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Assessment of the Information and Communications Technology (ICT) Integration in Teaching Selected High School Subjects: Basis for an ICT Integration Program

Gilbert S. Arrieta

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**ASSESSMENT OF THE INFORMATION AND COMMUNICATIONS TECHNOLOGY
(ICT) INTEGRATION IN TEACHING SELECTED HIGH SCHOOL SUBJECTS :
BASIS FOR AN ICT INTEGRATION PROGRAM**

A Thesis
Presented to
The Faculty of College of Graduate Studies and Teacher Education Research
Philippine Normal University
Manila

In Partial Fulfillment
Of the Requirements for the Degree
MASTER OF ARTS IN EDUCATION
with Specialization in Educational Management

GILBERT S. ARRIETA

March 15, 2016

APPROVAL SHEET

The thesis attached hereto, titled **ASSESSMENT OF THE INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) INTEGRATION IN TEACHING SELECTED HIGH SCHOOL SUBJECTS : BASIS FOR AN ICT INTEGRATION PROGRAM**, prepared and submitted by GILBERT S. ARRIETA in partial fulfillment of the requirements for the degree of **MASTER OF ARTS IN EDUCATION with specialization in Educational Management**, is hereby recommended for approval and acceptance.

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and most of all, for God's love and His choicest blessings . . .

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To

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for his never ending love

Don Bosco Technical Institute-Makati City, my second home,
for providing me opportunities to discover and learn new things,

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whose memory has always been a source of strength and inspiration

THIS THESIS IS FOR YOU...

TABLE OF CONTENTS

	PAGE
TITLE PAGE	i
APPROVAL SHEET	ii
ABSTRACT	iii
DEDICATION	v
ACKNOWLEDGMENT	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF APPENDICES	x
Chapter 1 The Problem and Its Background	1
1.1 Introduction.....	1
1.2 Conceptual Framework.....	9
1.3 Statement of the Problem.....	21
1.4 Significance of the Study.....	23
1.5 Scope and Delimitations of the Study.....	24
1.6 Definition of Terms.....	24
Chapter 2 Review of Related Literature	27
2.1 Technology in Education	27

2.2 Technology Integration	29
2.3 ICT in Teaching	33
2.4 Issues and Trends in Technology Integration	40
2.5 Assessment in Technology Integration	49
Chapter 3 Methodology	52
3.1 Research Design.....	52
3.2 Participants of the Study.....	53
3.3 Research Locale.....	53
3.4 Research Instrument.....	54
3.5 Validity of the Instrument.....	54
3.6 Reliability of the Instrument.....	55
3.7 Data Gathering Procedure.....	55
3.8 Data Analysis.....	56
3.9 Ethical Considerations.....	57
Chapter 4 Presentation, Analysis, and Interpretation of Data	59
4.1 Results in Curriculum and Instruction.....	59
4.2 Results in Faculty.....	70
4.3 Results in Supervision.....	79
4.4 Results in Training and Development.....	87
4.5 Results in Equipment and Facilities.....	93
4.6 Overall Result in All Areas.....	99
4.7 Issues Affecting ICT Integration.....	102
4.8 Inputs for an ICT Integration Program.....	111
Chapter 5 Summary, Conclusions, and Recommendations....	113
5.1 Summary of Findings	113
5.2 Conclusions.....	115
5.3 Recommendations.....	116
REFERENCES	118

CURRICULUM VITAE.....	160
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LIST OF TABLES

TABLE		PAGE
1	Weighted Means for Curriculum and Instruction	60
2	Weighted Means for Faculty	71
3	Weighted Means for Supervision	80
4	Weighted Means for Training and Development	88
5	Weighted Means for Equipment and Facilities	94
6	Weighted Mean for Every Area	99
7	Frequency on the Issues Affecting ICT Integration	102

LIST OF FIGURES

FIGURE		PAGE
1	Research Paradigm of the Study.....	22

LIST OF APPENDICES

APPENDIX		PAGE
A	Proposed Information and Communications Technology (ICT) Integration Program	124
B	Research Instrument.....	139
C	Permission to Use TPACK and Massachusetts Technology Self-Assessment Tool for Teachers	143
D	Letter to the Rector of Don Bosco Technical Institute-Makati City.....	147
E	Letter to Experts for Research Instrument Validation.....	148
F	Letter to the Principal of Don Bosco Technical College-Mandaluyong City.....	149
G	Letter to the Teachers of Don Bosco Technical College-Mandaluyong City.....	150
H	Letter to the Principal of Don Bosco Technical Institute-Makati City.....	151
I	Letter to the Assistant Principal for Academic Affairs of Don Bosco Technical Institute-Makati City.....	152
J	Letter to the Subject Area Heads (Math, Science, English, Filipino and Social Studies) of Don Bosco Technical Institute-Makati City....	153
K	Letter to the Principal of Don Bosco Technical Institute-Makati City on Ethical Considerations	154
L	Issues and Problems Encountered by Teachers in Technology Integration	155

ABSTRACT

Name : GILBERT S. ARRIETA

TITLE Title : ASSESSMENT OF THE INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) INTEGRATION IN TEACHING SELECTED HIGH SCHOOL SUBJECTS : BASIS FOR AN ICT INTEGRATION PROGRAM
Assessment of the Information and Communications Technology (ICT)
Integration in Teaching Selected High School Subjects: Basis for an ICT Integration Program

Key Concepts : Information and Communications Technology
Technology Integration
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DEGREE Degree : MASTER OF ARTS IN EDUCATION Master of Arts in Education with Specialization in
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Adviser : Caridad N. Barrameda, Ed.D.

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The study assessed the information and communications technology (ICT) integration in teaching math, science, English, Filipino, social studies, and Christian living, and identified issues affecting technology integration. It was conducted in school year 2015-2016 and participated by 43 high school faculty members teaching the aforementioned subjects in the high school department of Don Bosco Technical Institute-Makati City. The instrument used in this study was a researcher-made instrument with a five-point Likert rating scale. It was validated by

seven experts, and its reliability was tested using test-retest method and Cronbach alpha for internal consistency. The weighted means of each indicator and subject area, including the overall mean in the survey, were computed. Likewise, the mean for every area was computed including the overall rating.

The results showed that the status of technology integration in Don Bosco Technical Institute-Makati City is ~~“Very Good.”~~ well-implemented. However, teachers needed time to plan and prepare technology-based instructional materials and update their skills in technology and pedagogy. They also needed to be supervised closely through feedback and mentoring. In terms of professional advancement, they needed to be updated and trained on curriculum development, pedagogy, and technology. Equipment and facilities needed to be increased, improved, and maintained, most especially the internet connection.

The issues affecting ICT integration were lack of time in planning and preparing technology-based instructional materials, insufficient faculty training and updating on technology and education, slow internet connection, upgrading of technological software and equipment, and inadequate equipment and facilities including regular maintenance services.

Based on the findings, it is recommended that the proposed ICT Integration Program may be implemented to address the issues and concerns in technology integration. Likewise, the results of this study may be used by the Grade School Department of Don Bosco Technical Institute-Makati City and other Don Bosco schools in the Philippine Province-North as a basis in looking into their current technology integration practices in teaching and learning. The process observed in this study may be used in assessing teachers’ technological and pedagogical competencies based on educational standards. Furthermore, studies on the effects of technology

in teaching and learning particularly on teachers and students' performance may be conducted in schools which have fully integrated technology in teaching and learning.

CHAPTER I

THE PROBLEM AND ITS BACKGROUND

Introduction

Education is a learning process that is exciting, engaging, and challenging. It continues to evolve: curricular programs are revised now and then to meet the challenges brought about by the changes in the environment; -researches are conducted to discover new ideas and find ways to make education better; teachers update themselves through seminars and training to continuously become relevant and better facilitators of learning; and school administrators regularly evaluate and plan in order to realize the school's vision-mission.

Teaching and learning were very different in the past. The classroom structure showed teachers completely in control of learning. Since the teacher dominated the classroom activities, class participation was less. Students, as one of the few sources of information, -usually just had to listen and write whatever the teacher said and wrote on the board. Also, instructional materials were limited. Students depended only on books and what was written on the blackboard.

Through research, new theories on teaching and learning were founded. Schools had to adjust to these new developments and to the inevitable changes of the times. Thus, new teaching methods and strategies were introduced, and more instructional materials were created. Books started to become more affordable, and new teaching aids like flash cards, posters, diagrams, and pictures were developed which made learning more interesting.

As education adapts to changes, learning becomes engaging and challenging. Students begin to become more actively involved in their learning. They participate more in class and ask challenging questions to teachers in order to be enlightened on the lesson. Teachers, in turn, have to constantly update themselves on the current trends in their area of specialization and in education in general so as to teach effectively. They have to adjust their teaching styles, and to engage students in learning even more, they need to prepare instructional materials suited to the lessons.

Change does not stop, and the world is changing at an unexpected speed. According to Munro (2008), in a fast-changing world, looking at tomorrow and seeing it only as a little bit more or a little bit less of today would not cut it as we move into the future. As the education systems are expected to prepare their students for the future, there is a need for educators to use powerful trends data, coupled with imagination, as planned ahead. The challenge is not only to develop a plan but also to make it a living strategy – a strategic vision that will help in leading students, schools, and communities to an even more successful future. Much of what happens in shaping the road ahead, however, will come out of the blue. This is the reason for the need to stay in touch with a fast-moving society. It is a must to be ready to deal with what some people call “discontinuities.” In essence, everyone needs to be environmentalists, adapting the organization to the needs of the environment and at the same time adapting the environment to the needs of the organization.

Today, humanity is entering what seems like the unimaginable atmosphere of the global knowledge/information age. Indeed, today’s education is a far cry from what the elders experienced. No doubt, technology is the difference. Born in the digital age, today’s learners

are called “digital natives.” The use of technology plays a pivotal role in their learning. It makes these digital natives wanting to be more engaged and participative in learning. Thus, old methodologies may no longer be effective with them, like the lecture method where students sit for an hour just listening to the teacher. — Therefore, new methodologies and instructional materials must be developed, and teachers need to be more creative and innovative to meet the needs of today’s learners.

The use of technology in schools was already seen by the United Nations Educational, Scientific and Cultural Organization (UNESCO) more than two decades ago as stipulated in its Framework for Action to Meet Basic Learning Needs. It was pointed out that the quality and delivery of basic education can be enhanced through the judicious use of instructional technologies. Where such technologies were not widely used then, it was stated that their introduction would require the selection and/or development of suitable technologies, acquisition of the necessary equipment and operating systems, and the recruitment and training of teachers and other educational personnel to work with them. The definition of a suitable technology would vary by societal characteristics and would change rapidly over time as new technologies (educational radio and television, computers, and various audio-visual instructional devices) would become less expensive and more adaptable to a range of environments. Also, UNESCO said that the use of modern technology could also improve the management of basic education, with each country reexamining periodically its present and potential technologies capacity in relation to its basic educational needs and resources.

Grabe (2001) said that with technology becoming a powerful tool in education, schools will be restructured. It is assumed that with the use of technology, new teaching methodologies

will be applied. Teachers will function as facilitators of learning. Instead of presenting information and managing the classroom, they will guide the students through the inquiry model active learning. As for the students, they will work collaboratively and make some decisions. They will realize and build knowledge by responding to the content provided by teachers, media resources, and personal experiences instead of learning facts and skills by absorbing the content presented by teachers and media resources.

The new millennium is characterized as the age of media and technology. Internet use increased, new platforms were created, and more gadgets were introduced in the market in the last 10 years. Ipads, tablets, smart phones, e-book readers, laptops, and smart TV became available and accessible. Internet connection was strengthened. New software applications were designed for business and education.

Media and technology have transformed not only the worlds of work and leisure but also the world of education. Indeed, the start of the new millennium signaled a more challenging task ahead in education. In the rapid development in technology, schools upgraded their systems and trained their teachers. Curricular programs were improved, and technology was integrated into the teaching-learning process. Learning became more interesting and enjoyable. This, in fact, is the essence of the 21st century educational arena.

Senge (2000) pointed out that a learning classroom requires methods and infrastructure that make it possible for everyone to foster one another's success deliberately. This means focusing on changing how people think and interact and recognizing that students learn in diverse ways and that they have a lot of potentials. In such a class, students recognize that part of their purpose is making sure that everyone succeeds.

Technology may be very overwhelming because of the assumed positive effects on education, but studies show that there is still a lot to be done when it comes to integrating technology in the teaching-learning process. Mishra and Koehler (2006), the proponents of Technological Pedagogical Content Knowledge (TPACK), found that teachers both struggle with incorporating digital tools into instruction and with capitalizing on the affordances of using digital tools. Thus, technology is not a guarantee of effective learning; the technological and pedagogical skills of teachers are important in making it an important tool in learning.

In the Philippines, both private and public schools have already integrated technology in the teaching-learning process. Budget for technology is appropriated yearly to ensure that technology is available and maintained. Such investment manifests the belief that technology will facilitate learning and improve student performance.

The Department of Education (DepEd) Five-Year Information and Communication Technology (ICT) for Education Strategic Plan (DepEd ICT4E Strategic Plan 2009) states that “ICT plays a major role in creating a new and improved model of teaching and learning where education happens anytime, anywhere.” The use of ICT will reinvigorate schools to make them into dynamic, collaborative, and innovative learning institutions where students can become more interested, curious, and creative learners. It is the aim of the DepEd that this policy document will provide the direction needed to integrate ICT within the Philippine education system and push the country forward. It aims to completely integrate technology into the curriculum, which includes the development of multimedia instructional materials and ICT-enabled assessment. Also, it intends to intensify competency-based professional development

programs and establish the necessary ICT infrastructure and applications. The successful implementation of the ICT4E Strategic Plan will lead to a new era in education.

Another program of the DepEd is the Modernization Program (1996-2005) which showed the age of computers in the public school system: the computerization project and the School of the Future project. This program introduced the use of information technology in the improvement of the teaching and learning process, educational management and operations. It is supported by other government agencies and the private sector. Since the program's implementation, the Philippine Government has shown serious commitment to ICT in education by taking the first steps that apply ICT in teaching and learning. The various departments have already began enhancing the curriculum, acquiring multimedia materials, training personnel, establishing ICT governance structures and procuring equipment, albeit in varying degrees.

The DepEd believes that today's learners are growing up in a world characterized by technological change and innovation. It recognizes the need to equip learners with the necessary skills and experiences that will enable them to become productive members of the global community. Also, the DepEd urges the professional teachers to embrace the changes ICT will effect on teaching and learning. For one, teachers' role will shift from the traditional provider of knowledge to the facilitator of learning. In order to adapt to such changes, teachers should become habitual users of ICT. They should continue to look for opportunities to upgrade their competencies, share their experiences, and create a culture of collaboration in order to support one another. Schools, in turn, should be responsible for the progressive attainment of these competencies by their teachers as part of their annual performance appraisal. Compliance to this

directive of the DepEd and effectiveness of the comprehensive in-service training program will be yearly assessed by the Department.

In order to achieve the DepEd's vision, relevant professional development will be provided that will prepare ICT-competent teachers deemed integral to the success of the vision. Also, systems and infrastructure that ensure efficient, transparent, and effective governance will be in place.

Don Bosco Technical Institute-Makati is one of the private schools that have integrated the use of technology in classroom instruction. In 2000, the library was remodeled and given a new name - Multiple Intelligences Center (MIC). It is the library and instructional media center of the school. In the beginning, instructional materials developer, instructional materials production assistants, and multimedia assistants were hired to assist teachers in the preparation, selection of technology-based instructional materials, and operation of multimedia equipment. Computers were acquired, and teachers were provided computer training. Later, they were provided training on the proper use of technological equipment and pedagogy on the preparation of technology-based instructional materials. Eventually, they became comfortable in the use of technology in teaching. Through the years, more technological equipment were acquired like laptops, multi-media equipment, speakers, TV screens, and computers. Each classroom is now equipped with one LCD projector, screen projector, and TV screen. Each subject area has a laptop and at least two computer units in the faculty room. New software applications were installed, and internet connection was strengthened. Then recently, at the beginning of school year 2015-2016, the MIC was reverted to Library and Learning Resource Center because most of

the technology functions were transferred to the Information Technology Center. It was decided that it will function purely as a library with the inclusion only of technology learning resources. Knowing that the teachers can prepare their own technology-based instructional materials, the Institute declared that there is no need for instructional materials development assistants.

The vision-mission of Don Bosco Technical Institute-Makati City clearly shows the importance of technology in education and evangelization - “We provide quality education and holistic formation towards social transformation through a curriculum with technological orientation that promotes Gospel values.” Also, “Technological Skills for Life” is one of the core values of the school. In 2014, the administration came up with a “Three-Year Institutional Strategic and Educative Pastoral Plan (2014-2017). One of the components of the plan is curriculum and instruction development. Under this component, there are three action points covering technology integration in teaching, namely “to acquire and upgrade equipment that aid instruction and learning,” “to require teachers to produce instructional materials and supplements,” and “to make best use of technology in instruction.” Also, the curriculum instruction guide and learning plans indicate the use of technology in teaching.

For more than a decade, technology has been integrated in the teaching and learning in the Institute. With all the efforts and investment on the use of technology in learning, it is high time to find out the status of ICT integration in teaching in the high school department. Teachers may have been comfortable in using technology, but it does not automatically mean that they are using them appropriately for teaching and learning. They may have the mastery of the content, but they may not be using the appropriate technology and pedagogy. They may be using technology in teaching, but they are not provided training. The action points in the strategic plan

of the Institute suggest that there are significant actions to be done to improve technology integration in teaching.

This study assessed the ICT integration in teaching math, science, English, Filipino, social studies, and Christian living in the Institute. It also looked into the practices in using technology in teaching. It also determined the knowledge and skills of teachers in technology integration, including their strengths and weaknesses in ICT integration. The data gathered will serve as basis for the Institute's Administration to know how to improve the teachers' knowledge and skills in technology integration. Lastly, the study identified the specific directions to take in the future on technology integration.

Conceptual Framework

Technology has changed human's way of life. An influential tool in life, from business to education, it has made a significant impact in making business more productive and education more interesting, engaging, and challenging. Educational institutions consider technology as an important component in education, but technology integration in teaching is not at all that easy as initially perceived.

The importance of technology in teaching and learning must be clearly reflected in the vision, plans, and programs of any institution. Lucas and Associates (2000) said that before using technology, everyone should believe in its capability and role in education. Discussions about technology must be a key part of the visioning process because technology can change the whole nature of the teaching-learning context. The visioning process is a way to explore and

realize the many opportunities and challenges that can be met through the intelligent use of technology. The advantages and limitations of different technologies for teaching can be discussed and will involve stakeholders in the visioning process. Arguments and serious deliberations that happen in the visioning process will facilitate in identifying priorities for the use of technology. It will provide a basis in making serious decisions about technology that are nevertheless likely to be supported throughout the organization.

The changes in the environment, particularly with technology, are signs that new ideas always come out. Education continues to become more significant and meaningful because of the emerging ideas and challenges. Not only should teachers respond to the demands of the changes, curricular programs must also be reviewed and revised, adjusting to the challenges of the present times. Curriculum must integrate technology.

Lucido and Borabo (1997) said that technology forms part of school change and reform. It is seen as a way to monitor and standardize procedures already in place. In a student-learning situation, technology can be at the root of change. It can provide students with skills they need for today's workplace.

Schools can no longer be isolated from the rest of society with respect to educational technology. The information age involves a change in thinking, management, instructional strategies, problem-solving strategies, and communication skills. Automatic current educational practice can help enhance the quality of learning. However, teachers need to understand and accept technology in order to make it a useful tool. The teacher's pedagogy itself must adapt to the changes in order to encourage creative problem-solving and higher order thinking required

for producing technology-literate students. Still, technology should not be considered as the “savior” of educational problems. At the end, the importance of the role of the teacher should not be underestimated in implementing technology in the classroom.

The use of technology in instruction gave birth to “Educational Technology.” Corpuz and Lucido (2008) said that often times, however, it is given a narrow meaning, to mean just hardware. It refers to the use of all human inventions and discoveries to satisfy our educational need and desire, i.e., learning. These inventions and discoveries can be devices, tools, equipment, activities, procedures, and processes. Included among these human inventions are the various educational media.

Educational technology is more than instructional technology in the same way that education is more than instruction. Technology integration is part of instructional technology which, in turn, is part of educational technology. Educational technology is different from technology in education. The latter refers to the application of technology in the operation of education institutions while the former refers to the application of technology in the educative process that takes place in such education institutions.

From the traditional point of view, technology serves as source and presenter of knowledge. It is assumed that knowledge is embedded in the technology, and the technology presents that knowledge to the students. Technology, like computers, is seen as a productivity tool. The popularity of word processing, databases, spreadsheets, graphic programs, and desktop publishing in the 1980s points to this productive role of educational technology. With the eruption of the internet in the mid 90s, communications and multimedia have dominated the role of technology in the classroom for the past five years.

From the constructivist's point of view, educational technology serves as learning tools that learners learn with. It engages learners in "active, constructive, intentional, authentic, and cooperative" learning. It provides opportunities for technology and learner interaction for meaningful learning. In this case, technology will not be mere delivery vehicle for content. Rather, it is used as facilitator of thinking and knowledge construction.

There is a lingering issue on how educational technology is integrated in the teaching-learning process. This is due to the fact that the mere use of the computer does not mean technology has already been integrated in instruction. If one is looking for external manifestations of technology integration into instruction, there are certainly some manifestations. There's a change in the way classes are traditionally conducted. It is also noticeable that the quality of instruction is improved to a higher level in such a way that could not have been achieved without educational technology. In terms of preparation, there is planning by the teacher on the process of determining how and when technology fits into the teaching-learning process. The teacher sets instructional strategies to address specific instructional issues.

Lucido (2007) pointed out that it may need time for teachers who are unfamiliar in technology integration to become adept technology integrators. There is no need to worry since technology integration is a process. It is developmental which will eventually lead to mastery and expertise. In time, teachers' proficiency in technology integration will increase.

As technology became an important tool in education, a dramatic shift in the use of instructional materials was seen. Technology-based instructional materials for teaching became very popular. From the ordinary visual aids, today's instructional materials are technology-enhanced and more appealing. However, teachers should be reminded that technology is a tool;

it assists in learning. Therefore, technology-based instructional materials must be carefully planned and prepared. Teachers, then, must have the technological and pedagogical skills in preparing these kinds of instructional materials. It is imperative to learn the pedagogy of instructional materials.

Responding to the developing and recognizing the potential benefits of integrating ICT in education systems, DepEd launched the National Strategic Planning Initiative for ICTs in Basic Education in February 2005 as part of a system-wide reform process to bring Philippine basic education out of crisis. A series of round table discussions and consultative meetings were held with representatives of government, the private sector, academe, non-government organizations, and other education stakeholders for the purpose of formulating a National Framework Plan for ICT integration in Philippine basic education over the next six years. This plan should serve as a reference for filtering ICT programs to ensure that they address the priority needs of DepEd, add focus and direction to current ICT programs, and guide ICT program development and resource generation and allocation.

The National Framework Plan sets three parameters for the use of ICT such as radio, television, audiovisual equipment, telephones, computers, and the internet in basic education, namely appropriateness, effectiveness, and sustainability. Appropriateness refers to suitability in context. The variables must be considered, namely goals and objectives to be met, content to be processed or delivered, availability of technology, accessibility of technology, skills needed to use the technology, and availability of support services.

According to Kim and Freemyer (2011), there are numerous pedagogical, cultural, and technical challenges that teachers encounter when utilizing technologies. Technology integration is certainly a challenging task, but teachers should always be ready for new developments in education, like technology.

Since the introduction of the Technological Pedagogical Content Knowledge (TPACK), Koehler, Mishra, and Cain (2013) continued monitoring the challenges of teaching with technology. As technology develops, it somehow makes teaching with technology challenging. In their work, the word “technology” applies equally to analog and digital as well as to new and old technologies. As a matter of practical significance, however, most of the technologies under consideration in the current literature are newer and digital and have some inherent properties that make applying them in straightforward ways difficult. The rapid developments in technology present new challenges to teachers who are struggling to use more technology in their instruction. However, technology integration is not only about using technology. This is another challenge. Koehler, Mishra, and Cain (2013), the proponents of technology, pedagogy, and content knowledge (TPACK), They interestingly highlighted that at the heart of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationships among and between them. The interactions between and among the three components, playing out differently across diverse contexts, account for the wide variations in the extent and quality of educational technology integration. These three knowledge bases (content, pedagogy, and technology) form the heart of the technology, pedagogy, and content knowledge (TPACK) framework. This perspective is

consistent with that of other researchers and approaches that have attempted to extend Shulman's pedagogical content knowledge (PCK) construct to include educational technology.

Koehler et al. (2013) asked, "Faced with these challenges, how can teachers integrate technology into their teaching?" What is needed is an approach that treats teaching as an interaction between what teachers know and how they apply this knowledge in the unique circumstances or contexts within their classrooms. There is no "one best way" to integrate technology into the curriculum. Rather, integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts. Honoring the idea that teaching with technology is a complex, ill-structured task, they proposed that understanding approaches to successful technology integration requires educators to develop new ways of comprehending and accommodating this complexity.

In using technology in teaching, the teacher must always refer to basic teaching and pedagogical principles. When thoughtfully and carefully applied, he/she will be a skilled teacher. Bago (2008) emphasized that instructional skills pertain to the ability of the teacher to use a repertoire of instructional strategies that lead students to be involved actively in the learning process. A skillful teacher is able to make students participate lively in the learning process so that by doing so, they become accountable for their own behavior.

Instructional skills are demonstrated by competent teachers through: the application of motivation and presentation strategies suited to the topic and class level; use of appropriate instructional materials; selection and pacing of the learning activities that sustain students' interest; ease in explaining difficult concepts using simple terms; and the art of questioning. The

use of appropriate strategies determines to a large extent the quality of interactions in the classroom which promote and enhance learning. The interactions may be between teacher and student or among students themselves. A competent teacher is able to promote students' understanding of the lesson through a variety of strategies and techniques, monitors student performance, and provides useful feedback that will assist learners in the learning process.

The organization of content, materials, and methods of classroom instruction requires careful planning. Lesson plans prepared by teachers contain student learning objectives, instructional procedures, required materials, and written description of how the students will be evaluated. The organization of the elements shows logic and congruence. The content, as well as the instruction and evaluation strategies, all flow from one another and are based on the objectives. When classroom lessons are well-planned, teachers become confident and implement the prepared lessons with relative ease. When properly conducted, these lessons provide for a brisk and smooth transition of learning activities.

Burke (2000) states that although technology in the classroom is typically deemed to be simply a positive shift in the betterment of students' post-school skills, simply placing technology in the classroom is not enough. As argued by Cuban (2001), it does not necessarily follow that access to technology will mean it will be used by classroom teachers. Therefore, to effectively assess technology integration, supervisors need to focus on how the technology is implemented in the classroom, not merely document available materials.

Studies on technology integration were conducted. A summary of reviews of research on computers and education was published in the ACT Policy Report (2004). [In the report](#), Fouts

(2000) indicates that while not all reviews showed outcomes in favor of computer use, most studies yielded positive conclusions about its effectiveness. He reports general concurrence that when combined with traditional teaching, the use of technology, particularly computers, can increase student learning in the traditional curriculum and basic skills areas. The integration of computers with traditional instruction produces higher academic results in a variety of subject areas than does traditional teaching alone. Students learn more quickly and with greater comprehension when learning with the use of technology. Students like learning with computers, and their attitudes toward learning and school are strongly influenced by computer use. Also, the use of computers appears most promising for low achieving and at-risk students. However, relevant teacher training is an essential element of successful learning programs based on or assisted by technology. Fouts (2000) He cautions that much of the research have been criticized for their low quality and suggests that these results are not guaranteed by the simple introduction of computers and related technology into the classrooms. There are other factors that play important roles in the process.

The importance of assessing technology integration is presented in the ACT Policy Report on “Evaluating the Effectiveness of Technology in Our Schools” by Noeth and Volkov (2004). It explained how technology should be evaluated in schools. There seems to be a universal agreement that a major aspect of technological implementation in schools bring about improvement in teaching and learning and increase in student performance. However, there also seems to be universal agreement about the instability and challenges of reliably evaluating the effectiveness of technology.

In assessing technology integration, Penuel and Means (1999) pointed out their recommendation in the ACT Policy Report. They recommend-said that evaluation must look closely into local program contexts. Evaluators must first examine the program's specific design describing how interventions are expected to bring about particular changes in teaching and learning. They advise that anticipated changes must be described in detail for stakeholders to know when desired changes have been achieved. Second, evaluators must consider different factors such as scope of the evaluation, stakeholders, needed data, and how the data will be utilized. There is often no consistent set of specific curriculum-related goals and objectives for the use of technology in teaching and learning.

The Iowa Consortium for Assessment of Learning with Technology (Thompson, Schmidt, Walker, O'Connell, Bergland, Bengfort, & Linduska, 2000) suggests that there are three fundamental elements that create the foundation for evaluation: school improvement, research, and technology. The Consortium explains that specific curriculum standards are selected as targets to inform teachers' work with technology; technology represents the cognitive tools that students use to impact and change the way they learn; and research will help design studies that contribute to the existing knowledge base.

These theories and studies strongly recommend that educational institutions must assess their present ICT integration in the teaching-learning process. Once assessed, concerns will be addressed which will pave the way for new developments in technology integration. Technology continues to evolve and will always present new challenges to teachers.

Don Bosco Technical Institute-Makati City has integrated technology in its curriculum for more than a decade. It believes in technology integration in teaching and learning. Over the

years, equipment and facilities have been improved. Teachers were trained during the first three years of technology integration. Also, the curriculum instruction guide (CIG) was revised with the integration of technology. The classroom observation tool for teachers includes some indicators on technology integration. However, there were changes in the organizational structure, facilities, equipment, faculty, and programs in the last five years.

The school's three-year strategic plan (2014-2017) includes an action point in curriculum and instruction which states, "to make best use of technology in instruction." Actions have been taken to improve ICT integration in teaching. However, since its implementation, technology integration in the Institute has never been assessed. In order to make best use of technology in teaching, technology integration must first be assessed.

Evaluation can be tailored-fit in order to meet the needs of the institution. Evaluation can consider human and technology inputs (student, teacher, school, classroom, and other contextual influences), process (types and areas of technology use in school and classroom), and expected and unexpected outcomes (student, teacher, family, school, and community achievements). Evaluation should not only be limited to outcomes and effects (summative) but should also be related to the process of implementing the program, its rationale, and the quality of its goals and objectives (formative) (McNabb et al., 1999).

Based on the Technological Pedagogical Content Knowledge (TPACK) by Mishra and Koehler (2006), Massachusetts Technology Self-Assessment Tool for Teachers (Massachusetts Department of Elementary and Secondary Education), the National ICT Competency Standards (NICS) for Teachers by the Commission on Information and Communications Technology, and Survey Form A for High Schools by the Philippine Accrediting Association of Schools, Colleges

and Universities (PAASCU), curriculum and instruction, faculty, supervision, training and development, and equipment and facilities are the areas assessed in this study. According to Noeth and Volkov (2004), a great deal of the responsibility for successful integration of technology inevitably falls upon individual administrators and teachers. The most critical element in technology use is the preparedness and skill level of those who employ it. Teachers, for example, need high-quality professional development that leads to a professional community centered around the integration of technology into the curriculum. Similarly, Espiritu (2007) explained the performance indicators for the National ICT Competency Standards for Teachers which are technological, ethical, pedagogical, and professional. The technological domain refers to competencies related to technical operations and concepts, and productivity of various ICT tools like communication devices as well as applications available online and offline. The ethical domain refers to social, legal, and human issues which are about issues surrounding the responsible use of technology. The pedagogical domain refers to planning and designing learning environment and experience: teaching, learning, and curriculum; assessment and evaluation; and educational technology. The professional domain refers to professional growth and development, research, innovation, and collaboration. These areas were also pointed out by The Benton Foundation Communications Policy Program (2002). After more than two decades of research on the benefits of technology, they concluded that evidence that demonstrates its positive effects on achievement is mounting. They caution that, if technologies are used to support educational outcomes, there must be sustained professional development, technology leadership anchored on solid educational objectives, and evaluation that will help determine whether educational goals are realized and whether educational practices are appropriate.

Based on the foregoing discussion on assessing technology integration effectiveness, the following key areas were assessed- in this study as shown by Figure 1 (Research Paradigm of the Study) on page 22+77:

1. Curriculum and Instruction. It is the integration of technology in the curriculum and the teaching strategies applied when using technology.
2. Faculty. It is the teachers' knowledge and skills on technology, pedagogy, and content.
3. Supervision. It is the mentoring of teachers in technology integration in planning and teaching strategies including classroom observation.
4. Training and Development. It is the in-service training and professional development of teachers on technology, pedagogy, and content.
5. Equipment and Facilities. It is the availability of equipment and facilities including services for technology integration in teaching.

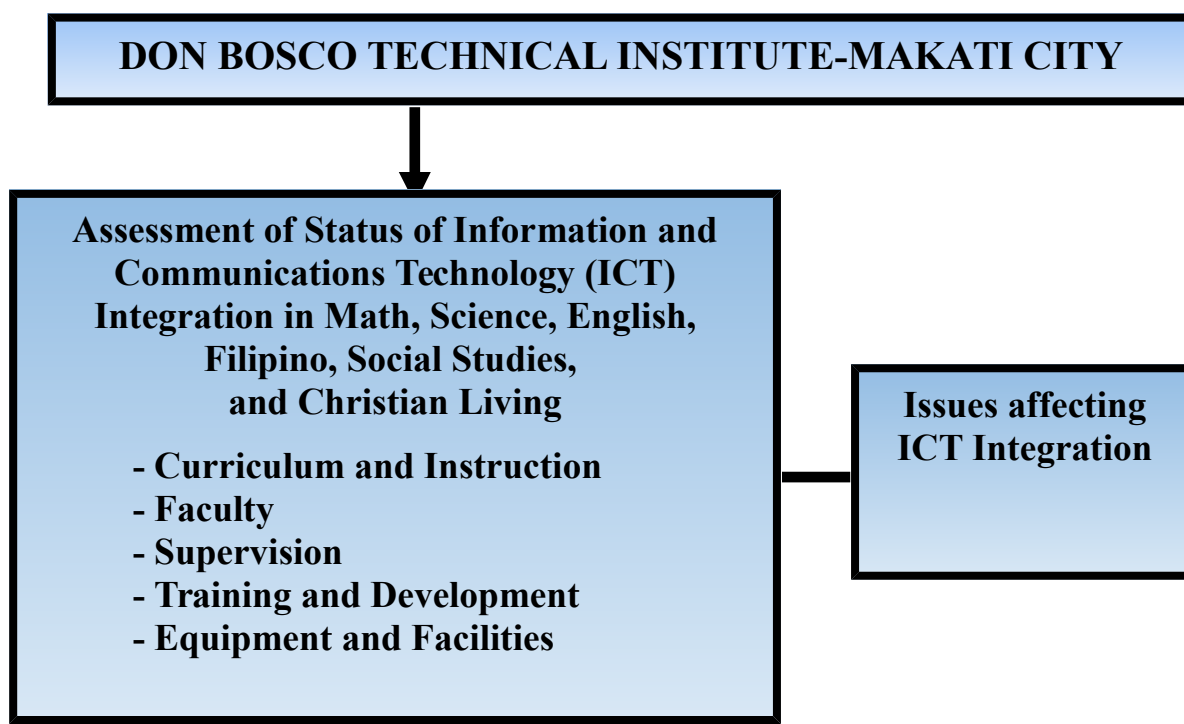
_____The results of the assessment served as bases in coming up with the proposed ICT Integration Program. Through the Program, the faculty development program of the high school department and other programs and services of Don Bosco Technical Institute-Makati City through the ICT integration program can be enhanced.

Statement of the Problem

This study assessed the information and communications technology integration in teaching selected academic subjects in the high school department of Don Bosco Technical Institute-Makati City.

Specifically, this study aimed to answer the following questions:

1. What is the status of the technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in terms of the following :
 - a. Curriculum and Instruction;



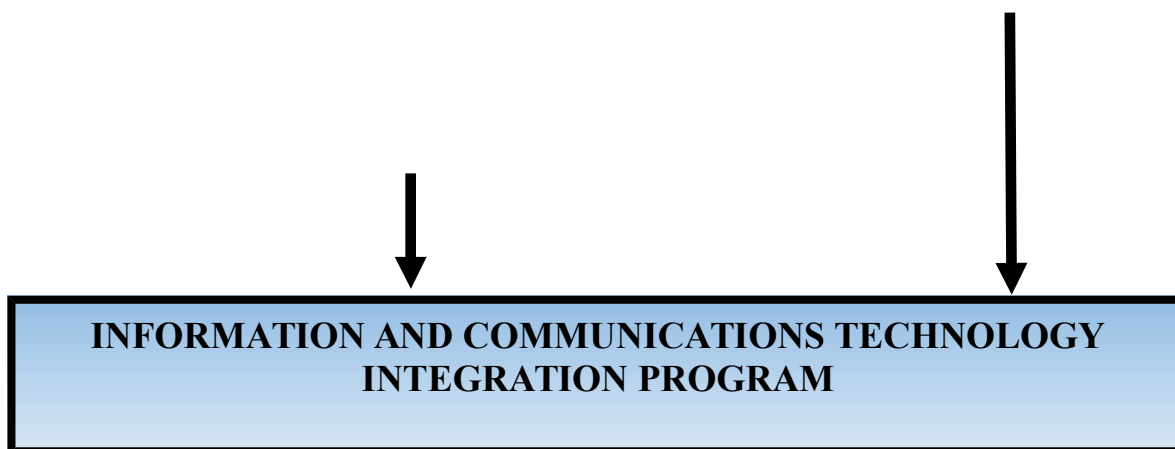


Figure 1. The Research Paradigm of the Study

Statement of the Problem

This study assessed the information and communications technology integration in teaching selected academic subjects in the high school department of Don Bosco Technical Institute-Makati City.

Specifically, this study aimed to answer the following questions:

4. What is the status of the technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in terms of the following :
 - f. Curriculum and Instruction;
 - g. Faculty;
 - h. Supervision;
 - i. Training and Development; and
 - j. Equipment and Facilities?
5. What are the issues affecting the ICT integration?

6. Based on the findings, what inputs can be derived to develop an ICT integration program for the school?

Significance of the Study

This study provides data that will be the basis for an ICT integration program of the high school department of Don Bosco Technical Institute-Makati City. Specifically, it will:

1. Assist the management team of the high school department in identifying training programs that will enhance the knowledge and skills of the faculty on ICT integration and other areas in teaching;
2. Guide the principal and high school management team in addressing issues and concerns in technology integration;
3. Assist the administration in improving other institutional plans and programs like Salesian Educative Pastoral Plan, strategic plan, and facilities development plan including technical support services for technology integration;
4. Guide the Grade School Department of Don Bosco Technical Institute-Makati City and other Don Bosco schools in the Philippine Province-North in assessing their current technology integration practices in teaching and learning;
5. Lead other school administrators in assessing the status of their information and communications technology integration in teaching in order to identify specific actions for improvement in their current practices and the future of technology integration in their school; and

6. Improve teacher's performance in classroom instruction including student's learning and performance.

Scope and Delimitations of the Study

The study focused only on the status of implementation of ICT integration in teaching selected high school subjects, namely math, science, English, Filipino, social studies, and Christian living in Don Bosco Technical Institute-Makati City. The participants were all high school teachers teaching the aforementioned subjects. It was conducted in school year 2015-2016.

Only six subjects out of eleven subjects in the high school department were covered in this study. Math, science, English, Filipino, social studies, and Christian living were the subjects chosen by the researcher because these are the basic subjects found in the secondary program for public and private schools. Christian living or values education was included because it is an important subject in Don Bosco Technical Institute-Makati City being a Catholic school. Technology, in this study, refers to computers, laptops, instructional software, internet, televisions, LCD projector, DVD players, audio equipment, and DVD because these provisions are available for teachers and students' use. Technology integration refers only to the utilization of technology in teaching and learning.

Definition of Terms

For a better understanding of the terms used in the study, the following are their operational definition:

Assessment. It refers to the systematic collection, review, and use of information about educational programs undertaken for the purpose of improving learning and development.

Curriculum. It refers to all of the experiences that individual learners have in a program of education whose purpose is to achieve broad goals and related specific objectives, which is planned in terms of a framework of theory and research or past and present professional practice.

Curriculum Instruction Guide (CIG). It refers to the year-long subject plan which includes objectives, content, learning experiences, instructional materials, and assessment.

Curriculum and Instruction. It refers to the set of subjects and content, and the methods they are carried out in teaching.

Educational Technology. It is a systematic way of designing, implementing, and evaluating the total process of learning and teaching in terms of specific objectives based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction ~~(Lucido & Borabo, 1997).~~

Equipment and Facilities. It refers to all technology resources that facilitate technology integration in teaching and learning.

High School Management Team. It refers to the principal, assistant principals, and subject area heads who make recommendations and decisions on program and activities of the high school department

Information and Communications Technology (ICT). It refers to the totality of the electronic means to collect, store, process, and present information to end-users in support of their activities. It consists, among others, computer systems, office systems, and consumer

electronics as well as networked information infrastructure, the components of which include the telephone system, the internet, fax machines, and computers ~~(NICS for Teachers)~~.

Learning Plan. It refers to the lesson plan presented in a tabular form used by Don Bosco Technical Institute-Makati in planning the weekly lesson.

Multimedia Equipment. It refers to the audio-visual equipment, such as laptops, computers, CD/VCD/DVD players, LCD projector, TV, and projector screen ~~(Lueido & Borabo, 1997)~~.

Supervision. It refers to the improvement of the total teaching-learning situation and the conditions that affect them. It is a socialized function designed to improve instruction by working with the people who are working with the students/pupils ~~(Sergiovanni & Starratt, 2007)~~.

Technology-based Instructional Materials. It refers to all teaching materials that require the use of technological equipment like computers, television, DVD/VCD players, and LCD projectors. ~~(Lueido & Borabo, 1997)~~.

Technology Integration. It refers to the incorporation-utilization of technology resources and technology-based instructional materials in teaching and learning practices into the daily routines, work, and management of schools.

~~**Technological, Pedagogical, and Content Knowledge.** It refers to the understanding that emerges from interactions among content, pedagogy, and technology (Mishra & Koehler, 2006).~~

Training and Development. It refers to the teaching and learning activities carried on for the primary purpose of helping members of an organization acquire and apply the knowledge, skills, abilities, and attitudes needed by a particular job and organization.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter presents and discusses foreign and local literature and studies that provided additional information in the pursuit of this research work.

Technology in Education

Change is inevitable. It allows human beings to develop as new challenges continue to emerge. Thus, schools should always be ready to meet the changes in the educational landscape. Today, the challenges in education are much broader. We are witnessing the rise of a new era: a new cultural work is becoming a person's most precious asset. Communications (multimedia and cyberspace) are providing tons of information available to everyone and despite globalization, conflict within the local culture is on the rise.

To meet the new challenges in education, a lot of local and international initiatives were taken. Though progress has been irregular, there have been great achievements given the presence of many urgent and serious problems. The need to react to changing situations sometimes prevented leaders from seeing that absolute priority should be given to the sustained effort to promote education and training, research, and specialized course and to make them

available to all those with the talent, ability, and perseverance to take advantage of such opportunities.

Rao (1997) pointed out that the basis for a learning society is a formal system where each individual is introduced to the many different forms of knowledge. Teacher-pupil relationship based on authority and dialogue cannot be replaced. This has been said since time immemorial by the great classical thinkers who have studied the question of education. It is the teacher's responsibility to impart to the pupil the knowledge that humankind has acquired about itself and about nature, and the essence of human creativity and inventiveness.

Estioko (1998) states that academic disciplines are never at a standstill; they keep on gaining new knowledge. The implication of this is that college courses will be open-ended. The idea of faculty development is meant to update teachers on new discoveries in their respective fields. Sometimes, though, the individual human mind can no longer master the abundance of knowledge, and storage-technology has come to the rescue. Through it, all knowledge can be stored and retrieved in a few seconds disposal. This phenomenon will greatly determine the future forms of schooling and specializations. Classroom instruction, which is heavily the present form of education, will gradually become obsolete. Educational institutions, too, will be decentralized when knowledge can be retrieved at home. A student need not spend four or five years in college to gain profession as sufficient knowledge from all professions can instantly be at his/her disposal.

The importance of technology in teaching and learning must be reflected in the vision, plans, and programs of any institution. Lucas and Associates (2000) said that before using technology, everyone should believe in its capability and role in education. Discussions about

technology must be a key part of the visioning process because technology can change the whole nature of the teaching-learning context. The visioning process is a way to explore and realize the many opportunities and challenges that can be met through the intelligent use of technology. The advantages and limitations of different technologies for teaching can be discussed and will involve stakeholders in the visioning process. Arguments and serious deliberations that happen in the visioning process will facilitate in identifying priorities for the use of technology. It will provide a basis in making serious decisions about technology that are nevertheless likely to be supported throughout the organization.

The changes in the environment, particularly with technology, are signs that new ideas always come out. Education continues to become more significant and meaningful because of the emerging ideas and challenges. Not only should teachers respond to the demands of the changes, curricular programs must also be reviewed and revised, adjusting to the challenges of the present times. Curriculum must integrate technology.

Aquino (2008) shared that curriculum innovation is of great relevance to Philippine education today and in the years to come because of certain characteristics of the Philippine educational system as well as of the socio-political system, and because of the rapid economic development and technological revolution (computer technology, information technology, globalization, etc.) that are sweeping the world today. Curriculum must be dynamic. No one can safely say or comfortably assume that a curriculum which is adequate in one period of time will also be adequate in another. Two factors support this viewpoint: The first pertains to the demands on education made by a changing society; the second pertains to the demands made by the changes and developments in organized knowledge.

The Department of Education (DepEd) sees that educational institutions all over the world must change in step with the rapidly changing economic and social environment in which their graduates must work and thrive. Instead of being simply repository of knowledge transmission, schools are challenged to become enablers of learning, facilitating the development of higher order thinking skills and the acquisition of knowledge and skills for lifelong learning.

Information and communication technologies refer to the diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information such as computers, the internet, radio, television, telephones, and access to education, and improve administrative and instructional efficiency.

Responding to the developing and recognizing the potential benefits of integrating ICT in education systems, DepEd launched the National Strategic Planning Initiative for ICTs in Basic Education in February 2005 as part of a system-wide reform process to bring Philippine basic education out of crisis. A series of round table discussions and consultative meetings were held with representatives of government, the private sector, academe, non-government organizations, and other education stakeholders for the purpose of formulating a National Framework Plan for ICT integration in Philippine basic education over the next six years. This plan should serve as a reference for filtering ICT programs to ensure that they address the priority needs of DepEd, add focus and direction to current ICT programs, and guide ICT program development and resource generation and allocation.

The National Framework Plan sets three parameters for the use of ICT such as radio, television, audiovisual equipment, telephones, computers, and the internet in basic education, namely appropriateness, effectiveness, and sustainability. Appropriateness refers to suitability in context. The variables must be considered, namely goals and objectives to be met, content to be processed or delivered, availability of technology, accessibility of technology, skills needed to use the technology, and availability of support services.

~~Marlow, Wash, Chapman, and Dale (2009), in their study, said that educational leaders noticed a trend centered on technology in the classroom. They found out that students enjoy and appreciate teachers' efforts when teachers use technology in teaching and learning. Technology is such a significant part of students' lives in today's world that if teachers use technology in the classroom, students automatically become more interested with what they are learning.~~

~~The use of technology in instruction gave birth to "Educational Technology."~~ Corpuz and Lucido (2008) said that often times, however, it is given a narrow meaning, to mean just hardware. It refers to the use of all human inventions and discoveries to satisfy our educational need and desire, i.e., learning. These inventions and discoveries can be devices, tools, equipment, activities, procedures, and processes. Included among these human inventions are the various educational media.

~~Educational technology is more than instructional technology in the same way that education is more than instruction. Technology integration is part of instructional technology which, in turn, is part of educational technology. Educational technology is different from technology in education. The latter refers to the application of technology in the operation of~~

~~education institutions while the former refers to the application of technology in the educative process that takes place in such education institutions.~~

~~From the traditional point of view, technology serves as source and presenter of knowledge. It is assumed that knowledge is embedded in the technology, and the technology presents that knowledge to the students. Technology, like computers, is seen as a productivity tool. The popularity of word processing, databases, spreadsheets, graphic programs, and desktop publishing in the 1980s points to this productive role of educational technology. With the eruption of the internet in the mid 90s, communications and multimedia have dominated the role of technology in the classroom for the past five years.~~

~~From the constructivist's point of view, educational technology serves as learning tools that learners learn with. It engages learners in "active, constructive, intentional, authentic, and cooperative" learning. It provides opportunities for technology and learner interaction for meaningful learning. In this case, technology will not be mere delivery vehicle for content. Rather, it is used as facilitator of thinking and knowledge construction.~~

~~There is a lingering issue on how educational technology is integrated in the teaching-learning process. This is due to the fact that the mere use of the computer does not mean technology has already been integrated in instruction. If one is looking for external manifestations of technology integration into instruction, there are certainly some manifestations. There's a change in the way classes are traditionally conducted. It is also noticeable that the quality of instruction is improved to a higher level in such a way that could not have been achieved without educational technology. In terms of preparation, there is planning by the~~

~~teacher on the process of determining how and when technology fits into the teaching-learning process.~~ The teacher sets instructional strategies to address specific instructional issues.

~~Lueido (2007) pointed out that~~ it may need time for teachers who are unfamiliar in technology integration to become adept technology integrators. There is no need to worry since technology integration is a process. It is developmental which will eventually lead to mastery and expertise. In time, teachers' proficiency in technology integration will increase.

~~As technology became an important tool in education, a dramatic shift in the use of instructional materials~~ was seen. Technology-based instructional materials for teaching became very popular. From the ordinary visual aids, today's instructional materials are technology-enhanced and more appealing. However, teachers should be reminded that technology is a tool; it assists in learning. Therefore, technology-based instructional materials must be carefully planned and prepared. Teachers, then, must have the technological and pedagogical skills in preparing these kinds of instructional materials. It is imperative to learn the pedagogy of instructional materials.

Technology Integration

Technology continues to evolve and -develops rapidly. It presents challenges to teachers in effectively integrating technology. Thus, teachers must be aware of the emerging developments in technology integration. Moratelli and DeJarnette (2014) said that today's educational system relies heavily on high-stakes testing and student assessment. As a result, classrooms can turn into an intense environment with intensive rote drill, practice, and assessment. Discovering ways in which to make learning meaningful and memorable, especially

for low-achieving students, is the challenge of every teacher across the nation. “Talented teachers know that there is more to successful reading than accurate and efficient strategy and skill use. The best strategy and skill teaching will be unsuccessful when students are unmotivated and unengaged, or when they don’t believe that they can succeed.” Today’s 21st century learners are digital learners, and teachers need to incorporate technology whenever possible to help engage students in the learning environment.

However, technology integration is not only about using technology. This is another challenge. Koehler, Mishra, and Cain (2013), the proponents of technology, pedagogy, and content knowledge (TPACK), interestingly highlighted that at the heart of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationships among and between them. The interactions between and among the three components, playing out differently across diverse contexts, account for the wide variations in the extent and quality of educational technology integration. These three knowledge bases (content, pedagogy, and technology) form the heart of the technology, pedagogy, and content knowledge (TPACK) framework. This perspective is consistent with that of other researchers and approaches that have attempted to extend Shulman’s pedagogical content knowledge (PCK) construct to include educational technology.

Similar findings were presented by Sands, Kokzleski, and French (2000) [in their study](#). They found out that as teachers alter their instructional methods in response to student diversity, they are also asked to change their practices in response to other social, political, and economic conditions. Information technology has expanded both the amount of information to access and the ways in which to access it. Also, the shift from national to global economics has resulted in a

need for workers with new skills and attitudes. Changes in the world necessitate changes in what and how students are taught. As curricular and instructional methods evolve, traditional school organizational policies, structures, and practices must change to provide the necessary structural frameworks and supports. As a result, educational reform in the next ten years will be more exhaustive and better supported than in previous change efforts.

Seeing the role of technology in education, researches were made on technology integration, particularly on the use of technology in teaching. The results solidified the importance of technology in learning. Teachers who creatively thought of and crafted instructional materials using technology and eventually used them have been successful. It was not easy in the beginning, though, because of the transition and getting the interest of the students.

~~To improve students' performance, teachers may design or use technology that best suit their students. Northrop (2013) conducted a study among poverty-stricken students who were not interested in their literacy period because basal reading textbook and workbook was used. Their comprehension, engagement, and assessment scores were failing. After brainstorming on various ways to improve students' literacy, they tried using clicker technology. Using this technology, students started participating in class. They became engaged in learning. After several weeks, their performance improved. When asked about their experience, the students said that they like and enjoy the use of the clicker technology. They frequently described the clicker review session as "fun," "exciting," and "learning." Taking into account the positive feedback received, these results can be related with student engagement. Students' self-efficacy and confidence increased as the weeks with the clickers progressed. If students believed the learning~~

~~experience was fun and enjoyable, then they could become more easily engaged and ultimately increase their reading comprehension and literacy skills. Thus, technology in the classroom can serve as an education tool for both teachers and students. Technology can help make student performance easily assessable. With technology making them self-regulated learners, students can immediately receive feedback (through clicker technology, for instance). Teachers, on the other hand, can easily identify students who need assistance and students who are ready to new concepts.~~

~~Including technology can increase student participation and motivation; however, it is important to note that the use of technology does not automatically lead to increase in student performance. Studies examining comprehension of children reading e-books, both on the computer and more recently, on tablets, showed that students cannot recall many narrative details when reading e-books, and students can become distracted by animations or enhanced content.~~

Once curricular goals and appropriate technology are identified, teachers need to consider whether the technology is providing instruction at a student's appropriate level. Use of technology and the content provided within needs to be accessible to the student and matched to his/her appropriate developmental learning level.

Social and contextual factors also complicate the relationships between teaching and technology. Social and institutional contexts are often unsupportive of teachers' efforts to integrate technology use in their work. Teachers often lack the experience with using digital technologies for teaching and learning.

Many teachers had earned degrees at a time when educational technology was at its infancy period. Thus, it is not surprising that they do not consider themselves sufficiently

prepared to use technology in the classroom and often do not appreciate its value or relevance to teaching and learning. Acquiring new knowledge and skills, particularly in technology, can be challenging considering the busy schedule of teachers. Moreover, this knowledge is unlikely to be used unless teachers can conceive of technology uses that are consistent with their existing pedagogical beliefs. Furthermore, teachers have often been provided with insufficient training for this task. Many approaches to teachers' professional development offer a one-size-fits-all approach to technology integration when, in fact, teachers operate in diverse contexts of teaching and learning.

Seeing the challenges in technology integration, supervisors must closely monitor and assist their teachers. Supervision will provide guidance and evaluation of how teachers effectively integrate technology in teaching. For a teacher to develop, he/she must be mentored. It entails openness and trust. This is what Sergiovanni and Starrat (2007) pointed out on the moral importance of supervision. If supervision is to be a moral action, it must respect the moral integrity of the supervisor and the supervised. That is to say, the exchange between the supervisor and the teacher must be trusting, open, and flexible to allow both persons to speak from their own sense of integrity and to encourage each person to respect the other's integrity. The exchange must begin with an honest discussion of what will be helpful for the teacher and the students. For this to happen, supervisors need to explore those conditions necessary to establish and maintain trust, honesty, and open communication. This means that supervisors need to discuss the ground rules ahead of time. Hence, supervisors need to explore with teachers what procedures will be followed, what rights and responsibilities will be defined, who controls what, whose needs are being served, the purpose of the exchange, and so on.

Beyond setting the parameters and guidelines, there is the exchange itself, an engagement of another person in all his/her complexity, fragility, and ambiguity. Embedded in the process of making contact with that other person are the moral imperatives of acceptance, honesty, respect, and care. These constitute the moral activity of empowerment, the willingness to let people be who they are, and beyond that willingness, an appreciation of what they have to contribute.

Once openness, trust, and honesty are established, supervision can honestly take place. Sergiovanni and Starrat (2007) added that general and clinical supervision are, of course, interdependent. Meaningful classroom interventions are built upon healthy organizational climates, facilitated by credible leadership, and premised on a reasoned educational program. Although general supervision is an important and necessary component of effective supervision, without clinical supervision and other forms of coaching, it is not sufficient. In an evaluation for quality control, the process should be formal and documented; criteria should be explicit, and standards should be legally defensible as being central to basic teaching competence; the emphasis should be on teachers meeting requirements of minimum acceptability; and responsibility for evaluation should be in the hands of administrators and other designated officials. When the purpose of teacher evaluation is professional improvement, the process should be informal; criteria should be tailored to the needs and capabilities of individual teachers before they are included in the evaluation; the emphasis should be on helping teachers reach agreed-upon professional development goals; and teachers should assume major responsibility for the process of engaging in self-evaluation and peer evaluation, and by obtaining evaluation information from students.

The outcome of evaluation for quality control should be the protection of students and the public from incompetent teaching. Unquestionably, this is an important outcome and a highly significant responsibility for principals and other supervisors as well as teachers. The outcome of evaluation for professional improvement is quite different. Rather than ensuring minimum acceptability in teaching, professional improvement seeks to guarantee quality teaching and school for the students and the public.

The quality of teaching depends not only on the teacher but also on the supervision of instruction by the instructional leaders. Successful technology integration in teaching needs supervision.

ICT in Teaching

In using technology in teaching, the teacher must always refer to basic teaching and pedagogical principles. When thoughtfully and carefully applied, he/she will be a skilled teacher. Bago (2008) emphasized that instructional skills pertain to the ability of the teacher to use a repertoire of instructional strategies that lead students to be involved actively in the learning process. A skillful teacher is able to make students participate lively in the learning process so that by doing so, they become accountable for their own behavior.

Instructional skills are demonstrated by competent teachers through: the application of motivation and presentation strategies suited to the topic and class level; use of appropriate instructional materials; selection and pacing of the learning activities that sustain students' interest; ease in explaining difficult concepts using simple terms; and the art of questioning. The use of appropriate strategies determines to a large extent the quality of interactions in the

classroom which promote and enhance learning. The interactions may be between teacher and student or among students themselves. A competent teacher is able to promote students' understanding of the lesson through a variety of strategies and techniques, monitors student performance, and provides useful feedback that will assist learners in the learning process.

The organization of content, materials, and methods of classroom instruction requires careful planning. Lesson plans prepared by teachers contain student learning objectives, instructional procedures, required materials, and written description of how the students will be evaluated. The organization of the elements shows logic and congruence. The content, as well as the instruction and evaluation strategies, all flow from one another and are based on the objectives. When classroom lessons are well-planned, teachers become confident and implement the prepared lessons with relative ease. When properly conducted, these lessons provide for a brisk and smooth transition of learning activities.

New technologies have some advantages over traditional classroom teaching. According to Lucas and Associates (2000), learners are now increasingly able to access high quality teaching and learning anytime and anywhere. Computers and the internet make it possible for information to be readily accessible to learners which was previously accessible only through a professor or instructor. Well-designed technology-based instructional materials can be more effective than traditional classroom methods; students can learn more easily and more quickly through the use of integrated illustration and animation through different structuring of materials and through increased control of and interaction with learning materials. New technologies can be designed to develop and facilitate higher-order learning skills, such as problem solving, decision making, and critical thinking. Through computers and the internet, it facilitates team

teaching, the use of guest faculty from other institutions and multi-cultural and international classes.

Noll (2010), in his compilation on issues in education, presented Frederick Hess, an educator, who believes that the tools of technology, when used appropriately, can support innovation and reinvention in education. He said that historically, teachers have been expected to perform a wide range of responsibilities. Each teacher is expected to do a lot of things. He/She designs lesson plans, lectures, runs class discussions, grades essays and exams, mentors colleagues, supervises homeroom, and patrols the cafeteria. The same lessons on civil war, the digestive system, and quadratic equations are taught to our high schools with tens of thousands of teachers giving variations. In fact, the job description of a teacher today is pretty similar to that of a teacher in 1950.

Even when computers were just starting to be part of education, Natividad (1995) found out in her study that computer-assisted instruction as a teaching strategy benefited the students in terms of science achievement. It is effective to all students of different mental abilities. It is recommended that computer-assisted instruction should be employed by teachers as part of their repertoire of teaching strategies. Together with other strategies, computer-assisted instruction should be used by teachers to increase students' interest toward science.

Technology has a strong impact in engaging students in learning. Though students are more updated, teachers are not left behind in using technology. It is now part of their daily life. However, using them for teaching and learning is a totally different thing. Technology in business is used differently, too. There are certain parameters required in order to make it more functional for transactions. It is the same with education. Technology must be used on what

education requires. It is a tool that must be used in order to optimize its purpose in a particular field, like education. Therefore, teachers should not use technology without proper training and careful planning. In doing such, teachers should be meticulous and patient in preparing technology-based instructional materials.

Preparing technology-based instructional materials involves a lot of planning. Orlich (2007) said that effective planning will always have a very strong impact on student achievement. Planning is a really a tedious and time-consuming process for the novice teachers. It is totally different if you are already a teacher, for you will be responsible for student learning. The many hours that you spent in the classroom as a student will help but will not be a big difference. As you gain experience, you will begin to identify which activities take detailed planning and which do not. As you plan, sometimes you realize along the way that there are activities to forego to take advantage of that unintended learning opportunity. It is a master teacher's skill. A good plan provides you with the context for this decision. Does this new opportunity (teachable moment) contribute more positively to the objectives of the lesson? Are you seizing the moment to take advantage of a lesson detour in order to meet the student's important need? The art of teaching is on striking a balance between preparation and flexibility in executing plan.

Planning is a dynamic process. It often seems downright chaotic. The United States is unique in that responsibility for planning and teaching at the classroom level rests with you, the teacher. In most countries, teachers are told what to teach and often even how to teach. With this in mind, you should be even more aware that – if state standards shift from general statements to specific learner objectives – you might be responsible only for the “how” part. Don't be afraid to

refine, modify, or experiment with these tools to develop instructional plans. You are the technicians; the tools are there to serve you and those all-important students.

Regardless of the tool or medium, a teacher with the right knowledge, skills, and attitude can make learning really happen. Today's tool is technology. One can be creative and passionate in preparing and using instructional materials, but planning can make it better. With technology as a powerful tool in education, it is important to use it appropriately and effectively.

Lasley, Matczynski, and Rowley (1997) agree on planning in using technology in learning. When thoughtfully applied, technology can add significant value to each of the eight models of teaching. Ultimately, it is up to the teachers to plan for the integration of technology and to articulate the specific ways in which it represents additional value for themselves and their students. The authors believe that this is most likely to occur when teachers view different forms of technology as authentic tools that students will likely need in their current and future lives, inside and outside of school. It is also most likely to happen when teachers have a clear conceptual understanding of the diverse purposes for which technology can be used to enhance the teaching and learning process.

Using a particular software for classroom discussion should involve an interplay of words and pictures. Students are in the world of visuals. They are digital natives. They like to see attractive things that will make them interested in the lesson. They grew up seeing and listening to words related to pictures or graphics. In teaching, preparing technology-based instructional materials require appropriate words and graphics.

This is also what Clark et al. (2008) added - that the rationale for using words and graphics or multimedia presentation is that people are more likely to understand material when

they can engage in active learning – that is, when they engage in relevant cognitive processing such as attending to the relevant material in the lesson, mentally organizing the material into a coherent cognitive presentation, and mentally integrating the material with their existing knowledge. Multimedia presentations can lead learners to participate in active learning by mentally bringing together the relationships between images and words. In contrast, presenting words alone may appear as something ordinary to learners which may engage them in- shallow learning such as no connection of the words with other knowledge.

Studies show that people are drawn to learning more deeply from words and pictures at least for some simple instructional situations. We call this multimedia effect – people learn more deeply from words and graphics than from words alone. The multimedia principle, which suggests that learning and understanding are enhanced by adding images to text rather than presenting text alone, appears to be well supported by findings from empirical studies.

Recesso and Orill (2008) also added that once you have the students' attention, you'll want to use instructional strategies and integrate technology in ways that make learning exciting and relevant. Initiating activities utilize three main instructional strategies: presentation, demonstration, and discussion. As you plan ways to integrate technology into an initiating activity, remember that the challenge is to harness technology's power in ways that are meaningful to learners. The message must not be lost in the medium. You don't want to overwhelm students with flashy technology that distracts them from your real purpose.

The emerging developments provide a picture of the future in education. Balili (2000) said that without prejudice to the vision, mission, goals and objectives, the present-day education can't be done anymore through words of mouth. The new millennium is characterized by global

technology revolution. As technology gains ground in education, teachers should be more determined in planning and creating instructional materials.

Quality education requires quality teachers. Bilbao (2008) pointed out that good teachers make the classroom brighter and interesting place. They are ideal companions of the learners. With the advances in communication technology, good teachers have to understand the information from the data that surround the learners. Excellent teachers are needed to draw the wisdom from the knowledge. A good institution is a reflection of having good teachers. Hence, the right faculty who are expected to be recruited are those with excellent and relevant preparation. These teachers must be provided support through continuing professional development in order to keep abreast with the changing demands of a learning society.

Pefianco (2002) shared that there is no best method that could work in a million of different student background and characteristics. However, for teachers to be effective, they must use appropriate strategies, approaches, and styles capped with compassionate and understanding nature. Teachers should choose teaching methods, learning activities, and instructional materials or resources appropriate to learners and aligned to objectives of the lesson. A teachable moment should be created to lead learners to use higher order thinking skills. Good teachers utilize information derived from assessment to enhance teaching and learning and adopt a culture of excellence.

As an individual, the envisioned teacher of the 21st century is one who possesses a high level of emotional and mental intelligence (inducting higher level thinking) and moral integrity. He/She shares global concerns and is at ease with and open to change.

As a professional, he/she is multi-faceted teacher, competent in the fields of pedagogy, multimedia instructional technology, and science and information technology including excellent communication and relational skills. He/She also has a high level of dedication, self-motivation, and commitment to his profession. He/She loves teaching and learning and his/her learners or students. He/She himself is a perpetual learner who continually seeks to upgrade his knowledge and skills.

As a facilitator, he/she is learner-focused, child-friendly, empathetic, and good at working with pupils, their parents, and the community in general. He/She is open, flexible, resourceful, anticipatory or proactive, and has a “strategic planning” mindset.

Cadauan (2000) agreed that to be able to make teaching and learning situation more effective in spite of the presence of all odds against it, the teacher should do well in using the different forms of educational technology in school because it will provide a rich variety of learning experiences. Science teachers in today’s school can be upgraded as to their knowledge and skills pertinent to providing well-illustrated science lessons by motivating the students to utilize the available resources and take advantage of the services offered by the audiovisual centers in their respective schools.

Another study revealed that the use of technology in teaching depends on teacher’s academic preparation. Molina (2001) found out in his study that teachers with different educational attainment differ in their teaching competency. This means that educational attainment is a factor that makes teachers competent in their teaching field. The higher the educational attainment, the more competent they become. The same thing is with computer

literacy. The higher the educational attainment of the teachers, the more literate they become in the use of computer. Educational attainment is a factor to make teachers literate in computer.

~~Impact and~~ Issues and Trends in Technology Integration

Technology integration in teaching has made an impact on education. Positive results and issues came out from the studies conducted.

Teachers want to use technology in teaching as they see its advantages. Zhang (2006) found out in her study that Geometry teachers believed that it is urgent to integrate technology into the Geometry classroom. They said that technology may be useful in helping their students go beyond the basics. They also said that the integration of technology in the teaching-learning process may clarify Geometry concepts and proofs more effectively. They hoped that integrating technology in teaching may help develop effective, interesting, and interactive activities for their students. They were motivated to learn how to integrate technology into their teaching due to the following reasons: First, they want to go with the trends in education so as not be left behind; second, they want to make the learning process more interesting and easier; and third, they want to help students appreciate and understand Geometry more.

Similar results were yielded in the study by Gallego (2012). In his case study, he said that the school had a big transformation when technology integration was given importance. After identifying the concerns, there was already an effective system that promoted the integration of technology in teaching and learning. Most administrators and most full-time teachers had

regularly integrated technology in their classes. Technology has become critical to the support of the learning environment, and the opportunity for students to achieve learning outcomes through the learning experiences were provided. There were many opportunities for students to use technology to demonstrate learning outcomes.

On assessing technology integration in schools and how it will help improve not only technology integration but also other school programs, various studies have been made. Issues and concerns were revealed.

A research study concurs with the need for appropriate technology training for teachers. Hutchison and Reinking (2010) found out that 82% of surveyed literacy and language arts teachers believed that a lack of meaningful professional development was a barrier to technology integration. One particular aspect of professional development that teachers identified as lacking was access to successful models for integrating digital technology into their instruction. The Technology Integration Planning Cycle for Literacy and Language Arts is specifically aimed at helping literacy teachers consider whether their planned instruction contributes to both digital and non-digital literacy development.

Budget and lack of sufficient equipment were identified as issues in technology integration. Majeski (2013) found in his study that integrating technology in teaching and learning is still a problem among middle school teachers. Principals consider the use of technology a new development in making teachers more dynamic and students more engaged in learning. However, the principals identified budget as the main issue in fully implementing technology integration. Teachers and principals embraced the use of technology as part of the culture of teaching, learning, and completing professional responsibilities. However, they

hungered for appropriate professional development. Also, they said that since technology is ever-changing, there is a need to upgrade the equipment in a short period of time. They observed the lack of equipment since many were frequently using it. Emerging problems like funding technology, lack of equipment, and limited continued professional development derailed the strong incorporation of technology in teaching. The Bring Your Own Device (BYOD) was also suggested to address the lack of equipment.

Gallego (2012) shared the same experience based on the case study he did in a college. After assessing the problems of the institution on technology integration particularly on administration, curriculum, faculty, and facilities, changes were introduced. After implementing the significant changes, he found out that the school has effective system that promotes the integration of technology in teaching and learning. Most administrators and most full-time teachers regularly integrated technology in their classes. Technology has become critical to the support of the learning environment, and the opportunity for students to achieve learning outcomes through the learning experiences were provided. There are many opportunities for students to use technology to demonstrate learning outcomes.

Another study pointed out the need for a long-term technology plan for schools. Arrington (2014) shared the same findings based on his research on the use of technology in teaching. He said that it is specifically about the need for a long-term technology plan. Insofar as managing the 21st century classrooms is concerned, school administrators still have a lot to know on managing 21st century classrooms. District level instructional leaders have only a general knowledge on in the use of technology in teaching. It was recommended that there is a need for the leaders to have more understanding about cultural and global issues in the digital age.

Likewise, they have to identify and engage in training and professional development opportunities to deepen their understanding of currently available technology and digital tools.

All the aforementioned studies strongly suggest the need to assess technology integration in schools. In the ACT Policy Report (2004) on evaluation technology effectiveness, it pointed out that teachers, technology coordinators, school administrators, and evaluators can collaborate to identify the impacts associated with technology uses. Evaluation should build up the capacity of teachers to assess technology resources and alignment of their uses with learning goals and content standards. McNabb et al. (1999) explained that some of the best results in evaluating technology come from schools that recognize and harness the expertise teachers have in identifying technology-induced learning outcomes. Having teachers train teachers to evaluate the effects of technology in the classroom presents a powerful professional development strategy. Judgments about the effectiveness of technology should be made on the basis of specific, documented criteria. These criteria can be formulated at the outset of the implementation after gaining a thorough understanding of the nature of the implementation and the perceptions of its stakeholders. To diagnose strengths and weaknesses effectively, administrators and policy makers must know what outcomes are expected.

Educational programs and educational technology plans should have written objectives that provide understandable levels of detail. Where objectives are vague, evaluators should work closely with administrators to understand and clarify what the target audience should be able to know and do after technology implementation. Evaluation information will be especially useful when target goals and outcomes are agreed upon and documented by stakeholders and

evaluators. Evaluators should also be attentive to the possibility of unplanned effects that might contribute to or hinder achievement.

Teachers use technology to address multiple learning outcomes. They are applying pedagogical principles with proficiency in their use of technology and have shifted to a more constructivist and learner-centered approach to teaching and learning. There is a growing core of mentors from teacher level, and more of them are actively modeling the new practices to their peers. Teachers within the same discipline actively and regularly collaborate with each other. The majority of the teachers are regularly producing quality instructional plan that integrate the use of technology. Also, a -majority are proficient in designing appropriate creative learning activities that require collaboration that are meaningful and promote deeper learning for students. Several teachers have integrated the use of rubric to measure more complex tasks and outputs of students.

These ideas clearly signify what technology can do in order to improve the delivery of instruction. The availability of technological equipment, software and hardware, and the preparedness of the teachers play a major role in making education better and more effective. It should help make content more accessible and understandable for students. Technology is not used for its own sake; it is used to help students better assimilate content.

The need for training and sufficient equipment and facilities came out in the study of Canlas (2000). She found out that the respondents, in general, had positive attitude toward new technology. Due to early uses of computers such as word processing, a great majority of the respondents showed less apprehension about using computers. Analyses based on additional data revealed that teachers reported availability of computers as useful: interactive exchange systems,

including electronic mail and online access to libraries and public databases. Furthermore, pre-service and in-service training in educational technology helped the respondents adapt comfortably with technology. Training can help enhance the teachers' knowledge of instructional media and, at the same time, correct inappropriate use of technology. That additional equipment like computers, audiocassette recorders, television, compact discs, and video players be provided for each classroom was recommended. With the availability of the above equipment, positive attitude will be further developed. Further study should be conducted to find out whether the technology-based materials available at Don Bosco School-Sta. Mesa match with the existing curriculum.

Similarly, Guibone (2001) recommended better facilities. In her study, she said that the use of multimedia resulted in an increase in performance among the low income group. It was recommended that the use of multimedia be utilized regularly among the low income groups who appeared to have relatively improved their performance compared to the high income group. Among the schools sampled with experimental group, media rooms were found inadequate, hardly affording a chance for each member of the class to undertake first-hand experience with CDs and tapes on Science and Math. It was recommended that each school should have media room which, among other purposes, should serve as center of teaching basic operations and programs as well as for students to explore CDs and tapes that offer lessons and exercises in science, math, and English.

The need for professional development was revealed in the study of Majeski (2013). He found out that teachers and principals in middle level education in Morris County, New Jersey perceived that technology is either important or very important to the learning environment

within the classroom. Though teachers agreed that planning and preparation of lessons with the use of technology can be time consuming, they were willing to explore the digital environment and support today's learner. Importance was given to the value of consistent and productive professional development that will keep teachers and principals updated in using current skills found in the technological advances and how these advances affect teaching and learning. Although middle level educators had access to a variety of technological equipment, they still had to find out how this equipment is being used in the curricula. There is no doubt that equipment such as digital cameras, scanners, video recorders, and active boards are important in technology integration. However, the question must be raised as to how, when, and if the budget that already has supported technology is being used accordingly.

Also, Arrington (2013) found out that technology training should be provided for systematically evaluating and selecting appropriate technologies, digital tools, and systems for their respective organizations and taking into consideration the future needs of that organization. This could be accomplished through school-provided trainings, higher learning opportunities or a number of other options that allow the district instructional leader to meet the established competencies. The district instructional leader needs to gain knowledge of the role of the leader and the teacher as well as the purpose of establishing cultural understanding and global awareness through digital tool usage for learning and collaboration. In addition, a significant relationship was also found between the tenure of the respondent as a classroom teacher and items across four of the elements. The second recommendation is the real experiences in the classroom engaged with and among students, teachers, and other district instructional leaders through the use of digital tools for the purpose of building a cultural understanding and global

awareness. This planned and authentic learning opportunity in the 21st century classroom can resolve the negative correlation between the needed knowledge and number of years since being in the classroom as well allows the acquisition of the needed knowledge. This would most likely need to be established within the organization and within the classroom and alongside the teachers which they lead.

Professional development also came out in the study of Becking (2011). She found out that teachers viewed technology integration as important to teaching and student learning. However, their perception of the support and training offered by their institution was not reported as excellent. The interviews revealed participant's practices of technology integration. Based on the study, professional development should be challenging and pedagogically oriented. It should not be just having a training for the sake of having it. There should be high-quality training for instructors that will help them show their students how to teach, rather than simply tell them what to teach. The support of the administration for technology should be widely available, with information clearly communicated on support services and help hours. This means that those in support positions, they should be able to render assistance not only for the general questions that are brought to them but more importantly for the specific things that can go wrong whenever they work with technology. Informal sharing is a practical approach to assist instructors who want to see what their colleagues are doing and how they are integrating technology in new ways.

In the area of supervision, Adams (2013) pointed out that for a more effective technology integration, it is important that supervisors give feedback to the teachers. Students may also be asked on how technology integration can be enhanced. New learning and realizations are the

results of mentoring. Mentors allow teachers to grow by providing them supportive feedback. Feedback is a process which is in alignment with the cycle of reflection that the principal and intern are focused on. Both must be committed and open to giving the feedback in a clear and constructive way. Honesty and openness are connected to this process.

All these findings also came out in the survey of information and communication technology utilization in Philippine Public High Schools by Tinio (2002) whose study was commissioned by the Center of International Cooperation for Computerization, Government of Japan. In her study, she cited the program of the Department of Education on the implementation of the Basic Education Curriculum (BEC) in June 2002. In elaborating the philosophy of education that informs it, the 2002 BEC enshrines information literacy as a prerequisite for social and economic development: “We have to educate our Filipino learners to filter information critically, seek reliable sources of knowledge, and use of data and facts creatively so that they can be driven in surviving, fighting poverty, raise their personal and national esteem, and realize a beautiful life in our challenging new world. In view of this goal, the new curriculum provides for the optimizing of the power of ICT as an instructional medium, specifying that ICT be “an integral part of all the learning areas, whenever hardware and software are available.” Consistent with the goals of the new curriculum, DepEd Information Technology Framework lays down the action areas for ICT-integration in the basic education system from 2000 to 2005. These include school computerization, in-service training, IT curriculum development, technology content development, budgeting, and monitoring and evaluation. However, government’s continued investment in ICT integration for education has attracted some criticisms. DepEd has been accused of a failing to justify the investments for not having clear-cut policies, plans, and targets

that would justify such investment for ICT rather than those for more traditional learning tools. In relation to this, there is a continuing argument over the differential efficacy of ICT intervention across subject areas, student characteristics, teacher roles, and levels of access to technology, among others. Despite the criticisms, the public and private sectors continue the computerization and connectivity initiatives. The absence of a comprehensive database on ICT deployment in the public school system makes it impossible to determine the actual level of ICT resources and their instructional use, but data that are available provide some indication of the extent of ICT penetration, if not actual use, in schools.

The study revealed five major obstacles to ICT use. The biggest obstacle was the technological equipment. Computers were inadequate. Other stumbling blocks were lack of technical support and services for operating and maintaining ICT resources, lack of professional training on technology for teachers, limited space for computers laboratories, and the general insufficient budget and funding for operations including maintenance of equipment, purchase of supplies, and electricity.

Assessment in Technology Integration

The ACT Policy Report (2004) has extensively reported the need to assess technology integration in schools. It emphasized the importance of evaluating technology integration because it will allow the stakeholders to think of the directions and future of technology in

education. The findings suggest that assessment must be done before developing any program for technology integration.

Building the evaluation capacity of districts and schools is critical, as is the participation of staff to evaluate their efforts. Teachers, technology coordinators, school administrators, and evaluators can work together to identify the impacts related with the use of technology in teaching. Evaluation should build up the capability of teachers to assess technology resources and alignment of their relevance with learning goals and content standards. McNabb et al. (1999) explained that some of the best results in evaluating technology come from schools that recognize and develop the expertise teachers have in identifying technology-induced learning outcomes. When teachers mentor their fellow teachers in the effects of technology in teaching and learning, it shows a motivating professional development strategy.

Decisions on the effectiveness of technology should be based on specific and documented criteria. At the start of its implementation, these criteria can be formulated after gaining a thorough understanding of the nature of the implementation and the perceptions of its stakeholders. To identify the strengths and weaknesses effectively, administrators and department heads must know the expected outcomes.

~~Educational programs and educational technology plans should have written objectives that provide understandable levels of detail. Evaluators should work closely with the administrators in order to find out which objectives are vague. It will allow the participants to understand and clarify what they have to know and do after the technology implementation. Stakeholders and evaluators must agree on the target goals and outcomes. In this way, evaluation~~

information will be useful. Evaluators must be watchful on the possibility of unexpected effects that might contribute or hinder achievement.

— Given the serious need to effectively evaluate the teaching, learning, and achievement outcomes of technology, three recommendations are presented to educational leaders and policymakers which they can include as part of all technology planning and evaluation. Though not exhaustive, they can serve as reasonable benchmarks for those faced with the challenges of assessing the accountability of their school and district's applications of technology. There must be an agreement among all stakeholders on the purpose and intended outcomes of the planned technology implementation. All technology plans must have an evaluation component. Multiple assessment methods should be considered and employed to assess agreed outcomes. There must be an adequate, customized, and continuing professional education for administrators and teachers on how to best integrate technology in teaching and learning. In integrating technology, they must also be evaluated on their proficiency.

Summary

Education continues to bring challenges to administrators and teachers. They have to innovate in order to make teaching and learning more interesting and engaging. The advent of technology in teaching paved the way for teachers to respond more positively to the new developments in education. Teachers were oriented and trained on technology. Later, technology-based instructional materials were acquired and created by teachers. They became comfortable in

using technology in teaching. With proper planning, creative designing, and applying the appropriate pedagogy in using technology, teachers got the students engaged and challenged in learning. Eventually, technology became a significant part in teaching and learning.

However, as the years went on, issues inevitably came out on the use of technology in teaching. Studies showed that technology is more than a tool for teaching. When teachers learned how to use computers and other technology-based instructional materials for teaching, it revealed that there are still a lot to enhance in technology integration. For convenience purposes, teachers transformed the blackboard to digital presentations without the pedagogical dimensions for instructional materials. Studies revealed that there are challenges in technology integration which need to be addressed. With the emerging issues like need for faculty training, better equipment, administrative support, planning, mentoring from supervisors, and integration in the curricula, it is important that schools assess their current practices in technology integration. More importantly, teachers' knowledge and skills in technology integration must also be assessed in order to identify their strengths, weaknesses, and concerns. Once technology is utilized in teaching and learning, teacher and student's performance can be assessed particularly on the effects of technology in instruction.

CHAPTER III

METHODOLOGY

This chapter discusses the method that the researcher used in conducting the study. It includes description of the participants and setting of the study. It also presents the development and validation of research instruments used. Furthermore, this chapter discusses the data gathering procedure and the statistical treatment of the data.

Research Design

The descriptive method of research was used as the principal means in assessing the information and communications technology (ICT) integration in teaching selected high school subjects. According to Best et al. (1998), a descriptive study describes and interprets what is. It is concerned with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident, or trends that are developing. Gay (1976) defines descriptive research as involving collection of data in order to test hypotheses or to answer questions concerning the current status of the subject of the study. A descriptive study determines and reports the way things are. Just as historical research has no control over what was, descriptive research has no control over what is, and it can only measure what already exists.

Sevilla et al (1992) claims that descriptive research, particularly surveys, are employed to measure the existing phenomenon without inquiring into why it exists. In such studies, the relationships between variables are not taken into account. The main intention is to use the data for problem solving rather than for hypothesis testing.

Participants of the Study

The participants in this study were all high school teachers of math, science, English, Filipino, social studies, and Christian living of Don Bosco Technical Institute-Makati City.

There were nine (9) math teachers, eight (8) science teachers, eight (8) English teachers, seven (7) Filipino teachers, six (6) social studies teachers, and five (5) Christian living teachers in the high school department. The total number of participants was forty-three (43).

Research Locale

The study was conducted in the high school department of Don Bosco Technical Institute located at Chino Roces Ave., Barangay San Lorenzo, Makati City. It is a Catholic school exclusively for boys and animated by the teachings of its patron saint, St. John Bosco. Founded in 1954 by the Salesians of Don Bosco, it is divided into three (3) departments, namely the Grade School, High School, and Technical Vocational Education Training Center. With its emphasis not only on academic area but also on spiritual and technical formation, the vision-mission statement clearly states the importance of technology in learning. The high school department offers dual curricula which refer to the academic and technical programs. Aside from the regular academic subjects, the technical curriculum includes General Technology, Electronics Technology, Electrical Technology, Automotive Technology, Mechanical Technology and Industrial Drafting Technology.

Research Instrument

The researcher developed a research instrument based on the indicators found in the TPACK Survey Instrument by Mishra and Koehler (2010), Massachusetts Technology Self-Assessment Tool for Teachers (Massachusetts Department of Elementary and Secondary Education), National ICT Competency Standards for Teachers by the Commission on Information and Communications Technology, and Survey Form A for High Schools by the

Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU). Permission to use the first two aforementioned instruments was sought by the researcher while for the latter two, their uses are available for researchers.

The developed instrument is patterned after the PAASCU Survey Form A for High Schools. The following is the Table of Specifications prepared by the researcher:

AREA	NO. OF ITEMS	PERCENTAGE
Curriculum and Instruction	15	25 %
Faculty	15	25 %
Supervision	10	16.6 %
Training and Development	10	16.6 %
Equipment and Facilities	10	16.6 %
TOTAL	60	100%

Validity of the Instrument

The researcher formulated the indicators and presented them to his adviser for comments and suggestions. After finalizing the proposed instrument, he submitted it for validation to seven experts ~~composed of two (2) PNU Graduate professors, two (2) PNU IT professors, Dean of College of Arts, Sciences, and Education of St. Paul University Manila, the Institutional Affairs Head and former Principal of the high school department of Don Bosco Technical Institute-Makati City, and the present Principal of the high school department of Don Bosco Technical Institute-Makati City.~~ Three weeks after, he was able to retrieve the instrument. He refined and finalized the instrument based on the evaluators' comments and suggestions, and guidance of his adviser. The Likert five point rating scale was used:

- 5 - Excellent. The provisions or conditions are extensively implemented.
- 4 - Very Good. The provisions or conditions are well implemented.
- 3 - Good. The provisions or conditions are moderately implemented.
- 2 - Fair. The provisions or conditions are limited in implementation.
- 1 – Poor. The provisions or conditions are limited and poorly implemented.

Reliability of the Instrument

The researcher tested the reliability of the instrument through the test-retest method with an interval of two weeks to selected math, science, English, Filipino, social studies, and Christian living teachers of the high school department of Don Bosco Technical College-Mandaluyong City. The first test was conducted on October 15, 2015. After an interval of two weeks, he conducted the retest on October 29, 2015. Using Pearson r , the reliability coefficients derived is as follows: moderately high correlation. There is also internal consistency of the indicators which was checked Using Cronbach alpha. , results showed that there is internal consistency of the indicators. Results signified that the instrument is reliable.

Area	r	Interpretation
A. Curriculum and Instruction	.66	moderately high correlation
B. Faculty	.76	moderately high correlation
C. Supervision	.64	moderately high correlation
D. Training and Development	.77	moderately high correlation
E. Equipment and Facilities	.64	moderately high correlation

The researcher also checked the internal consistency of the indicators using Cronbach alpha which yielded the following results:

Area	Alpha	Internal Consistency
Curriculum and Instruction	.89	Good
Faculty	.96	Excellent
Supervision	.93	Excellent
Training and Development	.93	Excellent
Equipment and Facilities	.80	Good

The results showed that there is internal consistency among the items. The r value and Cronbach alpha signified that the instrument is reliable.

Data Gathering Procedure

The researcher observed the following procedures in gathering data for this study:

- He sought permission from the Rector of Don Bosco Technical Institute-Makati City to conduct the study in the high school department.
- After getting the permission, he discussed the study with the Principal and Assistant Principal for Academic Affairs of the high school department. He presented the significance of the study and how it will assist the high school department particularly on ICT integration.
- He presented and discussed the study to the subject area heads. He explained the significance of and the ethical considerations in this study.
- He fielded the questionnaires to the teachers through the assistance of the subject area heads.
- After four days, the researcher was able to retrieve all survey questionnaires.

Data Analysis

The measures of central tendency indicate the typical or average value for a distribution. There are three common measures of central tendency: mean, median, and mode. Each of these embodies a different notion of average. The mean is the most commonly used measure of central tendency. It is the arithmetic average of a set of data. It is the sum of all scores in a distribution divided by the total number of cases. With interval or ratio data, the arithmetic mean can be calculated in addition to the mode and the median.

In this study, the mean for every indicator and subject area, including the overall mean in the survey, was computed. Likewise, the mean for every area was obtained, including the overall rating. Analysis and interpretation were made. The scale used to define the mean range is presented below. This scale facilitated the interpretation of results.

Scale	Range	Descriptive Rating
5	4.50 – 5.00	Excellent. The provisions or conditions are extensively implemented.
4	3.50 – 4.49	Very Good. The provisions or conditions are well implemented.
3	2.50 – 3.49	Good. The provisions or conditions are moderately implemented.
2	1.50 – 2.49	Fair. The provisions or conditions are limited in implementation.
1	1.00 – 1.49	Poor. The provisions or conditions are limited and poorly implemented.

In the study of Formento (2011) and Perez (2011), Total Quality Standard (TQS) was used. Total Quality Standard is a standard that sets out the requirements for a quality management system. It helps businesses and organizations to be more efficient and improve customer satisfaction (ISO 9001). In a scale of 5.0, the midpoint is 3.0. All components with a mean of 3.0 and above are considered strengths. Meanwhile, those with a mean below 3.0 are considered weaknesses.

However, if the area or indicator has a mean of 4.50 and above, it means that it has attained total quality standard. Those components which garner a mean score of 4.50 and below should be maintained or continuously developed. For the indicators which are considered strengths, there is still a need to strengthen the implementation while components/indicators which are considered weaknesses should be improved so that the TQS could be attained.

Ethical Considerations

Ethical aspects of the study have been addressed by implementing the following measures:

1. Participation of the participants was voluntary. They were fully informed of the significance and objectives of the study.
2. The study is for the improvement of the teaching-learning process and not to highlight the weaknesses of the department.
3. The questionnaire has been designed to collect information directly related to the research questions, and no private or personal questions were asked.
4. The answer of the respondents did not in any way affect their performance and their employment in the institution.

5. There was no conflict of interest in the pursuit of this study because it aimed to improve teacher's performance and student's learning and not to satisfy any biases.
6. The participants were told that confidentiality will be upheld. Before answering the questionnaire, they were oriented about the study and told that their participation is voluntary. By participating voluntarily in the survey, they gave their consent to the use of their responses for the study.

CHAPTER IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

CHAPTER IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

_____This chapter presents the analyses and interpretation of the data collected on the assessment of the information and communications technology (ICT) integration in teaching selected high school subjects. The discussions that follow are presented based on the statement of the problem.

1. What is the status of the technology integration in teaching math, science, English, Filipino, social studies, and Christian living in terms of the following :

1.1. Curriculum and Instruction

This is the area in the study which refers to the integration of technology in the curriculum and the teaching strategies applied when using technology. Table 1-a found on the next page shows the computed weighted means for math, science, English, and Filipino, while Table 1-b found on page 636 displays the obtained weighted means for social studies and Christian living, including the overall weighted means for Curriculum and Instruction.

The perception of math, science, English, Filipino, social studies, and Christian living teachers, in this exact order, is shown in Tables 1-a and 1-b. Indicator 1, “*The importance of technology in teaching and learning is reflected in the vision-mission of the school,*” obtained means of 5.0, 4.75, 4.75, 4.57, 4.83, and 4.60. Indicator 2, “*The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching like laptops,*

educational software, power point, film clips, images, music, and online learning,” got means of 5.00, 5.00, 4.88,

Table 1
WEIGHTED MEANS ON FOR CURRICULUM AND INSTRUCTION

	<u>MATH</u>	<u>SCI</u>	<u>ENG</u>	<u>FIL</u>	<u>SS</u>	<u>CL</u>	<u>OVERALL</u>
1. <u>The importance of technology in teaching and learning is reflected in the vision-mission of the school.</u>	<u>5.00</u>	<u>4.75</u>	<u>4.75</u>	<u>4.57</u>	<u>4.83</u>	<u>4.60</u>	<u>4.76</u>
2. <u>The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching like laptops, educational software, power point, film clips, images, music, and online learning.</u>	<u>5.00</u>	<u>5.00</u>	<u>4.88</u>	<u>4.57</u>	<u>4.83</u>	<u>4.60</u>	<u>4.81</u>
3. <u>The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching.</u>	<u>5.00</u>	<u>4.63</u>	<u>4.75</u>	<u>4.71</u>	<u>5.00</u>	<u>5.00</u>	<u>4.83</u>
4. <u>Teachers select technologies that they can use in class which will enhance teaching and learning.</u>	<u>5.00</u>	<u>4.75</u>	<u>4.50</u>	<u>4.57</u>	<u>4.83</u>	<u>5.00</u>	<u>4.76</u>
5. <u>Teachers deliver instruction that appropriately combine content, technologies, and teaching approaches.</u>	<u>4.89</u>	<u>4.63</u>	<u>4.63</u>	<u>4.29</u>	<u>4.83</u>	<u>4.20</u>	<u>4.60</u>
6. <u>Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards while addressing a variety of learning styles.</u>	<u>4.78</u>	<u>4.50</u>	<u>4.25</u>	<u>4.29</u>	<u>4.83</u>	<u>4.20</u>	<u>4.48</u>
7. <u>Teachers understand the pedagogy in the use of technology for classroom instruction.</u>	<u>4.78</u>	<u>4.25</u>	<u>4.75</u>	<u>3.86</u>	<u>4.83</u>	<u>4.20</u>	<u>4.46</u>
8. <u>Teachers prepare at least five technology-based instructional materials.</u>	<u>4.11</u>	<u>4.00</u>	<u>3.88</u>	<u>3.71</u>	<u>4.00</u>	<u>4.20</u>	<u>3.97</u>
9. <u>Teachers regularly update their technology-based instructional materials.</u>	<u>4.33</u>	<u>4.38</u>	<u>3.75</u>	<u>3.71</u>	<u>4.00</u>	<u>3.80</u>	<u>4.02</u>
10. <u>Teachers in the subject area collaborate with each other in preparing technology-based instructional materials.</u>	<u>4.22</u>	<u>4.50</u>	<u>4.13</u>	<u>3.86</u>	<u>4.33</u>	<u>3.80</u>	<u>4.16</u>
11. <u>Teachers encourage students to use technology for projects and other outputs.</u>	<u>4.56</u>	<u>4.75</u>	<u>4.38</u>	<u>4.29</u>	<u>4.83</u>	<u>4.60</u>	<u>4.55</u>
12. <u>Teachers guide the students in the use of technology for projects.</u>	<u>4.67</u>	<u>4.88</u>	<u>4.13</u>	<u>3.86</u>	<u>4.67</u>	<u>4.60</u>	<u>4.46</u>
13. <u>Provision for online learning for the subject is available.</u>	<u>5.00</u>	<u>4.63</u>	<u>4.75</u>	<u>3.86</u>	<u>4.50</u>	<u>4.00</u>	<u>4.51</u>
14. <u>Teachers and students use emails, group sites, blogs, and social media for disseminating information directly to students, colleagues, and parents, and for gathering feedback from students, colleagues, and parents.</u>	<u>4.33</u>	<u>4.38</u>	<u>4.13</u>	<u>4.14</u>	<u>4.33</u>	<u>4.80</u>	<u>4.32</u>
15. <u>There are at least three rubrics for assessing student performance in the use of various technologies.</u>	<u>4.22</u>	<u>4.38</u>	<u>4.25</u>	<u>3.57</u>	<u>4.00</u>	<u>4.20</u>	<u>4.11</u>

Subjects:

MATH - Math FIL - Filipino
SCI - Science SS - Social
Studies
ENG - English CL - Christian Living

Scale :

4.50 – 5.00 Excellent
3.50 – 4.49 Very Good
2.50 – 3.49 Good
1.50 – 2.49 Fair
1.00 – 1.49 Poor

~~5.00, 4.88,~~ 4.57, 4.83, and 4.60. Indicator 3, “The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching,” obtained means of 5.00, 4.63, 4.75, 4.71, 5.00, and 5.00. Indicator 4, “Teachers select technologies that they can use in class which will enhance teaching and learning,” obtained means of 5.00, 4.75, 4.50, 4.47, 4.83, and 5.00. The results show that the teachers similarly perceived the aforementioned indicators as “Excellent” which means that they are extensively implemented.

— The math, science, English, Filipino, social studies, and Christian living teachers perceived that technology is integrated in the curriculum. As observed by the researcher, all teachers are actively involved in the review and updating of the curriculum, including the use of technology in teaching. This was pointed out by Lucas and Associates (2000). They clearly emphasized that before using technology, everyone should believe in its capability and role in education. Noll (2010) also noted this in his compilation on issues in education presenting Frederick Hess, an educator. He believes that the tools of technology, when used appropriately, can support innovation and reinvention in education.

means of 5.00, 5.00, 4.88, 4.57, 4.83, and 4.60. Indicator 3, “*The Learning Plan (Lesson Plan)*”

Table 1.a**WEIGHTED MEANS ON CURRICULUM AND INSTRUCTION**

	MATH		SCIENCE		ENGLISH	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
16. The importance of technology in teaching and learning is reflected in the vision-mission of the school.	5.00	Excellent	4.75	Excellent	4.75	Excellent
17. The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching like laptops, educational software, power point, film clips, images, music, and online learning.	5.00	Excellent	5.00	Excellent	4.88	Excellent
18. The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching.	5.00	Excellent	4.63	Excellent	4.75	Excellent
19. Teachers select technologies that they can use in class which will enhance teaching and learning.	5.00	Excellent	4.75	Excellent	4.50	Excellent
20. Teachers deliver instruction that appropriately combine content, technologies, and teaching approaches.	4.89	Excellent	4.63	Excellent	4.63	Excellent
21. Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards while addressing a variety of learning styles.	4.78	Excellent	4.50	Excellent	4.25	Very Good
22. Teachers understand the pedagogy in the use of technology for classroom instruction.	4.78	Excellent	4.25	Very Good	4.75	Excellent
23. Teachers prepare at least five technology-based instructional materials.	4.11	Very Good	4.00	Very Good	3.88	Very Good
24. Teachers regularly update their technology-based instructional materials.	4.33	Very Good	4.38	Very Good	3.75	Very Good
25. Teachers in the subject area collaborate with each other in preparing technology-based instructional materials.	4.22	Very Good	4.50	Excellent	4.13	Very Good
26. Teachers encourage students to use technology for projects and other outputs.	4.56	Excellent	4.75	Excellent	4.38	Very Good
27. Teachers guide the students in the use of technology for projects.	4.67	Excellent	4.88	Excellent	4.13	Very Good
28. Provision for online learning for the subject is available.	5.00	Excellent	4.63	Excellent	4.75	Excellent
29. Teachers and students use emails, group sites, blogs, and social media for disseminating information directly to students, colleagues, and parents, and for gathering feedback from students, colleagues, and parents.	4.33	Very Good	4.38	Very Good	4.13	Very Good
30. There are at least three rubrics for assessing student performance in the use of various technologies.	4.22	Very Good	4.38	Very Good	4.25	Very Good

Table 1.b**WEIGHTED MEANS ON CURRICULUM AND INSTRUCTION**

	SOCIAL STUDIES		CHRISTIAN LIVING	
	Mean	Interpretation	Mean	Interpretation
1. The importance of technology in teaching and learning is reflected in the vision-mission of the school.	4.83	Excellent	4.60	Excellent
2. The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching like laptops, educational software, power point, film clips, images, music, and online	4.83	Excellent	4.60	Very Good

	learning:				
3.	The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching:	5.00	Excellent	5.00	Excellent
4.	Teachers select technologies that they can use in class which will enhance teaching and learning:	4.83	Excellent	5.00	Excellent
5.	Teachers deliver instruction that appropriately combine content, technologies and teaching approaches:	4.83	Excellent	4.20	Very Good
6.	Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards, while addressing a variety of learning styles:	4.83	Excellent	4.20	Very Good
7.	Teachers understand the pedagogy in the use of technology for classroom instruction:	4.83	Excellent	4.20	Very Good
8.	Teachers prepare at least five technology-based instructional materials:	4.00	Very Good	4.20	Very Good
9.	Teachers regularly update their technology-based instructional materials:	4.00	Very Good	3.80	Very Good
10.	Teachers in the subject area collaborate with each other in preparing technology-based instructional materials:	4.33	Very Good	3.80	Very Good
11.	Teachers encourage students to use technology for projects and other outputs:	4.83	Excellent	4.60	Excellent
12.	Teachers guide the students in the use of technology for projects:	4.67	Excellent	4.60	Excellent
13.	Provision for online learning for the subject is available:	4.50	Excellent	4.00	Very Good
14.	Teachers and students use emails, group sites, blogs, and social media for disseminating information directly to students, colleagues, and parents, and for gathering feedback from students, colleagues, and parents:	4.33	Very Good	4.80	Excellent
15.	There are at least three rubrics for assessing student performance in the use of various technologies:	4.00	Very Good	4.20	Very Good

means of 5.00, 5.00, 4.88, 4.57, 4.83, and 4.60. Indicator 3, “The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching,” obtained means of 5.00, 4.63, 4.75, 4.71, 5.00, and 5.00. Indicator 4, “Teachers select technologies that they can use in class which will enhance teaching and learning,” obtained means of 5.00, 4.75, 4.50, 4.47, 4.83, and 5.00. The results show that the teachers similarly perceived the aforementioned indicators as “Excellent” which means that they are extensively implemented.

The math, science, English, Filipino, social studies, and Christian living teachers perceived that technology is integrated in the curriculum. As observed by the researcher, all teachers are actively involved in the review and updating of the curriculum, including the use of technology in teaching. This was pointed out by Lucas and Associates (2000). They clearly emphasized that before using technology, everyone should believe in its capability and role in education. Noll (2010) also noted this in his compilation on issues in education presenting Frederick Hess, an educator. He believes that the tools of technology, when used appropriately, can support innovation and reinvention in education.

The math, science, English, and social studies teachers’ perception on Indicator 5, “Teachers deliver instruction that appropriately combine content, technologies and teaching approaches,” is shown in Table 1-a and Table 1-b. It obtained means of 4.89, 4.63, 4.63, and 4.83. These results show that the teachers perceived this indicator as “Excellent” which means that it is extensively implemented. On the other hand, the Filipino and Christian living teachers’ perception on Indicator 5 is presented in Tables 1-a and 1-b. The means derived are 4.29 and 4.20. The results show that the aforementioned teachers rated this indicator as “Very Good” which means that it is well implemented.

The findings clearly demonstrate that the math, science, English, social studies, and Christian living teachers have integrated technology in teaching. It is also obvious that they were fully aware of the importance of technology and pedagogy in teaching. However, they perceived that they need to learn more on combining content, technologies, and teaching approaches. This perception may be due to the fact that in the Filipino area, there are four newly hired teachers, three of whom are fresh graduates. Also, the Subject Area Head is a newly appointed one. As observed by the researcher, these teachers are still adjusting to the system, particularly on technology integration. Thus, they have to be guided in teaching,

particularly in the use of technology. This was highlighted by Koehler, Mishra and Cain (2013), the proponents of technology, pedagogy, and content knowledge (TPACK). They interestingly said that at the heart of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationships among and between them.

The perception of math, science, English, and social studies teachers on the [Indicator 13](#), “*Provision for online learning for the subject is available*,” is summarized in [Tables 1-a and 1-b](#). It obtained means of 5.00, 4.63, 4.75, and 4.50. These results show that the said teachers perceived this indicator to be extensively implemented, rating it as “Excellent”. Moreover, the Filipino and Christian living teachers’ perception on the same indicator, Indicator 13, is also shown in [Tables 1-a and 1-b](#). It obtained means of 3.86 and 4.00. The results show that they have observed that this indicator is “Very Good” which means it is well implemented.

The foregoing results demonstrate that the math, science, English, and social studies teachers perceived that online learning is well-provided by Don Bosco Technical Institute-Makati City. *Genyo*, the online learning partner of the school for five years, provides online teaching and learning to five subject areas, namely math, science, English, Filipino, and social studies but not to the Christian living subject. As observed by the researcher, the Filipino teachers, most especially the new teachers, may not have been fully oriented on this. Recesso and Orill (2008) highlighted the use of technology and online learning. They said that once you have the students’ attention, you’ll want to use instructional strategies and integrate technology in ways that make learning exciting and relevant. Initiating activities utilize three main instructional strategies: presentation, demonstration, and discussion. As

you plan ways to integrate technology into an initiating activity, remember that the challenge is to harness technology's power in ways that are meaningful to the learners.

The perception of math, science, Social Studies, and Christian living teachers about the Indicator 11, "*Teachers encourage students to use technology for projects and other outputs,*" is likewise summarized in Tables 1-a and 1-b. The indicator obtained means of 4.56, 4.75, 4.83 and 4.60. These results show that the teachers perceived this indicator as "Excellent" which means that it is extensively implemented. In addition, the English and Filipino teachers' ratings on Indicator 11, also shown in Table 1-a, produced means of 4.38 and 4.29. These results show that the said teachers observed this indicator to be "Very Good" which means that it is well implemented.

On the Indicator 12, "*Teachers guide the students in the use of technology for projects,*" the obtained means are 5.00, 4.63, 4.67 and 4.60 (Tables 1-a and 1-b). This indicates that the math, science, social studies, and Christian living teachers perceived this indicator as "Excellent" which means that it is extensively implemented. On the other hand, the English and Filipino teachers rated this indicator as "Very Good", with obtained means of 4.13 and 3.86. The data show that the indicator is well implemented.

Based on the results, the math, science, social studies, and Christian living teachers believed that they are able to guide and encourage students in using technology for their performance tasks. However, the English and Filipino teachers perceived that they need to improve on this. This may be due to the fact that in these subjects areas, there are eight new teachers. In learning, the teacher should primarily guide and encourage the students. According to Bago (2008), a competent teacher is able to promote students' understanding of

the lesson through a variety of strategies and techniques, monitor student performance and provide useful feedback that will assist learners in the learning process.

____ On the Indicator 6, *“Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards, while addressing a variety of learning styles,”* the math, science, and social studies teachers rated them as “Excellent, with means of 4.78, 4.50 and 4.83, respectively (Tables ~~1-a and 1-b~~). This means that the teachers perceived the indicator to be extensively implemented. On the other hand, the English, Filipino and Christian living teachers’ ratings of the same indicator resulted in means of 4.25, 4.29 and 4.20, respectively (Tables ~~1-a and 1-b~~). The results show that they observed this indicator as “Very Good” which means that it is well implemented.

As for the Indicator 7, *“Teachers understand the pedagogy in the use of technology for classroom instruction,”* the math, English, and social studies teachers rated it as “Excellent”, with means of 4.78, 4.75 and 4.83, respectively (Tables ~~1-a and 1-b~~ 1). The data reveal that the indicator is perceived to be extensively implemented. The science, Filipino and Christian living teachers, on the other hand, believed it to be well implemented, with means of 4.25, 3.86 and 4.20 interpreted as “Very Good” (Tables ~~1-a and 1-b~~).

____ Based on these results, teachers need to enhance their understanding and skills in preparing technology-based instructional materials. Northrop (2013) said that once curricular goals and appropriate technology are identified, teachers need to consider whether the technology is providing instruction at a student’s appropriate level. Use of technology and the content provided within needs to be accessible to the student and matched to his or her appropriate developmental learning level.

____ The perception of Christian living teachers of the Indicator 14, *“Teachers and students use emails, group sites, blogs, and social media for disseminating information*

directly to students, colleagues, and parents, and for gathering feedback from students, colleagues, and parents,” is shown in Table 1.b. The indicator got a mean of 4.80 interpreted as “Excellent”. This reveals that the indicator was extensively implemented.

For Indicator 11, the math, science, English, Filipino, and social studies teachers rated it as “Very Good” as evidenced by the computed means of 4.33, 4.38, 4.13, 4.14, and 4.33 (Tables 1.a and Table 1.b). The indicator is perceived to be well implemented.

As to the Indicator 8, *“Teachers prepare at least five technology-based instructional materials,”* it obtained means of 4.11, 4.00, 3.88, 3.71, 4.00, and 4.20 (Tables 1.a and 1.b), interpreted as “Very Good.” This means that the math, science, English, Filipino, social studies, and Christian living teachers observed this indicator as well implemented.

Also, the science teachers perceived Indicator 10, *“Teachers in the subject area collaborate with each other in preparing technology-based instructional materials,”* To be extensively implemented, with a mean of 4.50 (Table 1.a) interpreted as “Excellent”. On the other hand, the math, English, Filipino, social studies, and Christian living teachers’ rated the same indicator as “Very Good”, with means of 4.22, 4.13, 3.86, 4.33, and 3.80 (Tables 1.a and 1.b 1). This goes to show that they observed this indicator to be well implemented.

The ratings of math, science, English, Filipino, social studies, and Christian living teachers to Indicator 9, *“Teachers regularly update their technology-based instructional materials,”* is summarized in Tables 1.a and 1.b 1. Obtained means are 4.33, 4.38, 3.75, 3.71, 4.00, and 3.80. These findings bare that the indicator is perceived to be “Very Good” which means that it is well implemented.

The foregoing discussion discloses that math, science, English, Filipino, social studies, and Christian living teachers need to enhance their skill on preparation of technology-based instructional materials. According to Lasley, Matczynski, and Rowley (1997), it is ultimately up to the teachers to plan for the integration of technology and to articulate the specific ways

in which it represents additional value for themselves and their students. This idea is also shared by Bago (2008). She said that the use of well-designed technology-based instructional materials can be more effective than traditional classroom methods. Through the use of integrated images and animation, different structuring of materials, and increased control of and interaction with learning materials, students can learn more easily and quickly. New technologies can be developed which can facilitate higher-order learning skills, such as problem solving, decision making, and critical thinking.

On Indicator 15, *“There are at least three rubrics for assessing student performance in the use of various technologies,”* the math, science, English, Filipino, social studies, and Christian living teachers rated it as “Very Good”, with means of 4.22, 4.38, 4.25, 3.57, 4.00, and 4.20 (Tables 1.a and 1.b). This means that the indicator is well implemented.

Assessing student performance in the use of technology was recommended by Means (2000). He said that teachers should have basic technology skills and be able to manage student-centered, technology-supported activities, and assess student skills within the context of technology-supported activities.

The overall perception of teachers from the six subject areas on curriculum and instruction is shown in Table 1.b. Indicator 3, *“The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching,”* and Indicator 2, *“The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching like laptops, educational software, power point, film clips, images, music, and online learning,”* obtained the highest mean, 4.83 and 4.81, respectively. Indicator 5, *“Teachers deliver instruction that appropriately combine content, technologies and teaching approaches,”* got a mean of 4.60

while Indicator 11, *“Teachers encourage students to use technology for projects and other outputs,”* and Indicator 13, *“Provision for online learning for the subject is available,”* obtained a mean of 4.55 and 4.51, respectively. These results show that high school teachers from the six subject areas perceived the aforementioned indicators as “Excellent.” This means that they were extensively implemented.

— On the other hand, Indicator 6, *“Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards, while addressing a variety of learning styles,”* got a mean of 4.48. Indicator 7, *“Teachers understand the pedagogy in the use of technology for classroom instruction,”* and Indicator 12, *“Teachers guide the students in the use of technology for projects,”* both got a mean of 4.46. Indicator 14, *“Teachers and students use emails, group sites, blogs, and social media for disseminating information directly to students, colleagues, and parents, and for gathering feedback from students, colleagues, and parents,”* got a mean of 4.32. Indicator 10, *“Teachers in the subject area collaborate with each other in preparing technology-based instructional materials,”* and Indicator 15, *“There are at least three rubrics for assessing student performance in the use of various technologies,”* got a mean of 4.16 and 4.11, respectively. Indicator 9, *“Teachers regularly update their technology-based instructional materials,”* and Indicator 8, *“Teachers prepare at least five technology-based instructional material,”* obtained the two lowest means which are 4.02 and 3.97, respectively. These results show that high school teachers from the six subject areas perceived the aforementioned indicators as “Very Good” which means that they were well-implemented.

The overall mean obtained in the area of Curriculum and Instruction is 4.46 interpreted as “Very Good.” This discloses that the provision or conditions were well-implemented.

Technology integration in the vision-mission, curriculum instruction guide, and learning plans were evident. On the other end, the lowest means obtained are on the indicators on preparation of technology-based instructional materials. The current teaching load and other duties of the teachers may have prevented them from preparing more quality technology-based materials. As observed by the researcher, the lack of time affects the preparation and collaboration among teachers in planning for technology-based materials. This is supported by Orlich (2007). Effective planning will always have a very strong impact on student achievement. Planning is a really a tedious and time-consuming process for the novice teachers. It is totally different if you are already a teacher for you will be responsible for student learning. The many hours that you spent in the classroom as a student will help but will not be a big difference. However, as you gain experience, you will begin to identify which activities take detailed planning and which do not. As you plan, sometimes you realize along the way that there are activities to forego to take advantage of that unintended learning opportunity. It is a master teacher's skill. A good plan provides you with the context for this decision.

Also, Clark et al (2008) added that the rationale for using words and graphics or multimedia presentation is that people are more likely to understand material when they can engage in active learning – that is, when they engage in relevant cognitive processing such as attending to the relevant material in the lesson, mentally organizing the material into a coherent cognitive presentation, and mentally integrating the material with their existing knowledge. Multimedia presentations can lead learners to participate in active learning by mentally bringing together the relationships between images and words. Significantly, it is

timely that Don Bosco Technical Institute-Makati City indicated it in its “Three-Year Institutional Strategic and Educative Pastoral Plan (2014-2017).” One of the components of the plan is curriculum and instruction development. Under this component, there are three action points which cover technology integration in teaching. Two of them are directly related to the area of curriculum and instruction which are “to require teachers to produce instructional materials and supplements,” and “to make best use of technology in instruction.” In this study, it was shown that teachers were in need of improvement particularly on the preparation of technology-based instructional materials. Don Bosco Technical Institute-Makati City is taking the right direction in improving technology integration in teaching and learning.

1.2. Faculty

— This is the area covered in the study which refers to the teachers’ knowledge and skills on technology, pedagogy, and content integration. Table 2-a found on [the next page](#) shows the weighted means for math, science, English, and Filipino, while Table 2-b found on [page 758](#) reflects the weighted means for social studies and Christian living, including the overall weighted means for Faculty.

Tables 2-a and 2-b displays the obtained means from the ratings given by the math, science, English, Filipino, social studies, and Christian living teachers, in this order, on Faculty indicators. Indicator 1, *“I can operate laptop, LCD projector, and TV in the classroom to aid my instruction,”* garnered means of 5.00, 5.00, 5.00, 4.71, 4.83, and 5.00. Indicator 1a, *“I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop,”* obtained means of 4.89, 4.88, 5.00, 4.57, 4.83, and 5.00. Indicator 2a, *“I can insert table, text, pictures, sound, video and files in the documents,”* got means of 5.00, 4.89, 4.75, 5.00, 4.86, 4.83, and 5.00. For the Indicator 2d, *“I can enhance slide presentations by adding sound, customizing animation, and inserting images,”* 4.56, 4.88, 4.63, 4.57, 4.83, and 4.80 were the means derived. Last but not the least, Indicator 4, *“I can search the web to find current information on a topic that I need”* received means of 4.78, 4.75, 5.00, 4.57, 4.50, and 4.80. These results show that the teachers perceived the aforementioned indicators as “Excellent” which means that they are extensively implemented.

Table 2
WEIGHTED MEANS ON-FOR FACULTY

	MATH	SCI	ENG	FIL	SS	CL	OVERALL
1. <u>I can operate laptop, LCD projector and TV in the classroom to aid my instruction.</u>	<u>5.00</u>	<u>5.00</u>	<u>5.00</u>	<u>4.71</u>	<u>4.83</u>	<u>5.00</u>	<u>4.93</u>
a. <u>I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop).</u>	<u>4.89</u>	<u>4.88</u>	<u>5.00</u>	<u>4.57</u>	<u>4.83</u>	<u>5.00</u>	<u>4.86</u>
b. <u>I can configure computer settings of various software and hardware.</u>	<u>4.11</u>	<u>4.13</u>	<u>4.00</u>	<u>3.71</u>	<u>4.33</u>	<u>4.80</u>	<u>4.14</u>
2. <u>Using MS Word, Excel and PowerPoint for teaching.</u>							

and other related tasks.	4.89	4.75	5.00	4.86	4.83	5.00	4.88
a. I can insert table, text, pictures, sound, video, and files in the documents.							
b. I can make computation, use formula and create graphs using spreadsheets.	4.89	4.75	4.38	4.00	4.33	4.00	4.44
c. I can analyze assessment data using spreadsheets and statistical applications.	4.67	4.63	4.38	3.57	4.00	3.80	4.23
d. I can enhance slide presentations by adding sound, customizing animation, and inserting images.	4.56	4.88	4.63	4.57	4.83	4.80	4.69
e. I can make effective and interactive class Presentations using the slides and LCD projector.	4.56	4.50	5.00	4.29	4.83	4.60	4.62
f. I can design slides by balancing colors and using appropriate images and texts.	4.44	4.75	4.88	4.29	4.83	4.80	4.65
3. Using other computer software, I can attach and configure scanners, cameras, and cell phones to acquire digital images.	3.89	4.38	4.63	4.43	4.33	4.60	4.34
4. I can search the web to find current information on a topic that I need.	4.78	4.75	5.00	4.57	4.50	4.80	4.74
5. I choose the appropriate technology for my lesson.	4.67	4.63	4.88	4.29	4.67	4.80	4.65
6. I can identify and evaluate developing technologies as they relate to my subject area, grade level, and student population	4.67	4.38	4.75	4.43	4.33	4.40	4.51
7. I use email and social media to enhance teaching and learning.	4.67	4.50	4.00	4.86	4.17	4.60	4.46
8. I know and understand the legal implications of Software Licenses and Fair Use.	4.44	4.63	4.75	4.57	4.50	4.80	4.60
9. I report malfunctions and problems with computer software and hardware to my immediate head or IT Center.	4.89	4.50	4.50	4.57	4.33	4.80	4.60
10. I promote and implement rules and regulations on proper use of computers.	4.56	4.75	4.75	4.43	4.50	4.60	4.60
11. I recommend websites as references to my students for a better understanding of the lesson.	4.78	4.88	4.25	4.14	4.67	4.60	4.55

Subjects:

<u>MATH</u> - Math	<u>FIL</u> - Filipino
<u>SCI</u> - Science	<u>SS</u> - Social Studies
<u>ENG</u> - English	<u>CL</u> - Christian Living

reflects the weighted means for social studies and Christian living, including the overall weighted means for Faculty.

Tables 2.a and 2.b display the obtained means from the ratings given by the math, science, English, Filipino, social studies, and Christian living teachers, in this order, on Faculty indicators. Indicator 1, “I can operate laptop, LCD projector, and TV in the

classroom to aid my instruction,” garnered means of 5.00, 5.00, 5.00, 4.71, 4.83, and 5.00. Indicator 1a, *“I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop,”* obtained means of 4.89, 4.88, 5.00, 4.57, 4.83, and 5.00. Indicator 2a, *“I can insert table, text, pictures, sound, video and files in the documents,”* got means of 5.00, 4.89, 4.75, 5.00, 4.86, 4.83, and 5.00. For the Indicator 2d, *“I can enhance slide presentations by adding sound, customizing animation, and inserting images,”* 4.56, 4.88, 4.63, 4.57, 4.83, and 4.80 were the means derived. Last but not the least, Indicator 4, *“I can search the web to find current information on a topic that I need”* received means of 4.78, 4.75, 5.00, 4.57, 4.50, and 4.80. These results show that the teachers perceived the aforementioned indicators as “Excellent” which means that they are extensively implemented.

—Based on the results, it can be deduced that the teachers believed they have the basic skills in technology integration. A teacher is a perpetual learner. This was shared by Pefianco (2002). He said that as a professional, a teacher is multi-skilled, being very competent in the fields of pedagogy, —multimedia instructional technology, science and information technology—

competent in the fields of pedagogy, multimedia instructional technology, science and information technology and having

Table 2.a

WEIGHTED MEANS ON FACULTY

	MATH		SCIENC		ENGLIS	
	M e a n	Int erpreta tion	M e a n	Int erpreta tion	M e a n	Int erpreta on
12. I can operate laptop, LCD projector and TV in the classroom to aid my instruction.	5 : 0 0	Ex cellent	5 : 0 0	Ex cellent	5 : 0 0	Ex cellent
c. I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop).	4 : 8 9	Ex cellent	4 : 8 8	Ex cellent	5 : 0 0	Ex cellent
d. I can configure computer settings of various software and hardware.	4 : 1 1	Ve ry Good	4 : 1 3	Ve ry Good	4 : 0 0	Ve ry-Goo
13. Using MS Word, Excel and PowerPoint for teaching and other related tasks, g. I can insert table, text, pictures, sound, video, and files in the documents.	4 : 8 9	Ex cellent	4 : 7 5	Ex cellent	5 : 0 0	Ex cellent
h. I can make computation, use formula and create graphs using spreadsheets.	4 : 8 9	Ex cellent	4 : 7 5	Ex cellent	4 : 3 8	Ve ry-Goo
i. I can analyze assessment data using spreadsheets and statistical applications.	4 : 6 7	Ex cellent	4 : 6 3	Ex cellent	4 : 3 8	Ve ry-Goo
j. I can enhance slide presentations by adding sound, customizing animation, and inserting images.	4 : :	Ex cellent	4 : :	Ex cellent	4 : :	Ex cellent

	5 6		8 8		6 3	
k. I can make effective and interactive class presentations using the slides and LCD projector.	4 : 5 6	Ex cellent	4 : 5 0	Ex cellent	5 : 0 0	Ex cellent
l. I can design slides by balancing colors and using appropriate images and texts.	4 : 4 4	Ve ry Good	4 : 7 5	Ex cellent	4 : 8 8	Ex cellent
14. Using other computer software, I can attach and configure scanners, cameras, and cell phones to acquire digital images.	3 : 8 9	Ve ry Good	4 : 3 8	Ve ry Good	4 : 6 3	Ex cellent
15. I can search the web to find current information on a topic that I need.	4 : 7 8	Ex cellent	4 : 7 5	Ex cellent	5 : 0 0	Ex cellent
16. I choose the appropriate technology for my lesson.	4 : 6 7	Ex cellent	4 : 6 3	Ex cellent	4 : 8 8	Ex cellent
17. I can identify and evaluate developing technologies as they relate to my subject area, grade-level, and student population	4 : 6 7	Ex cellent	4 : 3 8	Ve ry Good	4 : 7 5	Ex cellent
18. I use email and social media to enhance teaching and learning.	4 : 6 7	Ex cellent	4 : 5 0	Ex cellent	4 : 0 0	Ve ry-Goo
19. I know and understand the legal implications of Software Licenses and Fair Use.	4 : 4 4	Ve ry Good	4 : 6 3	Ex cellent	4 : 7 5	Ex cellent
20. I report malfunctions and problems with computer software and hardware to my immediate head or IT Center.	4 : :	Ex cellent	4 : :	Ex cellent	4 : :	Ex cellent

	8 9		5 0		5 0	
21. I promote and implement rules and regulations on proper use of computers.	4 : 5 6	Ex cellent	4 : 7 5	Ex cellent	4 : 7 5	Ex cellent
22. I recommend websites as references to my students for a better understanding of the lesson.	4 : 7 8	Ex cellent	4 : 8 8	Ex cellent	4 : 2 5	Ve ry Good

Table 2.b

WEIGHTED MEANS ON FACULTY

	SOCIAL STUDIES		CHRISTIAN LIVING	
	Mean	Interpretation	Mean	Interpretation
1. I can operate laptop, LCD projector and TV in the classroom to aid my instruction.	4 .83	Excellent	5 .00	Excellent
a. I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop).	4 .83	Excellent	5 .00	Excellent
b. I can configure computer settings of various software and hardware.	4 .33	Very Good	4 .80	Excellent
2. Using MS Word, Excel and PowerPoint for teaching and other related tasks,	4 .83	Excellent	5 .00	Excellent
a. I can insert table, text, pictures, sound, video and files in the documents.	4 .83	Excellent	5 .00	Excellent
b. I can make computation, use formula, and create graphs using spreadsheets.	4 .33	Very Good	4 .00	Very Good
c. I can analyze assessment data using spreadsheets and statistical applications.	4 .00	Very Good	3 .80	Very

				Good
d. I can enhance slide presentations by adding sound, customizing animation, and inserting images.	4 .83	Excellent	4 .80	Excellent
e. I can make effective and interactive class presentations using the slides and LCD projector.	4 .83	Excellent	4 .60	Excellent
f. I can design slides by balancing colors and using appropriate images and texts.	4 .83	Excellent	4 .80	Excellent
3. Using other computer software, I can attach and configure scanners, cameras, and cell phones to acquire digital images.	4 .33	Very Good	4 .60	Excellent
4. I can search the web to find current information on a topic that I need.	4 .50	Excellent	4 .80	Excellent
5. I choose the appropriate technology for my lesson.	4 .67	Excellent	4 .80	Excellent
6. I can identify and evaluate developing technologies as they relate to my subject area, grade level and student population	4 .33	Very Good	4 .40	Very Good
7. I use email and social media to enhance teaching and learning.	4 .17	Very Good	4 .60	Excellent
8. I know and understand the legal implications of Software Licenses and Fair Use.	4 .50	Excellent	4 .80	Excellent
9. I report malfunctions and problems with computer software and hardware to my immediate head or IT Center.	4 .33	Very Good	4 .80	Excellent
10. I promote and implement rules and regulations on proper use of computers.	4 .50	Excellent	4 .60	Excellent
11. I recommend websites as references to my students for a better understanding of the lesson.	4	Exe	4	Ex

	-.67	cellent	-.60	cellent
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~~competent in the fields of pedagogy, multimedia instructional technology, science and information technology and having~~ excellent communication and relational skills. He/She also has a high level of ~~___~~
~~___~~dedication, self-motivation, and commitment to his/her profession.

~~___~~Table 2-a presents the means obtained from the ratings given by the math and science teachers, in this order to Indicator 2b, *“I can make computation, use formula, and create graphs using spreadsheets.”* The means computed are 4.89 and 4.75, interpreted as “Excellent,” which show that the indicator is perceived to be extensively implemented. On the other hand, the English, Filipino, social studies, and Christian living teachers rated the indicator as “Very Good” as evidenced by the means of 4.38, 4.00, 4.33, and 4.00 (Tables ~~s-2-a and 2-b~~ 2). Thus, this indicator is thought to be well-implemented.

~~_~~ For the Indicator 2c, *“I can analyze assessment data using spreadsheets and statistical applications,”* the obtained means of 4.67 and 4.63, interpreted as “Excellent” (Table 2-a), derived from the math and science teachers’ ratings show that this indicator is perceived to be extensively implemented. On the other hand, the English, Filipino, social studies, and Christian living teachers perceived themselves to be “Very Good” in this area, with means of 4.38, 3.57, 4.00, and 3.80, respectively (Tables ~~2-a and 2-b~~ 2-a and 2-b).

The results for Indicators 2a and 2b divulge that the teachers needed to enhance their MS Excel skills, the use of social media, and their knowledge and skills in computer configuration. According to Bilbao (2008), good teachers make the classroom brighter and interesting place. They are ideal companions of the learners. With the advances in communication technology, good teachers have to understand the information from the data

that surround the learners. Excellent teachers are needed to draw the wisdom from the knowledge. In addition, a good institution is a reflection of having good teachers. Hence, the right faculty who are expected to be recruited are those with excellent and relevant preparation. These teachers must be provided support through continuing professional development in order to keep abreast with the changing demands of a learning society.

On Indicator 2e, *“I can make effective and interactive class presentations using the slides and LCD projector,”* the math, science, English, social studies, and Christian living teachers perceived themselves to be “Excellent” in this area as shown by the computed means of 4.56, 4.50, 5.00, 4.83, and 4.80 (Tables 2-a and 2-b). The teachers teaching the Filipino subject also believed themselves to be well implementing this indicator as evidenced by the obtained mean of 4.29 interpreted as “Very Good” (Table 2-a).

As to the Indicator 2f, *“I can design slides by balancing colors and using appropriate images and texts,”* the science, English, social studies, and Christian living teachers believed themselves to be extensively implementing it as shown by the means of 4.75, 4.88, 4.83, and 4.80 interpreted as “Excellent” (Tables 2-a and 2-b). Likewise, the math and Filipino teachers’ perceived that this indicator is well implemented, with means of 4.44 and 4.29 interpreted as “Very Good” (Table 2-b).

As observed by the researcher, three Filipino teachers were fresh graduates. As such, they still have to be observed and evaluated on how they prepare their technology-based instructional materials. After a year or two, they may be already proficient. In the study of Tuttle (2012), he found out that faculty must be open to using technology if they really want to enhance the educational experiences of their students and if they want the student experience to be more student-centered, applicable to students’ lives, and performance-based.

As we all become more technology centered, the future of education lies in the appropriate intersection of pedagogy and technology. Tuttle (2012) added that, “It is the educators’ responsibility to expose students to the technology that drives their chosen career paths, as well as the academic content. Technology should only be used when it helps promote learning; often, technology just gets in the way.”

The English and Christian living teachers’ rating of themselves on Indicator 3, “*Using other computer software, I can attach and configure scanners, cameras, cell phones to acquire digital images,*” showed means of 4.63 and 4.60, with a verbal interpretation of “Excellent” (Tables 2.a and 2.b). The teachers were extensively implementing said indicator. The math, science, Filipino, and social studies teachers perceived the same, having means of 3.89, 4.38, 4.43, and 4.33 interpreted as “Very Good” (Tables 2.a and 2.b). The results show that they regarded the indicator as well-implemented.

The mean ratings given by the math, science, English, social studies, and Christian living teachers on Indicator 5, “*I choose the appropriate technology for my lesson,*” are shown in Tables 2.a and 2.b. The obtained means are 4.67, 4.63, 4.88, 4.67, and 4.80 interpreted as “Excellent”. This goes to show that the indicator is extensively implemented. Similarly, the teachers teaching Filipino rated themselves high on the same indicator, with a mean of 4.29 interpreted as “Very Good” (Table 2.a). They perceived themselves to be well implementing said indicator.

Based on the results for Indicators 2e, 2f, 3, and 5, it can be said that the teachers saw the need to continuously improve their skills in preparing technology-based instructional materials. According to Senge (2000), teachers must adapt to the changes in the present times to facilitate learning and make it interesting and enjoyable. New instructional

materials using technology must be created and developed to keep the students interested in the lesson.

— The math and English teachers' perception of themselves on the Indicator 6, *"I can identify and evaluate developing technologies as they relate to my subject area, grade level, and student population,"* is shown in Table 2-a. The means of 4.67 and 4.75 (Excellent) were derived, showing that the indicator is extensively implemented by said teachers. The science, Filipino, social studies, and Christian living teachers also had the same perception. The obtained means were 4.38, 4.43, 4.33, and 4.40 interpreted as "Very Good" (Table 2-a and Table 2-b). The results show that the teachers believed that this indicator is well-implemented.

On Indicator 7, *"I use email and social media to enhance teaching and learning,"* the math, science, Filipino, and Christian living teachers rated themselves high, with means of 4.67, 4.50, 4.86, and 4.60 with a verbal interpretation of "Excellent" (Tables 2-a and 2-b). The indicator is extensively implemented. Also, the English and social studies teachers perceived themselves to be well implementing the indicator as demonstrated by the obtained means 4.00 and 4.17, interpreted as "Very Good" (Tables 2-a and 2-b).

The results on the perception of science, English, Filipino, social studies, and Christian living teachers when it comes to Indicator 8, *"I know and understand the legal implications of Software Licenses and Fair Use,"* is shown in Tables 2-a and 2-b. The computed means of 4.63, 4.75, 4.57, 4.50, and 4.80 (Excellent) show that the teachers thought of this indicator as extensively implemented. Likewise, the math teachers regard themselves to be well implementing the same indicator, with a mean of 4.44 interpreted as "Very Good" (Table 2-a).

As regards the Indicator 10, *“I promote and implement rules and regulations on proper use of computers,”* the math, science, English, social studies, and Christian living teachers’ perception of themselves in this area is shown in Tables ~~2-a and 2-b~~. The means derived are 4.56, 4.75, 4.75, 4.50, and 4.60 (Excellent). This finding implies that the teachers were extensively implementing the said indicator. For the teachers handling the Filipino subject, a mean of 4.43 was obtained interpreted as “Very Good” (Table ~~2-a~~). This means that the indicator was well-implemented by the Filipino teachers.

For the Indicator 11, *“I recommend websites as references to my students for a better understanding of the lesson,”* the math, science, social studies, and Christian living teachers’ perception of themselves is summarized in Tables ~~2-a and 2-b~~ 2. The obtained means were 4.78, 4.88, 4.50, and 4.60 (Excellent), meaning the indicator was extensively implemented. Similarly, the English and Filipino teachers rated themselves high, with a mean of 4.25 and 4.14, respectively (Table ~~2-a~~). These means have verbal interpretation of “Very Good,” which means that the indicator was well-implemented.

The results for Indicators 6, 7, 8, 10, and 11 show that the teachers had the knowledge and skills in technology integration. As observed by the researcher, new teachers particularly in English and Filipino need more orientation and training on technology integration. Since teachers need to continuously update themselves, they should always be watchful in the new developments in education. According to Bago (2008), the use of appropriate strategies determines to a large extent the quality of interactions in the classroom which promote and enhance learning. The interactions may be between teacher and student or among students themselves. A competent teacher is able to promote students’

understanding of the lesson through a variety of strategies and techniques, monitors student performance, and provides useful feedback that will assist learners in the learning process

Overall, the high school teachers from the six subject areas perceived that they have extensive knowledge and skills on technology, pedagogy, and content integration. This is also reflected in Table 4. The overall mean for the faculty area is 4.59 (Excellent). The Indicator 1, *"I can operate laptop, LCD projector and TV in the classroom to aid my instruction,"* obtained the highest mean, 5.00 while Indicator 1a, *"I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop),"* Indicator 2a, *"I can insert table, text, pictures, sound, video and files in the document,"* and Indicator 4 *"I can search the web to find current information on a topic that I need,"* got a mean of 4.86, 4.88, and 4.74, respectively. The Indicator 2d, *"I can enhance slide presentations by adding sound, customizing animation, and inserting images,"* obtained a mean of 4.69 while Indicator 2f, *"I can design slides by balancing colors, and using appropriate images, and texts,"* and indicator 5 *"I choose the appropriate technology for my lesson,"* got a similar mean of 4.65. Indicator 2e, *"I can make effective and interactive class presentations using the slides and LCD projector,"* obtained a mean of 4.62.

Indicator 8, *"I know and understand the legal implications of Software Licenses and Fair Use,"* Indicator 9, *"I report malfunctions and problems with computer software and hardware to my immediate head or IT Center,"* and Indicator 10, *"I promote and implement rules and regulations on proper use of computers,"* similarly obtained a mean of 4.60. Indicator 11, *"I recommend websites as references to my students for a better understanding of the lesson,"* and Indicator 6, *"I can identify and evaluate developing technologies as they*

relate to my subject area, grade level and student population,” got a mean of 4.55 and 4.51, respectively. These findings demonstrate that the high school teachers from the six subject areas rated the aforementioned indicators as “Excellent” and perceived them to be extensively implemented.

On the other hand, Indicator 7, *“I use email and social media to enhance teaching and learning,”* and Indicator 3, *“Using other computer software, I can attach and configure scanners, cameras, cell phones to acquire digital images,”* obtained a mean of 4.46 and 4.34, respectively. Indicator 2b, *“I can make computation, use formula and create graphs using spreadsheets,”* and Indicator 2c, *“I can analyze assessment data using spreadsheets and statistical applications,”* got a mean of 4.44 and 4.23, respectively. Indicator 1b, *“I can configure computer settings of various software and hardware,”* had the lowest mean of 4.14. These results show that the high school teachers from the six subject areas rated the aforementioned indicators as “Very Good” which means they are perceived to be well-implemented.

Overall, the results show that the high school teachers from the six subject areas believed that they have the knowledge and skills in technology integration. Though they were adept on it, they felt the need to learn more on MS Excel, the use of social media in instruction, and configuring computer settings. This is reiterated by Majeski (2013) in his study. He found out that teachers and principals in middle level education in Morris County, New Jersey perceived that technology is either important or very important to the learning environment within the classroom. Though teachers agreed that planning and preparation of lessons with the use of technology can be time consuming, they were willing to explore the

digital environment and support today's learner. Importance was given to the value of consistent and productive professional development that would keep teachers and principals updated in using current skills found in the technological advances and how these advances affect teaching and learning.

Quality education requires quality teachers. The importance of having knowledge and skills by teachers in technology integration was also pointed out by Lucido and Borabo (1997). They said that technology forms part of school change and reform. The information age involves a change in thinking, management, instructional strategies, problem-solving strategies, and communication skills. Automatic current educational practice can help enhance the quality of learning.

1.3. Supervision

This is an area covered in the study which refers to the mentoring of teachers in technology integration on planning and teaching strategies, including classroom observation. Table 3-a found on the next page shows the weighted means for math, science, English, and Filipino, while Table 3.b found on page 885 reflects the weighted means for social studies and Christian living, including the overall weighted means for Supervision.

The means derived from the ratings given by the math, science, English, Filipino, social studies, and Christian living teachers on Indicator 1, *“Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal,”* is reflected in Table 3-a and Table 3.b. _____ The said indicator obtained means of 5.00, 5.00, 5.00, 4.86, 5.00, and 5.00 interpreted as “Excellent.” This goes to show that it is perceived to be extensively implemented.

The perception of math, science, Filipino, social studies, and Christian living teachers about the Indicator 2, “*Teachers are observed and evaluated on the use of technology in teaching,*” is reflected in Tables 3.a and 3.b. The means obtained for this indicator are 4.56, 4.75, 4.57, 4.50, and 4.80. The results show that the teachers perceived this indicator as “Excellent” which means that it is extensively implemented. As for the English teachers,

Table 3.a**WEIGHTED MEANS ON SUPERVISION**

	MATH		SCIENC E		ENGLIS	
	Mea n	Inte rpre tatio n	Mea n	Inte rpre tatio n	Mea n	Inte rpre tatio n
Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal.	5.00	Ex cell ent	5.00	Ex cell ent	5.00	Ex cell ent
Teachers are observed and evaluated on the use of technology in teaching.	4.56	Ex cell ent	4.75	Ex cell ent	4.25	Ver y- Go d
Feedbacks are given to teachers on how they use technology in teaching.	4.41	Ver y- Go d	4.50	Ex cell ent	4.50	Ex cell ent
Subject Area Heads give comments on the learning plans, particularly on learning activities and technology use.	3.89	Ver y- Go d	4.63	Ex cell ent	4.75	Ex cell ent
Teachers are guided by the Subject Area Head on the pedagogy in using technology in teaching.	4.41	Ver y- Go d	4.50	Ex cell ent	4.38	Ver y- Go d
Teachers and Subject Area Heads share knowledge and experiences on technology integration.	4.41	Ver y- Go d	4.75	Ex cell ent	4.50	Ex cell ent
Teachers are evaluated on the use of technology in teaching.	4.22	Ver y- Go d	4.38	Ver y- Go d	4.38	Ver y- Go d
Subject Area Heads consult teachers on software and technology needed for the improvement of technology integration in teaching.	4.22	Ver y- Go	4.50	Ex cell ent	4.25	Ver y- Go

		ed				d
Teachers and employees observe Information and Communications Technology (ICT) policies and procedures.	4.56	Excellent	4.63	Excellent	4.50	Excellent
Faculty, employees, and students are oriented yearly on ICT policies and procedures.	3.36	Good	4.63	Excellent	4.00	Very Good

Table 3.b**WEIGHTED MEANS ON SUPERVISION**

	SOCIAL STUDIES		CHRISTIAN LIVING		
	Mean	Interpretation	Mean	Interpretation	
Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal.	5.00	Excellent	5.00	Excellent	
Teachers are observed and evaluated on the use of technology in teaching.	4.50	Excellent	4.80	Excellent	
Feedbacks are given to teachers on how they use technology in teaching.	4.67	Excellent	4.60	Excellent	
Subject Area Heads give comments on the learning plans, particularly on learning activities and technology use.	4.8	Excellent	4.6	Excellent	

	3		0		
Teachers are guided by the Subject Area Head on the pedagogy in using technology in teaching.	4 : 6 7	Exe lle nt	4 : 4 0	Very Good	
Teachers and Subject Area Heads share knowledge and experiences on technology integration.	4 : 8 3	Exe lle nt	4 : 6 0	Exeelle nt	
Teachers are evaluated on the use of technology in teaching.	4 : 5 0	Exe lle nt	4 : 6 0	Exeelle nt	
Subject Area Heads consult teachers on software and technology needed for the improvement of technology integration in teaching.	4 : 5 0	Exe lle nt	4 : 2 0	Very Good	
Teachers and employees observe Information and Communications Technology (ICT) policies and procedures.	4 : 5 0	Exe lle nt	4 : 2 0	Very Good	
Faculty, employees, and students are oriented yearly on ICT policies and procedures.	4 : 1 7	Ver y- Goo d	3 : 4 0	Good	

Table 3
WEIGHTED MEANS ON FOR SUPERVISION

	<u>MATH</u>	<u>SCI</u>	<u>ENG</u>	<u>FIL</u>	<u>SS</u>	<u>CL</u>	<u>OVERALL</u>
1. <u>Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal.</u>	<u>5.00</u>	<u>5.00</u>	<u>5.00</u>	<u>4.86</u>	<u>5.00</u>	<u>5.00</u>	<u>4.97</u>
2. <u>Teachers are observed and evaluated on the use of technology in teaching.</u>	<u>4.56</u>	<u>4.75</u>	<u>4.25</u>	<u>4.57</u>	<u>4.50</u>	<u>4.80</u>	<u>4.55</u>
3. <u>Feedbacks are given to teachers on how they use technology in teaching.</u>	<u>4.11</u>	<u>4.50</u>	<u>4.50</u>	<u>4.50</u>	<u>4.67</u>	<u>4.60</u>	<u>4.48</u>
4. <u>Subject Area Heads give comments on the learning plans, particularly on learning activities and technology use.</u>	<u>3.89</u>	<u>4.63</u>	<u>4.75</u>	<u>4.63</u>	<u>4.83</u>	<u>4.60</u>	<u>4.53</u>

5.	<u>Teachers are guided by the Subject Area Head on the pedagogy in using technology in teaching.</u>	<u>4.11</u>	<u>4.50</u>	<u>4.38</u>	<u>4.50</u>	<u>4.67</u>	<u>4.40</u>	<u>4.44</u>
6.	<u>Teachers and Subject Area Heads share knowledge and experiences on technology integration.</u>	<u>4.11</u>	<u>4.75</u>	<u>4.50</u>	<u>4.75</u>	<u>4.83</u>	<u>4.60</u>	<u>4.53</u>
7.	<u>Teachers are evaluated on the use of technology in teaching.</u>	<u>4.22</u>	<u>4.38</u>	<u>4.38</u>	<u>4.38</u>	<u>4.50</u>	<u>4.60</u>	<u>4.39</u>
8.	<u>Subject Area Heads consult teachers on software and technology needed for the improvement of technology integration in teaching.</u>	<u>4.22</u>	<u>4.50</u>	<u>4.25</u>	<u>4.50</u>	<u>4.50</u>	<u>4.20</u>	<u>4.30</u>
9.	<u>Teachers and employees observe Information and Communications Technology (ICT) policies and procedures.</u>	<u>4.56</u>	<u>4.63</u>	<u>4.50</u>	<u>4.63</u>	<u>4.50</u>	<u>4.20</u>	<u>4.53</u>
10.	<u>Faculty, employees, and students are oriented yearly on ICT policies and procedures.</u>	<u>3.36</u>	<u>4.63</u>	<u>4.00</u>	<u>4.63</u>	<u>4.17</u>	<u>3.40</u>	<u>4.00</u>

Subjects:

MATH - Math FIL - Filipino
SCI - Science SS - Social Studies
ENG - English CL - Christian Living

Scale :

4.50 – 5.00 Excellent
3.50 – 4.49 Very Good
2.50 – 3.49 Good
1.50 – 2.49 Fair
1.00 – 1.49 Poor

The said indicator obtained means of 5.00, 5.00, 5.00, 4.86, 5.00, and 5.00 interpreted as “Excellent.” This goes to show that it is perceived to be extensively implemented.

The perception of math, science, Filipino, social studies, and Christian living teachers about the Indicator 2, “Teachers are observed and evaluated on the use of technology in teaching,” is reflected in Tables 3. The means obtained for this indicator are 4.56, 4.75, 4.57, 4.50, and 4.80. The results show that the teachers perceived this indicator as “Excellent” which means that it is extensively implemented. As for the English teachers, they perceived

this indicator to be well implemented as demonstrated by the obtained mean of 4.25 interpreted as “Very Good” (Table 3).

On the Indicator 3, “*Feedbacks are given to teachers on how they use of technology in teaching.*” the science, English, Filipino, social studies, and Christian living teachers rated it high, with means of 4.50, 4.50, 4.50, 4.67, and 4.60 interpreted as “Excellent” (Table 3). The indicator is thought to be extensively implemented. On the other hand, the math teachers perceived this indicator to be moderately implemented, with a mean of 4.11 interpreted as “Good” (Table 3).

The science, English, Filipino, social studies, and Christian living teachers’ perception of Indicator 4, “*Subject Area Heads give comments on the learning plans particularly on learning activities and technology use.*” is shown in Table 3. It obtained a mean of 4.63, 4.75, 4.63, 4.83, and 4.60, with a verbal interpretation of “Excellent”. These data disclose that the teachers regarded this indicator as extensively implemented. On the other hand, the math teachers rated this indicator not so high, with a mean of 3.89 interpreted as “Good” (Table 3). The indicator is thought to be moderately implemented.

4.75, 4.57, 4.50, and 4.80. The results show that the teachers perceived this indicator as “Excellent” which means that it is extensively implemented. As for the English teachers,

they perceived this indicator to be well implemented as demonstrated by the obtained mean of 4.25 interpreted as “Very Good” (Table 3.a).

On the Indicator 3, “*Feedbacks are given to teachers on how they use of technology in teaching,*” the science, English, Filipino, social studies, and Christian living teachers rated it high, with means of 4.50, 4.50, 4.50, 4.67, and 4.60 interpreted as “Excellent” (Tables 3.a and 3.b). The indicator is thought to be extensively implemented. On the other hand, the math teachers perceived this indicator to be moderately implemented, with a mean of 4.11 interpreted as “Good” (Table 3.a).

The science, English, Filipino, social studies, and Christian living teachers’ perception of Indicator 4, “*Subject Area Heads give comments on the learning plans particularly on learning activities and technology use,*” is shown in Tables 3.a and 3.b. It obtained a mean of 4.63, 4.75, 4.63, 4.83, and 4.60, with a verbal interpretation of “Excellent”. These data disclose that the teachers regarded this indicator as extensively implemented. On the other hand, the math teachers rated this indicator not so high, with a mean of 3.89 interpreted as “Good” (Table 3.a). The indicator is thought to be moderately implemented.

The perception of science, Filipino, and social studies teachers about Indicator 5, “*Teachers are guided by the Subject Area Head on the pedagogy in using technology in teaching,*” is reflected in Tables 3.a and 3.b. The obtained means are 4.50, 4.50, and 4.50 interpreted as “Excellent”. This implies that the indicator was extensively implemented. Likewise, the math, English, and Christian living teachers rated the same indicator high, with

means of 4.11, 4.38, and 4.40, all interpreted as “Very Good” (Tables 3.a and 3.b). This means the indicator is perceived to be well implemented.

The science, English, Filipino, social studies, and Christian living teachers believed that Indicator 6, “*Teachers and Subject Area Heads share knowledge and experiences on technology integration,*” is extensively implemented as demonstrated by the computed means of 4.75, 4.50, 4.75, 4.83, and 4.60 interpreted as “Excellent” (Tables ~~3.a and 3.b~~). The math teachers similarly had the same perception, rating the same indicator high with a mean of 4.11 interpreted as “Very Good” (Table ~~3.a~~). They believed the indicator was well implemented.

As regards the Indicator 7, “*Teachers are evaluated on the use of technology in teaching,*” the social studies and Christian living teachers’ perception is reflected in Table ~~3.b~~. It obtained a mean of 4.50 and 4.60 (Excellent), indicating that it is thought to be extensively implemented. The math, science, English, and Filipino teachers have the same perception. They regarded the indicator as well implemented, with means of 4.22, 4.38, 4.38, and 4.38 interpreted as “Very Good” (Table ~~3.a~~).

Based on the results for Indicators 1, 2, 3, 4, 5, 6, and 7, it can be inferred that the teachers were supervised properly in technology integration. However, as observed by the researcher, the subject area heads of English and Filipino were newly appointed while the math subject area head was just on her second year. They were mentored by their former supervisors, though, before being appointed as such. Still, they were in their adjustment period in their new assignment. According to Collay (2011), teachers bring varying amounts of expertise and learn the craft after taking their first teaching position. Most consider an

apprenticeship of three to five years essential for development into an experienced teacher. Because half of all teachers who enter the profession do not stay in the classroom beyond five years, the number of newcomers each year remains steady. Principals and experienced teachers understand the challenges of early years' teaching and, in most cases, work proactively to support their newest colleagues. The importance of supervision in teaching was pointed out by Adams (2013) in his study. He pointed out that for a more effective technology integration, it is important that supervisors give feedback to the teachers. Mentoring allow teachers to grow through by providing them supportive feedback. Feedback is a process which is in alignment with the cycle of reflection that the principal and intern are focused on. Both must be committed and open to giving the feedback in a clear and constructive way. Honesty and openness are connected to this process. In addition, students may also be asked on how technology integration can be enhanced. New learning and realizations are the results of mentoring.

The science, Filipino, and social studies teachers' perception about Indicator 8, *"Subject Area Heads consult teachers on software and technology needed for the improvement of technology integration in teaching,"* is summarized in Tables 3-a and 3-b. The means of 4.50, 4.50 and 4.50 (Excellent) were derived. This finding indicates that the indicator is perceived to be extensively implemented. As for the math, English, and Christian living teachers' perception of this indicator, means of 4.22, 4.25, and 4.20 interpreted as "Very Good" (Tables 3-a and 3-b_3) were obtained. These results show that the indicator is perceived by math, English, and Christian living teachers to be well implemented.

On Indicator 9, *“Teachers and employees observe Information and Communications Technology (ICT) policies and procedures,”* the math, science, English, Filipino, and social studies teachers rated it high, with obtained means of 4.56, 4.63, 4.50, 4.63 and 4.50 interpreted as “Excellent” (Table ~~s-3-a and 3-b~~). They believed that Indicator 9 is extensively implemented. Likewise, the Christian living teachers rated it high, with a mean of 4.20 interpreted as “Very Good” (Table 3-b). They perceived it to be well implemented.

Indicator 10, *“Faculty, employees and students are oriented yearly on ICT policies and procedures,”* also got positive ratings. The math and Filipino teachers regarded its implementation as extensive, with a mean of 4.63 for both groups, interpreted as “Excellent” (Table 3-a) while the English and social studies teachers thought of it to be well implemented, having means of 4.00 and 4.17, respectively, interpreted as “Very Good” (Tables 3-a and 3-b). However, the math and Christian living teachers perceived it to be moderately implemented as demonstrated by the means of 3.36 and 3.40, respectively, interpreted as “Good” (Tables 3-a and Table 3-b). respectively.

___ In any organization, communication is important. For teaching and learning, teachers must be consulted on their needs and policies to be implemented. To ensure that policies are properly implemented and consultation is encouraged, right communication and supervision are important. Martires (2002) shared that communication is the foundation of any organization. Communicating ideas and information allows action and coordination possible. Likewise, communication plays a major role in modifying behavior, effecting changes, and achieving goals. The impairment of communication due to certain barriers only causes confusion and misunderstanding. Managers and workers spend a large part of their time

communicating. Yet, often, the importance of the communication process itself is taken for granted. To perform well, organizations must foster effective communication. In terms of supervision, Sergiovanni and Starrat (2007) said that implanted in the process of establishing contact with the other person are the moral imperatives of acceptance, honesty, respect, and care. These constitute the moral activity of empowerment, the willingness to make people show who they are, and beyond that willingness, an appreciation of what they have to contribute. Supervisors need to discuss thoroughly with teachers what procedures will be followed, what rights and responsibilities will be defined, who controls what, whose needs are being served, the purpose of the exchange, and so on.

The perception of the high school teachers from the six subject areas is presented in Table 3-b. Based on the data, it can be seen that the teachers perceived that they are managed and mentored in technology very well by their immediate heads. Indicator 1, *“Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal,”* obtained the highest mean of 4.97. Indicator 2, *“Teachers are observed and evaluated on the use of technology in teaching,”* got a mean of 4.55 while Indicator 4, *“Subject Area Heads give comments on the learning plans particularly on learning activities and technology use,”* Indicator 6, *“Teachers and Subject Area Heads share knowledge and experiences on technology integration,”* and Indicator 9 *“Teachers and employees observe Information and Communications Technology (ICT) policies and procedures,”* had a similar mean of 4.53. These findings indicates that the high school teachers from the six subject areas regarded the aforementioned indicators to be extensively implemented.

On the other hand, Indicator 3, “*Feedbacks are given to teachers on how they use of technology in teaching,*” and Indicator 5, “*Teachers are guided by the Subject Area Head on the pedagogy in using technology in teaching,*” obtained a mean of 4.48 and 4.44 respectively. Indicator 7, “*Teachers are evaluated on the use of technology in teaching,*” and Indicator 8, “*Subject Area Heads consult teachers on software and technology needed for the improvement of technology integration in teaching,*” got a mean of 4.39 and 4.30 respectively. At the other end, Indicator 10, “*Faculty, employees and students are oriented yearly on ICT policies and procedures,*” obtained the lowest but still positive mean of 4.00. These results signify that the high school teachers from the six subject areas perceived the aforementioned indicators as “Very Good” which means that they are well-implemented.

Looking at the overall results, it means that the teachers were managed and mentored very well in technology integration. However, there is a need to give feedback and guidance to teachers. They should also be consulted on technologies that can be used for instruction to become enriched. More importantly, orientation on the ICT policies to faculty and students should be conducted regularly. This was pointed out by Sergiovanni and Starrat (2007). They said that meaningful classroom interventions are built upon healthy organizational climates, facilitated by credible leadership, and premised on a reasoned educational program. Although general supervision is an important and necessary component of effective supervision, without clinical supervision and other forms of coaching, it is not sufficient. In an evaluation for quality control, the process should be formal and documented; criteria should be explicit, and standards should be legally defensible as being central to basic teaching competence; the emphasis should be on teachers, meeting requirements of minimum acceptability.

____ In addition, Zulueta and Maglaya (2004) said that the element of leadership is the ability to inspire followers to apply their full capabilities to an undertaking. It may be normal that while the use of motivators seems to focus on subordinates and their needs, inspiration also emanates from group heads. They may possess the qualities of charisma that may give rise to devotion, commitment, and loyalty, and in effect, a strong desire on the part of subordinates to promote what their leaders plan to accomplish for the organization.

1.4. Training and Development

____ This is the area in the study which refers to the in-service training and professional development of teachers on technology, pedagogy, and content. Table 4-a found on the next page shows the weighted means for math, science, English, and Filipino, while Table 4-b found on page 943 reflects the weighted means for social studies and Christian living, including the overall weighted means for Training and Development.

The perception of math, science, English, Filipino, social studies, and Christian living teachers of Indicator 1, *“Teachers are provided training on curriculum development,”* and Indicator 2, *“Teachers are provided in-service training on the pedagogy in technology,”* is reflected in Tables 4-a and 4-b. For Indicator 1, the obtained means are 4.44, 4.38, 4.13, 4.14, 3.83, and 4.40 while Indicator 2 got means of 4.33, 4.25, 4.13, 4.14, 4.00, and 4.20. The results show that the teachers perceived the two indicators as “Very Good” which means that they are well implemented.

____ The math and social studies teachers’ perception of Indicator 3, *“Teachers are oriented on the use of new equipment,”* is found in Tables 4-a and 4-b. Said indicator

garnered means of 4.56 and 4.50 interpreted as “Excellent”. This means that Indicator 3 is believed to be extensively implemented. Similarly, the science, English, Filipino, and Christian living teachers rated it high (Tables 4.a and 4.b). The results imply that it is believed to be well implemented as the means derived had a verbal interpretation of “Very Good”.

Table 4
WEIGHTED MEANS FOR ON TRAINING AND DEVELOPMENT

	<u>MATH</u>	<u>SCI</u>	<u>ENG</u>	<u>FIL</u>	<u>SS</u>	<u>CL</u>	<u>OVERALL</u>
1. <u>Teachers are provided training on curriculum development.</u>	<u>4.44</u>	<u>4.38</u>	<u>4.13</u>	<u>4.13</u>	<u>3.83</u>	<u>4.40</u>	<u>4.23</u>
2. <u>Teachers are provided in-service training on the pedagogy in technology.</u>	<u>4.33</u>	<u>4.25</u>	<u>4.13</u>	<u>4.13</u>	<u>4.00</u>	<u>4.20</u>	<u>4.18</u>
3. <u>Teachers are oriented on the use of new equipment.</u>	<u>4.56</u>	<u>4.38</u>	<u>4.00</u>	<u>4.00</u>	<u>4.50</u>	<u>4.40</u>	<u>4.32</u>
4. <u>There are reading materials in the library on educational technology.</u>	<u>4.67</u>	<u>4.50</u>	<u>4.25</u>	<u>4.25</u>	<u>4.33</u>	<u>4.40</u>	<u>4.44</u>
5. <u>Teachers are updated on new books, journals, magazines, and non-print materials on technology.</u>	<u>4.11</u>	<u>4.38</u>	<u>4.00</u>	<u>4.00</u>	<u>4.17</u>	<u>4.40</u>	<u>4.18</u>
6. <u>Teachers recommend useful and credible web sites to fellow teachers.</u>	<u>4.44</u>	<u>4.13</u>	<u>4.00</u>	<u>4.00</u>	<u>4.33</u>	<u>4.40</u>	<u>4.25</u>
7. <u>Teachers join online communities, forums, and discussions.</u>	<u>3.22</u>	<u>4.38</u>	<u>3.38</u>	<u>3.38</u>	<u>3.83</u>	<u>3.40</u>	<u>3.60</u>
8. <u>Teachers identify educational sites and portals suitable to their subject area.</u>	<u>4.44</u>	<u>4.50</u>	<u>4.13</u>	<u>4.13</u>	<u>3.83</u>	<u>4.40</u>	<u>4.20</u>
9. <u>Teachers review new and existing software for education.</u>	<u>4.11</u>	<u>4.00</u>	<u>3.50</u>	<u>3.50</u>	<u>3.67</u>	<u>3.60</u>	<u>3.74</u>
10. <u>Researches are conducted on the use of technology in the classroom.</u>	<u>3.56</u>	<u>4.25</u>	<u>3.25</u>	<u>3.25</u>	<u>3.50</u>	<u>3.60</u>	<u>3.67</u>

Scale :

<u>4.50 – 5.00</u>	<u>Excellent</u>
<u>3.50 – 4.49</u>	<u>Very Good</u>
<u>2.50 – 3.49</u>	<u>Good</u>
<u>1.50 – 2.49</u>	<u>Fair</u>
<u>1.00 – 1.49</u>	<u>Poor</u>

Subjects:

<u>MATH</u>	- Math	<u>FIL</u>	- Filipino
<u>SCI</u>	- Science	<u>SS</u>	- Social Studies
<u>ENG</u>	- English	<u>CL</u>	- Christian Living

4.50 interpreted as “Excellent”. This means that Indicator 3 is believed to be extensively implemented. Similarly, the science, English, Filipino, and Christian living teachers rated it high (Table 4). The results imply that it is believed to be well implemented as the means derived had a verbal interpretation of “Very Good”.

Based on the results for Indicators 1, 2, and 3, it may be inferred that the teachers see the need for more professional development along technology. The importance of continuous professional training was emphasized by Evans and Lindsay (2014). They said that people are the most valuable resource of any organization. They want to do a good job and require training

Table 4.a
WEIGHTED MEANS ON TRAINING AND DEVELOPMENT

	MATH		SCIENCE		ENGLISH	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
11. Teachers are provided training on curriculum development.	4.44	Very Good	4.38	Very Good	4.13	Very Good
12. Teachers are provided in-service training on the pedagogy in technology.	4.33	Very Good	4.25	Very Good	4.13	Very Good
13. Teachers are oriented on the use of new equipment.	4.56	Excellent	4.38	Very Good	4.00	Very Good
14. There are reading materials in the library on educational technology.	4.67	Excellent	4.50	Excellent	4.25	Very Good
15. Teachers are updated on new books, journals, magazines, and non-print materials on technology.	4.11	Very Good	4.38	Very Good	4.00	Very Good
16. Teachers recommend useful and credible web sites to fellow teachers.	4.44	Very Good	4.13	Very Good	4.00	Very Good
17. Teachers join online communities, forums, and discussions.	3.22	Good	4.38	Very Good	3.38	Good
18. Teachers identify educational sites and portals suitable to their subject area.	4.44	Very Good	4.50	Excellent	4.13	Very Good
19. Teachers review new and existing software for education.	4.11	Very Good	4.00	Very Good	3.50	Very Good
20. Researches are conducted on the use of technology in the classroom.	3.56	Very Good	4.25	Very Good	3.25	Good

Table 4.b
WEIGHTED MEANS ON TRAINING AND DEVELOPMENT

	SOCIAL STUDIES		CHRISTIAN LIVING		
	Mean-	Interpretation	Mean-	Interpretation	
1. Teachers are provided training on curriculum-development.	3.83	Very Good	4.40	Very Good	
2. Teachers are provided in-service training on the pedagogy in technology.	4.00	Very Good	4.20	Very Good	
3. Teachers are oriented on the use of new equipment.	4.50	Excellent	4.40	Very Good	
4. There are reading materials in the library on-educational technology.	4.33	Very Good	4.40	Very Good	
5. Teachers are updated on new books, journals, magazines, and non-print materials on technology.	4.17	Very Good	4.40	Very Good	
6. Teachers recommend useful and credible web sites to fellow teachers.	4.33	Very Good	4.40	Very Good	
7. Teachers join online communities, forums, and discussions.	3.83	Very Good	3.40	Good	
8. Teachers identify educational sites and portals suitable to their subject area.	3.83	Very Good	4.40	Very Good	
9. Teachers review new and existing software for education.	3.67	Very Good	3.60	Very Good	
10. Researches are conducted on the use of technology in the classroom.	3.50	Very Good	3.60	Very Good	

Imply that it is believed to be well implemented as the means derived had a verbal interpretation of “Very Good”.

~~Based on the results for Indicators 1, 2, and 3, it may be inferred that the teachers see the need for more professional development along technology. The importance of continuous professional training was emphasized by Evans and Lindsay (2014). They said that people are the most valuable resource of any organization. They want to do a good job and require training~~ to do it well. Training does not only improve quality and productivity. It also adds to the morale of the worker, and shows to workers that the company is dedicated to investing in their future. Training must go beyond the basic job skills as running a machine. Today, many companies provide excellent training programs for technology related to direct production, but they fail to develop communication, social, and relational skills of workers. With the challenges in education, continuous training and development is needed.

As to Indicator 4,” *There are reading materials in the library on educational technology,*” the math and science teachers’ perception of it is found in Table 4.a. Said indicator was given means of 4.67 and 4.50 interpreted as “Excellent”. This reveals that the teachers observed it to be extensively implemented. Likewise, the English, Filipino, social studies, and Christian living teachers rated this indicator favorably, with obtained means of 4.25, 4.43, 4.33, and 4.40 interpreted as “Very Good” (Tables 4.a and 4.b).

The perception of math, science, English, Filipino, social studies, and Christian living teachers about the Indicator 5, *“Teachers are updated on new books, journals, magazines, and non-print materials on technology,”* and Indicator 6, *“Teachers recommend useful and credible web sites to fellow teachers,”* is found in Tables 4.a and 4.b. For Indicator 5, it

obtained the means 4.11, 4.38, 4.00, 4.14, 4.17, and 4.40 while for Indicator 6, 4.44, 4.13, 4.00, 4.29, 4.33, and 4.40. All the means had verbal interpretation of “Very Good”. These data reveal that the teachers perceived these two indicators as well implemented.

—The same may be said about Indicator 7, “*Teachers join online communities, forums, and discussions.*” The science and social studies teachers (means =4.38 and 3.83) and the math, English, Filipino, and Christian living teachers (means =3.22, 3.38, 3.43, ~~3.83~~, and 3.40) believed it to be well-moderately implemented (Table ~~4es 4.a and 4.b~~).

—The science teachers’ perception of Indicator 8, “*Teachers identify educational sites and portals suitable to their subject area,*” is found in Table ~~4-a~~. It obtained a mean of 4.50. The result shows that they perceived this indicator as “Excellent” which means that it is extensively implemented. For the math, English, Filipino, social studies, and Christian living teachers’ perception, Table ~~4s 4.a and 4.b~~ shows that the obtained means are 4.44, 4.13, 3.86, 3.83, and 4.40 interpreted as “Very Good”. This finding shows that they perceived this indicator as well implemented.

On Indicator 9, “*Teachers review new and existing software for education,*” the perception of math, science, English, social studies, and Christian living teachers is found in Tables ~~4-a and 4.b~~. The computed means are 4.11, 4.00, 3.50, 3.67, and 3.60 interpreted as “Very Good”, which show that the indicator is thought to be well implemented. However, the teachers handling the Filipino subject found it to be moderately implemented, with a mean of 3.43 interpreted as Good” (Table ~~4-a~~).

The math, science, Filipino, Social Studies, and Christian living teachers’ perception of Indicator 10, “*Researches are conducted on the use of technology in the classroom,*” is

found in Tables 4-a and 4-b. It obtained a mean of 3.56, 4.25, 3.86, 3.50, and 3.60 interpreted as “Very Good”, indicating that it is well implemented. However, the English teachers rated it lower albeit still positive, with a mean of 3.25 interpreted as “Good” (Table 4-a). They deemed it to be moderately implemented.

— In terms of the other aspects related to training and development like joining online communities and continuous reading and updating on teaching and learning knowledge and skills, teachers have to improve particularly on technology integration. As observed by the researcher, the science area started joining online fora and discussions two years ago. The other teachers still have to join such discussion or fora. With technology as one of the forefronts in education today, the Department of Education saw the need to engage the teachers in updating themselves. In its Modernization Program (1996-2005), DepEd said that professional teachers should accept the changes ICT will effect on teaching and learning. Teachers will become facilitators of learning instead of the traditional provider of knowledge. They have to become habitual users of technology. Technology will make them hungry for learning. They must search for opportunities to upgrade their competencies, share their experiences, and create a culture of collaboration in order to support each other. Relevant professional development will be provided that will prepare ICT-competent teachers that are integral to the success of this vision. Leveriza (1995) added that training is the responsibility of the organization. The administration, as a matter of fact, has first to choose the people before they are trained. Training is the responsibility of the organization, from the top administrator to the lower ranks.

____The overall perception of the teachers from the six subject areas on Training and Development is shown in Table 4.b. It can be gleaned from the said Table that the teachers perceived that the in-service training and professional development of teachers on technology, pedagogy, and content is not adequate. The obtained mean is 4.09 while all the other indicators obtained means ranging from 3.60 to 4.44 interpreted as "Very Good." This means that the teachers should be provided with more training on curriculum development, pedagogy in technology, and orientation on the use of new technological equipment. Reading materials including non-print materials should be increased in order to keep the teachers abreast with the technological developments. Also, teachers should check more educational websites and emerging software which can be useful in their lessons. Likewise, they should be more active in participating in online communities and discussions, and conduct research on use of technology in teaching.

____Training and development make teachers more dynamic and relevant. They are perpetual learners. As observed by the researcher, in-service training for faculty is only given during summer. Over the years, training on the use of technology has not been given, most especially to new teachers. With their current teaching load and added responsibilities, they do not have sufficient time for professional reading. Some could not even pursue their graduate studies. Still, they have to be given opportunities and encouragement to become better facilitators of learning through professional development. This was clearly highlighted in Becking's (2011) study. She said that professional development should be challenging and pedagogically oriented. High-quality training is needed for instructors which will help them show their students how to teach rather than simply tell them what to teach. Training should

be pedagogically-oriented rather than a “click here” approach which implies that instruction should be offered by those who not only know the technology but can convey ways to use the technology in teaching to answer the “why” questions. Instructors need to not only know where to click but also how, why, and when to use chosen technologies. Professional development providers need to know pedagogy to effectively help instructors in their technology integration. Those in positions of decision-making for technology purchases at the university need to explore not only the infrastructure of the campus technology but also how they can provide for instructional technology needs.

1.5. Equipment and Facilities

This is the area in the study which refers to the availability of equipment and facilities including services for technology integration in teaching. Table 5.a found on the next page shows the weighted means derived from the ratings given by the math, science, English, and Filipino social studies and Christian living teachers ~~while Table 5.b found on page 1014 reflects the weighted means for social studies and Christian living~~, including the overall weighted means for Equipment and Facilities.

—The perception of math, science, English, Filipino, social studies, and Christian living teachers of Indicator 4, *“Computer and internet laboratories are checked and maintained regularly,”* Indicator 7, *“Teachers are consulted on technologies that can be used to enhance technology integration,”* and Indicator 10, *“The Library and Learning Resource Center has sufficient technology-based instructional materials and educational software,”* is shown in Tables 5.a and 5.b. For Indicator 4, the obtained means are 3.89, 4.13, 4.00, 4.43, 4.00, and

4.20; for Indicator 7, 4.11, 3.88, 3.75, 4.14, 4.00, and 4.00; and for Indicator 10, 3.67, 4.38, 4.00, 4.14, 4.17, and 4.00. The results show that the teachers perceived these indicators as well implemented.

Table 5.a

WEIGHTED MEANS ON EQUIPMENT AND FACILITIES

	MATH		SCIENCE		ENGLISH	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
Each subject area is provided with sufficient computer units and laptops.	4.00	Very Good	4.00	Excellent	4.00	Excellent
The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, iPad, and tablet for teaching.	4.00	Very Good	4.00	Excellent	4.00	Very Good
The classroom is equipped with LCD projector, TV, projector screen, and sound system.	4.00	Very Good	4.00	Excellent	4.00	Very Good
Computer and internet laboratories are checked						

and maintained regularly.	3 : 8 9	Ver y-Good	4 : 1 3	Ver y-Good	4 : 0 0	Ver y-Good
Installed software in the computers units and laptops in the school are licensed.	4 : 4 4	Ver y-Good	4 : 5 0	Excellent	4 : 2 5	Ver y-Good
Equipment, software and information system are updated and functioning.	4 : 1 1	Ver y-Good	4 : 1 3	Ver y-Good	4 : 5 0	Excellent
Teachers are consulted on technologies that can be used to enhance technology integration.	4 : 1 1	Ver y-Good	3 : 8 8	Ver y-Good	3 : 7 5	Ver y-Good
Internet connection is steady, strong, and fast.	3 : 1 1	Good	3 : 7 5	Ver y-Good	3 : 6 3	Ver y-Good
There are sufficient technicians who assist for software and hardware-related concerns.	4 : 3	Ver y-Good	4 : 3	Ver y-Good	3 : 6	Ver y-Good

	3		8		3	
The Library and Learning Resource Center has sufficient technology-based instructional materials and educational software.	3	Ver	4	Ver	4	Ver
	:	y Good	:	y Good	:	y Good
	6		3		0	
	7		8		0	

Table 5.b**WEIGHTED MEANS ON EQUIPMENT AND FACILITIES**

	SOCIAL		CHRISTIAN		
	STUDIES		LIVING		
	M	Inter	M	Interpr	
	ean-	pretation	ean-	etation	
Each subject area is provided with sufficient computer units and laptops.	4	Very Good	4	Excellent	
	.17		.60		
The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, iPad, and tablet for teaching.	4	Very Good	4	Very Good	
	.17		.20		
The classroom is equipped with LCD projector, TV, projector screen, and sound system.	4	Very Good	4	Very Good	
	.00		.40		
Computer and internet laboratories are checked and maintained regularly.	4	Very Good	4	Very Good	
	.00		.20		
Installed software in the computers units and laptops in the school are licensed.	4	Excellent	4	Excellent	
	.50		.60		
Equipment, software and information system are updated and functioning.	4	Very Good	4	Very Good	
	.33		.40		

Teachers are consulted on technologies that can be used to enhance technology integration.	4 .00	Very Good	4 .00	Very Good	
Internet connection is steady, strong, and fast.	3 .33	Good	3 .00	Good	
There are sufficient technicians who assist for software and hardware-related concerns.	4 .50	Excellent	4 .00	Very Good	
The Library and Learning Resource Center has sufficient technology-based instructional materials and educational software.	4 .17	Very Good	4 .00	Very Good	

—In addition, the math and social studies teachers also believed that Indicator 10 is well implemented, with obtained means of 4.44 and 4.17 interpreted as “Very Good” (Tables 5.a and 5.b) However, the Filipino teachers found it to be moderately implemented, with a computed mean of 3.43 interpreted as “Good” (Table 5.a).—

As regards Indicator 2, “*The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, IPad, and tablet for teaching,*” the science teachers regarded it as extensively implemented, with a mean of 4.50 interpreted as “Excellent”

Table 5
WEIGHTED MEANS FOR EQUIPMENT AND FACILITIES

	MATH	SCI	ENG	FIL	SS	CL	OVERALL
1. <u>Each subject area is provided with sufficient computer units and laptops.</u>	4.44	4.50	4.63	3.43	4.17	4.60	4.30
2. <u>The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, IPad, and tablet for teaching.</u>	4.44	4.50	4.13	3.86	4.17	4.20	4.23
3. <u>The classroom is equipped with LCD projector, TV, projector screen, and sound system.</u>	4.44	4.63	4.38	4.71	4.00	4.40	4.44
4. <u>Computer and internet laboratories are checked and maintained regularly.</u>	3.89	4.13	4.00	4.43	4.00	4.20	4.09
5. <u>Installed software in the computers units and laptops in the school are licensed.</u>	4.44	4.50	4.25	4.57	4.50	4.60	4.46
6. <u>Equipment, software and information system are updated and functioning.</u>	4.11	4.13	4.50	4.71	4.33	4.40	4.34
7. <u>Teachers are consulted on technologies that can be used to enhance technology integration.</u>	4.11	3.88	3.75	4.14	4.00	4.00	3.97
8. <u>Internet connection is steady, strong, and fast.</u>	3.11	3.75	3.63	3.43	3.33	3.00	3.39
9. <u>There are sufficient technicians who assist for software and hardware-related concerns.</u>	4.33	4.38	3.63	4.43	4.50	4.00	4.20
10. <u>The Library and Learning Resource Center has sufficient technology-based instructional materials and educational</u>	3.67	4.38	4.00	4.14	4.17	4.00	4.04

software.

Subjects:

<u>MATH</u>	<u>- Math</u>	<u>FIL</u>	<u>- Filipino</u>
<u>SCI</u>	<u>- Science</u>	<u>SS</u>	<u>- Social Studies</u>
<u>ENG</u>	<u>- English</u>	<u>CL</u>	<u>- Christian Living</u>

Scale :

<u>4.50 – 5.00</u>	<u>Excellent</u>
<u>3.50 – 4.49</u>	<u>Very Good</u>
<u>2.50 – 3.49</u>	<u>Good</u>
<u>1.50 – 2.49</u>	<u>Fair</u>
<u>1.00 – 1.49</u>	<u>Poor</u>

4.00, 4.14, 4.17, and 4.00. The results show that the teachers perceived these indicators as well implemented.

In addition, the math and social studies teachers also believed that Indicator 10 is well implemented, with obtained means of 4.44 and 4.17 interpreted as “Very Good” (Table 5). However, the Filipino teachers found it to be moderately implemented, with a computed mean of 3.43 interpreted as “Good” (Table 5).

As regards Indicator 2, “*The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, IPad, and tablet for teaching,*” the science teachers regarded it as extensively implemented, with a mean of 4.50 interpreted as “Excellent.”

~~(Table 5-a).~~ Similarly, the Math, English, Filipino, Social Studies, and Christian Living teachers rated it high, with derived means of 4.44, 4.13, 3.86, 4.17, and 4.20 interpreted as “Very Good” (Tables ~~5-a and 5-b~~). ~~†~~The data that this indicator is well implemented.

The science and Filipino teachers believed that Indicator 3, *“The classroom is equipped with LCD projector, TV, projector screen, and sound system,”* is extensively implemented, with obtained means of 4.63 and 4.71, respectively, interpreted as “Excellent” (Table 5-a). Likewise, the math, English, social studies, and Christian living teachers’ perceived it to be well implemented as demonstrated by the obtained means of 4.44, 4.38, 4.00, and 4.40 interpreted as “Very Good” (Tables 5-a and 5-b).

Indicator 5, *“Installed software in the computers units and laptops in the school are licensed,”* also received very positive ratings (Tables 5-a and 5-b). For the science, Filipino, social studies, and Christian living teachers, the obtained means are 4.50, 4.57, 4.50, and 4.60 respectively, interpreted as “Excellent”; and for the math and English teachers, 4.44 and 4.25 interpreted as “Very Good” (Table 5-a).

The English and Filipino teachers’ perception of Indicator 6, *“Equipment, software and information system are updated and functioning,”* is reflected in Table 5-a. It obtained a mean of 4.50 and 4.71 interpreted as “Excellent”. The results show that the indicator is deemed to be extensively implemented. For the math, science, social studies, and Christian living teachers, the obtained means are 4.11, 4.13, 4.33, and 4.40 interpreted as “Very Good” (Tables 5-a and 5-b). The findings clearly indicate that Indicator 6 is implemented well.

The perception of science and English teachers of Indicator 8, *“Internet connection is steady, strong, and fast,”* is shown in Table 5-a. It obtained the means of 3.75 and 3.63, with a verbal interpretation of “Very Good”. The results show that said teachers perceived Indicator 8 as well implemented. However, the math, Filipino, social studies, and Christian

living teachers believed it to be just moderately implemented, with computed means of 3.11, 3.43, 3.33, and 3.00 interpreted as “Good” (Tables 5.a and 5.b).

The provision of equipment and other resources are important to make technology integration extensive. As observed by the researcher, a significant number of the faculty use their own laptops. They complain of slow internet connection. This concern was likewise found out in the study of Tuttle (2012). He said that the institution must be ready to acquire resources to supporting those technologies as faculty use new technologies in teaching and learning. It is a mutual process involving the faculty and administration if they want to truly grow and improve teaching and learning. They should work together to help accomplish goals. Administrators should address the growing need of additional bandwidth and space for media storage.

Based on the gathered data, there is a need to increase provision of equipment and digital resources for technology integration, and improvement of services. The math, Filipino, and social studies teachers perceived that their provision of computer units and laptops are inadequate. On a positive note, the science, Filipino, social studies, and Christian living teachers perceived that all software installed in all computers and laptops are licensed, but the math and English teachers believed that there are software installed which are not licensed.

The social studies teachers’ perception of Indicator 9, “*There are sufficient technicians who assist for software and hardware related concerns,*” is shown in Table 5.b. The obtained mean is 4.50, interpreted as “Excellent”. The indicator is deemed to be extensively implemented. Similarly, the math, science, English, Filipino, and Christian

living teachers believed this indicator to be implemented well, with obtained means of 4.33, 4.38, 3.63, 4.43, and 4.00 interpreted as “**v**Very Good” (Tables 5-a and 5-b).

Vital to technology integration is the provision of equipment. The provision of equipment and facilities including services should be looked into. Teachers have observed the lack of equipment since many are frequently using it. This was also pointed out by McNabb et al. (1999). They said that the availability of technological equipment, software and hardware, and the preparedness of the teachers play a major role in making education better and more effective. The availability of equipment was mentioned by Senge (2000). He said that a learning classroom requires methods and infrastructure that make it possible for everyone to foster one another’s success deliberately. The DepEd Five-Year Information and Communication Technology for Education Strategic Plan (DepEd ICT4E Strategic Plan 2009) pointed out the support for the vision on systems and infrastructure that ensure efficient, transparent, and effective governance.

The overall perception of the high school teachers from the six subject areas on Equipment and Facilities is reflected in Table 5-b. The overall mean obtained for this area is 4.15. All the indicators obtained means ranging from 3.39 to 4.46 interpreted as “Very Good.” Indicator 8, “*Internet connection is steady, strong, and fast,*” obtained the lowest but still positive mean of 3.33 which means “Good.”

The overall results show that the computer units and laptops for every subject area and the provision for other digital devices like digital camera, video camera, LCD projector, and tablet including the technological equipment in the classroom may not be adequate. The

researcher observed that a significant number of teachers use their own laptop for classroom instruction and other related tasks.

Technology-based instructional materials and educational software in the library should also be increased. It is also brought out that not all computer software are licensed. In addition, teachers saw the need to be consulted on technologies that can be used for classroom instruction. They also perceived that the services on technology integration like provision of technicians, maintenance of equipment and laboratories can be improved. They perceived the internet connection not strong, steady, and fast.

The results concur with the “Three-Year Institutional Strategic and Educative Pastoral Plan (2014-2017)” of Don Bosco Technical Institute-Makati City. One of the components of the plan is curriculum and instruction development. Under this component, there are three action points which cover technology integration in teaching. One of them is “to acquire and upgrade equipment that aid instruction and learning.” The school administration saw the need to provide more technological equipment to improve technology integration. Insofar as managing the 21st century classrooms is concerned, school administrators still have a lot to know on managing 21st century classrooms. Becking (2011) pointed out that administrators and department heads should look into the technology purchases at the university and explore not only the infrastructure of the school but also how they can provide for the needs in technology integration in teaching and learning.

Based on the overall assessment of the respondents, it can be concluded that the status of ICT integration in Don Bosco Technical-Makati City can be described as “Very Good” as indicated by the mean of 4.35 (in Table 6).

Table 6
WEIGHTED MEAN ~~FOR~~ FOR EVERY AREA

AREA	MEAN	INTERPRETATION	RANK
Curriculum and Instruction	4.45	Very Good	3
Faculty	4.58	Excellent	1
Supervision	4.47	Very Good	2
Training and Development	4.08	Very Good	5
Equipment and Facilities	4.15	Very Good	4
Overall	4.35	Very Good	

Among the five areas, the respondents rated the faculty area -as “Excellent” with a mean of 4.58. This means that it is extensively implemented. They also perceived supervision, curriculum and instruction, equipment and facilities, and training and development as “Very Good.” This means that these areas are well implemented.

In technology integration, teachers must acquire the knowledge and skills in order to make it effective. In this study, the respondents perceived that they have the knowledge and skills in integrating technology. Since all the respondents were college graduates and licensed teachers, they are able to acquire new skills particularly in technology easily. In the study of Molina (2001), it was found out that teachers with different educational attainment differed in their teaching competency. This means that educational attainment is a factor that makes teachers competent in their teaching field. The higher the educational attainment, the more competent they become. The same thing is true with computer literacy. The higher the educational attainment of the teachers, the more literate they become in the use of computer. Educational attainment is a factor to make teachers literate in computer.

It is not enough that teachers have the knowledge and skills in technology integration. They have to ensure that it is integrated in the curriculum. Bilbao et al (2008) clearly stated

that it is at the stage of instructional planning that the role of technology finds its place in terms of curriculum implementation. The coherent whole is formed in a teaching-learning situation. Otherwise, learning may end up confusing and in the end ineffective. A systematic approach to instructional planning is necessary. As often done, each lesson should have a clear idea of general specific goals, instructional objectives, content, activities, media, materials, assessment and evaluation on how objectives have been achieved which can be found in instructional planning for each lesson. The role of technology comes in the choice of instructional media.

Teachers, most especially the new teachers, should be supervised despite having the knowledge and skills in technology integration. Bago (2008) shared that the effective delivery of instruction must be ensured. This is the primary objective of supervision of instruction. This can be accomplished through the efforts of instructional leaders. They should assist teachers, most especially the new faculty members, in the performance of their assigned tasks. Teachers must always be provided with the necessary guidance and assistance through various intervention strategies such as clinical supervision, mentoring, coaching, and others designed to improve the pedagogical skills of teachers and to enhance their self-confidence.

The respondents perceived that they need training and professional development on technology integration. Since technology keeps on changing and developing, teachers must be abreast with the latest developments. Majeski (2013) stated that importance should be given to the value of consistent and productive professional development that will keep teachers and principals updated in using current skills found in the technological advances and how

these advances affect teaching and learning. Similarly, Hutchison and Reinking (2010) found out that 82% of surveyed literacy and language arts teachers believed that the barrier to technology integration is a lack of meaningful professional development. In particular, access to successful models for integrating digital technology into their instruction is what teachers identified as lacking.

The importance of providing sufficient and appropriate technological equipment, including maintenance and services, was perceived by the respondents. This finding concurs with that of Arrington (2014). He cited the need for a long-term technology plan. Insofar as managing the 21st century classrooms is concerned, school administrators still have a lot to know on managing 21st century classrooms. District level instructional leaders have only a general knowledge on the use of technology in teaching. It was recommended that there is a need for the leaders to have more understanding about cultural and global issues in the digital age. Similarly, Majeski (2013) found out that since technology is ever-changing, there is a need to upgrade the equipment in a short period of time. They have observed the lack of equipment since many are frequently using it. Emerging problems like funding technology, lack of equipment, and limited continued professional development derail the strong incorporation of technology in teaching.

2. What are the issues affecting the ICT integration?

The responses of the high school faculty teaching math, science, English, Filipino, social studies, and Christian living on the issues affecting ICT integration were coded or classified by the researcher. Table 7 displays the identified issues.

Table 7**FREQUENCY ON THE ISSUES AFFECTING ICT INTEGRATION**

ISSUES	<i>f</i>
Insufficient Equipment and Facilities	33
Inadequate Faculty Training and Updating on Technology and Pedagogy	26
Slow Internet Connection	24
Lack of Regular Maintenance Services of Equipment and Facilities	19
Upgrading of Technological Software and Equipment	10
Lack of Time Preparing Technology-Based Instructional Materials	2

2.1. Insufficient Equipment and Facilities

Though equipment are provided for technology instruction, the respondents said that they are insufficient. —Table 7 found on [page 109](#) ~~this page~~ [102](#) shows that thirty-three (33) respondents identified it as a problem or issue encountered in technology integration. Classrooms are not completely technology-ready. They lack sound system and computer units. One respondent wrote, *“Bringing a lot of materials like speakers, laptops, etc... It is a hassle on the teacher’s part.”* Another respondent wrote, *“Classrooms are not completely technology-ready except for the availability of TV and LCD.”* On the provision of equipment, the teacher-respondents used laptops which are provided by the school. As observed by the

researcher, there were teachers who use their own laptops due to unavailability of equipment. One respondent wrote, *“Limited number of laptop for instructional use.”* Also, there are only two (2) computer laboratories for online learning. One respondent wrote, *“Since there are five subject areas which use online learning, scheduling becomes difficult.”*

— This issue also came out in the area of equipment and facilities as reflected in Table 5-b found on page 101094. The results for Indicator 1, *“Each subject area is provided with sufficient computer units and laptops,”* Indicator 2, *“The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, IPad, and tablet for teaching,”* and Indicator 3, *“The classroom is equipped with LCD projector, TV, projector screen, and sound system,”* show that the overall weighted means interpreted as “very Good” were 4.30, 4.23, and 4.40, respectively. Though these indicators are perceived to be well implemented, they need to be continuously improved. Likewise, this issue also came out in the study of Canlas (2000). She recommended that additional equipment like computers, audiocassette recorders, television, compact discs and video players be provided for each classroom. With the availability of the above equipment, positive attitude will be further developed. In the study of Maschmann (2014), administrators and teachers both agree the success of the one-to-one initiative which relies on financial support, commitment from all stakeholders, proper implementation process, and continued support and training for teachers and students. Schools need to commit to strategic planning strategies to update their technology infrastructure to maintain a positive technology culture within their districts. An administrator said, “It is important to think ahead and have a plan to keep the laptops updated due to the cost of the laptops.” The teachers believed to have continued success with their

districts' laptop initiative, continued professional development opportunities should be provided. They also recognized the need to support and update the current network infrastructure to meet the demands of technology in school systems. A teacher said, "I have talked to the Superintendent about continuing the program, and he believes the district needs to budget every year for updates on the servers and increased bandwidth."

2.2. Inadequate Faculty Training and Updating on Technology and Pedagogy

The respondents cited the need for more technology-related training because technology development is rapid. Table 7 found on page 102209 shows that twenty-six (26) respondents identified it as a problem or issue encountered in technology integration.

Teachers should be abreast with the latest developments in technology. One respondent wrote, "*Bilang pangunahing tagapagsimula ng pagpapakilala ng teknolohiya bilang kagamitan sa mas mahusay na pagkatutong mga mag-aaral. Ang guro ay nararapat na maging mas maalam sa kung anong kagamitang pangteknolohiya ang angkop sa kanyang mga mag-aaral at paksang itinuturo. Ika nga, "We cannot give what do not have."* Similarly, another respondent said, "*As the students are becoming more adept at using technology, I find them to be even harder to please and to keep interested.*" When the teacher is abreast with technology, he/she can keep up with the students. His/Her knowledge and skills will be improved when he/she is provided with the needed training. The lack of faculty training on

technology and pedagogy was observed by the researcher. One respondent wrote, *“Lack of time to explore new emerging technologies in teaching.”*

___ Similarly, Table 4.4 reveals this issue on training and development found on page 94388. The results for Indicator 1, *“Teachers are provided training on curriculum development,”* Indicator 2, *“Teachers are provided in-service training on the pedagogy in technology,”* and Indicator 3, *“Teachers are oriented on the use of new equipment,”* show that the overall weighted means were 4.23, 4.18, and 4.32, respectively, interpreted as “Very Good” which means that the indicators were well implemented. They need to be continuously improved, though. Students are quite advanced on technology, and some teachers depend on them.

___ Canlas (2000) recommended the importance of training of teachers. Moreover, she said that pre-service and in-service training in educational technology helped the respondents adapt comfortably with technology. Training can help enhance the teachers’ knowledge of instructional media and, at the same time, correct inappropriate use of technology. Similarly, Evans and Lindsay (2014) pointed out the importance of learning and development. They said training and education should focus not only on what is needed to know but also on how to do it. Training related to quality includes awareness, leadership, project management, communications, teamwork, problem-solving, interpreting and using data, meeting customer requirements, process analysis, process simplification, waste reduction, cycle time reduction, error-proofing, and other issues that affect employee effectiveness, efficiency, and safety. Training should meet the key organizational needs and strengthen the mission and vision of

the organization. They must be delivered effectively and evaluated. Jobs should be reinforced.

2.3. Slow Internet Connection

Most of the respondents identified that the slow internet connection is affecting technology integration. Table 7 found on page 1022-09 shows that twenty-four (24) respondents identified it as a problem or issue encountered in technology integration. It was observed that during online learning activities, internet connection suddenly becomes slower. When searching for appropriate pictures, videos, and literature for their technology-based instructional materials, a lot of time is consumed because of the slow internet connection. One respondent wrote, *“Slow internet connection often results in the delay of the lesson.”* Another respondent wrote, *“Internet connection is sometimes poor.”*

___ In the area of equipment and facilities, this issue also came out as revealed in Table 5-b found on page 910-14. The results for Indicator 8, *“Internet connection is steady, strong, and fast,”* show that the overall weighted mean computed is 3.39 interpreted as “Good” which means that it is moderately implemented.

___ The issue on facilities was mentioned in the study of Becking (2011). She said that support for technology should be always available, with information clearly communicated on technical and support services. Those in the support services must ensure that technical assistance is attended to the specific things that can go wrong whenever working with technology. Seeing the importance of internet in technology integration, the issue on slow internet connectivity must be immediately addressed. She added that technology resources must be available to teachers in the preparation and work-related use and for teaching in the

classroom. Resources include the hardware, software, professional development, and support needed to successfully integrate technology in the higher education setting.

2.4. Lack of Regular Maintenance Services of Equipment and Facilities

The respondents observed that there are computer units and laptops which are malfunctioning. Also, mouse, keyboards, cables, connectors, headsets, and computer monitors are defective. Table 7 found on page 102209 shows that nineteen (19) respondents identified it as a problem or issue encountered in technology integration. One respondent wrote, *“Some of the VGA cables inside the classroom are malfunctioning.”* Another respondent said, *“In some classrooms, LCD projectors are not functioning well.”* The malfunctioning of equipment prevents the teachers from carrying out the lesson on time. The need for regular maintenance check of the equipment was cited as a concern. One respondent wrote, *“A few computer units are not functioning well (internet lab and computer lab). CPUs, keyboards, mouse not working properly.”* Another respondent stated, *“Just when one is ready and well-prepared with technology integration in teaching, something goes wrong with the equipment.”*

___In the area of equipment and facilities, this issue was also revealed (Table 5-b, page 91041). The results for Indicator 4, *“Computer and internet laboratories are checked and maintained regularly,”* Indicator 6, *“Equipment, software and information system are updated and functioning,”* and Indicator 9, *“There are sufficient technicians who assist for software and hardware related concerns,”* show overall weighted means of 4.09, 4.34, and 4.20 interpreted as “Very Good”. This finding implies that the indicators are well implemented. It needs to be continuously developed, though.

____Tinio (2002) revealed five major obstacles to ICT use. The biggest obstacle is the technological equipment. Computers are inadequate. Other stumbling blocks are lack of technical support and services for operating and maintaining ICT resources, lack of professional training on technology for teachers, limited space for computers laboratories, and the general insufficient budget and funding for operations including maintenance of equipment, purchase of supplies, and electricity.

2.5. Upgrading of Technological Software and Equipment

As new software emerge, they should be evaluated and presented to the teachers. The respondents said that some software are outdated and not available for teacher's use. Table 7 found on page 1021209 shows that ten (10) respondents identified it as a problem or issue encountered in technology integration. One respondent wrote, *"Though licensed software are expensive, some can be acquired so that teachers will be knowledgeable and skilled in these technologies."* Some equipment are not updated. A respondent wrote, *"There is a need to upgrade/update on the latest trends in technology integration with the help of qualified personnel or expert in the field."* Another respondent said, *"Keeping abreast with the new advancement in technology."* Though not malfunctioning, some equipment are slow. Hence, technological software and equipment must be updated. They should be suitable to the needs in technology integration.

In the area of equipment and facilities, the issue on upgrading technology also came out. Table 5 found on page 91041 shows that Indicator 6, *"Equipment, software and information system are updated and functioning,"* and Indicator 7, *"Teachers are consulted*

on technologies that can be used to enhance technology integration,” got the overall weighted means of 4.34 and 3.97 interpreted as “Very Good”. Though the means imply that the indicators are well implemented, continuous upgrading should be practised. According to Lucas and Associates (2000), learners are now increasingly able to access high quality teaching and learning at any time, at any place. Much of the information previously accessible only through a professor or instructor is now readily accessible on demand through computers and the Internet. New technologies can be designed to develop and facilitate higher-order learning skills, such as problem solving, decision making and critical thinking. This is supported by Arrington (2014) who shared the same findings based on his research on the use of technology in teaching. He said that it is specifically about the need for a long-term technology plan. Insofar as managing the 21st century classrooms is concerned, school administrators still have a lot to know on managing 21st century classrooms. It was recommended that there is a need for the leaders to have more understanding about cultural and global issues in the digital age. Likewise, they have to identify and engage in training and professional development opportunities to deepen their understanding of currently available technology and digital tools.

2.6. Lack of Time Preparing Technology-Based Instructional Materials

Due to lack of time and slow internet connection, the respondents found it harder to plan and prepare quality technology-based instruction materials. [Table 7 found on page 101+22 shows](#) ~~Table 12 shows~~ that two (2) respondents identified it as a problem or issue encountered in technology integration. Though only two cited it as an issue, the other issues

identified were affecting the preparation of technology-based instructional materials. As one respondent said, *“Time limitation is an issue since integrating technology needs careful planning and requires more time.”* Though teachers have the knowledge and skills in technology integration, time and careful planning and preparation are important. Another respondent said, *“Lack of time to explore new emerging technologies in teaching.”* Based on the observation of the researcher, the teaching load and other duties of the teacher make it difficult in preparing quality technology-based materials. This is really the challenge. The preparation of technology-based materials is not that easy. It certainly requires time. Some viewed technology as a tool that makes teaching easier for teachers.

____ In the area of curriculum and instruction, this issue also came out as shown in Table 21.1a found on page 60-663. The results for Indicator 8, *“Teachers prepare at least five technology-based instructional materials,”* Indicator 9, *“Teachers regularly update their technology-based instructional materials,”* and Indicator 10, *“Teachers in the subject area collaborate with each other in preparing technology-based instructional materials,”* got the overall weighted means of 3.97, 4.02 and 4.16 interpreted as “Very Good”. Though they imply that the indicators are well implemented, continuous development is still needed.

____ According to Reeves (2009), teachers require time. If teachers lack the time in implementing great ideas, these will only remain as illusions including well-designed curriculum, program, assessment and other interventions. Therefore, the commitment of administrators and principals in adjusting the schedule and support for time provision should be shown if teachers are expected to excel in literacy, math, data analysis, assessment, or any other endeavor.

3. Based on the findings, what inputs can be derived to develop an ICT integration program of the school?

~~_____The “Proposed ICT Integration Program (2016-2019)” for Don Bosco Technical Institute-Makati City, developed based on the inputs derived in this study, is presented hereunder on the next page.~~ The findings in the study showed that it is evident that Don Bosco Technical Institute-Makati City strongly support the use of technology in teaching and learning, and teachers have the knowledge and skills in integrating technology in the lessons. The vision-mission, curriculum guide, and learning plans reflect the use of technology. In general, technology integration is well-implemented but there are issues and concerns affecting it. In terms of curriculum and instruction, teachers perceive the need to improve their planning and preparation of technology-based instructional materials. Though teachers perceived that they have the knowledge and skills in using technology for teaching, they believe that they need to update their knowledge and skills and be guided by their immediate head in order to carry out the lesson more effectively. They added that they hunger for new learning in education and technology as they observed the insufficient seminars and trainings provided by the administration. Though budget for **technological equipment and facilities** is allocated yearly, teachers perceived that the equipment are inadequate, including the maintenance services for the equipment.

~~_____~~ These findings suggest that technology integration will be extensively implemented if the strengths -are maintained and the issues are addressed. It is proposed that an ICT Integration

Program be developed to ensure that teachers utilize effectively technology for teaching and learning, and the administration provides direction, supervision, training, equipment, and support services in technology integration. This will lead to better teacher performance as they design and use technology that best suit their students. Student's performance will also improve as they become more interested and participative in class. This was seen by Northrop (2013) who conducted a study among poverty-stricken students who were not interested in their literacy period because basal reading textbook and workbook was used. Their comprehension, engagement, and assessment scores were failing. After brainstorming on various ways to improve students' literacy, they tried using clicker technology. Using this technology, students started participating in class. They became engaged in learning. After several weeks, their performance improved. When asked about their experience, the students said that they like and enjoy the use of the clicker technology. With technology making them self-regulated learners, students can immediately receive feedback (through clicker technology, for instance). Teachers, on the other hand, can easily identify students who need assistance and students who are ready to new concepts.

_____ The "Proposed ICT Integration Program (2016-2019)" for Don Bosco Technical Institute-Makati City, developed based on the inputs derived in this study, is presented on page 124 (Appendix A).

~~To Through an ICT Integration Program, Teacher's performance will be better and student's performance will improve. Teachers will be more motivated to search and find the best technology in teaching a particular lesson.~~

~~teaching and learning in every subject will improve if technology integration is extensively implemented. Teachers will be motivated to find and use the best technology more judiciously in teaching a particular lesson. Until all the issues on technology integration is addressed, student and teacher's performance~~

DON BOSCO TECHNICAL INSTITUTE
Makati City

**PROPOSED INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT)-
INTEGRATION PROGRAM
2016-2019**

INTRODUCTION

Many educational institutions have integrated technology which makes teaching and learning today inevitable without it. Though some continue to use the traditional method, many teachers and students prepare their learning materials using technology. They research information from different websites and interact with their fellow students and teachers online through social media. However, technology integration in teaching and learning is not at all that easy. Technology is so dynamic that new developments come so rapidly, enabling teachers to continuously update themselves in order to keep up with technology in teaching. As for students of today, they are digital natives, and they best learn and work with the use of technology.

Lucido and Borabo (1997) said that technology forms part of school change and reform. It is seen as a way to monitor and standardize procedures already in place. In a student-learning situation, technology can be at the root of change. It can provide students with skills they need for today's workplace. Indeed, schools can no longer be isolated from the rest of society with respect to educational technology. The information age involves a change in thinking, management, instructional strategies, problem-solving strategies, and communication skills. Thus, teachers need to understand and accept technology in order to make it a useful tool. The teacher's pedagogy itself must adapt to the changes in order to encourage the creative problem-solving and higher order thinking required for producing technology-literate students. Also, automatic current educational practice can help enhance the quality of learning.

Still, technology should not be considered as the “savior” of educational problems. Technology integration is certainly a challenging task. Mishra and Koehler (2006) found out that teachers both struggle with incorporating digital tools into instruction and with capitalizing on the affordances of using digital tools. They said that teaching with technology is complicated further when the challenges newer technologies present to teachers are considered. Newer technologies which are unstable and opaque present new challenges to teachers who are struggling to use more technology in their instruction.

Thus, teachers should always be ready for new developments in education like technology. Teachers should read, do research, explore and keep themselves abreast with the latest trends in technology and education.

RATIONALE

For more than a decade, Don Bosco Technical Institute Makati has been integrating technology in teaching and learning. Aside from the acquisition and improvement on the facilities necessary for technology integration, teachers were provided with training in order to optimize technology for instruction. With technology being the newest trend in education, all teachers had to adjust and learn about the integration of content, pedagogy, and technology in teaching.

As the years went on, teachers began to improve their knowledge and skills in technology, making them comfortable with technology. Most teachers held learning activities in the classroom using technology which eventually led to the introduction of online learning.

However, technology integration in teaching and learning has never been assessed since its implementation. Though efforts were made to improve the integration of technology, no formal assessment has been conducted to identify the status and issues on technology integration.

This study on technology integration in the high school department of the Institute revealed results and issues in the following areas:

1. **Curriculum and Instruction.** It is the integration of technology in the curriculum and the teaching strategies applied when using technology.
 - Lack of time to plan, prepare, and collaborate in creating technology-based instructional materials
2. **Faculty.** It is the teachers' knowledge and skills on technology, pedagogy, and content.
 - Updating of skills in various technologies related to teaching and learning (hardware and software)
3. **Supervision.** It is the mentoring of teachers in technology integration in planning and teaching strategies, including classroom observation.
 - Improvement of guidance and evaluation of teachers on the use of technology in teaching and learning
 - Holding regular orientation on ICT policies and procedures
4. **Training and Development.** It is the in-service training and professional development of teachers on technology, pedagogy, and content.
 - Inadequate in-service training and other forms of professional development on education and technology
 - Updating on the latest trends in technological software and equipment
5. **Equipment and Facilities.** It is the availability of equipment and facilities, including services for technology integration in teaching.
 - Insufficient technological equipment and resources like laptops, computers, sound system, and other digital devices
 - Upgrading of technological equipment and facilities, particularly the internet
 - Lack of regular maintenance services of equipment and facilities

To address these issues on technology integration, it is necessary to have an Information and Communications Technology (ICT) Integration Program that will ensure technology integration is continuously improved, sustained, and optimized. Moreover, it will provide guidance and direction for technology integration in the Institute. This program will also support the “Three-Year Institutional Strategic and Educative Pastoral Plan (2014-2017)” of Don Bosco Technical Institute-Makati City which covers three action points on technology integration in teaching, namely “to acquire and upgrade equipment that aid instruction and learning,” “to require teachers to produce instructional materials and supplements,” and “to make best use of technology in instruction.” Other programs of the institution will also benefit from this program.

With this directive of the institution on technology integration, it continues to believe on the importance of technology in instruction. Likewise, the results of this study showed that technology integration requires continuous development in the areas of Curriculum and Instruction, Faculty, Supervision, Training and Development, and Equipment and Facilities. Hence, ICT Integration is proposed to guide the administration and faculty in providing quality education with the use of technology.

The ICT Integration Program aims to:

1. ensure the optimization of technology integration in teaching;
2. enrich teachers’ knowledge and skills in the planning and preparation of technology-based instructional materials;
3. improve the integration of content, pedagogy, and technology in teaching; and
4. keep the teachers updated and engaged in the latest trends in technology.

AREA	OBJECTIVES	LINES OF ACTION	PERSON/S IN-CHARGE	TIMELINE
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CURRICULUM- AND- INSTRUCTION <i>It is the integration of technology in the curriculum and the teaching strategies applied when using technology.</i>	• to intensify technology integration in curriculum and instruction • to optimize technology integration in teaching and learning	• Conduct yearly evaluation and updating of curriculum instruction guide and integration of technology. • Check weekly the learning plan, particularly on how technology is integrated in the lesson. • Guide the teachers in the integration of technology, pedagogy, and content based on standards. • Require students to do performance tasks with the use of technology at least once a quarter. • Create more rubrics for assessing student performance in the use of various technologies. • Identify topics that best suit	• Principal • Assistant Principal • Subject Area Head (SAH) • Teachers	2016-2019
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		technology integration.— - Require teachers to prepare technology-based instructional materials.— - Monitor the preparation of technology-based instructional materials.—	- Assistant Principal - Subject Area Heads - Teachers	2016-2019
	to produce more quality technology-based instructional materials for each subject area	- Discuss technology integration with the teachers.— - Make an area resolution in working together for the preparation of the lessons.—	- Assistant Principal - Subject Area Heads - Teachers	Monthly
		Remind constantly the teachers on social media ethics during area meeting.—	- Assistant Principal - Subject Area Heads	Monthly
	to foster stronger collaboration	Provide online learning program that supports the curriculum and educational programs of the department.—	- Principal - Assistant Principal	June 2016

	among teachers in the preparation of technology-based instructional materials • to use properly social media in teaching and learning • to enhance the online learning program			
FACULTY It is the teachers' knowledge and skills on technology, pedagogy, and content.	• to enrich the technological and pedagogical skills of the faculty • to enhance teachers' knowledge and skills in MS Excel	• Conduct needs assessment of teachers in technology integration. • Identify topics on technology, pedagogy, and content for faculty training. • Provide faculty training on various technologies. • Conduct faculty training program on MS Excel, particularly on computation, use of formula, and statistical	• Principal • Assistant Principals • Subject Area Heads • Teachers • Principal • Assistant Principals • Subject Area Heads • Teachers	April 2016 April 2016 May—July 2016 May 2016

	- to enrich technology-based reference materials like software and websites - to strengthen classroom management skills, particularly on the use of technology for instruction - to acquire skills in configuring settings software and hardware	applications: - Search the internet for the latest educational websites and software. - Create list of websites useful for the area for instruction. - Strictly implement ICT policies and procedures. - Conduct yearly orientation on new computer software and hardware.	- Subject Area Heads - Teachers - Principal - Assistant Principals - Subject Area Heads - Teachers - Principal - Assistant Principals - Subject Area Heads - ITC Head - Teachers	2016-2019 2016-2019 June 2016 June 2017 June 2018
SUPERVISION <i>It is the mentoring of teachers in technology integration in planning and teaching strategies including classroom observation.—</i>	- to identify one's strengths and weaknesses in technology integration - to apply the principles and pedagogy in the use of technology in teaching	- Review and strengthen the classroom and evaluation tool, particularly the indicators on technology integration. - Hold class observation, including how technology is integrated in	- Principal - Assistant Principals - Subject Area Heads - ITC Head - Teachers	May-July 2016 Quarterly

	to know and understand the ICT policies of the institution	teaching- - Give feedbacks to teachers on how they integrate technology in instruction based on classroom observation. - Include technology area in the area meeting agenda at least once a month. - Orient teachers on the pedagogical principles in using technology in teaching. - Guide the teachers in the use of technology in teaching. - Conduct yearly orientation to teachers on ICT policies and software licenses. - Conduct ICT policies orientation to students.	- Assistant Principals - Subject Area Heads - ITC Head - Teachers	May-June-2016 May-June-2017 May-June-2018
TRAINING AND DEVELOPMENT <i>It is the in-service training and professional</i>	to keep the faculty abreast on the latest development in	Conduct seminar-workshop on curriculum	- Principal - Assistant Principal - Subject Area	May 2016- May 2017

<i>development of teachers on technology, pedagogy and content.</i>	education and technology • to learn from other institutions and communities on the teaching of the subject • to acquire skills in the operation of new technological equipment • to enhance teaching and	development and pedagogy in the use of technology for instruction. • Conduct yearly orientation to teachers on the technological equipment. • Update the faculty on the latest books, magazines, journals, and software. • Encourage teachers to do professional reading on technology and education. • Provide list and review of educational websites for the subject area. • Require teachers to share in area meetings knowledge and experiences in technology integration. • Require each subject area to conduct research on education and technology once a year. • Conduct	Heads • Teachers • Head Librarian • Assistant Principals • Subject Area Heads	2016-2019 June 2016 June 2017 June 2018
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	learning-through social-media-and-online-learning-portal	- orientation-to-teachers-on-the-use-and-ethics-of-social-media-for-teaching-and-learning. - Conduct-orientation-to-teachers-about-the-online-portal.	- ITC-Head - Teachers	
EQUIPMENT-AND-FACILITIES <i>It is the availability of equipment and facilities including services for technology integration in teaching.</i>	to-make-technological-equipment-available-for-technology-integration-in-instruction	- Acquire-sufficient-computer-units-and-laptops-for-each-subject-area. - Acquire-more-digital-devices-like-camera,-video-and-audio-recorder,-Ipad,-etc.- - Provide-the-needed-technological-equipment-in-the-classroom-like-LCD,-computer-unit,-TV,-internet,-projector-screen,-and-sound-system. - Provide-additional-computer-technicians. - Hold-regular-update-and-maintenance-of-all-technological-equipment,-	- Administrator - Principal - ITC-Head - Principal - Assistant Principals - Subject Area Heads - ITC-Head - Teachers	2016-2019 2016-2019

	• to ensure the functionality of all technological equipment • to enrich knowledge on the latest trends in education and technology	including software licenses in the classrooms, computer laboratories, faculty rooms, and library. • Consult teachers on technology needed for instruction. • Provide steady, strong, and fast internet connection. • Update teachers on the latest reading materials on education and technology. • Acquire more reading materials on education and technology.	• Principal • Head Librarian	2016-2019
	• to ensure that equipment and facilities are updated and responding to the needs of teachers and students	• Create a long-term technology plan	• Administrator • Principal	2016-2019

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CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary, conclusions, and recommendations of the study which is on the assessment of the information and communications technology (ICT) integration in selected high school subjects.

SUMMARY OF FINDINGS

Guided by the statement of the problem, the findings of the study are hereby summarized.

1. The status of information and communications technology (ICT) integration in the teaching of selected high school subjects on curriculum and instruction, faculty, supervision, training and development, and equipment and facilities are :

1.1. Curriculum and Instruction

Technology integration was evident in the vision-mission, curriculum instruction guide, and learning plan. However, the teachers needed time to collaborate, plan, and prepare technology-based instructional materials. They also have to develop more rubrics in assessing student learning particularly on the use of technology, and use email, blogs, and social media more often in teaching and learning.

1.2. Faculty

The teachers perceived that they have the knowledge and skills on technology, pedagogy, and content integration, including operation of digital devices like computers, laptops, and LCD projector. However, they needed to enhance their

knowledge and skills in MS Excel and in configuring computer settings (software and hardware).

1.3. Supervision

The teachers perceived that they are managed and mentored properly in technology integration. However, supervision must be enhanced particularly in providing feedback, guidance, and evaluation of teachers in the use of technology in teaching. They also believed that the orientation on ICT policies is not given regularly to faculty and students.

1.4. Training and Development

The teachers felt that they need to be updated on the latest technological trends in education through orientation and in-service training on curriculum development, and pedagogy on the use of technology. Likewise, they perceived that they have to update themselves through reading of educational books, journals, and websites including research.

1.5. Equipment and Facilities

The resources for technology integration particularly computers, laptops, digital devices in the classrooms, including provision of educational software and materials, were not sufficient. The teachers perceived that technology services need improvement considering the unstable internet connection and lack of regular maintenance services and upgrading of equipment and facilities.

2. The various issues affecting ICT integration were the need for more time and resources in the planning and preparation of technology-based instructional materials, inadequate in-service training on curriculum development and pedagogy in the use of technology in teaching, and

updating of skills in various technologies. Other issues identified are poor internet connection, insufficient equipment like computers and laptops, inadequate technological equipment in the classrooms, and lack of regular upgrading and maintenance of equipment and software.

CONCLUSIONS

Based on the findings of the study, it can be concluded that:

1. The integration of information and communications technology (ICT) in the teaching of selected high school subjects is well implemented. The administration supports TICT he integration of information and communications technology (ICT) in the teaching of selected high school in teaching and learning subjects is “Very Good.” as it is reflected in the vision-mission and curricular programs. But the administrators and academic heads need to closely supervise teachers in technology integration and use of social media in teaching and learning through feedback and mentoring. The orientation on ICT policies and procedures is not regularly provided to students and teachers. Another concern is the training of teachers on curriculum development, pedagogy, and technology, which the administration inadequately provides. In terms of equipment, facilities and technical support, these are provided by the -administration but they are insufficient and need updating.
2. The teachers have the knowledge and skills in using technology for teaching and learning but they need time to plan and prepare technology-based instructional materials. Also, they want to update their knowledge and skills in various educational technologies including social media and MS Excel as they integrate them in teaching and learning.
3. Teaching and learning will become more creative, interesting and engaging if technology integration is extensively implemented. Further studies on technology integration may be

conducted particularly on the effects of the utilization of technology on teachers and students' performance.

However, teachers need time to plan and prepare technology-based instructional materials, and update their skills in technology and pedagogy particularly MS Excel. Teachers need to be supervised closely through feedback and mentoring. The in-service training of teachers on curriculum development, pedagogy, and technology, including other resources, are not sufficiently provided. Laptops and other digital devices are inadequate for teacher's use in the classroom. Equipment and facilities need to be improved and maintained, most especially the internet connection.

- 4. ~~The issues affecting ICT integration~~ are lack of time in planning and preparing technology-based instructional materials, insufficient faculty training and updating on technology and education, slow internet connection, upgrading of technological software and equipment, inadequate equipment and facilities, and lack of regular maintenance services of equipment and facilities.**

RECOMMENDATIONS

After considering the above findings and conclusions, the researcher recommends the following:

1. Teachers should be provided with sufficient time to plan, prepare, collaborate, and create technology-based instructional materials.
2. In-service training program on curriculum development and pedagogy on the use of technology in teaching, including MS Excel, should be provided.
3. Supervision of teachers particularly on technology integration and use of email and social media in teaching and learning safeguarded by ethics must be enhanced through feedback and mentoring.

4. The administration may conduct yearly orientation on ITC policies and procedures and latest development in technology for teaching and learning.
5. Additional laptops, computer units, and technological equipment for classrooms should be acquired.
6. A regular maintenance and updating services on equipment and facilities including internet connection must be provided.
7. The proposed ICT Integration Program may be implemented.
8. The results of this study may be used by the Grade School Department of Don Bosco Technical Institute-Makati City ~~and other Don Bosco schools in the Philippine Province-North~~ as a basis in looking into their current technology integration practices in teaching and learning.
9. The process observed in this study may be used in assessing the teachers' technological and pedagogical competencies based on educational standards. as technology is integrated in teaching and learning.
10. A ~~similar~~ study on the effects of technology in teaching and learning particularly on teachers and students' performance may be conducted ~~particularly~~ in schools which have fully integrated technology in ~~teaching and learning~~.

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Appendix A

DON BOSCO TECHNICAL INSTITUTE **Makati City**

PROPOSED INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) **INTEGRATION PROGRAM** **2016-2019**

INTRODUCTION

Many educational institutions have integrated technology which makes teaching and learning today inevitable without it. Though some continue to use the traditional method, many teachers and students prepare their learning materials using technology. They research information from different websites and interact with their fellow students and teachers online through social media. However, technology integration in teaching and learning is not at all that easy. Technology is so dynamic that new developments come so rapidly, enabling teachers to

continuously update themselves in order to keep up with technology in teaching. As for students of today, they are digital natives, and they best learn and work with the use of technology.

Lucido and Borabo (1997) said that technology forms part of school change and reform. It is seen as a way to monitor and standardize procedures already in place. In a student-learning situation, technology can be at the root of change. It can provide students with skills they need for today's workplace. Indeed, schools can no longer be isolated from the rest of society with respect to educational technology. The information age involves a change in thinking, management, instructional strategies, problem-solving strategies, and communication skills. Thus, teachers need to understand and accept technology in order to make it a useful tool. The teacher's pedagogy itself must adapt to the changes in order to encourage the creative problem-solving and higher order thinking required for producing technology-literate students. Also, automatic current educational practice can help enhance the quality of learning.

Still, technology should not be considered as the "savior" of educational problems. Technology integration is certainly a challenging task. Mishra and Koehler (2006) found out that teachers both struggle with incorporating digital tools into instruction and with capitalizing on the affordances of using digital tools. They said that teaching with technology is complicated further when the challenges newer technologies present to teachers are considered. Newer technologies which are unstable and opaque present new challenges to teachers who are struggling to use more technology in their instruction.

Thus, teachers should always be ready for new developments in education like technology. Teachers should read, do research, explore and keep themselves abreast with the

latest trends in technology and education. The judicious use of instructional technology will lead to a better teaching and learning environment.

TEACHING AND LEARNING, EFFECTS OF THE USE OF TECHNOLOGY

RATIONALE

For more than a decade, Don Bosco Technical Institute-Makati has been integrating technology in teaching and learning. Aside from the acquisition and improvement on the facilities necessary for technology integration, teachers were provided with training in order to optimize technology for instruction. With technology being the newest trend in education, all teachers had to adjust and learn about the integration of content, pedagogy, and technology in teaching.

As the years went on, teachers began to improve their knowledge and skills in technology, making them comfortable with technology. Most teachers held learning activities in the classroom using technology which eventually led to the introduction of online learning.

However, technology integration in teaching and learning has never been assessed since its implementation. Though efforts were made to improve the integration of technology, no formal assessment has been conducted to identify the status and issues on technology integration.

This study on technology integration in the high school department of the Institute revealed the status and issues in the following areas:

6. **Curriculum and Instruction.** It is the integration of technology in the curriculum and the teaching strategies applied when using technology.

- The vision-mission and curricular programs evidently show the utilization of technology.
 - good
 - Teachers Lack-of-need time to plan, prepare, and collaborate in creating technology-based instructional materials.
7. **Faculty.** It is the teachers' knowledge and skills on technology, pedagogy, and content.
- goodTeachers have the knowledge and skills in integrating technology in teaching and learning and operating technological equipment.
 - Teachers need to uUpdating-e of-their knowledge and skills in various technologies like MS Excel and configuring computer settings (hardware and software).
 - related to teaching and learning (hardware and software)
8. **Supervision.** It is the mentoring of teachers in technology integration in planning and teaching strategies, including classroom observation.
- goodAcademic Heads observe and assist teachers in the use of technology for instruction.
 - Academic Heads need to closely supervise teachers in technology integration and use of social media in teaching and learning through feedback and mentoring.
 - The administration does not regularly provide regular-orientation on ICT policies and procedures to students and teachers.
 - Improvement of guidancee and evaluation of teachers on the use of technology in teaching and learning
 - Holding regular-orientation on ICT policies and procedures-
9. **Training and Development.** It is the in-service training and professional development of teachers on technology, pedagogy, and content.
- Teachers need to update themselves on the latest trends on technology and education which will improve teaching and learning.
 - goodThe administration does not provide adequate

- ~~Inadequate~~ **in-service training and other forms of professional development** ~~on education and~~ **technology** ~~and education to teachers and staff.~~
 - ~~Updating on the latest trends in technological software and equipment~~
10. **Equipment and Facilities.** It is the availability of equipment and facilities, including services for technology integration in teaching.
- ~~Good~~
 - ~~Insufficient~~ Technological equipment and resources like laptops, computers, sound system, and other digital devices are not sufficient.
 - ~~Upgrading of~~ Technological equipment and facilities , particularly including the internet need to be improved and updated.
 - Educational software, technology-based instructional materials, and reading materials on educational technology are not adequate.
 - There is Lack of regular maintenance services of equipment and facilities.

To address these issues on technology integration, it is necessary to have an Information and Communications Technology (ICT) Integration Program that will ensure technology integration is continuously improved, sustained, and optimized. Moreover, it will provide guidance and direction for technology integration in the Institute. This program will also support the “Three-Year Institutional Strategic and Educative Pastoral Plan (2014-2017)” of Don Bosco Technical Institute-Makati City which covers three action points on technology integration in teaching, namely “to acquire and upgrade equipment that aid instruction and learning,” “to require teachers to produce instructional materials and supplements,” and “to make best use of technology in instruction.” Other programs of the institution will also benefit from this program.

With this directive of the institution on technology integration, it continues to believe on the importance of technology in instruction. Likewise, the results of this study showed that technology integration requires continuous development in the areas of Curriculum and Instruction, Faculty, Supervision, Training and Development, and Equipment and Facilities. Continuous development in the utilization of technology in teaching and learning should lead to better teacher and student performance. Teachers will become effective facilitators of learning making students self-regulating and more engaged. Marlow, Wash, Chapman, and Dale (2009), in their study, said that educational leaders noticed a trend centered on technology in the classroom. They found out that students enjoy and appreciate teachers' efforts when teachers use technology in teaching and learning. Technology is such a significant part of students' lives in today's world that if teachers use technology in the classroom, students automatically become more interested with what they are learning.

Teacher's creativity and innovation in the use of technology in teaching will lead to better learning and improved student performance. This is supported by the study of Northrop (2013) who conducted a study among poverty-stricken students who were not interested in their literacy period because basal reading textbook and workbook was used. Their comprehension, engagement, and assessment scores were failing. After brainstorming on various ways to improve students' literacy, they tried using clicker technology. Using this technology, students started participating in class. They became engaged in learning. After several weeks, their performance improved. When asked about their experience, the students said that they like and enjoy the use of the clicker technology. They frequently described the clicker review session as "fun," "exciting," and "learning." Taking into account the positive feedback received, these

results can be related with student engagement. Students' self-efficacy and confidence increased as the weeks with the clickers progressed. If students believed the learning experience was fun and enjoyable, then they could become more easily engaged and ultimately increase their reading comprehension and literacy skills. Thus, technology in the classroom can serve as an education tool for both teachers and students. Technology can help make student performance easily assessable. With technology making them self-regulated learners, students can immediately receive feedback (through clicker technology, for instance). Teachers, on the other hand, can easily identify students who need assistance and students who are ready to new concepts.

Hence, -ICT Integration is proposed to guide the administration and faculty in providing quality education with the use of technologyutilizing technology in teaching and learning.

The ICT Integration Program aims to:

5. ensure the optimization of technology integration in teaching;
6. enrich teachers' knowledge and skills in the planning and preparation of technology-based instructional materials;
7. improve the integration of content, pedagogy, and technology in teaching; and
8. keep the teachers updated and engaged in the latest trends in technology;
9. enhance teacher's performance in classroom instruction; and
10. improve student's learning and performance. –

AREA	OBJECTIVES	LINES OF ACTION	PERSON/S IN-CHARGE	TIMELINE
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<u>CURRICULUM AND INSTRUCTION</u> <i><u>It is the integration of technology in the curriculum and the teaching strategies applied when using technology.</u></i> <u>CURRICULUM AND INSTRUCTION</u> <i><u>It is the integration of technology in the curriculum and the teaching strategies applied when using technology.</u></i>	to optimize technology integration in teaching and learning	- Conduct yearly evaluation and updating of curriculum instruction guide and integration of technology. - Check weekly the learning plan, particularly on how technology is integrated in the lesson. - Guide the teachers in the integration of technology, pedagogy, and content based on standards.	- Principal - Assistant Principal - Subject Area Head (SAH)	<u>2016-2019</u>
		- Require students to do performance tasks with the use of technology at least once a quarter. - Create more rubrics for assessing student performance in the use of various technologies.	Teachers	

		Identify topics that best suit technology integration.		
	- To intensify technology integration in curriculum and instruction - to optimize technology integration in teaching and learning	- Conduct yearly evaluation and updating of curriculum, instruction guide and integration of technology. - Check weekly the learning plan, particularly on how technology is integrated in the lesson. - Guide the teachers in the integration of technology, pedagogy, and content based on standards. - Require students to do performance tasks with the use of technology at least once a quarter. - Create more rubrics for assessing student performance in the use of various	- Assistant Principal - Subject Area Heads (SAH) Principal - Assistant Principal - Subject Area Head (SAH) - Teachers	2016-2019 Monthly Monthly June 2016

	• <u>to produce more quality technology-based instructional materials for each subject area</u> • <u>to foster stronger collaboration among teachers in the preparation of technology-based instructional materials</u> • <u>to use properly social media in teaching and learning</u>	<u>technologies:</u> • <u>Identify topics that best suit technology integration.</u> • <u>Require teachers to prepare technology-based instructional materials.</u> • <u>Monitor the preparation of technology-based instructional materials.</u> • <u>Discuss technology integration with the teachers.</u> • <u>Make an area resolution in working together for the preparation of the lessons.</u> • <u>Remind constantly the teachers on social media ethics during area meeting.</u>		
	• <u>To enhance</u>	• <u>Provide</u>	• <u>Teachers</u>	

	<u>student's learning and performance</u>	<u>learning activities with the use of technology</u> • <u>Hold performance tasks using technology</u> • <u>Make analysis of student's performance every quarter</u> • <u>Present in the area meeting progress report of student's performance</u>		
	• <u>to enhance the online learning program</u>	• <u>Provide online learning program that supports the curriculum and educational programs of the department.</u> • <u>Evaluate teacher and student's performance vis-à-vis online learning program</u>	• <u>Principal</u> • <u>Assistant Principal</u>	<u>2016-2017</u>
<u>FACULTY</u>	• <u>to enrich the technological and pedagogical skills of the faculty</u>	• <u>Conduct needs assessment of teachers in technology integration.</u> • <u>Identify topics on technology, pedagogy, and content for</u>	• <u>Principal</u> • <u>Assistant Principals</u> • <u>Subject Area Heads</u>	<u>May 2016</u>

		• <u>faculty training.</u> • <u>Provide faculty training on various technologies.</u>		
	• <u>to enhance teachers' knowledge and skills in MS Excel</u>	• <u>Conduct faculty training program on MS Excel, particularly on computation, use of formula, and statistical applications.</u>	• <u>Principal</u> • <u>Assistant Principals</u> • <u>Subject Area Heads</u>	<u>June – August 2016</u>
	• <u>to enrich technology-based reference materials like software and websites</u>	• <u>Search the internet for the latest educational websites and software.</u> • <u>Create list of websites useful for the area for instruction.</u>	• <u>Teachers</u>	<u>2016-2019</u>
	• <u>to strengthen classroom management skills, particularly on the use of technology for instruction</u>	• <u>Strictly implement ICT policies and procedures.</u>	• <u>Assistant Principals</u> • <u>Subject Area Heads</u> • <u>Teachers</u>	<u>2016-2019</u>
	• <u>to acquire skills in configuring settings software and hardware</u>	• <u>Conduct yearly orientation on new computer software and hardware.</u>	• <u>Assistant Principals</u> • <u>ITC Head</u>	<u>June 2016</u> <u>June 2017</u> <u>June 2018</u>
<u>SUPERVISION</u>	• <u>to identify one's</u>	• <u>Review and strengthen the</u>	• <u>Principal</u> • <u>Assistant</u>	<u>2016-2019</u>

	<u>strengths and weaknesses in technology integration</u> • <u>To enhance teacher's performance in classroom instruction</u>	<u>classroom and evaluation tool, particularly the indicators on technology integration.</u> • <u>Hold class observation, including how technology is integrated in teaching.</u> • <u>Give feedbacks to teachers on how they integrate technology in instruction based on classroom observation.</u> • <u>Include technology item in the area meeting agenda at least once a month.</u> • <u>Hold summative assessment of teacher's performance</u>	• <u>Principals</u> • <u>Subject Area Heads</u>	
	• <u>to apply the principles and pedagogy in the use of technology in teaching</u>	• <u>Orient teachers on the pedagogical principles in using technology in teaching.</u> • <u>Guide the teachers in the</u>	• <u>Assistant Principals</u> • <u>Subject Area Heads</u>	<u>June 2016</u> <u>June 2017</u> <u>June 2018</u> <u>Quarterly</u>

		<u>use of technology in teaching.</u>		
	• <u>to understand and observe strictly the ICT policies of the institution</u>	• <u>Conduct yearly orientation to teachers on ICT policies and software licenses.</u> • <u>Conduct ICT policies orientation to students.</u>	• <u>Administrator</u> • <u>ITC Head</u>	<u>May-June 2016</u> <u>May-June 2017</u> <u>May-June 2018</u>
<u>TRAINING AND DEVELOPMENT</u>	• <u>to keep the faculty abreast on the latest development in education and technology</u>	• <u>Conduct seminar-workshop on curriculum development and pedagogy in the use of technology for instruction.</u> • <u>Encourage teachers to do professional reading on technology and education.</u>	• <u>Principal</u>	<u>May 2016-May 2019</u>
	• <u>to respond to challenges brought by technology in education particularly on student learning</u>	• <u>Require teachers to share in area meetings knowledge and experiences in technology integration.</u> • <u>Require each subject area to conduct research on education and technology</u>	• <u>Assistant Principals</u> • <u>Subject Area Heads</u>	<u>May 2016-May 2019</u>

	• <u>to acquire skills in the operation of new technological equipment</u>	• <u>once a year.</u> • <u>Conduct yearly orientation to teachers on the latest developments in technological equipment.</u>	• <u>Administrator</u> • <u>ITC Head</u>	<u>June 2016</u> <u>June 2017</u> <u>June 2018</u>
	• <u>to enhance teaching and learning through social media and online learning portal</u>	• <u>Conduct orientation to teachers on the use and ethics of social media for teaching and learning.</u> • <u>Get regular feedbacks from teachers on the effects of the use of social media in teaching and learning</u>	• <u>Subject Area Heads</u> • <u>Teachers</u>	<u>May 2016-</u> <u>May 2019</u>
<u>EQUIPMENT AND FACILITIES</u>	• <u>to make technological equipment available for technology integration in teaching and learning</u>	• <u>Acquire sufficient computer units and laptops for each subject area.</u> • <u>Acquire more digital devices like camera, video and audio recorder, Ipad, etc.</u> • <u>Provide the needed technological equipment in the classroom like LCD,</u>	• <u>Administrator</u> • <u>Principal</u> • <u>ITC Head</u>	<u>2016-2019</u>

		<u>computer unit,</u> <u>TV, internet,</u> <u>projector</u> <u>screen, and</u> <u>sound system.</u> • <u>Consult</u> <u>teachers on</u> <u>technology</u> <u>needed for</u> <u>instruction.</u>		
	• <u>to ensure the</u> <u>functionality of</u> <u>all</u> <u>technological</u> <u>equipment</u>	• <u>Provide</u> <u>additional</u> <u>computer</u> <u>technicians.</u> • <u>Hold regular</u> <u>update and</u> <u>maintenance of</u> <u>all</u> <u>technological</u> <u>equipment,</u> <u>including</u> <u>software</u> <u>licenses in the</u> <u>classrooms,</u> <u>computer</u> <u>laboratories,</u> <u>faculty rooms,</u> <u>and library.</u> • <u>Provide steady,</u> <u>strong, and fast</u> <u>internet</u> <u>connection.</u>	• <u>Administrator</u> • <u>ITC Head</u>	<u>2016-2019</u>
	• <u>to enrich</u> <u>knowledge on</u> <u>the latest</u> <u>trends in</u> <u>education and</u> <u>technology</u>	• <u>Update</u> <u>teachers on the</u> <u>latest reading</u> <u>materials on</u> <u>education and</u> <u>technology.</u> • <u>Acquire more</u> <u>reading</u> <u>materials on</u> <u>education and</u>	• <u>Head Librarian</u>	<u>2016-2019</u>

		<u>technology.</u>		
	• <u>to ensure that equipment and facilities are updated and responding to the needs of teachers and students</u>	• <u>Create a long-term technology plan</u>	• <u>Administrator</u> • <u>Principal</u> • <u>ITC Head</u>	<u>2016-2017</u>

Appendix **BA**

PHILIPPINE NORMAL UNIVERSITY
 College of Graduate Studies and Teacher Education Research
 Taft Ave., Manila

13 August 2015

FR. ALEXANDER L. GARCES, SDB
Rector
Don Bosco Technical Institute
Chino Roces Ave., Makati City

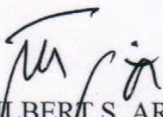
Dear Fr. Garces,

I am GILBERT S. ARRIETA, the Subject Area Head of Christian Living, and a graduate student of Philippine Normal University, Manila. I am currently doing my thesis proposal entitled **"Assessment of the Information and Communications Technology Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program"**. My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in enhancing the Faculty Development Program of the high school department. The data will also be useful in developing the other programs in the school which are related to instruction.

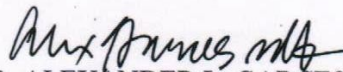
In this regard, I would like to ask your permission in conducting my study this school year 2015-2016 in the high school department.

Thank you very much for your support.

Respectfully yours,


 GILBERT S. ARRIETA
 PNU Graduate Student

Approved by:


 FR. ALEXANDER L. GARCES, SDB
 Rector



PHILIPPINE NORMAL UNIVERSITY

College of Graduate Studies and Teacher Education Research
Taft Ave., Manila

13 August 2015

FR. ALEXANDER L. GARCES, SDB

Rector

Don Bosco Technical Institute

Chino Roces Ave., Makati City

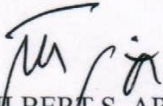
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GILBERT S. ARRIETA
PNU Graduate Student

Approved by:


FR. ALEXANDER L. GARCES, SDB
Rector

Appendix B

PROPOSED RESEARCH INSTRUMENT**SURVEY QUESTIONNAIRE ON INFORMATION AND COMMUNICATIONS
TECHNOLOGY (ICT) INTEGRATION IN TEACHING**

————— Kindly check (✓) if you think the indicator is **APPROPRIATE (AP)** or **NOT APPROPRIATE (NA)**. If you have suggestions for improvement of the indicator, please write on the space provided for.

A. CURRICULUM AND INSTRUCTION <i>It is the integration of technology in the curriculum and the teaching strategies applied when using technology.</i>	AP	NA	Suggestions
1. The importance of technology in teaching and learning is reflected in the vision-mission of the school.			
2. The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching.			
3. The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching.			
4. Curriculum review is done to reflect current educational practices and pedagogy.			
5. Curriculum and technological innovations are done to ensure technology integration.			
6. Teachers select technologies that they can use in class which will enhance teaching and learning.			
7. Teachers use strategies that combine content, technologies and teaching approaches in the delivery of the lesson.			
8. Teachers teach lessons that appropriately combine content, technologies and teaching approaches.			
9. Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards, while addressing a variety of learning styles.			
10. Teachers understand the pedagogy in the use of technology for classroom instruction.			
11. There are technology-based instructional materials prepared by teachers.			
12. Technology-based instructional materials are updated by teachers.			
13. Teachers collaborate in preparing technology-based instructional materials.			
14. Students accomplish tasks and create projects using technology.			
15. Teachers require students to use technology for projects and other outputs.			
16. Teachers guide the students in the use of technology for projects.			
17. Students use technology resources provided by the school.			
18. There is a provision for online learning for the subject.			
19. Teachers use emails, group sites, blogs, and social media (facebook, twitter) for disseminating information directly to			

students, colleagues and parents.			
20. Teachers use emails, group sites, blogs, and social media (facebook, twitter) to collect information and feedback directly from students, colleagues and parents.			
21. Students use their own digital devices like laptops, tablets, and similar devices for classroom instruction.			
22. There are rubrics for assessing student performance in the use of various technologies.			

B. FACULTY <i>It is the teachers' knowledge and skills on technology, pedagogy, and content integration.</i>	AP	NA	Suggestions
1. I can operate laptop, LCD projector and TV in the classroom.			
2. I can connect and use classroom peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop).			
3. I can configure computer settings of various software and hardware.			
4. I use MS Word, Excel and PowerPoint for teaching and other related tasks with relative ease.			
5. I can insert table, text, pictures, sound, video and files in the documents.			
6. I can make computation, use formula and create graphs using spreadsheets.			
7. I analyze assessment data using spreadsheets and statistical applications.			
8. I can enhance slide presentations by adding sound, customizing animation and inserting images.			
9. I can make effective class presentations using the slides and LCD projector.			
10. I can crop, scale, color correct and enhance digital images.			
11. I can attach and configure scanners, cameras, cell phones to acquire digital images.			
12. I can convert files to different formats.			
13. I can upload and download documents, presentations, digital images and other media from web sites, CD, flash drives, etc.			
14. I can search the web to find current information on a topic that I need.			
15. I choose the appropriate technology for my lesson.			
16. I can identify and evaluate developing technologies as they relate to my subject area, grade level and student population.			
17. I use email and social media to enhance teaching and learning.			
18. Teachers are consulted on technologies that can be used to enhance technology integration.			
19. Teachers can use their own laptops, gadgets, and other software for instruction.			
20. Teachers know and understand the legal implications of Software Licenses and Fair Use.			
21. I report malfunctions and problems with computer software and hardware.			

22. I use electronic means of administering quizzes and examinations.			
23. I promote and implement rules and regulations on proper use of computers.			
24. I recommend websites as references to my students for a better understanding of the lesson.			

C. SUPERVISION <i>It is the managing and mentoring of teachers in technology integration in planning and teaching strategies including classroom observation.</i>	AP	NA	Suggestions
1. Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal.			
2. Subject Area Heads conduct regular supervisory visits to classes and post-observation conferences.			
3. Teachers are observed on the use of technology in teaching.			
4. Feedbacks are given to teachers on how they use of technology in teaching.			
5. Subject Area Heads give comments on the learning plans particularly on learning activities and technology use.			
6. Teachers are guided on the pedagogy in using technology in teaching.			
7. The use of technology in teaching is discussed during area meetings.			
8. Teachers and subject area heads share knowledge and experiences on technology integration.			
9. Teachers are evaluated on the use of technology in teaching.			
10. Performance appraisal of teachers includes the use of technology in teaching.			
11. Teachers are asked on software and technology needed for the improvement of technology integration in teaching.			
12. The supervisory program includes the use of technology in teaching.			
13. There are Information and Communications Technology (ICT) policies and procedures observed by faculty, employees and students.			
14. Faculty, employees and students are oriented yearly on ICT policies and procedures.			

D. TRAINING AND DEVELOPMENT <i>It is the in-service training and professional development of teachers on technology, pedagogy and content.</i>	AP	NA	Suggestions
1. Teachers' needs for professional development are assessed regularly.			
2. Teachers are provided training on curriculum development.			
3. Teachers are provided in-service training on the pedagogy in technology.			
4. New teachers are provided training on the use of technology in teaching.			
5. Teachers are updated on the new technologies for instruction.			

6.	Teachers are oriented on the use of new equipment.			
7.	There are reading materials in the library on educational technology.			
8.	Teachers are updated on new books, journals, magazines, and non-print materials on technology.			
9.	Teachers recommend useful and credible web sites to fellow teachers.			
10.	Expert teachers on the use of technology assist in the development of technology-based instructional materials.			
11.	Teachers join online communities, forums, and discussions.			
12.	Teachers identify educational sites and portals suitable to their subject area.			
13.	Teachers review new and existing software for education.			
14.	Researches are conducted on the use of technology in the classroom.			
15.	Teachers' needs for professional development are assessed regularly.			

E. EQUIPMENT AND FACILITIES <i>It is the availability of equipment and facilities including services for technology integration in teaching.</i>		AP	NA	Suggestions
1.	Each subject area is provided with sufficient computer units and laptops.			
2.	The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, iPad and tablet for teaching.			
3.	The classroom is equipped with LCD projector, TV, and projector screen.			
4.	The classroom is equipped with sound system.			
5.	Computer and internet laboratories are checked and maintained regularly.			
6.	Technological equipment and facilities are checked and maintained regularly.			
7.	Installed software in the computers units and laptops in the school are licensed.			
8.	Equipment, software and information system are updated and functioning.			
9.	Internet connection is steady, strong and fast.			
10.	Computer units have internet access.			
11.	Faculty members have internet access in the school.			
12.	Students have internet access in the school.			
13.	There are sufficient technicians who assist for software and hardware related concerns.			
14.	The Library and Learning Resource Center has sufficient technology-based instructional materials and educational software.			
15.	The school has Information and Communications Technology (ICT) policies and procedures.			
16.	Each subject area is provided with sufficient computer units and laptops.			

17. The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, iPad and tablet for teaching.			
18. The classroom is equipped with LCD projector, TV, and projector screen.			

Appendix C

RESEARCH INSTRUMENT

SURVEY QUESTIONNAIRE ON INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) INTEGRATION IN TEACHING

Name (optional) _____

Subject Area _____

Position _____

Direction:

Kindly check (✓) the box which corresponds to your answer to the indicators using the rating scale below.

5 – Excellent (The provision or condition is extensively implemented.)

4 – Very Good (The provision or condition is well implemented.)

3 – Good (The provision or condition is moderately implemented.)

2 – Fair (The provision or condition is limited in implementation.)

1 – Poor (The provision or condition is limited and poorly implemented.)

A. CURRICULUM AND INSTRUCTION <i>It is the integration of technology in the curriculum and the teaching strategies applied when using technology.</i>	5	4	3	2	1
1. The importance of technology in teaching and learning is reflected in the vision-mission of the school.					
2. The Curriculum Instruction Guide (CIG) includes the use of instructional technology in teaching like laptops, educational software, power point, film clips, images, music, and online learning.					
3. The Learning Plan (Lesson Plan) includes the use of instructional technology in teaching.					
4. Teachers select technologies that they can use in class which will enhance teaching and learning.					

5. Teachers deliver instruction that appropriately combine content, technologies and teaching approaches.					
6. Teachers prepare technology-enhanced lessons that address content standards and student technology literacy standards, while addressing a variety of learning styles.					
7. Teachers understand the pedagogy in the use of technology for classroom instruction.					
8. Teachers prepare at least five technology-based instructional materials.					
9. Teachers regularly update their technology-based instructional materials.					
10. Teachers in the subject area collaborate with each other in preparing technology-based instructional materials.					
11. Teachers encourage students to use technology for projects and other outputs.					
12. Teachers guide the students in the use of technology for projects.					
13. Provision for online learning for the subject is available.					
14. Teachers and students use emails, group sites, blogs, and social media for disseminating information directly to students, colleagues, and parents, and for gathering feedback from students, colleagues, and parents.					
15. There are at least three rubrics for assessing student performance in the use of various technologies.					

B. FACULTY <i>It is the teachers' knowledge and skills on technology, pedagogy, and content integration.</i>	5	4	3	2	1
1. I can operate laptop, LCD projector and TV in the classroom to aid my instruction.					
a. I can connect and use technology peripherals (ex. mouse, projector, speaker, Ipad, tablet, laptop).					
b. I can configure computer settings of various software and hardware.					
2. Using MS Word, Excel and PowerPoint for teaching and other related tasks,					
a. I can insert table, text, pictures, sound, video and files in the documents.					
b. I can make computation, use formula and create graphs using spreadsheets.					
c. I can analyze assessment data using spreadsheets and statistical applications.					
d. I can enhance slide presentations by adding sound, customizing animation, and inserting images.					
e. I can make effective and interactive class presentations using the slides and LCD projector.					
f. I can design slides by balancing colors, and using appropriate images, and texts.					
3. Using other computer software, I can attach and configure scanners, cameras, cell phones to acquire digital images.					
4. I can search the web to find current information on a topic that I need.					
5. I choose the appropriate technology for my lesson.					
6. I can identify and evaluate developing technologies as they relate to my subject area, grade level and student population					
7. I use email and social media to enhance teaching and learning.					
8. I know and understand the legal implications of Software Licenses and Fair Use.					
9. I report malfunctions and problems with computer software and hardware to my immediate head or IT Center.					
10. I promote and implement rules and regulations on proper use of computers.					

11. I recommend websites as references to my students for a better understanding of the lesson.					
---	--	--	--	--	--

C. SUPERVISION <i>It is the managing and mentoring of teachers in technology integration in planning and teaching strategies including classroom observation.</i>	5	4	3	2	1
1. Learning Plans (Lesson Plan) are checked weekly by the Subject Area Heads and Asst. Principal.					
2. Teachers are observed and evaluated on the use of technology in teaching.					
3. Feedbacks are given to teachers on how they use of technology in teaching.					
4. Subject Area Heads give comments on the learning plans particularly on learning activities and technology use.					
5. Teachers are guided by the Subject Area Head on the pedagogy in using technology in teaching.					
6. Teachers and Subject Area Heads share knowledge and experiences on technology integration.					
7. Teachers are evaluated on the use of technology in teaching.					
8. Subject Area Heads consult teachers on software and technology needed for the improvement of technology integration in teaching.					
9. Teachers and employees observe Information and Communications Technology (ICT) policies and procedures.					
10. Faculty, employees and students are oriented yearly on ICT policies and procedures.					

D. TRAINING AND DEVELOPMENT <i>It is the in-service training and professional development of teachers on technology, pedagogy and content.</i>	5	4	3	2	1
1. Teachers are provided training on curriculum development.					
2. Teachers are provided in-service training on the pedagogy in technology.					
3. Teachers are oriented on the use of new equipment.					
4. There are reading materials in the library on educational technology.					
5. Teachers are updated on new books, journals, magazines, and non-print materials on technology.					
6. Teachers recommend useful and credible web sites to fellow teachers.					
7. Teachers join online communities, forums, and discussions.					
8. Teachers identify educational sites and portals suitable to their subject area.					
9. Teachers review new and existing software for education.					
10. Researches are conducted on the use of technology in the classroom.					

E. EQUIPMENT AND FACILITIES <i>It is the availability of equipment and facilities including services for technology integration in teaching.</i>	5	4	3	2	1
1. Each subject area is provided with sufficient computer units and laptops.					
2. The school provides other digital devices and peripherals like LCD projector, digital camera, video camera, iPad and tablet for teaching.					
3. The classroom is equipped with LCD projector, TV, projector screen, and sound system.					
4. Computer and internet laboratories are checked and maintained regularly.					
5. Installed software in the computers units and laptops in the school are licensed.					

6. Equipment, software and information system are updated and functioning.					
7. Teachers are consulted on technologies that can be used to enhance technology integration.					
8. Internet connection is steady, strong, and fast.					
9. There are sufficient technicians who assist for software and hardware related concerns.					
10. The Library and Learning Resource Center has sufficient technology-based instructional materials and educational software.					

Your responses will be kept with utmost confidentiality.

Thank you for your cooperation!

SURVEY ON INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) INTEGRATION IN TEACHING

Name (optional) _____

Subject Area _____

Position _____

Kindly answer the question based on your knowledge and experience on technology integration in teaching. Your responses will be kept with utmost confidentiality.

What are the problems or issues do you encounter in the integration of technology in teaching and learning?

Thank you very much for your cooperation!

PERMISSION TO USE TPACK AND MASSACHUSETTS TECHNOLOGY SELF-ASSESSMENT TOOL FOR TEACHERS

Subject: Re: Permission to use research instrument
From: Gilbert Arrieta (betstong@yahoo.com)
To: punya@msu.edu;
Date: Thursday, August 20, 2015 1:54 PM

Dear Professor Mishra,

Thank you so much. I will go through the site. I will update you on the development of my study.

gilbert arrieta

On Thursday, August 20, 2015 1:34 PM, Punya Mishra <punya@msu.edu> wrote:

Dear Gilbert

Thank you for your interest in the TPACK framework. The best way to learn more about it is by going to TPACK.org - there is a lot of information there about instruments etc. to measure TPACK. These are all made freely available to the research community.

thanks
 ~ punya

 Punya Mishra
 Web: <http://punyamishra.com>
 Blog: <http://punya.educ.msu.edu/blog/>

On 8/19/15, 10:34 PM, Gilbert Arrieta wrote:

Dear Professor Mishra,

I am Gilbert S. Arrieta from the Philippines. I have been in the field of education for more than 25 years specifically in Don Bosco Technical Institute-Makati City. I recently returned to the Philippine Normal University Graduate School to earn my master's degree in educational management. Currently, I am working on my thesis entitled "Assessment of the Information and Communications Technology Integration in Teaching Selected Subjects: Basis for ICT Integration Program. In my readings, I came across your TPACK which I find very rich and encouraging in pursuing my research work. Your research work contributes greatly to my thesis particularly your research instrument.

I am seriously considering a lot of indicators in your instrument which will be helpful in coming up with an instrument that I will use in my study. In this regard, can I ask your

permission to use your instrument particularly the indicators that will be useful in my research work.

Hoping to receive a positive response from you on this request. Thank you so much. God bless.

Sincerely yours,

GILBERT S. ARRIETA
09273184371 (Philippines)

|

Subject: Re: Permission to use the self-assessment tool
From: Gilbert Arrieta (betstong@yahoo.com)
To: odl@doe.mass.edu;
Date: Sunday, August 23, 2015 10:49 AM

Dear Ms. Jennifer,

Thank you so much for your assistance. I'll update you on the development of my study.

Sincerely,

Gilbert

On Friday, August 21, 2015 4:06 AM, Office of Digital Learning (DOE) <odl@doe.mass.edu> wrote:

Hello Gilbert,

Thanks for reaching out to the Office of Digital Learning. The TSAT is open to all. Best of luck with your study, and please let us know if we may be of further assistance.

Warm regards,
 Jennifer (on behalf of the Office of Digital Learning)

Jennifer A. Gwatkin
Massachusetts Department of Elementary and Secondary Education
 Office of Digital Learning
 75 Pleasant Street
 Malden, MA 02148
 p: 781.338.3251
 e: jgwatkin@doe.mass.edu
 t: @MASchoolsK12
www.doe.mass.edu

From: Gilbert Arrieta [mailto:betstong@yahoo.com]
Sent: Wednesday, August 19, 2015 10:49 PM
To: Office of Digital Learning (DOE)
Subject: Permission to use the self-assessment tool

To Whom It May Concern,

I am Gilbert S. Arrieta, an educator for 25 years at Don Bosco Technical Institute-Makati in the Philippines and presently working on my thesis proposal in Philippine Normal University. In my readings for my research work on technology integration, I came across

your TSAT Massachusetts Technology Self-Assessment Tool for Teachers (Massachusetts Department of Elementary and Secondary Education). I find it very useful in designing the instrument that I will use in my study.

In this regard, can I ask permission through your office to use the abovementioned instrument for my study?

Thank you so much.

Sincerely,

GILBERT S. ARRIETA

|

Appendix **D**

PHILIPPINE NORMAL UNIVERSITY
 College of Graduate Studies and Teacher Education Research
 Taft Ave., Manila

13 August 2015

FR. ALEXANDER L. GARCES, SDB
Rector
Don Bosco Technical Institute
Chino Roces Ave., Makati City

Dear Fr. Garces,

I am GILBERT S. ARRIETA, the Subject Area Head of Christian Living, and a graduate student of Philippine Normal University, Manila. I am currently doing my thesis proposal entitled **"Assessment of the Information and Communications Technology Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program"**. My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in enhancing the Faculty Development Program of the high school department. The data will also be useful in developing the other programs in the school which are related to instruction.

In this regard, I would like to ask your permission in conducting my study this school year 2015-2016 in the high school department.

Thank you very much for your support.

Respectfully yours,

A handwritten signature in black ink, appearing to read 'G. Arrieta'.

GILBERT S. ARRIETA
 PNU Graduate Student

Approved by:

A handwritten signature in black ink, appearing to read 'Fr. Alexander L. Garces, SDB'.

FR. ALEXANDER L. GARCES, SDB
 Rector

Appendix EE



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Ave., Manila

9 September 2015

PROF. EMILIO F. AGUINALDO
Professor, Information and Communications Technology
Institute of Knowledge Management
Philippine Normal University
Taft Ave., Manila

Dear Prof. Aguinaldo,

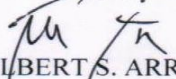
Greetings!

I am **GILBERT S. ARRIETA**, the Subject Area Head of Christian Living of the high school department of Don Bosco Technical Institute-Makati City and a graduate student of Philippine Normal University, Manila. I am currently working on my thesis entitled "**Assessment of the Information and Communications Technology (ICT) Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program**". My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in the technology integration in teaching in the high school department. The data will also be useful in developing other programs in the school which are related to faculty and instruction. I am presently doing a validation of my research instrument for this study.

Believing in your expertise and experience in education and technology, may I request for your assistance in validating and improving my research instrument. Attached herewith is the research instrument.

Thank you very much for your assistance.

Respectfully yours,


GILBERT S. ARRIETA
PNU Graduate Student
Educational Management
09273184371

Noted by:


DR. CARIDAD N. BARRAMEDA
Thesis Adviser

Appendix EF



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Ave., Manila

5 October 2015

FR. ONOFRE INOCENCIO, JR., SDB
Superintendent
Don Bosco Schools and TVET Centers
Salesians of Don Bosco-Philippine Province North

Dear Fr. Jun,

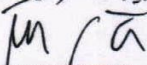
Greetings!

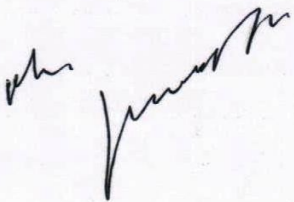
I am **GILBERT S. ARRIETA**, the Subject Area Head of Christian Living of the high school department of Don Bosco Technical Institute-Makati City and a graduate student of Philippine Normal University, Manila. I am currently working on my thesis entitled "**Assessment of the Information and Communications Technology (ICT) Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program**". My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in the technology integration in teaching in the high school department. The data will also be useful in developing other programs in the school which are related to faculty and instruction. I have already validated my research instrument. I will be testing its reliability to a school which is parallel to Don Bosco Technical Institute-Makati.

Since Don Bosco Technical College-Mandaluyong particularly the high school department is parallel with Don Bosco Technical Institute-Makati, I would like to seek your permission as the in-charge of the Basic Education Department to conduct the test and retest of my instrument's reliability to selected high school teachers of Math, Science, English, Filipino, Social Studies, and Christian Living. I will retrieve the accomplished instruments two days after conducting it.

Thank you very much for your assistance.

Respectfully yours,


GILBERT S. ARRIETA
PNU Graduate Student
Educational Management
09273184371



Appendix GG



PHILIPPINE NORMAL UNIVERSITY
 College of Graduate Studies and Teacher Education Research
 Taft Ave., Manila

14 October 2015

Dear Colleagues,

Greetings!

I am **GILBERT S. ARRIETA**, the Subject Area Head of Christian Living of the high school department of Don Bosco Technical Institute-Makati City and a graduate student of Philippine Normal University, Manila. I am currently working on my thesis entitled **"Assessment of the Information and Communications Technology (ICT) Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program"**. My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in the technology integration in teaching in the high school department of Don Bosco Technical Institute-Makati City. The data will also be useful in developing other programs in the school which are related to faculty and instruction.

I have developed a research instrument for my study. Seven experts validated the instrument. I am now in the process of testing its reliability. The researcher finds the high school faculty of Don Bosco Technical College-Mandaluyong City as the most appropriate to conduct the testing of my instrument's reliability.

Your responses will be treated with utmost confidentiality. It will not in any way affect your performance or status in the institution. Your participation will contribute in future researches by having a local instrument that can be used in assessing the integration of technology in teaching and learning most especially in Don Bosco schools.

Thank you very much for your participation and support.

Respectfully yours,

A handwritten signature in dark ink, appearing to read 'Gilbert S. Arrieta'.

GILBERT S. ARRIETA
 PNU Graduate Student
 Educational Management
 09273184371

Appendix HH



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Ave., Manila

6 November 2015

MS. VIOLETA F. ROXAS
Principal
High School Department
Don Bosco Technical Institute
Makati City

Dear Miss Roxas,

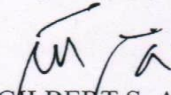
Greetings !

I am GILBERT S. ARRIETA, the Subject Area Head of Christian Living, and a graduate student of Philippine Normal University, Manila. I am currently doing my thesis proposal entitled **"Assessment of the Information and Communications Technology Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program"**. My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in enhancing the different programs in the school particularly in the high school department which are related to instruction. I have already sought the permission of our Rector to conduct my study this school year, 2015-2016.

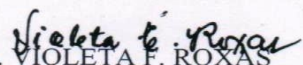
In this regard, I would like to present to you my study together with the Assistant Principal for Academic Affairs and the Subject Area Heads of Math, Science, English, Filipino, Social Studies, and Christian Living.

Thank you very much for your participation and support.

Respectfully yours,


GILBERT S. ARRIETA
PNU Graduate Student

Approved by:


MS. VIOLETA F. ROXAS
Principal, High School Department
Don Bosco Technical Institute
Makati City

Appendix H



PHILIPPINE NORMAL UNIVERSITY
 College of Graduate Studies and Teacher Education Research
 Taft Ave., Manila

6 November 2015

MRS. WILMA G. GAMO
 Assistant Principal for Academic Affairs
 High School Department
 Don Bosco Technical Institute
 Makati City

Dear Mrs. Gamo,

I am GILBERT S. ARRIETA, the Subject Area Head of Christian Living, and a graduate student of Philippine Normal University, Manila. I am currently doing my thesis proposal entitled "**Assessment of the Information and Communications Technology Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program**". My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in enhancing the different programs in the school particularly in the high school department which are related to instruction.

In this regard, I would like to have a meeting with you and the subject area heads of Math, Science, English, Filipino, Social Studies, and Christian Living to discuss my study. I have already sought the permission of Fr. Rector and the Principal to conduct the study.

Thank you very much for your participation and support.

Respectfully yours,

A handwritten signature in black ink, appearing to read 'Gilbert S. Arrieta'.

GILBERT S. ARRIETA
 PNU Graduate Student

Approved by:

A handwritten signature in black ink, appearing to read 'Violeta F. Roxas'.

MS. VIOLETA F. ROXAS
 Principal, High School Department
 Don Bosco Technical Institute
 Makati City

Appendix



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Ave., Manila

6 November 2015

MRS. MYRA R. FABIC
Subject Area Head, Mathematics
High School Department
Don Bosco Technical Institute
Makati City

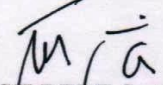
Dear Mrs. Fabic,

I am GILBERT S. ARRIETA, the Subject Area Head of Christian Living, and a graduate student of Philippine Normal University, Manila. I am currently doing my thesis proposal entitled "**Assessment of the Information and Communications Technology Integration in Teaching Selected Subject Areas: Basis for an ICT Integration Program**". My study aims to find out the status of technology integration in teaching Math, Science, English, Filipino, Social Studies, and Christian Living in the high school department. The results of the study will certainly help in enhancing the different programs in the school particularly in the high school department which are related to instruction.

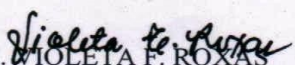
In this regard, I would like to seek your assistance in asking your teachers to answer the survey questionnaire. Their responses will be treated with utmost confidentiality and will not in any way affect their performance or status in the institution. I will retrieve the accomplished instruments two days after conducting it.

Thank you very much for your participation and support.

Respectfully yours,


GILBERT S. ARRIETA
PNU Graduate Student

Approved by:


MS. VIOLETA F. ROXAS
Principal, High School Department
Don Bosco Technical Institute
Makati City



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Ave., Manila

9 November 2015

MISS VIOLETA F. ROXAS
Principal
High School Department
Don Bosco Technical Institute-Makati City

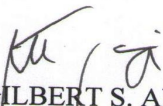
Dear Miss Roxas,

Greetings!

I am very grateful for allowing me to present and discuss with you and the subject area heads concerned my thesis entitled "Assessment of the Information and Communications Technology (ICT) Integration in Teaching Selected High School Subjects: Basis for an ICT Integration Program" last November 6, 2015. *Before I conduct the study, I would like to inform you that the participation of teachers will be voluntary. Moreover, the results will be treated with utmost confidentiality and will not in any way affect the performance and employment of the respondents. Rather, the results may be used to enhance the different programs of the high school department of Don Bosco Technical Institute-Makati City particularly the faculty development program.*

Thank you very much for your assistance.

Respectfully yours,


GILBERT S. ARRIETA
PNU Graduate Student
Educational Management

Approved by:


MISS VIOLETA F. ROXAS
Principal, High School Department
Don Bosco Technical Institute
Makati City

*****The meeting with the Assistant Principal and Subject Area Heads concerned was held last November 9, 2015 at 1:00 PM. The study was discussed including the ethical considerations.***

PROBLEMS / ISSUES ENCOUNTERED IN THE INTEGRATION OF TECHNOLOGY IN TEACHING AND LEARNING

SOCIAL STUDIES	FILIPINO
- Limited technology supports – weak internet connection (slow internet connection) - Speed of internet connection becomes slower during peak hours (slow internet connection) - Lack of time to explore new emerging technologies in teaching (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Slow internet connection and defective computers (slow internet connection) - Low internet connectivity in the classroom (4th floor) (slow internet connection) - Some of the teachers “learned helplessness” – mas madali magtanong kaysa subukang tuklasin (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Lack of training for teachers (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Kakulangan sa pagbibigay ng pagsasanay sa guro lalo’t na kung nagkaroon ng problema sa paggamit ng technology sa oras ng pagtuturo (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Availability of computer hardware/software (licensed) as such prezi.com; lucidchart.com; Camtasia.com; powtoon (Lack of Regular Maintenance Services of Equipment and Facilities) - Scheduling of IT facilities conflicts with availability (Insufficient Equipment and Facilities) - No available equipment for technology integration (Insufficient Equipment and Facilities) - Lack of materials to be integrated in the lesson (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Many topics to be discussed in a short period of time (Inadequate Faculty Training and Updating on Technology and Pedagogy)	- May mga pagkakataong hindi nababasang TV ang gamit na USB (Lack of Regular Maintenance Services of Equipment and Facilities) - Mas makakatulong kung may built-in speaker sa bawat classroom (Insufficient Equipment and Facilities) - Sometimes, we need internet resources in English language or in foreign examples (upgrading of technological software and equipment) - I see to it that there is a pedagogy in using technology in my topic or subject (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Pag-iibang kulay ng LCD projector (Lack of Regular Maintenance Services of Equipment and Facilities) - Kawalan ng remote sa projector (Insufficient Equipment and Facilities) - Server, slow internet connection (slow internet connection) - Scheduling in the computer laboratories (enough lab) (Insufficient Equipment and Facilities) - Commands in Filipino subject (upgrading of technological software and equipment) - Yung LCD projector sa 10-4 hindi na ata gumagana, sira (Lack of Regular Maintenance Services of Equipment and Facilities) - LCD projector (Lack of Regular Maintenance Services of Equipment and Facilities) - Laptop/computer virus (Lack of Regular Maintenance Services of Equipment and Facilities) - Kakulangan sa kagamitan/pasilidad (Insufficient Equipment and Facilities) - Kakulangan sa kakayahan sa paggamit ng guro (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Maling konsepto ng “pedagogy of technology” (Inadequate Faculty Training and Updating on Technology and Pedagogy)

- Students are not familiar with the technology to be used (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Lack of computer laboratories (Insufficient Equipment and Facilities) - Time consuming – teachers must spend hours looking for the quality photographs and video clips (Lack of Time Preparing Technology-Based Instructional Materials)	- Midyum sa paggamit ng anumang teknolohiya (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Pagkahuli sa mga napapanahong kaalaman sa paggamit ng teknolohiya sa pagtuturo (Inadequate Faculty Training and Updating on Technology and Pedagogy) <u>PAARALAN</u> - Malaking papel ang ginagampanan ng mga paaralan sa usaping integrasyon ng teknolohiya sa pagkatuturo ang pangunahing pinanggagalingan ng mga kagamitang pangteknolohiya sa pagtuturo at pagkatuto (Insufficient Equipment and Facilities) <u>GURO</u> - Bilang pangunahing tagapagsimula ng pagpapakilala ng teknolohiya bilang kagamitan sa mas mahusay napagkatuto ng mga mag-aaral. Ang guro ay nararapat na maging mas maalam sa kung anong kagamitang pangteknolohiya ang angkop sa kanyang mga mag-aaral at paksang itinatuturo. Ika nga “We cannot give what do not have.” Nararapat na gumagamit tayo ng angkop na teknolohiya ayon sa pangangailangan. Ganun pa man tayo ay kasabay na natututo ng ating mga mag-aaral ayon nga <u>asa</u> aral ni “Caroll at Witherspoon (2002) “Sa loob ng klasrum, lahat tayo ay parang mga estudyante.” (Inadequate Faculty Training and Updating on Technology and Pedagogy) <u>MAG-AARAL</u> - Sa panahon ngayon (21st century), ang mga mag-aaral natin ay nasa pagitan ng generation “y” at “2” nangangahulugan na ang paggamit ng mga kagamitang pangteknolohiya ay una na nilang natutunan bago pa man pumasok at talakayin/gamitin sa paaralan. Ibig sabihin ay dapat na maging tuon natin ang “pedagogy of technology” kung saan binibigyan natin ang mga magaaral ng direksyon sa matalinong paggamit ng kanilang kaalaman sa teknolohiya. Isang karanasang magagamit sa reyalidad ng buhay. (Inadequate Faculty
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	Training and Updating on Technology and Pedagogy)
CHRISTIAN LIVING	ENGLISH
- Bandwidth – effectiveness of instruction highly depends on fast internet connection (slow internet connection) - Slow internet connection (slow internet connection) - Not all students have access to internet (Insufficient Equipment and Facilities) - New programs for teaching aids how to use them (upgrading of technological software and equipment) - How effective are the new technologies in teaching (Inadequate Faculty Training and Updating on Technology and Pedagogy) - How to integrate technology to informal teaching (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Are there new technologies? (upgrading of technological software and equipment) - Sustainability/improvements of these technologies (upgrading of technological software and equipment) - There must be variation in integration of technology so that the student will be interested to the subject matter (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Lack of resources /limited resources (Insufficient Equipment and Facilities) - Outdated software and programs that are necessary to the subject/topic. (upgrading of technological software and equipment) - Limited equipment, materials, tools, etc that are necessary to the subjects (Insufficient Equipment and Facilities) - Sometimes students are more knowledgeable than the teachers in using the technology/ equipment (faculty training and updating) - Administration could only provide as much laptops and not for everyone(Insufficient Equipment and Facilities) - Loss of data / corrupted files (Lack of Regular	- The speed of internet (slow internet connection) - Slow internet connection (slow internet connection) - The availability of computer laboratory (Insufficient Equipment and Facilities) - The availability of computer set/laptop to be used inside the classroom (Insufficient Equipment and Facilities) - The technical problem in using other equipment like LCD projector and TV (computer to TV) (Lack of Regular Maintenance Services of Equipment and Facilities) - Equipment malfunctioning (Lack of Regular Maintenance Services of Equipment and Facilities) - Keeping abreast with the new advancement in technology (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Slow internet connection often results to the delay of the lesson (slow internet connection) - If the given assignment is internet-based, most students do not comply. - Some facilities are not always readily available (audio for video) (Insufficient Equipment and Facilities) - Computer rooms are limited (Insufficient Equipment and Facilities) - Internet connection is not always dependable for students to accomplish works in a period (slow internet connection) - Classrooms are not completely technology ready except for the availability of TV and LCD (Insufficient Equipment and Facilities) - Not all lessons could be integrated with technology (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Reliance on technology sometimes limits teachers (Inadequate Faculty Training and

Maintenance Services of Equipment and Facilities) - At times, availability of materials/gadgets (Insufficient Equipment and Facilities) - Needs to upgrade/update on the latest trends in technology integration with the help of qualified personnel or expert in the field (upgrading of technological software and equipment) - As the students are becoming more adept at using technology, I find them to be even harder to please and to keep interested (Inadequate Faculty Training and Updating on Technology and Pedagogy) - As videos (educational or otherwise) are extensively shared over social media, the chance that the learners have seen downloaded videos meant for the classroom is more probable. (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Licensed software are expensive. (upgrading of technological software and equipment) - Just when one is ready and well-prepared with technology integration in teaching, something goes wrong with the equipment. (Lack of Regular Maintenance Services of Equipment and Facilities)	Updating on Technology and Pedagogy) - Students are already used to seeing power points and they find it difficult to concentrate with the absence of them. (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Bringing a lot of materials like speakers, laptops etc. It is a hassle on the teacher's part. (Insufficient Equipment and Facilities) - Thinking of interactive activities with the use of technology. (Inadequate Faculty Training and Updating on Technology and Pedagogy)
SCIENCE	MATH
- Slow internet connection (slow internet connection) - A few computer units are not functioning well (internet lab and computer lab) (Lack of Regular Maintenance Services of Equipment and Facilities) - Slow internet connection (slow internet connection) - Limited computer units (Insufficient Equipment and Facilities) - No available speakers (Insufficient Equipment and Facilities) - Slow internet connection inside the classroom (slow internet connection) - No speakers in the classroom for video clip presentation (Insufficient Equipment and Facilities) - Cable of the projector is not in good condition	- Time limitation since integrating technology needs careful planning and requires more time. (Lack of Time Preparing Technology-Based Instructional Materials) - Access to resources since the use of technology and computer laboratories have to be booked in advance, sometimes there are conflicts in scheduling. (Insufficient Equipment and Facilities) - Another problem would be the insufficient simultaneous internet access. (slow internet connection) - Lack of quality materials (Insufficient Equipment and Facilities) - Poor internet connection (slow internet connection) - Unavailable computer units for students in school (Insufficient Equipment and

(Lack of Regular Maintenance Services of Equipment and Facilities) - Limited number of laptop for instructional use (Insufficient Equipment and Facilities) - Slow internet connection (slow internet connection) - CPUs, keyboards, mouse not working properly (Lack of Regular Maintenance Services of Equipment and Facilities) - LCD projector not working properly (Lack of Regular Maintenance Services of Equipment and Facilities) - Sudden cut/stop of internet connection in the afternoon affecting class instruction (slow internet connection) - Sometimes poor connection to the server (internet connection) (slow internet connection) - Some headphones/earphones are not functioning (genyo class) (Lack of Regular Maintenance Services of Equipment and Facilities) - The availability of speakers in the classroom during video presentation (Insufficient Equipment and Facilities) - In some classrooms, LCD projector are not functioning well (Lack of Regular Maintenance Services of Equipment and Facilities) - Slow internet connection (slow internet connection) - Lack of equipment (laptops) (Insufficient Equipment and Facilities) - Headsets are not functioning properly in the internet laboratory (Lack of Regular Maintenance Services of Equipment and Facilities) - Internet connection is sometimes poor (slow internet connection) - Lack of speakers in the classroom (Insufficient Equipment and Facilities)	Facilities) - Limited number of equipment (Insufficient Equipment and Facilities) - Internet connection – speed (slow internet connection) - Conflict of schedule (Genyo) - Time consuming – mobilization from classroom to internet lab especially grade 7 - Some of the VGA cables inside the classroom are malfunctioning (Lack of Regular Maintenance Services of Equipment and Facilities) - Limited number of equipment (Insufficient Equipment and Facilities) - There are some VGA cables (inside the classroom) that are not working properly (Lack of Regular Maintenance Services of Equipment and Facilities) - Some of the remote controls for TV are not available (Lack of Regular Maintenance Services of Equipment and Facilities) - Internet connection (slow internet connection) - Internet speed (slow internet connection) - Availability of software (licensed, online/offline) (upgrading of technological software and equipment) - Limited number of equipment / facilities (Insufficient Equipment and Facilities) - Lack of effective training (new trends in technology) (Inadequate Faculty Training and Updating on Technology and Pedagogy) - Lack of time (schedule in GENYO) (Insufficient Equipment and Facilities)
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CURRICULUM VITAE

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Elementary Education

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Secondary Education

Our Lady of Guadalupe Minor Seminary 1982-1986
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College

Bachelor of Arts major in Classical Philosophy 1986-1990
San Carlos Seminary
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Graduate Studies

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Master of Arts in Education major in Guidance and Counseling
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WORK EXPERIENCE

Don Bosco Technical Institute, Chino Roces Ave., Makati City

Teacher-Secretary, Office of the Principal 1990 – 1998

Teacher, Christian Living and Class Adviser (HS) 1998 – 2003

Acting Subject Area Head, Christian Living (HS) 2002 – 2003

Subject Area Head, Christian Living (HS) 2003 – 2010

Head, Multiple Intelligences Center (Library) 2010 – 2015

Subject Area Head, Christian Living (HS) 2015 – present