally authored introductory statistics textbooks by the PSA revealed that most of these textbooks were written by non-statisticians, did not encourage or require the use of computers, and that "statistical reasoning and logic was largely amateurish, with statistical methods enumerated like recipes in a cookbook" (David and Maligalig, 2006).

In one study by Keong, et al (2005), as cited by Lombrio (2009), it was revealed that the use of Information Communication Technology (ICT) in teaching can make the teaching process more effective as well as enhance students' capabilities in understanding concepts. Normally, according to Gilber (2009), as cited by Lombrio, faculty use ICT as means to present lesson or instruction to students and to everyone more effectively and efficiently (e.g. powerpoint, video, recording of lectures, computer-aided instruction and assessment).

Another study conducted by Pope (2001), as cited by Lombrio (2009), backed up the idea that the use of ICT were felt to have been successful in supporting teaching and learning activities. Furthermore, even suggest that ICT enables teachers to employ what is the established practice, but in a more effective and extensive way.

Mills (2008), in his paper, described the use of multimedia technology, particularly the powerpoint presentation, in teaching his class and compared it

with the plain lecture. According to him, the different multimedia allowed him to broaden the scope of his lectures. Further, he adds that the use of powerpoint as a presentation tool allows the student to see the note in the screen.

In one of his article, Streich (2008) on the other hand stated that power point presentation can greatly enhance classroom instruction, yet teachers that misuse the technology run the risk of devaluing instructional time. The advent of the powerpoint has greatly benefited classroom instruction but has also led to widespread misuse.

In the study Tchantchane and Fortes (2011) entitled "A Multivariate Survey Analysis: Evaluation of Technology Integration in Teaching Statistics", revealed that the inclusion of technology has given the students the opportunity to apply statistical concepts to real-world situations. The students learned to present data into frequency tables, histograms and contingency tables with the use of excel program. They also learned to summarize data using excel data analysis tools and to produce box plots. Furthermore, the analysis of the survey highlighted the students' positive perception regardless of their overall performance and the failure rate was reduced from 34 percent with traditional teaching to only 14 percent with the inclusion of new technology.

The study of Tchantchane and Fortes, is similar to the present study in the sense that the subject of both studies are all about technology integration in teaching statistics. Moreover, the cited studies used factor analysis to define the underlying structures of the variables being studied and the present study will

be using also a factor analysis to extract underlying structures from the major variables. On the other hand, the studies differ on the methodology and purpose of the study. The cited study used an experimental design to evaluate technology integration in teaching statistics while the present study used descriptive-correlational research design to determine relationships among latent factors for effective technology integration.

Another study of Liu (2010) entitled "Factors Related to Pedagogical Beliefs of Teachers and Technology Integration", the teacher-respondents answered the 30 items questions using four-point-likert scale. Liu utilized factor analysis to analyze the factor structure of teacher considerations for using technology. According to his factor analysis results, six factors were extracted from the 30 items question. These factors were "teaching implementation", "instructional design", "individual mindset", "external expectations", "school support" and "student achievement".

The study of Liu is related to the present study in the sense that they both studied the same subject, that is, technology integration in teaching. Furthermore, the former utilized factor analysis, chi-square test and two-way ANOVA for determining teacher's considerations for using technology. While the present study will be utilizing factor analysis, regression and Pearson r for determining the relationships among the underlying factors for technology integration in teaching statistics.

Van Braak et al, (2004) created a path model explaining the different types of computer use through examining teacher demographic characteristics, computer experience, and attitudes. From the 486 primary school teachers, they found that some teacher-level factors such as attitude towards computers in education and computer training had the strongest direct effect on computer use in the classroom. They also found that teacher age and prior computer experience had indirect effects on classroom computer use.

The study of Gorder (2008), reported that teacher' experience is significantly correlated with the actual use of technology. She revealed that effective use of computer was related to technological comfort levels and liberty to shape instruction to teacher-perceived student needs. Also, Baek et al (2008) claimed that experienced teachers are less ready to integrate ICT into their teaching.

Gender differences and the use of ICT have been reported in several studies. Watson (2006), conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integration technology into their teaching less than the male teachers. But the situation was different in mid-western US basic school where Breisser (2006) found that the females' perceptions about technology competence improved while males' self-perceptions about technological dominance remained unchanged in a lego-lego project. The study was in agreement with (Adams, 2002) that female teachers applied ICT more than the male teachers.

However, some studies revealed that gender variable was not a predictor of ICT integration into teaching (Sullivan, 2003). In a research conducted by Kay (2006), he found that male teachers had relatively higher levels of computer attitude and ability before computer implementation.

Meanwhile, several studies have revealed that teachers' professional development is a key factor to successful integration of computers into classroom teaching. Muller (2008), in a study of 400 pre-tertiary teachers, showed that professional development and the continuing support of good practice are among the greatest determinants of successful ICT integration.

Furthermore, demographics such as age and gender may be primary factors that influence whether faculty members use technology (Cooper, 2006). In the study of Lau and Sim (2008) on the extent of ICT adoption among 250 secondary school teachers in Malaysia, their findings revealed that older teachers frequently use computer technology in the classrooms more than younger teachers. On the other hand, Peluchette and Rust (2005) state that at the university level, faculty who are in the middle of their careers can either be "allies or stubborn opponents as their institutions adjust to competitive pressures, revise programs to meet the needs of increasingly diverse students, and integrate new educational technologies".

Demici (2009) conducted a study on teachers' attitude towards the use of Geographic Information systems (GIS). The study used questionnaires to collect data from 79 geography teachers teaching in 55 different high schools. The study

revealed that though barriers such as lack of hardware and software existed, teachers positive attitudes towards GIS was an important determinant to the successful integration of GIS into geography. In a similar study, Teo (2008) conducted a survey on pre-service teachers' attitudes towards computer use in Singapore. A sample of 139 pre-service teachers was assessed for their computer attitudes using questionnaire with four factors: affect (liking), perceived usefulness, perceived control, and behavioral intention to use the computer. He found that teachers were more positive about their attitude towards computers and intention to use computer than their perceptions of the usefulness of the computer and their control of the computer.

Furthermore, Meelisse et al, (2007) conducted a study about factors which stimulate or limit the innovative use of ICT by teacher educators in the Netherlands. The study used questionnaires for 210 teachers and interviews for four of those teachers who had responded. Their findings showed that several factors such as a student-oriented pedagogical approach, a positive ICT attitude, computer experience, and personal entrepreneurship of the teacher educator have a direct positive influence on the innovative use of ICT by the teacher. Also, comparison between these factors in predicting computer use identified that attitude toward computer contributed more in explaining ICT use by teachers.

Peralta and Costa (2007) conducted a study of 20 teachers' competence and confidence regarding the use of ICT in classrooms. They revealed that in Italy, teachers' technical competence with technology is a factor of pedagogical

and personal factors as those which mostly contribute to their confidence in ICT use. On the other side, Park et al, (2009), who conducted a study of Korean teachers, determined that lack of knowledge about computers significantly affected teacher decisions about technology use. He posited that lack of knowledge about how to use technology effectively, which influences teacher decisions about whether to use technology, is likely a barrier to technology integration.

The above mentioned studies were related to the present study, in a sense that latter studies discussed the different teachers' factors influencing integration of technology in teaching. Such as teachers' profile, teachers' knowledge and skills in using computer for personal and instructional purposes, self-confidence in using computer, and attitude towards computer. On the other hand, they differ on the analysis that they used.

Chapter 3

METHODOLOGY

This chapter discusses the methodology employed by the researcher in this study. Among the items discussed in detail were research design, instrumentation and its validation, sampling procedure, data gathering procedure and the statistical treatment of data.

Research Design

The study utilized the descriptive-correlational research design using the questionnaire as the main data gathering instrument. Descriptive method was used to determine the teacher- and student-respondents' profile and the extent to which the level of technology integration by the teachers in teaching statistics. Moreover, correlational analysis was employed to ascertain whether there is a significant relationship between the extent of technology integration by the teachers in teaching selected topics in Basic Statistics and their profile variates; relationship between the students' achievement level on the selected topics in basic statistics and their profile variates, and relationship between teachers' extent of technology integration in teaching selected topics in Basic Statistics and the level of students' achievement level.

There were two instruments used in data gathering, such as, survey questionnaire and achievement test. Total enumeration was employed for the two sets of respondents.

The study utilized the following statistical tools: mean, weighted mean, frequency counts, regression, and Pearson-Product-Moment Correlation Coefficient and Fisher's t-test. Moreover, statistical software such as, SPSS version 16.0 and Spreadsheet was utilized in the analysis.

Instrumentation

This study utilized survey questionnaire and achievement test as the main data gathering instruments.

Questionnaire. There were two sets of questionnaires: set one was for the student-respondents and the other set was for the teacher-respondents. The instruments were adapted from Papastasiou and Angeli (2008).

The survey instrument for the teacher-respondents was consisted of four sections. The first section includes the profile related to teacher such as: demographic characteristics – age, sex, civil status, and average family monthly income; professional characteristics – academic degree obtained, teaching experience, seminars/trainings attended related to teaching statistics, workload and number of preparation, and extent of ICT utilization for Basic Statistics; and environmental characteristics – availability of internet, computer-student ratio, statistical software utilized, technology infrastructure, and other instructional

materials used. The other sections were used to obtain information related to: the ICT literacy, attitude towards ICT, and teachers' extent of technology integration in teaching selected topics in Basic Statistics.

In relation to the teachers' extent of ICT utilization the researcher used also the scoring of 5 – Very High (ICT is utilized for about 6 hours and above in a day), 4 – Moderately High (ICT is utilized at least 4-5 hours in a day), 3 – High (ICT was utilized at least 3-4 hours in a day), 2 – Low (ICT is utilized at least 1-2 hours in a day), and 1 – Very Low (ICT is utilized less than an hour in a day).

More specifically, the second section of the questionnaire used a Likert-type scale from 1 to 5 (with response options as follows: 1 - No knowledge at All; 2 – Learner: I am not sure how to do this task; 3 – Basic: I have done this before, but might need some help; 4 – Proficient: I can perform this task without any assistance; 5 – Advanced: I could train staff to do this) to measure teachers' ICT literacy.

Similarly, the third section measured the teachers' attitudes with a 5-point-Likert-Scale (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree). An average rating close to the value of 5 suggests a positive attitude; while an average rating in the direction of one indicates a negative attitude.

The fourth section, which measured the teachers' extent of technology integration in teaching selected topics in Basic Statistic. This was measures through teachers' frequency and duration of using various computer programs in classroom practices in which the researcher used the following scoring: 5 –

Very High (Technology is used 100 percent of the time in a semester); 4 – Moderately High (Technology is used at least 75 percent of the time in a semester); 3 – High (Technology is used at least 50 percent of the time in a semester); 2 – Low (Technology is used at least 25 percent of the time in a semester), and 1 – Very Low (Technology is used below 25 percent of the time in a semester).

On the same manner, the instrument for the student-respondents was consisted with four sections. Section one of the instrument was the profile of the student, namely, age, sex, course, year level, extent of ICT utilization, and availability of personal computer. Section two measured the students' attitudes towards ICT with a 5-point-Likert-Scale (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree). While sections three and four, measured the students' ICT literacy and teachers' extent of technology integration in teaching selected topics in Basic Statistics (frequency and duration of using various computer programs in classroom practices) using the same scoring used in the instruments used by the teachers..

Achievement test. The test is composed of five major topics that were common to all the teachers who taught the subject during the first semester, SY 2014-2015. The five major topics were the six items in Basic Concepts of Statistics, 12 items in Graphical Presentation and Frequency distribution, 13 items in Measures of Central Tendency, five items in Other Positional Measures, and 13 items in Measures of Variability. The researcher prepared the initial test of the

achievement test based on the table of specifications. It was checked by her adviser and other Statistics instructors of Samar State University who are knowledgeable on the content. Then, it was tried out to second year college students of Northwestern Samar State University, Calbayog City. After the item analysis of the test, a 35-item was developed. Based on the 35-item test, six were knowledge, 12 were comprehension, six were analysis, five were synthesis, and 18 evaluation.

Validation of the Instrument

The face and content validity of the questionnaire were validated by expert, peers and pilot tryout.

After the researcher had finished her draft, she submitted it to her adviser, panel of evaluators for corrections and comments. They provided inputs for the initial revision of the instrument. After this, she requested an expert in ICT to review the instrument, as to gross errors in content and construction. Their comments and suggestions were considered in another revision of the instruments. Then she went to NwSSU last January 9 and 14, 2015 for the pilot testing following a test-retest procedure using an interval of five days. The researcher, sought first an approval from the university president and then had a courtesy call to the Dean of the College of Management and Information Technology (CMIT) and asked permission to access the current and first semester, SY 2014-2015 class schedule to determine the teachers students of the

Basic Statistics subjects during first semester, SY 2014-2015. Finally, the instruments for students were tested to the second year college students of Bachelor of Science in Information Technology (BSIT). While the instruments for teachers were tested to the teachers handling the subject Basic Statistics. The computed reliability coefficient for the teacher-respondents' instrument was 0.84 while the survey instrument for the students was 0.82.

On the other hand, the researcher prepared the initial test of the achievement test based on the table of specification following the Bloom's Taxonomy of Learning in which there were six were knowledge skills, 12 were comprehension skills, six were analysis skills, five were synthesis skills, and 18 evaluation skills. It was then passed to his adviser and other Statistics instructors of Samar State University who are knowledgeable on the content

The first draft was tried out to 30 students of Bachelor of Science in Information Technology of NwSSU, Calbayog City.

The test instrument was subjected to item analysis for facility values and discrimination indices. Out of the original 50-item test, it was trimmed down to 35 items due to low discrimination indices. Moreover, the Kuder-Richardson formula was applied to determine the reliability of the test instrument where in the data used was the scores of the students who participated in the try-out. The test's reliability coefficient was computed to be 0.815, which is acceptable for research purposes. Thus, the test instrument was reliable for the study.

Sampling Procedure

The participants of this study focused to the teachers teaching Basic Statistics and students who were also officially enrolled in Basic Statistics subject during the first semester SY 2014-2015. Out of the eight colleges of SSU, there were only three colleges who were considered in the study, namely, SSU Mercedes Campus, College of Arts and Sciences (CAS), and the College of Industrial Technology (CIT). There were only three teachers involved in the study, that is, one teacher in each college. On the other hand, there were 111 total students were officially enrolled during the first semester, SY 2014-2015 but there were only 92 students were involved in the study due to some of them did not continue schooling. More specifically, there were 76 students from the CIT, nine from the CAS and seven students from the SSU-Mercedes campus. In this manner, the researcher did not use any sampling method in this study.

Data Gathering Procedure

Right after the instruments were validated the researcher finalized her research instruments. Permission was sought from the office of the President to conduct the study in the different colleges. The approval was used by the researcher to seek permission from the Deans or Heads of the different colleges to start orientation and fielding of questionnaires. This actual data gathering was conducted last January 19 – 30, 2015. This was done by the researcher personally

with the help of some instructors of the different departments involved in the study to ensure proper accomplishment of the questionnaire.

Statistical Treatment of Data

After all data have been gathered, tallied, scored and tabulated, the researcher started analyzing and treating the data statistically through statistical software namely SPSS version 16.0 and Microsoft Excel. The following statistical tools were used:

Frequency counts and percentage. These were used in organizing the data of the teachers' profile such the demographic, professional, and environmental characteristics.

Weighted means. This was used to analyze and interpret the respondents' attitude and ICT literacy.

Pearson Product Moment Correlation Coefficient. This was used to determine the relationships between the extent of technology integration by the teachers in teaching selected topics in Basic statistics and their profile, relationship between the students' achievement level on the selected topics in Basic Statics and their profile variates, and relationship between the teachers' extent of technology integration in teaching selected topics in Basic Statistics and the level of students' achievement.

Regression analysis. This was used to determine the significant correlates between the teachers' extent of technology integration in teaching selected topics in Basic Statistics and the students' achievement.

The researcher utilized 0.05 level of significance in testing all the hypotheses.

Chapter 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This section presents the analyses and interpretation of the data generated in this study. It includes the discussion of the following: profile of teachers teaching Basic Statistics; profile of students; extent of technology integration by the teachers teaching selected topics in Basic Statistics; relationship between the extent of technology integration by the teachers in teaching selected topics in Basic Statistics and their profile variates; students' achievement level in the selected topics in Basic Statistics; relationship between the students' achievement level on the selected topics in Basic Statistics and their profile variates, and relationship between the teachers' extent of technology integration in teaching selected topics in Basic Statistics and the level of students' achievement.

Teacher-Respondents' Profile

Table 1-3 present the profile of the teachers teaching Basic Statistics with respect to their demographic characteristics - age, sex, civil status, and average family monthly income; professional characteristics - academic degree obtained, teaching experience, relevant seminars/trainings attended, attitude towards ICT, ICT literacy, workload and number of preparation, and extent of ICT utilization; and environmental characteristics - availability of internet, computer-student

ratio, statistical software utilized, other technology infrastructure, and other instructional materials used.

Demographic characteristics. Table 1 specifically shows the age, civil status, and average family monthly income distribution of the teacher-respondents. Among the three teachers, two or 66.67 percent were 36 years old and one or 33.33 percent was 55 years old. The average age of the group was 42.33 years with a standard deviation of 10.97 years.

Table 1

Teacher-Respondents' Demographic Characteristics

Variates	F	Percent
Age (in years)		
55	1	33.33
36	2	66.67
Total	3	100.00
Mean	42.33 years	-
SD	10.97 years	-
Civil Status		
Married	2	66.67
Widower	1	33.33
Total	3	100.00
Average Family Monthly Income (in Php)		
55,000.00	1	33.33
44,887.00	1	33.33
21,000.00	1	33.33
Total	3	100.00
Mean	Php40,295.67	-
SD	Php17,458.816	-

As to sex distribution, the teacher-respondents were all female.

As regards to the civil status, two or 66.67 of them were married and one or 3.33 percent was a widower.

In relation to the income profile of the teacher-respondents, it is also disclosed in Table 1. One each had an income of Php55,000.00, 44, 887.00, and 21,000.00 respectively. The average monthly income posted at Php40,295.67 with SD of Php17, 458.82. The respondents had a quite big monthly income which is more than the poverty threshold set by NEDA. This meant that the school heads could provide themselves with the necessary amenities in life.

Professional characteristics. Table 2 shows the teacher-respondents academic degree obtained, teaching experience, relevant seminars/trainings attended, attitude towards ICT, ICT literacy, extent of ICT utilization, workload and number of preparations.

In relation to the academic degree obtained by the teachers teaching Basic Statistics, there were two or 66.67 percent obtained doctorate degree and one or 33.33 percent had doctoral units. These results signify that teachers were very much qualified in their teaching profession.

As regards to teaching experience, one each had teaching experience of 34, 14, and 10 years with a mean of 19.33 years and SD of 12.86 years. It implies that the teachers were already seasoned teachers.

Table 2

Teacher-Respondents' Professional Characteristics

Professional Characteristics	f/Xw	Percent
Academic Degree Obtained		
Doctoral Degree	2	66.67
w/Doctoral Units	1	33.33
Total	3	100.00
Teaching Experience		
34	1	33.33
14	1	33.33
10	1	33.33
Total	3	100.00
Mean	19.33 years	-
SD	12.86 years	-
Seminars & Trainings Attended		
SPSS	1	33.33
None	2	66.67
Total	3	100.00
Attitude Toward ICT	4.73	Very Favorable Attitude
ICT Literacy	3.30	Basic
Extent of ICT Utilization	2.05	Low
No. of Workload		
11	2	66.67
7	1	33.33
Total	3	100.00
Mean	9 workloads	-
SD	3 workloads	-
No. of Preparations		
6	2	66.67
4	1	33.33
Total	3	100.00
Mean	5 preparations	-
SD	1 preparation	-

As to their attitude towards ICT profile, it can be gleaned that teachers had a very favorable attitude towards ICT with a weighted mean of 4.73. Thus, this signifies that teachers believed that technology plays a vital role in the field of statistics. This result supported the findings of Teo (2008) and Demici (2009) indicating that teachers were more positive about their attitude towards computers and intention to use computer. Additionally, in the study of Hew and Brush (2007) indicated positive attitude of the teachers toward the use of educational technology can easily provide useful insight about the adoption and integration of ICT into teaching and learning process.

Likewise, the teacher-respondents showed a "Basic" knowledge in terms of ICT literacy profile with a weighted mean of 3.30 which basically means that the task were done before, but might need some help.

On the extent of ICT utilization, the teachers had a "low" extent of utilization as evidenced by the weighted mean of 2.05 which further tells that teacher' utilization of ICT was just about 1 - hour in a day.

Concerning teachers' number of workload, two or 66.67 percent had 11 workloads and one or 33.33 percent had seven workloads, respectively with an average of nine workloads and standard deviation of three workloads. Similarly, there were two or 66.67 percent had six preparations and one or 33.33 percent had four preparations with an average number of five preparations and standard deviation of one preparation. This implies that teachers teaching Basic Statistics had sufficient workloads and number of preparations that prevented them for

using computers in their classes as well as prepare materials for use with their classes.

Environmental characteristics. Table 3 specifically shows the availability of internet, computer-student ratio, statistical software utilized, other technology infrastructure and other instructional materials used.

Table 3

Teacher-Respondents' Environmental Characteristics

Environmental Characteristics	f	Percent
Availability of Internet		
Available	1	33.33
Not Available	2	66.67
Total	3	100.00
Computer-Student Ratio		
1 computer: 1 student	1	16.67
1 computer: 1 class	5	83.33
Statistical Software Utilized		
Microsoft Excel	1	33.33
Microsoft Excel Add-in pH Stat	1	33.33
Statistical Packages for Social Sciences	1	33.33
Other Technology Infrastructure		
LCD Projector	3	100.00
Other Instructional Materials Used		
Books	3	100.00
Module	3	100.00
Hand-out	2	66.67

As to availability of internet, two or 66.67 percent of the teacher-respondents had no available internet or no access to internet and one or 33.33 percent had an internet access or available internet. This signifies further that teachers had limited internet accessibility.

As regards to the computer-student ratio, there were five classes or 83.33 percent had a 1 computer: 1 class ratio and only one class or 16.67 percent had 1 computer:1 student ratio. These data further shows, that majority of the class had a limited availability of computers for use for the entire class.

In addition, the teacher-respondents' utilization of statistical software revealed that there were only one or 3.33 percent of the teacher utilized statistical software such as Microsoft Excel, Microsoft Excel add-in pH stat, and SPSS.

Meanwhile, all of them used other technology infrastructure in teaching statistics particularly LCD projector.

Further, all of them used books and module while only two or 66.67 percent of them used hand-out in teaching the subject.

Student-Respondents' Profile

Tables 4-9 present the profile of the students with respect to their age and sex, course, attitude towards ICT, ICT literacy, extent of ICT utilization, and availability of personal computer.

Age and sex. Table 4 specifically shows the age and sex distribution of the student-respondents.

Table 4

Age and Sex of the Student-Respondents in Basic Statistics

Age	Sex				Total	Percent
	Male		Female			
	f	Percent	f	Percent		
27	1	1.85	0	0.00	1	1.09
26	1	1.85	0	0.00	1	1.09
25	0	0.00	1	2.63	1	1.09
24	1	1.85	1	2.63	2	2.17
23	4	7.41	2	5.26	6	6.52
22	5	9.26	2	5.26	7	7.61
21	6	11.11	2	5.26	8	8.70
20	11	20.37	5	13.16	16	17.39
19	14	25.93	8	21.05	22	23.91
18	10	18.52	12	31.58	22	23.91
17	1	1.85	3	7.89	4	4.35
Not Specified	0	0.00	2	5.26	2	2.17
Total	54	100.00	38	100.00	92	100.00
Percent	58.70	-	41.30	-	100.00	-
Mean	20.14 years	-	19.45 years	-	18.85 years	-
SD	2.06 years	-	1.98 years	-	1.83 years	-

Among the 92 students, there were 23 or 23.91 percent who had equally got the ages of 21 and 22 years old; one or 1.09 percent each belonged to 25, 26, and 27 years old; four or 4.35 percent belonged to 17 years old. The oldest student was 27 years old and the youngest was 17 years old. The average age of the group was 18.85 years with a standard deviation of 1.83 years.

With regards to sex distribution, 54 or 58.70 percent were male and 38 or 41.30 percent were female.

Course. Table 5 indicates the course of the student-respondents. Of the 92 students involved in the study, majority of them had course Bachelor of Technology having a frequency of 76 or 82.61 students; nine or 9.78 percent had course Bachelor of Science in Applied Statistics; four or 4.35 percent had course Bachelor of Science in Fishery, and three or 3.26 percent had Bachelor of Science in Marine Biology course. It implies that majority of the students were on trade-technical courses.

Table 5

Student-Respondents' Course

Course	f	Percent
Bachelor of Technology	76	82.61
BS Applied Statistics	9	9.78
Bachelor of Science in Fishery	4	4.35
BS Marine Biology	3	3.26
Total	92	100.00

Year level. The students involved in the study were all second year students.

Attitude towards ICT. The attitude of the student-respondents can be found in Table 6.

Table 6

Student-Respondents' Attitude Towards ICT

Indicators	Scale					Total	Xw/Interpretation
	5 SA	4 A	3 U	2 D	1 SD		
1. I feel comfortable with the idea of the computers as a tool in teaching and learning	3	21	35	16	11	86	2.87 N
2. The use of computers in learning motivates me.	5	25	27	21	7	85	3.00 N
3. The use of the computers as learning tool excites me	2	19	30	24	10	85	2.75 N
4. Working with my classmates in the computer laboratory is very useful.	10	30	15	18	11	84	3.12 N
5. The computer helps me understand concepts in more effective ways.	4	29	24	21	5	83	3.07 N
6. The computer helps me learn because it allows to express my thinking in better and different ways.	5	22	28	27	3	85	2.99 N
Grand Total	-	-	-	-	-	-	30.43 -
Grand Mean	-	-	-	-	-	-	3.04 N

Legend: 4.51 - 5.00 Strongly Agree (SA)/Very Favorable
 3.51 - 4.50 Agree (A)/Moderately
 2.51 - 3.50 Uncertain (U)/Neutral
 1.51 - 2.50 Disagree (D)/Unfavorable
 1.00 - 1.50 Strongly Disagree (SD)/Strongly Unfavorable

It can be gleaned that the highest mean was 3.12 which they were neutral to the statement "Working with my classmates in the computer laboratory is very useful". The second highest mean was 3.07 which they were neutral to the statement "The computer helps me understand concepts in more effective ways". The lowest mean of 2.75, on the other hand, signified also uncertain on the statement "The use of the computers as learning tool excites me". The second lowest mean of 2.87, interpreted as "Neutral" was posted on the statement "I feel comfortable with the idea of the computers as a tool in

teaching and learning". The grand mean of 3.04 indicated neutral attitude towards ICT. Hence, students are expected to have better level of performance towards ICT.

ICT literacy. Table 7 illustrates the student-respondents' ICT literacy. The top three highest mean were 2.70, 2.69, and 2.51 which corresponds to the following ICT literacy indicators: "Take digital pictures and download/upload them to computer, "Take digital video and download/upload it to my computer", and "Save files so they can be opened in different software version (i.e. MS Word 97 vs MS Word 2000)" which basically means they have done the task before, but might need some help. On the other hand, the top three lowest mean were 2.15, 2.16, and 2.21, respectively which corresponds to the ICT literacy indicators: "Connect and Use the CPS (Class Performance System Software)", "Create a functioning web page (knowledge of internet to create a web site) Microsoft word", and "Map a network drive to my web folder (or team web folder, if applicable).

Generally, the ICT literacy profile of the students were still on the stage of a "Learner" which basically means, they are on the process of becoming ICT literate as evidenced by the grand mean posted at 2.38. This may be attributed to the absence or inadequate computers in the previous years. In the absence of computers, students are completely dependent on their teachers for whatever knowledge, processes and skills they have to learn.

Table 7

Student-Respondents' ICT Literacy

Indicators	Scale					Total	Xw/Interpretation	
	5 SA	4 A	3 U	2 D	1 SD			
1. Create a functioning web page (<i>knowledge of internet to create a web site</i>) Microsoft word.	0	7	22	35	22	86	2.16 L	
2. Map a network drive to my web folder (or team web folder, if applicable).	3	6	21	32	25	87	2.21 L	
3. Connect and use the Smartboard.	2	9	28	25	19	83	2.40 L	
4. Connect and use an LCD projector with my laptop.	3	9	31	24	18	85	2.47 L	
5. Connect and use the CPS (Classroom Performance System Software).	3	5	25	20	31	84	2.15 L	
6. Create lessons or assessments in CPS (Classroom Performance System Software).	3	2	22	29	29	85	2.07 L	
7. Take digital pictures and download/upload them to my computer.	5	23	20	17	21	86	2.70 B	
8. Take digital video and download/upload it to my computer.	5	18	24	20	17	84	2.69 B	
9. Analyze data and create graphs in Microsoft Excel.	6	11	23	19	27	86	2.44 L	
10. Save files so they can be opened in different software version (i. e. MS Word 97 vs MS Word 2000).	5	11	26	22	20	84	2.51 B	
Grand Total	-	-	-	-	-	-	23.80	-
Grand Mean	-	-	-	-	-	-	2.38	L

Legend: 4.51 - 5.00 Advanced (A)/Could Train staff to do the task
 3.51 - 4.50 Proficient (P)/Can perform the task without any assistance
 2.51 - 3.50 Basic (B)/Have done before, but might need some help
 1.51 - 2.50 Learner (L)/Not sure how to do the task
 1.00 - 1.50 No knowledge at all (NKA)

Extent of ICT utilization. Table 8 shows the students' profile in terms of their extent of ICT utilization. As shown in the table, the students utilized

computers elsewhere in the school (e.g. library, computer lab, etc.) for at least 1-2 hours in a day as evidenced by the mean of 1.93 which interpreted as "Low Extent". Meanwhile, the extent of internet, statistical software, and other technology infrastructure utilization were very low which signifies further that they had utilized such technology for just less than an hour.

Table 8

Student-Respondents' Extent of ICT Utilization

Indicators	Scale					Total	Xw/Interpretation	
	5 VH	4 MH	3 H	2 L	1 VL			
1. Computers in a classroom	0	0	0	11	81	92	1.12	VL
2. Computers elsewhere in the school (e.g. library, computer lab, etc.)	0	0	1	84	7	92	1.93	L
3. Personal Computer/laptop/netbook	0	1	0	6	85	92	1.10	VL
4. Computers at home	0	0	0	5	87	92	1.05	VL
5. Internet in a classroom	0	0	0	6	86	92	1.07	VL
6. Internet at home	0	0	0	3	89	92	1.03	VL
7. school network through which can access the internet from home	0	0	0	3	89	92	1.03	VL
Statistical Software								
1. Microsoft Excel	0	0	0	8	84	92	1.09	VL
2. Microsoft Excel Add-in MegaStat	0	0	0	5	87	92	1.05	VL
3. Microsoft Excel Add-in pH Stat	0	0	0	4	88	92	1.04	VL
4. SPSS	0	0	0	5	87	92	1.05	VL
5. Minitab	0	0	0	3	89	92	1.03	VL
Other Technology Infrastructure								
1. LCD	0	0	0	10	82	92	1.11	VL
2. DVD	0	0	0	13	79	92	1.14	VL
Grand Total	-	-	-	-	-	-	15.84	-
Grand Mean	-	-	-	-	-	-	1.13	VL

Legend: 4.51 - 5.00 Very High (VH)/ICT is utilized in about 6 hours and above
 3.51 - 4.50 Moderately High (MH) /ICT is utilized at least 4-5 hours in a day
 2.51 - 3.50 High (H)/ICT is utilized at least 3-4 hours in a day
 1.51 - 2.50 Low (L)/ ICT is utilized at least 1-2 hours in a day
 1.00 - 1.50 Very Low (VL)/ICT is utilized less than 1 hour

In general, the accessibility and availability of the ICT infrastructure is very limited as a result to the very low extent of ICT utilization.

Availability of personal computer. Presented in Table 9 is the students' profile in terms of their availability of personal computer.

Table 9

Student-Respondents' Availability of Personal Computer

Availability of Personal Computer	f	Percent
Not Available (<i>w/o a personal computer</i>)	82	89.13
Available (<i>w/ a personal computer</i>)	8	8.70
Not Specified	2	2.17
Total	92	100.00

As shown in Table 9, there were 82 out of the 92 student-respondents having no available personal computer. Nevertheless, about eight or 8.70 percent of them had an available personal computer.

These findings suggest that more of the respondents does not possess personal computer.

Extent of Technology Integration by the Teachers in Teaching Selected Topics in Basic Statistics

Table 10 illustrates the extent of technology integration by the teachers in teaching selected topics in Basic Statistics.

As presented in Table 10, the extent of technology integration in the selected topics of Basic Statistics was reported by the teachers and students

Table 10
Extent of Technology Integration by the Teachers
In Teaching Selected Topics in Basic Statistics

Indicator	Respondents' Category				Combined Mean/Interpretation	
	Teacher		Student			
	Xw/Interpretation		Xw/Interpretation			
1. Practice drills	1.00	VL	1.00	VL	1.00	VL
2. Solve problems/analyze data	1.00	VL	1.00	VL	1.00	VL
3. Use computer applications such as word processing, spreadsheets, etc.	2.33	L	1.39	VL	1.86	VL
4. Graphical presentations of materials	1.33	VL	1.10	VL	1.22	VL
5. Demonstrations/simulations	1.33	VL	1.10	VL	1.22	VL
6. Produce multimedia reports/projects	2.33	L	1.39	VL	1.86	L
7. Research using CD-ROM	1.00	VL	1.00	VL	1.00	VL
8. Research using the internet	2.33	L	1.00	VL	1.67	L
9. Assessment delivery	1.00	VL	1.00	VL	1.00	VL
10. Student engagement directly with digital materials in class	1.00	VL	1.00	VL	1.00	VL
11. Assignment of digital materials for student access at home	1.33	VL	1.10	VL	1.22	VL
12. collaboration between students	1.67	L	1.20	VL	1.44	VL
Grand Total	17.65	-	13.28	-	15.49	-
Grand Mean	1.47	VL	1.11	VL	1.29	VL

Legend: 4.51 - 5.00 Very High (Technology is used 100% of the time in a semester)
 3.51 - 4.50 Moderately High (MH) (Technology is used at least 75% of the time in a semester)
 2.51 - 3.50 High (H) (Technology is used at least 50% of the time in a semester)
 1.51 - 2.50 Low (L) (Technology is used at least 25% of the time in a semester)
 1.00 - 1.50 Very Low (VL) (Technology is used below 25% of the time in a semester)

involved in the study. Specifically, the respondents rated 1.00 in practice drills, solve problems/analyze data, assessment delivery, and student engagement

directly with digital materials in class, indicating that they integrated technology as to very low extent in the said areas. In addition, they rated 1.86 and 1.67 which interpreted as "Low" extent of technology integration on the areas of producing multimedia reports/projects and research using internet.

Generally, technology integration in teaching selected topics in Basic Statistics was very low as evidenced by the grand mean of 1.29 which basically means that technology was used only below $\frac{1}{4}$ or below 25.00 percent of the time in a semester.

Relationship Between the Extent of Technology Integration By the Teachers in Teaching Selected Topics in Basic Statistics

Table 11 reflects the summary of the correlational analyses done between the extent of technology integration by the teachers in teaching selected topics in Basic Statistics and their profile variates namely: demographic characteristics - age, civil status, average family monthly income; professional characteristics - teaching experience, workload, number of preparation, academic degree obtained, scholarship grant, seminars and trainings attended; environmental characteristics - statistical software utilized, other technology infrastructure, other instructional materials used, computer-student ratio, extent of ICT utilization, ICT literacy, and attitude towards ICT.

Table 11

**Relationship Between the Extent of Technology Integration by
the Teachers in Teaching Selected Topics in Basic Statistics
and their Profile Variates**

Profile	Correlation Parameter		Evaluation
Age	Pearson Correlation	-0.219	Not Significant
	Sig. (2-tailed)	0.859	
	N	3	
Civil Status	Pearson Correlation	-0.735	Not Significant
	Sig. (2-tailed)	0.474	
	N	3	
Ave. Monthly Family income	Pearson Correlation	0.500	Not Significant
	Sig. (2-tailed)	0.667	
	N	3	
Teaching Experience	Pearson Correlation	-0.368	Not Significant
	Sig. (2-tailed)	0.76	
	N	3	
Workload	Pearson Correlation	-0.955	Not Significant
	Sig. (2-tailed)	0.193	
	N	3	
No. of Preparation	Pearson Correlation	0.219	Not Significant
	Sig. (2-tailed)	0.859	
	N	3	
Academic Degree Obtained	Pearson Correlation	0.735	Not Significant
	Sig. (2-tailed)	0.474	
	N	3	
Scholarship Grant	Pearson Correlation	-0.219	Not Significant
	Sig. (2-tailed)	0.859	
	N	3	
Seminars & Trainings Attended	Pearson Correlation	0.955	Not Significant
	Sig. (2-tailed)	0.193	
	N	3	
Statistical Software Utilized	Pearson Correlation	0.955	Not Significant
	Sig. (2-tailed)	0.193	
	N	3	

Table 11 continued

Profile	Correlation Parameter		Evaluation
Other Technology Infrastructure	Pearson Correlation	0.804	Not Significant
	Sig. (2-tailed)	0.405	
	N	3	
Other Instructional Materials Used	Pearson Correlation	0.735	Not Significant
	Sig. (2-tailed)	0.474	
	N	3	
Computer-Student Ratio	Pearson Correlation	0.955	Not Significant
	Sig. (2-tailed)	0.193	
	N	3	
Extent of ICT Utilization	Pearson Correlation	0.955	Not Significant
	Sig. (2-tailed)	0.193	
	N	3	
ICT Literacy	Pearson Correlation	0.566	Not Significant
	Sig. (2-tailed)	0.617	
	N	3	
Attitude Toward ICT	Pearson Correlation	0.735	Not Significant
	Sig. (2-tailed)	0.474	
	N	3	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

It can be noted in the analyses that teachers' civil status, workload, academic degree obtained, seminars and trainings attended, statistical software utilized, other technology infrastructure, other instructional materials, computer-student ratio, extent of ICT utilization and attitude towards ICT posted a very high relationship to the teachers' extent of technology integration but they were tested by its significance through the use of p-value, it turned out not to be significantly correlated due to very small number of observations.

Student-Respondents' Achievement Level in Selected Topics in Basic Statistics

Table 12 indicates the students' achievement in selected topics in Basic Statistics by the student-respondents.

Table 12

Student-Respondents' Achievement Level in Selected Topics in Basic Statistics

Rating	f	Percent
80	3	3.26
79	2	2.17
77	1	1.09
76	1	1.09
75	2	2.17
74	6	6.52
73	4	4.35
72	6	6.52
71	14	15.22
70	6	6.52
69	14	15.22
68	10	10.87
≤ 67	23	25.00
Total	92	100.00
Mean	70.00	-
SD	4.10	-

The highest scores obtained by the students with regards to the achievement in Basic Statistics, it was posted at a rating of 80 having only three students got the said score. One each got a rating of 79, 78, 77, and 76. Further,

there were eight students got a rating of 66 and below. It also reflected that majority of them had a rating of 71 with a mean of 70.91 and standard deviation of 3.53. These data revealed that the achievement level of the respondents were below average. This result was an evidence that students did not achieve the specific objectives of the course. This may be attributed to the very extent of technology integration in teaching selected topics in Basic Statistics. This result confirm the studies of Tretten and Zachariou (1995), Boaler (1999), and Ryba and Brown (2000) stating that computers can successfully enhance problem solving abilities of the students and project-based learning students developed a more flexible form of mathematical knowledge that they were able to apply in a range of settings. Likewise, learning, which occurs in the context of problem solving, is more likely to be retained and applied than inert knowledge acquired through more traditional teaching method.

Relationship Between the Students' Achievement Level On the Selected Topics in Basic Statistics and their Profile Variates

Table 13 showcases the results of the correlational analysis between the students' achievement level on the selected topics in Basic Statistics and their profile variates.

It can be gleaned that the only variate that correlated significantly with the students' achievement level was course registering a correlation coefficient of 0.225. When tested for its significance using p-value method, the p-value (sig.)

Table 13

**Relationship Between Students' Achievement Level
On the Selected Topics in Basic Statistics
and their Profile Variates**

Profile	Correlation Parameter		Evaluation
Age	Pearson Correlation	-0.075	Not Significant
	Sig. (2-tailed)	0.482	
	N	91	
Sex	Pearson Correlation	0.182	Not Significant
	Sig. (2-tailed)	0.094	
	N	91	
Course	Pearson Correlation	.225*	Significant
	Sig. (2-tailed)	0.031	
	N	92	
Availability of Personal Computer	Pearson Correlation	-0.161	Not Significant
	Sig. (2-tailed)	0.129	
	N	90	
Extent of ICT Utilization	Pearson Correlation	0.194	Not Significant
	Sig. (2-tailed)	0.065	
	N	92	
ICT Literacy	Pearson Correlation	0.103	Not Significant
	Sig. (2-tailed)	0.33	
	N	91	
Attitude Toward Computer	Pearson Correlation	0.095	Not Significant
	Sig. (2-tailed)	0.422	
	N	91	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

was pegged at 0.003 which was lesser than the level of significance of 0.05. Thus, the hypothesis involving the relationship between these two variables was rejected. It meant that course affected the students' achievement on the selected topics in Basic Statistics. The r being positive, denoted that the relationship

between these variates was directly proportional. It meant that students in non-technical courses tend to have high level content-learning in Basic Statistics. Moreover, students in technical courses tend to have low content-learning in Basic Statistics. This is somehow due to the fact that students in non-technical courses had more in academic subjects like mathematics, language, and the like. While those students in technical courses, focused more in their major subjects where in they do it manually in their shop.

Between students' achievement level and the rest of the students' profile the computed r 's were: -0.075 for age; 0.182 for sex; -0.161 for availability of personal computer; 0.194 for extent of ICT utilization; 0.103 for ICT literacy; 0.085 for attitude towards computer. Using p -value to test its significance, the p -values posted at 0.485, 0.084, 0.129, 0.065, 0.33, and 0.422, respectively, which proved higher than the 0.05 level of significance. Hence, the hypotheses involving the students' achievement level and the abovementioned variates were accepted. It meant that other students' personal characteristics did not matter to the students' achievement level in Basic Statistics.

Relationship Between the Extent of Technology Integration by the Teachers Teaching Selected Topics in Basic Statistics and the Student-Respondents' Achievement Level

The correlational analysis done between the extent of technology integration by the teachers teaching selected topics in Basic Statistics and the student-respondents' achievement level is summarized in Table 14.

Table 14

**Relationship Between the Extent of Technology Integration by
the Teachers in Teaching Selected Topics in Basic Statistics
and Student-Respondents' Achievement Level**

Level	Correlation Parameter		Evaluation
Content-Learning	Pearson Correlation	.86**	Significant
	Sig. (2-tailed)	0	
	N	92	

** Correlation is significant at the 0.01 level (2-tailed).

It can be seen from the table, the correlational analyses between the aforementioned variables yielded a computed r of 0.86. When tested for its significance by using 0.05 level of significance and p -value of 0.01, these values show that the p -value (sig.) was lesser than the level of significance. Thus, the hypothesis involving the relationship between the extent of technology integration by the teachers in teaching selected topics in Basic Statistics and the students' achievement level was rejected. It meant that somehow technology integration in teaching affect the achievement of the students. With a positive correlation coefficient, it denoted that the relationship between them was directly proportional. It could be said that the higher was the technology integration in teaching, the higher the students' achievement the students had. On the same manner, when the technology integration in teaching was low, students' achievement would also be low. It further indicates that technology integration in teaching statistics at any rate is somehow effective.

Nonetheless, the regression analysis was used to determine the model of the teachers' extent of technology integration in teaching Basic Statistics and the students' achievement in Basic Statistics. Table 15 illustrates the results of the analysis.

Table 15

**Regression Analysis Between the Extent of Technology Integration
by the Teachers Teaching Selected Topics in Basic Statistics**

Model Summary				
Variable	Beta	Std. Error	t	Sig
(Constant)	11.862	5.174	0.504	0.262
Technology Integration	1.681	3.365	2.292	0.045
r^2	0.74			

The result of the analysis gave the regression equation model, $y = 11.862 + 1.681X$. Interpreting technology integration in teaching statistics in terms of the value of the coefficient of 1.681, it further meant that for an every one hour increase of integrating technology in teaching statistics, it is expected that the students' academic performance in Basic Statistics will increase for about 1.681.

Further analysis showed that the extent of technology integration in teaching basic statistics, explains 74.00 percent of the variation in the students' achievement in Basic Statistics, leaving about 26.00 percent unexplained by the variable.

Implications from the Findings of the Study

The results of the analyses of data showed that teachers' profile does not affect or does not influence in teaching Basic Statistics using technology which meant that they can integrate technology in teaching the subject as long as it was in her/his preferred strategies in teaching. Nevertheless, to the fact that the teachers had a very favorable attitude towards ICT, this is an implication that teachers had a positive view on teaching the subject using some form of technology and with that, it could be implied that teachers would be more likely to integrate technology in teaching the subject.

However, teachers showed a very low extent of technology integration in teaching Basic Statistics which could be implied that they do not have yet sufficient knowledge and necessary skills in integrating technology in the teaching process. Likewise, lack of accessibility on computers and internet could be a predictor.

The extent of technology integration by the teachers in teaching selected topics in Basic Statistics had something to do with the students' achievement in the subject. Thus, it is recommended that there is a need for the teachers to embrace the Pedagogical Technology Content Knowledge (TPCK) concept developed by Thomas and Hong (cited by Neiss, 2005) that, technology has been an important instrument for learning, hence teachers must also develop an overarching conception of their subject matter in teaching with technology. Moreover, the result also implies to provide teachers with state-of-the art

technology including hardware and software as well as provide them with some release time so that they can plan effectively for technology integration in teaching.

Chapter 5

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains the summary of findings, the conclusions derived from the findings and the corresponding recommendations.

Summary of Findings

The study crystallized the following salient findings:

1. In relation to the teachers' demographic characteristics; the typical statistics teacher is 42 years old, female, married, and had an income of Php40,295.67. As to their professional characteristics; they obtained a doctoral degree, spent 19 years in teaching, attended training on SPSS, had a very high favorable attitude towards ICT, basically ICT literate, had 11 workloads and six preparations, and had low extent of ICT utilization. Likewise, as to environmental characteristics; only one teacher had available internet while two of them had no available or no accessibility to an internet, one class had 1computer:1 student while five classes had 1computer:1class ratio, only one teacher utilized statistical software such as, Microsoft Excel, Microsoft Excel Add-in pH stat and SPSS, they all used books and module while two of them also used hand-out in teaching Basic Statistics.

2. The students had an average age of 18.85 years with a standard deviation of 1.83 years old, majority were males taking up Bachelor of

Technology, had favorable attitude towards ICT, they were on the stage as beginner or learner in relation to ICT literacy, showed a very low extent of ICT utilization and most of them do not have available personal computer.

3. The teachers' extent of technology integration in teaching selected topics in Basic Statistics as reported by themselves and the students, revealed "very low" having a grand mean of 1.29 which basically means that the technology was used for only below 25.00 percent of the time in a semester.

4. The correlational analysis between the extent of technology integration by the teachers teaching selected topics in Basic Statistics and their demographic, professional, and environmental characteristics were accepted.

5. The students' achievement level revealed a mean of 70.00 with a standard deviation of 4.91.

6. The result of the correlational analysis between the students' achievement level and their course profile registered a correlation coefficient of 0.225. When tested for its significance using p-value, the p-value (sig.) was pegged at 0.003 which was lesser than the level of significance of 0.05. Thus, the hypothesis involving the relationship between these two variables was rejected. Meanwhile, between students' achievement level and the rest of the students' profile were accepted.

7. The correlational analysis between the extent of technology integration by the teachers teaching selected topics in Basic Statistics and the students' achievement level yielded a computed r of 0.428. When tested for its

significance by using 0.05 level of significance and p-value of 0.01, these values proved that p-value (sig.) was lesser than the level of significance. Thus, the hypothesis involving the relationship between the extent of technology integration by the teachers in teaching selected topics in Basic Statistics and the students' achievement was rejected. It meant that somehow technology integration in teaching affect the achievement on the part of the students. With a positive correlation coefficient, it denoted that the relationship between them was directly proportional. It could be said that the higher was the technology integration in teaching, the higher the achievement the students had. On the same manner, when the technology integration in teaching was low, the lower the achievement would be.

Conclusions

On the basis of foregoing findings the study came up with the following conclusions:

1. The teachers were in their forties, apparently at their prime and active age; all females; mostly were married; had adequate income; highly qualified for their present positions; had adequate experience in teaching; had adequate income; lacks of seminars and trainings attended relevant to Statistics; possessed a very favorable attitude towards ICT; had basic knowledge in ICT; had small extent of ICT utilization; had sufficient workload and highly sufficient preparations; had limited access on internet; had limited computer available in a

class; few of them utilized statistical software, and they all used books, module and hand-out as their other instructional materials used in teaching selected topics in Basic Statistics.

2. The students were in their typical college students; dominated by males; represented by Bachelor of Technology course; all sophomore; had favorable attitude towards ICT; ICT learner; utilized ICT less than an hour in a day, and most of them have no available personal computer.

3. Teachers integrate technology in teaching selected topics in Basic Statistics for just below 25 percent of the time in a semester.

4. The extent of technology integration by the teachers in teaching selected topics in Basic Statistics did not correlate significantly with demographic characteristics - age, civil status, average family monthly income; professional characteristics - teaching experience, workload, preparation, academic degree obtained, scholarship grant, seminars and trainings attended; attitude towards ICT; ICT literacy; workload and number of preparation, and extent of ICT utilization; environmental characteristics - availability of internet, computer-student ratio, statistical software utilized; technology infrastructure, and other instructional materials used. This means that the profile of the teachers has nothing to do with their extent of technology integration in teaching.

5. The students' achievement level in the selected topics in Basic Statistics was basically below average.

6. The students' achievement level did not correlated significantly with age, sex, year level, attitude towards ICT, ICT literacy, extent of ICT utilization, and availability of personal computer. This means that the students' achievement level was not affected by the abovementioned students' profile variates. Meanwhile, students' course correlated significantly. This further means that those students enrolled in non-technical courses had high level in achievement in statistics, while, those students enrolled in technical courses tend to have low achievement level. This implies, that students in non-technical courses focuses more on the academic subjects or have more mathematics subjects offered than those in technical courses, moreover, those students in technical courses focuses more in the manual content-learning target.

7. Extent of technology integration by the teachers in teaching selected topics in Basic Statistics correlated significantly with the students' achievement level. It signifies that when the extent of technology integration in teaching was high, the students' achievement tends to become high. In the same manner, when the extent of technology integration in teaching was low, the students' achievement tends also to become low.

Recommendations

Based on the foregoing findings and conclusions, the following recommendations are advanced:

1. Policy makers and educational planners should formulate realistic policies and plans toward a more widespread and efficient computer use in instruction in various higher and basic education institutions.
2. School administrators and department heads should consider teachers' ICT literacy and experience in computer use, and ownership of computer as a possible criteria in the assignment of teachers in Statistics.
3. Teachers who are not computer literate or non-computer users should undertake computer trainings so that they could acquire sufficient knowledge/skills necessary for them to become efficient users of computers as tools in teaching Statistics.
4. An in-service training on Statistics and other related trainings for teachers should be undertaken.
5. Teachers should integrate technology in teaching the curriculum to improve the students' achievement.
6. Students should have to take initiatives to continually develop their attitudes, knowledge and skills in the use of computers as aids of their achievement in statistics.
7. To improve students' achievement level in Basic Statistics, desirable change in teachers' classroom practices is imperative to achieve the desired competency level of the learners in the same subject and address issues of concern recognized by the teachers themselves.

8. Study may be done to compare the students' achievement in Basic Statistics with technology integration in the curriculum using experimental design as well as to determine factors affecting technology integration in teaching Statistics.

9. A replicate study may be done to include other schools.

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APPENDICES



Republic of the Philippines
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Website: www.ssu.edu.ph



October 28, 2014

DR. MARILYN D. CARDOSO
Vice President for Academic Affairs/
Dean College of Graduate Studies
This University

Madam:

May I have the honor to submit the following titles for my thesis proposal.

It is my earnest desire to study one of these titles for my thesis:

1. Success Factors for Technology Integration in Teaching Statistics
2. Competencies of Fourth Year BSAS Students in Statistics: Input for Curriculum Revision
3. Behaviors of BSAS Students and Non-BSAS students Towards Statistics.

I hope for your favorable action regarding this matter.

Respectfully yours,

(SGD.) **EMMA Q. TENEDERO**
Researcher

APPROVED:

(SGD.) **MARILYN D. CARDOSO, Ph. D.**
Vice President for Academic Affairs/
Dean, College of Graduate Studies



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October 14, 2014

TO:

Dr. Eusebio T. Pacolor
Dr. Florabelle B. Patosa

Dr. Ronald L. Orale
Dr. Jose S. Labro

May I ask you to be a member of the committee to evaluate the attached Thesis/Dissertation title?

Please give your comments and suggestions which you will discuss with the proponent.

Thank you for your cooperation.

Very truly yours,

(SGD.) MARILYN D. CARDOSO, Ph. D.
Dean, College of Graduate Studies

EVALUATION/RECOMMENDATIONS



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December 15, 2014

DR. VICTORIA M. TAFALLA
 Dean, College of Education
 This University

Madam:

The undersigned is currently enrolled in thesis writing entitled, "**Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning**". In this regard, please allow her to access some of your data, more specifically, your class schedule last semester (first semester, SY 2014-2015) for her to know the faculty members of your college who taught the subject, Basic Statistics in said period. The data that will be gathered will be used solely for this purpose.

Hoping for your favorable action regarding this matter.

Thank you very much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

Recommending Approval:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 University President/Adviser

(SGD.) MARILYN D. CARDOSO, Ph.D.
 Vice President for Academic Affairs/
 Dean, College of Graduate Studies

Approved:

(SGD.) VICTORIA M. TAFALLA, Ph. D.
 Dean, College of Education



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December 15, 2014

ENGR. LOURDES P. AMANTE
 Dean, College of Engineering
 This University

Madam:

The undersigned is currently enrolled in thesis writing entitled, **“Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning”**. In this regard, please allow her to access some of your data, more specifically, your class schedule last semester (first semester, SY 2014-2015) for her to know the faculty members of your college who taught the subject, Basic Statistics in said period. The data that will be gathered will be used solely for this purpose.

Hoping for your favorable action regarding this matter.

Thank you very much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

Recommending Approval:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 University President/ Adviser

(SGD.) MARILYN D. CARDOSO, Ph. D.
 Vice President for Academic Affairs/
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Approved:

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December 15, 2014

DR. LOLITO O. AMPARADO
 Campus Director, College of Fisheries
 and Marine Sciences
 This University

Sir:

The undersigned is currently enrolled in thesis writing entitled, **“Extent of Technology Integration in Teaching Statistics: Its Implication to Learning Content”**. In this regard, please allow her to access some of your data, more specifically, your class schedule last semester (first semester, SY 2014-2015) for her to know the faculty members of your college who taught the subject, Basic Statistics in said period. The data that will be gathered will be used solely for this purpose.

Hoping for your favorable action regarding this matter. Thank you very much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

Recommending Approval:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 University President/ Adviser

(SGD.) MARILYN D. CARDOSO, Ph. D.
 Vice President for Academic Affairs/
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Approved:

(SGD.) LOLITO M. AMPARADO, Ph. D.
 Campus Director , College of Fisheries
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December 15, 2014

DR. VALENTINA W. DACULA
 Director, Paranas Campus
 This University

Madam:

The undersigned is currently enrolled in thesis writing entitled, "**Extent of Technology Integration in Teaching Statistics: Its Implication to Learning Content**". In this regard, please allow her to access some of your data, more specifically, your class schedule last semester (first semester, SY 2014-2015) for her to know the faculty members of your college who taught the subject, Basic Statistics in said period. The data that will be gathered will be used solely for this purpose.

Hoping for your favorable action regarding this matter. Thank you very much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

Recommending Approval:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 University President/ Adviser

(SGD.) MARILYN D. CARDOSO, Ph. D.
 Vice President for Academic Affairs/
 Dean, College of Graduate Studies

Approved:

(SGD.) VALENTINA W. DACULA
 Director , Paranas Campus



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December 15, 2014

DR. FLORABELLE B. PATOSA
 Dean, College of Arts and Sciences
 This University

Madam:

The undersigned is currently enrolled in thesis writing entitled, "**Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning**". In this regard, please allow her to access some of your data, more specifically, your class schedule last semester (first semester, SY 2014-2015) for her to know the faculty members of the colleges who taught the subject, Basic Statistics in said period. The data that will be gathered will be used solely for this purpose.

Hoping for your favorable action regarding this matter.

Thank you very much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

Recommending Approval:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 University President/Adviser

(SGD.) MARILYN D. CARDOSO, Ph. D.
 Vice President for Academic Affairs/
 Dean, College of Graduate Studies

Approved:

(SGD.) FLORABELLE B. PATOSA, Ph. D.
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January 7, 2015

DR. AVELINA N. BERGADO
 University President
 Northwest Samar State University

Madam:

The undersigned is a bonafide student of the College of Graduate Studies of this university taking the degree of Master of Arts in Teaching major in Mathematics who is currently conducting a thesis writing entitled **"Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning"**.

In this regard, she would like to ask permission from your good office to please allow her to conduct a pilot testing of her survey instruments to the students and teachers in the subject, Basic Statistics on January 9, 2015 (Friday). The data which will be gathered will serve as bases on making of the final copy of the said research instruments

Hoping for your favorable approval and accommodation on this request.

Thank you so much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

Recommending Approval:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 University President/Adviser

(SGD.) MARILYN D. CARDOSO, Ph. D.
 Vice - President for Academic Affairs/
 Dean, College of Graduate Studies

APPROVED:

(SGD.) AVELINA N. BERGADO, Ph. D.
 University President, NwSSU



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January 12, 2015

DR. EUSEBIO T. PACOLOR

University President

This University

Sir:

Greetings!

The undersigned is a bonafide student of the College of Graduate Studies of this university taking the degree of Master of Arts in Teaching major in Mathematics who is currently conducting a thesis writing entitled "Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning".

In connection to this, the undersigned would like to ask permission from your good office to please allow her to conduct her survey instrument to the students and teacher-respondents from SSU main campus and Mercedes campus specifically to the College of Arts Sciences, College of Industrial Technology, and College of Marine Sciences.

Hoping for an affirmative response on this request.

Thank you so much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO

Researcher

Recommending Approval:

(SGD.) MARILYN D. CARDOSO, Ph. D.

Vice - President for Academic Affairs/
 Dean, College of Graduate Studies

APPROVED:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.

University President



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January 12, 2015

DR. FLORABELLE B. PATOSA
 Dean, College of Arts and Sciences
 This University

Sir:

Greetings!

The undersigned is a bonafide student of the College of Graduate Studies of this university taking the degree of Master of Arts in Teaching major in Mathematics who is currently conducting a thesis writing entitled "Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning".

In connection to this, the undersigned would like to ask permission from your good office to please allow her to conduct her survey instrument to the BS Applied Statistics students who took up the subject Basic Statistics during first semester SY 2014-2015 and the teacher who also handled the subject Basic Statistics of the said term. The data that will be gathered will be used solely for research purposes only.

Hoping for an affirmative response on this request.

Thank you so much.

Respectfully yours,

(SGD.) **EMMA Q. TENEDERO**
 Researcher

Noted:

(SGD.) **EUSEBIO T. PACOLOR, Ph. D.**
 Adviser/University President

APPROVED:

(SGD.) **FLORABELLE B. PATOSA, Ph. D.**
 Dean, College of Arts and Sciences



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January 12, 2015

DR. ALEX A. CARDOSO

Dean, College of Industrial Technology
 This University

Sir:

Greetings!

The undersigned is a bonafide student of the College of Graduate Studies of this university taking the degree of Master of Arts in Teaching major in Mathematics who is currently conducting a thesis writing entitled "**Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning**".

In connection to this, the undersigned would like to ask permission from your good office to please allow her to conduct her survey instrument to the BS Applied Statistics students who took up the subject Basic Statistics during first semester SY 2014-2015 and the teacher who also handled the subject Basic Statistics of the said term. The data that will be gathered will be used solely for research purposes only.

Hoping for an affirmative response on this request.

Thank you so much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

Noted:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.
 Adviser/University President

APPROVED:

(SGD.) ALEX A. CARDOSO, Ph. D.
 Dean, College of Industrial Technology



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January 12, 2015

DR. LOLITO O. AMPARADO

Campus Director

SSU - Mercedes Campus

Sir:

Greetings!

The undersigned is a bonafide student of the College of Graduate Studies of this university taking the degree of Master of Arts in Teaching major in Mathematics who is currently conducting a thesis writing entitled "Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning".

In connection to this, the undersigned would like to ask permission from your good office to please allow her to conduct her survey instrument to the BS Applied Statistics students who took up the subject Basic Statistics during first semester SY 2014-2015 and the teacher who also handled the subject Basic Statistics of the said term. The data that will be gathered will be used solely for research purposes only.

Hoping for an affirmative response on this request.

Thank you so much.

Respectfully yours,

(SGD.) EMMA Q. TENEDERO

Researcher

Noted:

(SGD.) EUSEBIO T. PACOLOR, Ph. D.

Adviser/University President

APPROVED:

(SGD.) LOLITO O. AMPARADO, Ph. D.

Campus Director



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Telephone Numbers: (055)-543-8394 / (055)-251-2139

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Dear Respondents:

Greetings!

The undersigned is currently enrolled in the Masters Degree Program of Samar State University and presently working on her thesis entitled, "Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning". In this connection, the researcher humbly requests that the attached questionnaires be answered. Rest assured that all the information you fill out will be anonymised and treated with confidence.

Your cooperation on this matter will greatly contribute to the success of the undertaking.

Thank you very much!

Very truly yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

SURVEY INSTRUMENT FOR TEACHER-RESPONDENTS

I - PROFILE

A. DEMOGRAPHIC CHARACTERISTICS

Direction: Please check or write your answer on the space provided.

1. Age: _____
2. Sex: _____ Male _____ Female
3. Civil Status: _____ Single _____ Married _____ Separated _____ widow/er
4. Income: _____

5. Do you have other family members who also earn? _____ YES _____ NO

If yes, please specify below:

Name	Relationship	Estimated Income

B. PROFESSIONAL-RELATED CHARACTERISTICS

6. Years of teaching experience: _____

7. How many workload do you have during first semester, SY 2014-2015?

8. How many preparations do you have during first semester, SY 2014-2015?

9. Educational Background:

Level	Major	Minor
Undergraduate		
w/ MA/MS Units		
w/ MA/MS CAR		
MA/MS Graduate		
Ed.D/Ph.D. units		
Ed.D/Ph.D. CAR		
Ed.D/Ph.D./TM Graduate		

10. What scholarship scholarship grants have you availed?

Scholarship Grant/Program	Level/Classification (<i>Short course/Undergraduate/Graduate/Post Graduate?</i>)	Period

11. Seminars/Trainings Attended related to ICT in statistics:

Tile of Seminars/Trainings Attended	Level	Period

C. ENVIRONMENTAL FACTORS

12. Statistics session during the first semester SY 2014-2015

Class Schedule		No. of Units	Number of Sessions		Estimated No. of HRS. of Computer Utilization/Session
Day	Time		Target	Actual	

13. What statistical software have you used in teaching Basic Statistics? (please check)

	Estimated No. of Hrs Utilized
___ Microsoft Excel	_____
___ Microsoft Excel Add-in Mega Stat	_____
___ Microsoft Excel Add-in pH Stat	_____
___ Statistical Package Software for Social Sciences (SPSS)	_____
___ Minitab	_____
___ Others (please specify)	_____
_____	_____
_____	_____

14. What **other technology infrastructure** did you use in teaching basic statistics?
(please check)

Technology Infrastructure	(Check here)	Estimated Total Number of Hours Utilized	Topic
LCD Projector			
DVD			
Others _____ please specify: _____			

15. What other instructional materials did you used in the subject Basic Statistics?

Type of Instructional Material	(Please check here)	Topic
Module		
Hand-out		
Books		
Others _____ (please specify) _____		

16. Are the following available to you, and if yes, to what extent do you use them?

Indicator	Available		If available, indicate the number of hours/day
	YES (1)	NO (2)	
Computers in your classroom			
Computers elsewhere in the school (e.g, library, Computer lab, etc)			
Personal Computer/laptop/netbook			
Computers at home			
Internet in your classroom			
Internet at home			
School network through which you can access the internet from home			

II – ICT LITERACY

Please rate your own ICT literacy by checking the corresponding numbers: 1- No. knowledge at all, 2-Learner: I am not sure how to do this task, 3-Basic: I have done this before, but might need some help, 4-Proficient: I can perform this task without any assistance, 5-Advanced: I could train staff to do this.

INDICATOR	1 No Knowledge at All	2 Learner: I am not sure how to do this task,	3 Basic: I have done this before, but might need some help	4 Proficient: I can perform this task without any assistance,	5 Advanced: I could train staff to do this
1. Create a functioning web page (<i>knowledge of internet to create a web site</i>) Microsoft word					
2. Map a network drive to my web folder (or team web folder, if applicable)					
3. Connect and use the Smartboard					
4. Connect and use an LCD projector with my laptop					
5. Connect and use the CPS (Classroom Performance System Software)					
6. Create lessons or assessments in CPS (Classroom Performance System Software)					
7. Take digital pictures and download/upload them to my computer.					
8. Take digital video and download/upload it to my computer					
9. Analyze data and create graphs in Microsoft Excel					
10. Save files so they can be opened in different software version (i. e. MS Word 97 vs MS Word 2000)					

III - TEACHERS' ATTITUDE TOWARDS COMPUTER

Identify as to what extent you either agree or disagree with the following statements by checking the corresponding numbers: 1=strongly Disagree (SD), 2=Disagree (D), 3=Neutral(N) 4= Agree (A), 5=Strongly Agree (SA)

INDICATOR	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)
I feel comfortable using computer.					
Computers effective teaching-learning tools					
Computers are a fast means of getting information					
The use of the computer as a learning tool excites me					
Computers can enhance students' learning					
The computer is a valuable tool for teachers					
The computer will change the way I teach					
The computer will change the way students learn in my classes					
Teaching with computers offers real advantages					
The computer helps students understand concepts in more effective ways					
The computer helps students learn because it allows them to express their thinking in better and different ways					

IV - How many times did you used computers or internet in Basic Statistics subjects in the following ways?

(Please indicate the number of times have you taught the subject involving computers or internet on the space provided).

Indicator	Frequency	Duration
1. Practice drills		
2. Solve problems/ analyze data		
3. Use computer applications such as word processing, spreadsheets, etc.		
4. Graphical presentations of materials		
5. Demonstrations/simulations		
6. Produce multimedia reports/projects		
7. Research using CD-ROM		
8. Research using the internet		
9. Assessment delivery		
10. Student engagement directly with digital materials in class		
11. Assignment of digital materials for student access at home		
12. collaboration between students		



Republic of the Philippines
 SAMAR STATE UNIVERSITY
 COLLEGE OF GRADUATE STUDIES
 Catbalogan, Samar

Telephone Numbers: (055)-543-8394 / (055)-251-2139

Website: www.ssu.edu.ph



Dear Respondents:

Greetings!

The undersigned is currently enrolled in the Masters' Degree Program of Samar State University and presently working on her thesis entitled, "Extent of Technology Integration in Teaching Statistics: Its Implication to Content-Learning". In this connection, the researcher humbly requests that the attached questionnaires be answered. Rest assured that all the information you fill out will be anonymised and treated with confidence.

Your cooperation on this matter will greatly contribute to the success of the undertaking.

Thank you very much!

Very truly yours,

(SGD.) EMMA Q. TENEDERO
 Researcher

SURVEY INSTRUMENT FOR STUDENT-RESPONDENTS

I - PROFILE

Direction: Please check or write your answer on the space provided.

1. Age: _____
2. Sex: ____ Male ____ Female
3. Course: _____
4. Year Level: _____
5. Do you have a personal computer/netbook/laptop? ____ YES ____ NO

6. Are the following available to you, and if yes, to what extent do you use them?

Indicator	Available		If available, indicate the number of hours/day
	YES (1)	NO (2)	
Computers in your classroom			
Computers elsewhere in the school (e.g, library, Computer lab, etc)			
Personal Computer/laptop/netbook			
Computers at home			
Internet in your classroom			
Internet at home			
School network through which you can access the internet from home			
Statistical Software:			
Microsoft Excel			
Microsoft Excel Add-in MegaStat			
Microsoft Excel Add-in pH Stat			
Statistical Packages Software for Social Science (SPSS)			
Minitab			
Others (<i>please specify</i>)			
Other Technology Infrastructure:			
LCD			
DVD			
Others (<i>please specify</i>)			

II - STUDENTS' ATTITUDE TOWARDS COMPUTER

Identify as to what extent you either agree or disagree with the following statements by checking the corresponding numbers: 1=*strongly Disagree (SD)*, 2=*Disagree (D)*, 3=*Neutral(N)* 4= *Agree (A)*, 5=*Strongly Agree (SA)*

INDICATOR	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)
1. I feel comfortable with the idea of the computers as a tool in teaching and learning					
2. The use of computers in learning motivates me.					
3. The use of the computers as learning tool excites me					
4. Working with my classmates in the computer laboratory is very useful.					
5. The computer helps me understand concepts in more effective ways.					
6. The computer helps me learn because it allows to express my thinking in better and different ways.					

II - ICT LITERACY

Please rate your own ICT literacy by checking the corresponding numbers: **1- No. knowledge at all, 2-Learner: I am not sure how to do this task, 3-Basic: I have done this before, but might need some help, 4-Proficient: I can perform this task without any assistance, 5-Advanced: I could train staff to do this.**

INDICATOR	1 No Knowledge at All	2 Learner: I am not sure how to do this task,	3 Basic: I have done this before, but might need some help	4 Proficient: I can perform this task without any assistance,	5 Advance d: I could train staff to do this
2. Create a functioning web page (knowledge of internet to create a web site) Microsoft word					
2. Map a network drive to my web folder (or team web folder, if applicable)					
3. Connect and use the Smartboard					
4. Connect and use an LCD projector with my laptop					
5. Connect and use the CPS (Classroom Performance System Software)					
6. Create lessons or assessments in CPS (Classroom Performance System Software)					
7. Take digital pictures and download/upload them to my computer.					
8. Take digital video and download/upload it to my computer					
9. Analyze data and create graphs in Microsoft Excel					
10. Save files so they can be opened in different software version (i. e. MS Word 97 vs MS Word 2000)					

III – In your subject Basic Statistics, how many times have you used computers or internet in the following ways?

(Please indicate the number of times have you taught the subject involving computers or internet on the space provided).

Indicator	Frequency	Duration
1. Practice drills		
2. Solve problems/analyze data		
3. Use computer applications such as word processing, spreadsheets, etc.		
4. Graphical presentations of materials		
5. Demonstrations/simulations		
6. Produce multimedia reports/projects		
7. Research using CD-ROM		
8. Research using the internet		
9. Assessment delivery		
10. Student engagement directly with digital materials in class		
11. Assignment of digital materials for student access at home		
12. collaboration between students		

THANK YOU SO MUCH FOR YOUR COOPERATION.

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ACHIEVEMENT TEST
 IN
BASIC STATISTICS

TOPIC	COGNITIVE SKILLS TESTED							TOTAL
	KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION	PSYCHOMOTOR	
Basic Concepts of Statistics	43	37, 38, 46		39	45			6
Frequency Distribution & Graphical Presentation	2, 3, 8, 36	4, 42		1, 7	5, 6, 9, 10			12
Measures of Central Tendency	11, 47	13, 14, 41		12, 20	13, 30	16, 17, 18, 19		13
Measures of Positional Measures		34				31, 32, 33, 50		5
Measures of Variability	48	28, 30, 49		23	27, 25, 26	21, 22, 24, 29, 35		13
TOTAL	6	12		6	5	18		50

Prepared by: **EMMA Q. TENEDERO** – Researcher

Samar State University
Catbalogan City, Samar

ACHIEVEMENT TEST FOR BASIC STATISTICS

Direction: Choose the letter that corresponds to the questions. Write only the letter of your answer. **NOTE:** Answer must be in a CAPITAL LETTER.

- When a straight line segments are connected through the midpoints at the top of the rectangles of a histogram with the two ends "tie down" to the horizontal axis, the resulting graph is called
 - A bar chart
 - A frequency polygon
 - A pie chart
 - A Frequency Distribution
- The cumulative relative frequency for a given class is defined to be
 - The proportion of values preceding the given class
 - The proportion of values smaller than and including the given class when the classes are ascending order of magnitude
 - The proportion of values for the given class
 - The proportion of values below the given class
- A property of a frequency polygon is that
 - A histogram is always needed in the construction of the polygon
 - The polygon is made up of line segments
 - The end points of the polygon need not be tied down to the horizontal axis at both ends
 - The polygon can be constructed on a pie chart.
- Can a frequency distribution have overlapping classes?
 - Sometimes
 - No
 - Yes
 - all of the above
- Organizing observed data into tabular form in which classes and frequencies are used is called
 - Bar chart
 - B. pie chart
 - C. frequency distribution
 - D. frequency polygon
- The following table shows the distribution of scores on a final basic statistics examination for a large section of students.

Scores	Number of Students
80-89	12
70-79	40
60-69	18
50-59	13
40-49	6

What is the class width of the above frequency distribution?

- 9
- 10
- 7
- 1

7. **The most frequently occurring value in a data set is called the**
A. spread B. mode
C. skewness D. maximum value
8. **The mean of a set numerical data is the value that represents**
A. the middle value of the data set
B. the most frequently observed value
C. the average of the squared deviations of the values from the mean of the data set
D. the arithmetic average of the data set
9. **The median of an ordered set of data is the value that represents**
A. the middle or the approximate middle value of the data set
B. the most frequently observed value of the data set
C. the average of the squared deviations of the values from the mean of the data set
D. the arithmetic average of the data set
10. **A statement is made that more students are purchasing graphing calculators than any other type of calculator. Which measure is being used here?**
A. Mean B. Median C. Mode D. None of the above
11. **A cyclist recorded the following quiz scores (out of a possible 10 points) for the 12 students who were present for her Friday afternoon statistics class. The scores were 7, 4, 4, 7, 9, 10, 6, 7, 3, 8, 5. The mode for this set of scores is**
A. 9.5 B. 7 C. 6 D. 3
12. **A cyclist recorded the number of miles per day she cycled for five days. The recordings were as follows: 13, 10, 12, 10, 11. The mean (average) number of miles she cycled per day was**
A. 13 B. 11 C. 10 D. 11.2
13. **Which of the following is true for a positively skewed distribution?**
A. Mode=median=mean C. mean>median>mode
B. Mean<median<mode D. median<mode<mean
14. **Given the following sample values, what is the sample variance?**
15, 20, 40, 25, 35
A. 9.27 B. 86.0 C. 10.37 D. 107.5
15. **An instructor recorded the following quiz scores (out of possible 10 points) for the 12 students presents. The scores were 7 4 4 7 2 9 10 6 7 3 8 5. The interquartile range for this set of scores is**
A. 7.5 B. 6.5 C. 8 D.3.5
16. **A statement is made that the average distance from the mean in a set of data values is 10. Which measure is being used here?**
A. range C. mean absolute deviation
B. Interquartile range D. standard deviation
17. **Which of the following statements is correct?**
A. Two sets of numbers with completely different means and standard deviations may have the same coefficient of variation
B. The most frequently used measure of variation is the standard deviation

- C. The range is a crude measure of dispersion because it only involves the smallest and the largest values in a data set
 D. All the above statements are correct
18. If a distribution has zero variance, which of the following is true?
 A. all the values are positive
 B. All the values are negative
 C. The number of positive values and the number of negative values are equal
 D. all the values are equal to each other
19. Which of the following is not a property of the standard deviation?
 A. It is affected by extreme values in a data set
 B. It is the most widely used measure of spread
 C. It uses all the values in the data set in its computation
 D. It is always a positive number
20. For which of the following is the coefficient of variation the smallest?
 A. $x = 10$ and $s = 2$ C. $x = 30$ and $s = 5$
 B. $x = 14$ and $s = 3$ D. $x = 39$ and $s = 8$
21. When it is necessary to determine whether an observation from a set of data falls in the upper 25 percent or lower 75 percent of the ordered data set, which measure should be used?
 A. third quartile C. first quartile
 B. mean D. seventieth percentile

For questions 22-23

An instructor recorded the following quiz scores (out of 10 points) for the 12 students present. The scores were 7 4 4 7 2 9 10 6 7 3 8 and 5.

22. What is the P_{25} of the set of scores?
 A. 4 B. 6 C. 6.5 D. 7.5
23. What is the D_6 of the set of scores?
 A. 9 B. 7.5 C. 6.5 D. 7
24. Which of the following is not a measure of position?
 A. First quartile C. Fourth decile
 B. Median D. Mean
25. Presentation of data refers to the organization of data into:
 A. registration B. tables C. questionnaires D. techniques
26. Variables whose values or levels cannot take the form of decimals refer to:
 A. discrete B. continuous C. criterion D. predictor
27. The type of data for military rank can be classified into:
 A. nominal B. ordinal C. interval D. ratio
28. Which is the most common type of distribution observed?
 A. Negatively skewed distributions
 B. Positively skewed distributions

- C. Symmetrical distribution
D. D. All the above have an equal chance of being observed
29. **The most frequently occurring value in a data set is called the**
A. spread B. mode C. skewness D. maximum value
30. **The number of occurrences of a data value is called**
A. the class limits C. the cumulative frequency
B. the frequency D. the relative frequency
31. **Organizing observed data into tabular form in which classes and frequencies are used is called**
A. bar chart
B. pie chart
C. frequency distribution
D. frequency polygon
32. **It was reported from the survey that 48 percent of the population will vote for the current president instead of the leading opposing candidate. This is an example of**
A. population B. sample C. inferential statistics D. Descriptive statistics
33. **Which of the following does NOT pertain to descriptive statistics?**
A. summarizing quantitative data
B. collecting quantitative data
C. making generalizations about a population from a sample of quantitative data
D. graphical presentation of quantitative data
34. **The distance between the highest and lowest value is _____**
A. range B. variance C. mean D. interquartile range
35. **P_{25} is identical to _____**
A. Q_2 B. Q_1 C. D_5 C. D_7

Prepared by:

EMMA Q. TENEDERO
Researcher

ITEM ANALYSIS

Item No.	UG	LG	FV	Interpre- tation	ID	Interpre- tation	Evaluation/ Action
1	2	0	0.14	VD	0.29	GD	Good Item; Retain
2	1	2	0.21	DI	-0.14	ND	Improbable; discard
3	3	0	0.21	DI	0.43	GD	Good Item; Retain
4	2	1	0.21	DI	0.14	MD	Needs revision
5	0	1	0.07	VD	-0.14	QD	Improbable; discard
6	2	3	0.36	MD	-0.14	QD	Revise
7	2	2	0.29	DI	0.00	MD	Needs revision
8	6	4	0.71	E	0.29	GD	Needs revision
9	2	2	0.29	DI	0.00	MD	Needs revision
10		2	0.14	VD	-0.29	ND	Improbable; discard
11	3	5	0.57	MD	-0.29	ND	Revise
12	4	5	0.64	E	-0.14	QD	Improbable; discard
13	1	0	0.07	VD	0.14	MD	Needs revision
14	3	1	0.29	DI	0.29	GD	Good Item; Retain
15	0	1	0.07	VD	-0.14	QD	Improbable; discard
16	2	0	0.14	VD	0.29	GD	Good Item; Retain
17	2	2	0.29	DI	0.00	MD	Needs revision
18	3	5	0.57	MD	-0.29	ND	Revise
19	2	2	0.29	DI	0.00	MD	Needs revision
20	2	1	0.21	DI	0.14	MD	Needs revision
21	3	1	0.29	DI	0.29	GD	Good Item; Retain
22	2	0	0.14	VD	0.29	GD	Good Item; Retain
23	4	1	0.36	DI	0.43	GD	Good Item; Retain
24			0.00		0.00		Improbable; discard
25	4	1	0.36	DI	0.43	GD	Good Item; Retain
26	3	2	0.36	DI	0.14	MD	Needs revision
27	2	0	0.14	VD	0.29	GD	Good Item; Retain
28	3	1	0.29	DI	0.29	GD	Good Item; Retain
29	2	1	0.21	DI	0.14	MD	Needs revision
30	0	0	0.00		0.00		Improbable; discard
31	2	0	0.14	VD	0.29	GD	Good Item; Retain
32	2	0	0.14	VD	0.29	GD	Good Item; Retain
33	2	0	0.14	VD	0.29	GD	Good Item; Retain
34	4	1	0.36	DI	0.43	GD	Good Item; Retain
35	0	0	0.00		0.00		Improbable; discard
36	5	1	0.43	MD	0.57	GD	Good Item; Retain
37	1	3	0.29	DI	-0.29	ND	Improbable; discard
38	3	0	0.21	DI	0.43	GD	Good Item; Retain
39	2	1	0.21	DI	0.14	MD	Needs revision
40	4	2	0.43	MD	0.29	GD	Good Item; Retain
41	4	0	0.29	DI	0.57	GD	Good Item; Retain
42	2	0	0.14	VD	0.29	GD	Good Item; Retain
43	0	1	0.07	VD	-0.14	ND	Improbable; discard
44	4	0	0.29	DI	0.57	GD	Good Item; Retain
45	3	2	0.36	DI	0.14	MD	Needs revision
46	2	3	0.36	DI	-0.14	ND	Needs revision
47	5	4	0.64	E	0.14	MD	Needs revision
48	3	3	0.43	MD	0.00	ND	Needs revision
49	1	0	0.07	VD	0.14	MD	Needs revision
50	0	1	0.07	VD	-0.14	ND	Improbable; discard

ACHIEVEMENT TEST'S ANSWERS KEY

- | | |
|-------|-------|
| 1. B | 21. A |
| 2. B | 22. A |
| 3. B | 23. B |
| 4. C | 24. D |
| 5. C | 25. B |
| 6. B | 26. A |
| 7. B | 27. B |
| 8. D | 28. D |
| 9. A | 29. B |
| 10. C | 30. B |
| 11. B | 31. C |
| 12. D | 32. C |
| 13. C | 33. C |
| 14. D | 34. A |
| 15. D | 35. B |
| 16. C | |
| 17. D | |
| 18. D | |
| 19. A | |
| 20. C | |

CURRICULUM VITAE

CURRICULUM VITAE

Name : **EMMA Q. TENEDERO**
Date of Birth : **May 29, 1982**
Present Position : **Instructor I**
Station : **Samar State University**
Civil Status : **Married**
Degree Pursued : **Master of Arts in Teaching major in Mathematics**

EDUCATIONAL BACKGROUND

Elementary : **Casandig Elementary School (1995)**
Paranas, Samar
High School : **Casandig National High School (1999)**
Paranas, Samar
College : **Samar State Polytechnic College (2003)**
Catbalogan, Samar
Bachelor of Science in Applied Statistics (BSAS)
Graduate Studies : **Samar State University**

ELIGIBILITY

Career Civil Service (CSC) Professional, September 09, 2003

EXPERIENCES

Job-Order Employee **Samar State University**
July 2008 - July 2012
Instructor I **Samar State University**
July 23, 2012 - present

IN-SERVICE TRAININGS/SEMINARS/WORKSHOP ATTENDED

Local Resource Institute Training (LRI) "Citizen Satisfaction Index Survey",
Tierra de Milagros, Palo Leyte, April 23-24, 2015.

Training on Applied Multivariate Analysis: The Conjoint, Discriminant, and
Canonical Correlation Analysis, St. Mark Hotel, Cebu City, June 23-26,
2014.

Training on Applied Multivariate Analysis: The Factor and Cluster Analyses,
Foundation University, Dumaguete City, November 11 - 23, 2013.

In-House Seminar Workshop for the Academic Personnel of Samar State
University - TOWARDS EXCELLENCE IN TEACHING" May 28 - 30,
2013.

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