"ROOMLESS TEACHERS: IMPLICATIONS FOR

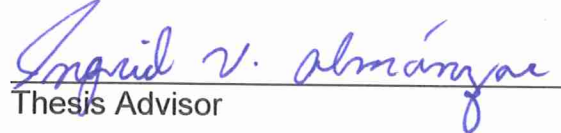TECHNOLOGY IMPLEMENTATION IN THE ENGLISH CLASSROOM"

THESIS AS PARTIAL REQUIREMENTS FOR MASTER'S DEGREE IN

EDUCATION WITH A MAJOR IN INSTRUCTIONAL DESIGN AND

EDUCATIONAL TECHNOLOGY, AND A MINOR IN THE TEACHING OF

ENGLISH AS A SECOND LANGUAGE.

VILMARIE LUGO REYES
MAY, 2008

THESIS APPROVAL PAGE

I hereby certify that I have read this study and in my opinion, it meets the acceptable canons of an academic dissertation and it is completely adequate in its purpose and quality, as a thesis for master's degree in education with a major in instructional design and educational technology, and a minor in the teaching of English as a second language.
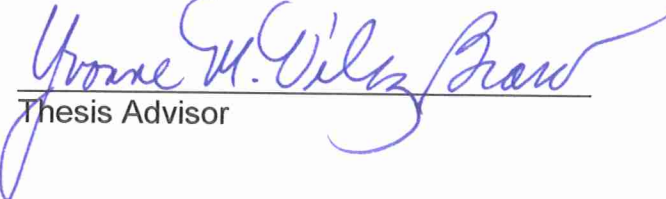
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Dedication

This work is in honor of my Creator. You guided me every step of the way, giving me strength to continue through this journey. You raised me whenever I fell and provided me the tools to keep going on…

To my son, you are my inspiration. Every time I look into your eyes I get stronger, I become a better person. I want to construct a better tomorrow, so I can teach you how to construct with me, beside me….and then see how you construct something even better, making your own future, walking you own path…all the time I sacrificed, missing you…was worth it. This work is for you…

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Abstract

The advances in today's modern world have influenced the educational field, changing its purpose, scope and approaches. Combinations of essential conditions are required to create learning environments conducive to powerful uses of technology, including: educators' skills, content standards and curriculum resources, equipment, funds, maintenance and repair funds, infrastructures, assessments of the effectiveness of technology use for learning among many others. Curriculum integration with the use of technology involves the infusion of technology as a tool to enhance learning in a content area. Technology enables students to learn in ways not previously possible.

The Elementary School English teachers face a difficult situation when they have to travel from classroom to classroom to teach the class. In order to refer to this situation, the researcher created the term roomless teachers. Many schools are multilevel with no elevators available. Some others are complex structures with various multilevel buildings. The purpose of this study was to explore the level of technology implementation of elementary English teachers, in a large urban city of Puerto Rico. It also intended to investigate if there was a difference in technology implementation between roomless teachers and teachers with permanent classrooms, through the use of descriptive statistics with a cross sectional research design.

The sample consisted of 13 roomless and 11 permanent classroom elementary English teachers of a school district of a large urban city. An

adaptation of the Levels of Technology Implementation Survey (LoTi) was the instrument used to conduct this study.

The findings of this study reveal that the majority of the participants did not have a technology resource room in their schools. A great number of participants (16) rated their school' infrastructure as in need of improvement and eight rated it as poor. Over 80 % of the participants considered themselves to be proficient with technological tools and software. Another important finding was regarding the use of current technologies in the classroom as active tools for students to engage in their own learning, a considerable number of participants (75 %) answered; somewhat true of me now and very true of me now.

The analysis performed by Learning Quest, Inc. to determine levels of technology implementation and the levels of personal computer use revealed that there was no difference between the roomless and the permanent classroom teachers regarding their level of technology implementation. However some differences were determined on the levels of personal computer use. Based on the results, the LoTi level of all the participants was level 0, which means Nonuse: Nonuse implies there is a perceived lack of access to technology-based tools (e.g., computers) or a lack of time to pursue electronic technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector).

Based on these results, the researcher recommends the further in-depth research should be conducted around the island to properly assess the individual

and particular needs of every learning community, in terms of professional development, infrastructure, equipment and technological resources.

"Roomless Teachers: Implications for

Technology Implementation in the English Classroom"

CHAPTER I

INTRODUCTION

Technology advances are revolutionizing today's everyday life to its most simple element. The advances in today's modern world have influenced the educational field, changing its purpose, scope and approaches. Educational technology has become an essential component in this digital era. In order to implement changes that will fulfill the societies technological needs, the Puerto Rico Department of Education has identified two technology oriented goals in their Curricular Framework for the English Program Document. This action denotes the apparent importance this institution is conferring to the educational technology field.

The goals as stated in the Curricular Framework for the English Program Document (Department of Education of Puerto Rico, 2003) are:

"Prepare students to access, organize, and evaluate information obtained through technological or electronic means for the development of listening, reading and writing skills" p. 13

"Provide opportunities for student participation in a variety of social and interactive scenarios" p. 13

The Curricular framework also establishes the Constructivist approach as the official approach to use in the English class. It also states that the curriculum should include the following aspects of technology; computation; network; access, effective use of equipment; set of rules and regulations; educational application; configure; cybernetics; distance learning; integration; internet. But in reality there are many aspects in which the integration of the use of technology has been limited.

Certain conditions are necessary for schools to effectively integrate educational technology for learning, teaching and educational management. Combinations of essential conditions are required to create learning environments conducive to powerful uses of technology, including: educators' skills, content standards and curriculum resources, equipment, funds, maintenance and repair funds, infrastructures, assessments of the effectiveness of technology use for learning among many others.

Curriculum integration with the use of technology involves the infusion of technology as a tool to enhance learning in a content area. Technology enables students to learn in ways not previously possible. Giving them access to information to gather data, visual documentation in an interactive manner, the possibility of immediate revision and correction, immediate feedback, provide learning beyond drill and practice, and it can address various learning styles as well as help build learning strategies. Curriculum integration with the use of technology provides the learners with the opportunity to become familiar with technology that they will encounter in their daily lives.

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The *Standards for the English Language Arts* of the National Council of Teachers of English (NCTE, 1996) and the International Reading Association (IRA), emphasizes the importance of technology as a "tool in learning, opening worlds to students, making available tremendous assortment of information, ideas, and images, providing new motivations and allowing students to assume greater responsibility in their own learning" p. 28

One challenge that the Department of Education of Puerto Rico faces is to empower students to function effectively in a society in constant change and deeply influenced by information growth and evolving technology. To keep up with students' interests, to be as equal as what the students are exposed in their respective lives and to fulfill the requirements of an increasingly technological society in an information-based world, educational technology has become an essential tool for the education system. Educational technology as a learning tool can increase opportunities for students, increasing their interest and improving their learning processes. The International Society for Technology in Education (ISTE) (2000) defines technology curriculum integration as follows:

> Curriculum integration with the use of technology involves the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting. Technology enables students to learn in ways not previously possible. Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions—as accessible as all other classroom tools. ¶ 3.

Statement of the Problem

According to the internet site tendenciaspr.com, a project supported by the University of Puerto Rico, students enrolled in the public schools system are estimated to be 575,993 and in 2005 there were 1,523 schools with 43,054 teachers. Most of the English teachers of kindergarten through third grade are roomless. This is a situation generally found in most of the Puerto Rican elementary schools, since historically public schools have encountered serious problems with classroom space limitations. Roomless teachers must overcome the infrastructure, time, and equipment limitations in order to effectively integrate technology in the curriculum. This is a great disadvantage in order to achieve the Department of Education Of Puerto Rico goals stated in the Grade Level Expectations Document. Roomless teachers are required to achieve these goals facing different circumstances and great limitations in comparison with teachers that have a permanent classroom.

In Puerto Rico, pedagogically English is in fact not a second language, it is a foreign language. English must be as relevant and important as any other subject taught in the public schools. It may even need to be considered more important than other subject areas, since it is the international language in which the majority of textbooks, digital, business and entertainment industries are managed. Not assigning a permanent classroom to the English teachers can send a negative message to students, parents and even coworkers. Foreign language teaching needs a great variety of materials, innovative approaches and ground-breaking methods that require a permanent space. Teachers can prepare

beforehand the activities to be carried out during the class without having the limitations of carrying materials from classroom to classroom, facing last minute infrastructure problems and limitations and time consumption while preparing the environment in every classroom. For the roomless teachers, the integration of technology has greater limitations and the disadvantages are significantly increased.

Another important issue needed to be addressed is the infrastructure of the school' buildings. Many schools are multilevel with no elevators available. Some others are complex structures with various multilevel buildings. These types of schools make the roomless teachers work extremely hard, undergoing circumstances such as weather, materials carriage and time schedules.

Purpose of the Study

The purpose of this study is to explore the level of technology implementation of elementary English teachers, in a school district of a large urban city of Puerto Rico. It also intends to investigate if there is a difference in technology implementation between roomless English teachers and English teachers with permanent classrooms. The study was conducted through the use of a survey that provided quantitative data.

Justification of the Study

Teachers are required to achieve the Puerto Rico's Department of Education goals stated in the Grade Level Expectations Document. This requirement does not ponder the specific circumstances of each individual teacher and the conditions surrounding the educational environment. Roomless teachers have many limitations that may harm their opportunity to implement technology, that teachers with a permanent classroom do not have. To create suitable technology oriented learning environments, the process of implementing technology must flow naturally. Technology should not be seen as an extracurricular device or as a new cool tool to teach. Okojie, Loinzock and Okojie-Boulder (2006) state the following "It should be noted that technology, which is used to facilitate learning, is part of the instructional process and not an appendage to be attached at any convenient stage during the course of instruction." p. 2.

Another important rationale for conducting this study is the shortage or lack of information and lack of studies exploring the roomless teacher situation. This research may provide a foundation for future studies. The findings should create awareness of the plight of the roomless English teachers, their limitations, difficulties and work circumstances within the educational community and the Puerto Rican Department of Education.

Research Questions

These are the research questions of this study:

1) What is the technology implementation level of Elementary English School teachers with permanent classrooms in a school district of a large urban city of Puerto Rico?

2) What is the technology implementation level of roomless English teachers?

3) What factors influence the teacher's level of technology implementation?

4) Is there is a difference in technology implementation between a roomless elementary English teacher and one that has a permanent classroom.

Definitions of terms

The following terms will be used for the purposes of this study.

Conceptual definitions

Roomless Teachers

For the purposes of this study the researcher used this term in order to refer to teachers who do not have a permanent classroom during a school year and have to travel from classroom to classroom to give the English class. The following terms have been used in the literature for this phenomenon; floating,

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traveler and itinerant. The researcher chose not to use any of these terms due to the uncertainty and changes in meaning from one place to another.

Permanent Classroom

Refers to a specific classroom assigned to a specific teacher for an entire school year. The use of this classroom is mainly limited to the activities and classes of a specific teacher.

Technology

For the purpose of this study, technology is defined as equipment such as but not limited to; computers, data projectors, overhead projectors, electronic board, television, Digital Video Disk, radio, internet, printers, scanners, cameras and software.

Operation Definition

Technology Implementation

Technology implementation will be defined as a score on the Levels of Technology Implementation Survey instrument (LoTi).

Delimitations of the Study

The study was conducted only in one school district of a large urban city of Puerto Rico; therefore the results cannot be generalized to other school districts, unless the conditions are the same as this school district. Another limitation of this study may be the social desirability factor which is the tendency to respond in

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a socially desirable manner to attitudinal questionnaires. Participants may give

the responses that they think are expected from them by the researcher.

CHAPTER II

Review of Literature

This chapter reviews the important information, theoretical background and previous studies which support the integration of technology to the curriculum. Due to the absence of previous research and even an appropriate term to describe the situation of the teachers that do not have a permanent assigned room during the school year, information related to this important situation will be explored during the present study.

Problem

The constant changes in the modern world have caused inevitable influences in the educational field. Today's educational needs are based on a fast pace technological society in which the access to information is relative in real time and where communication can be synchronous throughout the world. Learners demand the use of technological tools that reflect their everyday lifestyle. It is almost impossible to find a home with no TV, DVD or electronic games. Everywhere, in every simple chore there is the influence of technology, and students are well aware of that fact. They are eager and even excited to be exposed to technology in their classrooms. According to Okojie (2006) teachers should develop strategies to motivate students to keep them focused as the instruction progresses and to consider that different students prefer different learning styles and that they learn at different rates.

Historical Background

The use of instructional technology has evolved over the last two decades. Initially, instructional technology had two uses: learning about computers and using computers to increase basic skills. Learning about computers morphed into computer literacy, which is typically defined as the history, terminology and background of computing, using computing tools, programming, as well as ethical and social uses of computing. However multiple definitions for educational technology can be found in the literature. For example:

> …concerned with improving the effectiveness and efficiency of learning in educational contexts, regardless of the nature or substance of that learning….Solutions to instructional problems might entail social as well as machine technologies. (Cassidy, 1982, p. 1)

> The systemic and systematic application of strategies and techniques derived from behavioral and physical sciences concepts and other knowledge to the solution of instructional problems. (Gentry, 1995, p. 7)

> …the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard…[as well as]…a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communications, and employing a combination of human and nonhuman resources to bring about more effective instructions. (Commission on Instructional Technology, 1970, p. 19)

> …the application of our scientific knowledge about human learning to the practical tasks of teaching and learning. (Heinich *et al.*, 1993, p. 16)

The advantages of using new technology in language classrooms can be interpreted in light of the changing goals of language education and the shifting conditions in our postindustrial society (Warschauer &Meskill, 2000). So while we

taught foreign language students to write essays and read magazines a generation ago, we must now teach them to write e-mail and conduct online research. Thus, integrating technology into language classrooms is inevitable. A nationwide survey of teachers and superintendents commissioned by Jostens Learning Corporation (1997) indicated that the computer revolution has had a tremendous impact in the classroom. A variety of other surveys (Bosch, 1993; Niess, 1991; Trotter, 1997) cited in The Integration of Instructional Technology into Public Education: Promises and Challenges (Earle, R., 2002), while reporting strong computer usage by teachers, actually indicated a lack of integrated use with the curriculum.

Technology integration in foreign language teaching demonstrates the shift in educational paradigms from a behavioral to a constructivist learning approach. Language is a living thing, so the best way to learn a language is in interactive, authentic environments. Computer technologies and the Internet are powerful tools for assisting these approaches to language teaching.

Educational Technology started many years ago but it has been in the last 20 years that implementation of technology for an educational purpose has become a real revolution. The beginning of the use of technology for educational purposes started with Pressey, S. in 1927, and then LaZerte, M.E., developed a set of instructional devices for teaching and learning in 1929. For example, he developed several devices and methods to minimize instructor involvement and to increase the likelihood of gathering data in a consistent manner. One mechanical device that he developed was the "problem cylinder" which could

present a problem to a student and check whether the steps to a solution given by the student were correct. Another important innovation on the technology field was the development of the memex on 1945 by, Bush. V. The memex was a device that not only offered linked information to a user, but was also a tool for establishing the links. The technology used would have been a combination of electromechanical controls and microfilm cameras and readers, all integrated into a large desk. Most of the microfilm library would have been contained within the desk, but the user could add or remove microfilm reels at will.

B.F. Skinner developed programmed instruction and an updated teaching machine on 1953 to 1956. But, it was Programmed Logic for Automated Teaching Operations (PLATO) the first generalized computer assisted instruction systems, first widely used starting in the early 1970s. PLATO was originally built by the University of Illinois and ran for many years, both for in-university coursework as well as being remotely accessed by local schools.

A very important innovation was the invention of the Advanced Research Projects Agency Network (ARPANET) by the United States Department of Defense on 1969. This was the first step to what we know today as Internet. Digitized communication and networking in education started in the middle of 1980s and became popular by the 1990's, in particular through the World-Wide Web (WWW), email and Forums. There is a difference between two major forms of online learning. The earlier type, based on either Computer Based Training (CBT) or Computer-based learning (CBL), focused on the interaction between

the student and computer drills plus tutorials on one hand or micro-worlds and simulations on the other.

In the article School and reform in the information age by *Education Week* (1999), some interesting facts about the state of affairs of computer technology in public education in the United States are revealed:

> "The dividends that educators can expect from this…unprecedented support for school technology…are not yet clear….There is no guarantee that technology improves student achievement." (Trotter, 1997, cited in School and reform in the information age, 1999 p. 6)

> 43% of respondents in a survey felt that the introduction of computers into public schools was not happening fast enough. (Trotter, 1997, cited in School and reform in the information age, 1999 p. 7)

> Despite the lack of research evidence, 74% of the public and 93% of educators agreed that computers had indeed improved the quality of education, teaching, and learning. (Trotter, 1997, cited in School and reform in the information age, 1999 p. 8)

> Research on the effects of technology on student   achievement offers mixed results. (Viadero, 1997, cited in School and reform in the information age, 1999 p.12)

> Money spent on school technology is wasted without an equal effort to help teachers with its use and integration into the curriculum. (Zehr, 1997, cited in School and reform in the information age, 1999 p. 24)

> "Around the nation teachers are using technology to create exciting and creative learning environments where students teach and learn from each other, solve problems, and collaborate on projects that put learning in a real-world context" (*GLEF Blast Newsletter*, 2001, cited in School and reform in the information age, 1999 p. 1)

Since the development of revolutionary technologies, the government has endorsed and created agencies to promote the implementation of the existing technologies and the creation of new ones. One example is the legislation High

Performance Computing Act of 1991, which requires participating agencies to support the establishment of the National Research and Education Network, to link research and educational institutions, government, and industry in every State. The National Research and Education Network (NREN) is a specialized internet service provider dedicated to supporting the needs of the research and education communities within a country. Another example is The Center for Implementing Technology in Education (CITEd, n.d), a technical assistance center funded by the U.S. Department of Education, Office of Special Education Programs, is a cooperative effort of the American Institutes for Research (AIR), the Center for Applied Special Technology (CAST), and the Education Development Center (EDC). CITEd supports leadership at state and local education agencies to integrate instructional technology for all students to achieve high educational standards. ¶ 1.

As an example of this requirement; in Puerto Rico the Department of Education implemented the SMART Board™ interactive whiteboards - with more than 100 participating sites and 1,640 teachers nationwide as a pilot project for the integration of technology. The installation is part of the Distance Learning Satellite Network, a high-tech pilot project to improve K-12 education throughout the commonwealth of Puerto Rico. As Knowlton (SMART Media, 2005), SMART's president says "With this pilot project, the Puerto Rican Department of Education has made a serious commitment to engaging students with integrated classroom technology and providing a unified professional development program to enhance teacher training,".¶ 4.

The Puerto Rico's Department of Education has four major current projects to support and encourage the implementation of technology. Multimedia: an Educational Perspective is offered to provide teachers' support; training and visits of monitoring during the establishment of the project, at present 100 schools of the upper and intermediate level are benefited, participating approximately 14,000 students. Another projects is also named Center of Technological Innovations for the Teaching (CITeD, n.d. ¶ 1). It has the responsibility to support, to promote and to develop different activities directed to facilitate the access and effective integration of the technology to the classroom in each school district. These centers are dynamic and of vanguard in the technological changes and in the communications.

Educational television is also another project which provides an alternative for the distance education. The objectives of these projects are to divulge and to inform all the school community of the federal laws and technology projects of and its impacts on the system. To instruct teachers and to the school community in the area of the integration of the technology to the classroom and to promote and to initiate strategies to establish the foundations for a culture of distance education in each school district and through ten (10) pilot schools. This project counts on a digital satellite network that will be the base of the communication among the school districts, schools, and the Centers of Innovations and Educational Technology (CITeD).

In Puerto Rico the implementation of technology has been gradual and very slow-paced, the situation for roomless teachers is even more complicated

and problematic. The purpose of this research study is to explore the level of technology implementation among English teachers with permanent classrooms and those that are roomless. The roomless teachers' phenomenon had been a historical and traditional one to the extent that being an elementary level English teacher and having a permanent classroom is not very common. This phenomenon is mostly observed on the lower elementary level were students spent all day long in the same classroom in which they receive all subjects. Traditionally issues of student's immaturity and security have been the rational for self contained classrooms in the lower elementary level (k-3).

Conceptual Framework

According to Bruner (1966), the essence of teaching and learning is to help learners acquire knowledge and use the knowledge they have acquired to create other knowledge, technology integration can be described as a process of using existing tools, equipment and materials, including the use of electronic media, for the purpose of enhancing learning. It involves managing and coordinating available instructional aides and resources in order to facilitate learning. It also involves the selection of suitable technology based on the learning needs of students as well as the ability of teachers to adapt such technology to fit specific learning activities.

It requires teachers to use appropriate technology to present and evaluate instruction as well as use relevant technology for follow-up learning activities.

Cummins (2000) states that "information technology has considerable potential to promote language learning in a transformative way when it is aligned with pedagogy oriented towards promoting collaborative relations of power in the classroom and beyond"(p.539).

Technology should not be treated as a separate entity but should be considered as an integral part of instructional process. In teaching and learning, technology should be applied as a process rather than as a single, isolated and discrete activity. Technology implementation not only involves the inclusion of technical artifacts per se, but also includes theories about technology integration and the application of research findings to promote teaching/learning. Part of the importance of integrating technology into the learning process, is to make the classroom environment and activities as real as the students' daily experiences outside school.

The notion that students can learn better with computers is based on the belief that a relationship exists between technology and knowledge. However, this relationship is frequently misunderstood. Technology, by one definition, is an embodiment of knowledge (Saettler, 1990) and, significantly, we also use a wide range of technologies in our pursuit of knowledge (Clark, 1997). Recognizing and understanding the relationship between technology and learning, from the pencil to the computer, should help us improve our educational system.

The purpose of educational technology is not to make learning processes easier, but rather to make learning more effective, pertinent and powerful. The

reasons behind the integration of technology into the curriculum are not solely about computers; they are also about educational improvement. Technology implementation enables learners to explore, expand, and to enhance their own capabilities to create their own knowledge. According to Jonassen, (1996) and Hannafin, (2000), instead of using technology to deliver educational materials, the goal should be to develop learning environments in which students more effectively generate knowledge using the technology. Technology integration is having the curriculum drive technology usage, not having technology drive the curriculum.

A few but important reasons for integrating technology are that students live in the information age, there is an intrinsic need to learn technology, students are motivated by technology, thus increasing academic engagement time, while working in more depth with the content. Students are able to move beyond knowledge and comprehension to application and analysis of information; they learn where to find information in an information rich world. Students also learn computer skills which should not be taught in isolation. Technology also helps students to develop computer literacy by applying various computer skills as part of the learning process. Technology has also created a great way to communicate with people in different cultures. For instance, the Internet offers a worldwide learning environment that makes distance communication fast and affordable. By using the Internet, cross-cultural cooperative groups can be built up.

According to the National Educational Technology Standards for Students (ISTE, 2007):

"Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions- - accessible as all other classroom tools."(p.6).

In the Elementary School Practice position paper published by The National Council of Teachers of English (NCTE,1993) it is stated that children learn best when they are working on meaningful projects. When students are actively involved in experiments or explorations on a range of topics that interest them, when they can share their new ideas with others, and when they can take control of and reflect upon their own learning. Technology opens great opportunities to accomplish the standards of English and language arts.

To many students, technology is motivational and nonjudgmental. It gives them prompt feedback, individualizes their learning, and tailors the instructional sequence. Technology can meet specific student needs, increase their autonomy, allow for more responsibility, promote equal opportunities in an early nonsexist environment, encourage student cooperation with peers, and encourage them to make decisions (Burgess & Trinidad, 1997). Mehlinger (1995), believes that technology can support learner-centered instruction as practice which can develop students motivation and engagement on tasks.

The educational system should include a curriculum where technology use is determined by its capability to support learning. In such an environment technology would be used as an active part of the classroom; where technology

is not a special event, but rather as a normal part of the classroom and curriculum. Ertmer (2000) addresses technology integration and identifies two sets of obstacles in education. They are first order obstacles, which include problems involving hardware, access, and technical support; and second order obstacles, such as changes in pedagogy, or personal preferences that influence an individual's acceptance of new ideas. Based on Ertmer's definitions of technology implementation obstacles, the variable classroom is aligned with the first order of obstacles.

Learning mediated by digital technologies and supported by best practices, means academic, linguistic, and cultural success to students from diverse backgrounds. For elementary ESL students, using technology to engage in actual activity may lead to improved language skills by increasing their vocabulary and in a more in-depth level students can share their feelings.

According to Haugland (2000), primary-aged children need opportunities to make choices, but also need directed activities with technology. Haugland also states, "The potential gains for kindergarten and primary children are tremendous, including improved motor skills, enhanced mathematical thinking, increased creativity, higher scores on tests of critical thinking and problem solving..." ¶ 9. "Technology can be a catalyst for improving student achievement and impacting the types of activities that teachers use in their classrooms" (Isernhagen, 1999) ¶ 5. Technology provides a tool to increase a child's self-esteem and relations with other children. The student, when using technology,

also has power to develop their imagination throughout the many available computer programs.

The importance of meeting the requirements of the No Child Left Behind (NCLB) act the Department of Education of Puerto Rico has to demonstrate adequate yearly progress. Each state has developed and implemented measurements for determining whether its schools and local educational agencies (LEAs) are making adequate yearly progress (AYP). AYP is an individual state's measure of progress toward the goal of 100 %of students achieving to state academic standards in at least reading/language arts and math. It sets the minimum level of proficiency that the state, its school districts, and schools must achieve each year on annual tests and related academic indicators. In Puerto Rico the Pruebas Puertorriqueñas de Aprovechamiento Académico is the instrument used to determine the AYP of the students in our schools. So far this instrument focuses on the content material of the core subjects and includes just a few questions regarding technology as equipment. In the elementary level minimal questions are included in terms about the uses of technology for educational purposes and or everyday life tasks.

The NCLB law includes funding for technology integration under part D, titled Enhancing Education through Technology (NCLB, 2001. ¶ 1). This part of the law specifies the purposes and goals, the definitions and the Authorization of Appropriations. Some of these purposes are:

>   (1) To provide assistance to States and localities for the implementation and support of a comprehensive system that

effectively uses technology in elementary schools and secondary schools to improve student academic achievement.

(2) To encourage the establishment or expansion of initiatives, including initiatives involving public-private partnerships, designed to increase access to technology, particularly in schools served by high-need local educational agencies.

(3) To assist States and localities in the acquisition, development, interconnection, implementation, improvement, and maintenance of an effective educational technology infrastructure in a manner that expands access to technology for students (particularly for disadvantaged students) and teachers.

(4) To promote initiatives that provide school teachers, principals, and administrators with the capacity to integrate technology effectively into curricula and instruction that are aligned with challenging State academic content and student academic achievement standards, through such means as high-quality professional development programs.

(5) To enhance the ongoing professional development of teachers, principals, and administrators by providing constant access to training and updated research in teaching and learning through electronic means.

(6) To support the development and utilization of electronic networks and other innovative methods, such as distance learning, of delivering specialized or rigorous academic courses and curricula for students in areas that would not otherwise have access to such courses and curricula, particularly in geographically isolated regions.

(7) To support the rigorous evaluation of programs funded under this part, particularly regarding the impact of such programs on student academic achievement, and ensure that timely information on the results of such evaluations is widely accessible through electronic means.

(8) To support local efforts using technology to promote parent and family involvement in education and communication among students, parents, teachers, principals, and administrators. ¶ 1.

The primary goal of this part is to improve student academic achievement through the use of technology in elementary schools and secondary schools. It also establishes as a goal to assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability. The final goal stated in the act is to encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices by State educational agencies and local educational agencies.

The NCLB act also establishes The Office of Educational Technology (OET) which is responsible for coordinating the development and implementation of the Department's educational technology policies, research projects and national technology summits. The Office's main goal is to maximize technology's contributions to improving education through developing national educational technology policy and implementing policy department-wide, to support the goals of No Child Left Behind.

In 2005 OET produced the publication The National Education Technology Plan, which provides a summary of the challenges in schools, the importance of technology, current student attitudes regarding technology and recommendations for meeting the challenges of No Child Left Behind through technology.

The Puerto Rico Department of Education created an educational technology standards document based on the ISTE standards and its components for students, teachers and administrators. The mission of this document is to guarantee the effective integration of technology in every learning community in order to benefit all the students. The document seeks to create conscience regarding the educational theories sustaining the integration of educational technology to the curriculum, to promote the use of educational technology as powerful tools to improve learning and achievement and to create and promote new projects implementing educational technology.

Another purpose of this document is to facilitate a transformation of the educational methodologies, which can stimulate whole life learners and citizens through the effective implementation of educational technology into the classrooms.

Previous Research Technology Implementation

There is no previous research in Puerto Rico on teachers' technology implementation with the mediating variable of not having a permanent classroom as main variable. Previous research has focused on technology use on specific schools or districts, effectiveness of software and or devices and implications of technology use in student's achievement and motivation.

In a study conducted by Serra (2005). Exploring the Accessibility and use of Computers in the ESL Classroom in Two Schools in Vega Alta, Puerto Rico it

was found that there was a lack of computers in the ESL classrooms. Another finding of that study was that in classrooms that did have computers, were not used at their fullest potential. The researcher concludes that based on her finding there were no interaction between students and computers in the two schools that participated in the study. In the same study it was found that 75% of the students had a computer at home and the 25 % of those had access to the internet. In order to provide meaningful and pertinent activities for students, computers must be included as part of their learning processes. These findings reveal valuable information regarding the integration of technology in schools.

In another study carried out by Perez (2005), Reflections on the Use of the Internet in the ESL Classroom in the Secondary Level, the researcher found that a management guide for integrating technology would be of great value for teachers. Perez also states that teachers are in need of training and encouragement to integrate technology into their classroom. This is an aspect that should be thoroughly explored. It is of extreme importance to determine the needs of teachers and schools in order to provide the appropriate equipments and services to comply with the requirements of the NCLB Act.

In the study "The effectiveness of the English Discovers Software Program on the development of reading comprehension skills of 8th grade ESL students" conducted by Betancourt, R. (2005) the researcher presents a as part of her conclusions that computer assisted instruction can be a "valuable tool in teaching language" and the "it provide students to learn at their own pace". These conclusions concurred with the constructivism theory in which students learn by

doing at their own pace. The importance of computers in the classroom is that it can serve as a tool for above the level and below the level learners. It can provide these students with experiences that will foster their individual needs while the teacher can concentrate in reaching or helping other students' needs. The variable classroom is crucial in this matter since the roomless teachers have to use whatever hardware and software is available and functional in the classrooms they provide their courses.

In another study conducted by Vélez (2006) The Effect of Several High Impact Technologies in the Learning of English as Second Language In Students of Fifth and Sixth Degree in The Elementary School, the findings reveal students perceptions and attitudes towards the integration of technology. Their affective filter was low and students' behavior was determined to be better when technology was integrated in the English class. It is also stated that students were positively motivated to learn when technology was used in the class. According to Cortés (2005), in her study; Video Segments and computers software: technological tools for the improvement of ESL third grade student's reading comprehensive skills; "well planned technology-oriented lessons may be extremely advantageous to students in this technological era". It is important to determine if roomless teachers have access to implement technology at the same level as permanent classroom teachers. The possibility that not having an assigned permanent classroom, were the integration of technology may be feasible, may affect students' motivation, affective filter and even their behavior

can have a serious implications on students' learning and therefore counteract with the requirements of the NCLB Act requirements.

The study Teachers' tools for the 21st Century: a Report on teachers' use of technology, conducted by Dockstader et al (1999) forThe National Center for Education Statistics (NCES) consisted of a short survey with public school teachers in 1999 that included items on teachers' use of computers and the Internet. Findings of the study indicate that about half of the teachers with computers available in their schools used them for classroom instruction. Teachers' use of technology was related to their training and preparation and work environments. Teachers were more likely to use these technologies when the technologies were available to them, available in their classrooms as opposed to computer labs, and available in great numbers. Teachers who reported feeling better prepared were more likely to use these technologies than their less prepared colleagues. Teachers who spent more time in professional development reported feeling better prepared than their colleagues. Teachers who perceived that lacking computers and time for students to use computers as great barriers were less likely than their colleagues to assign students to use computers or the Internet for some instructional activities.

NCES found that 99% of teachers have computers somewhere in the school but not available to them. Eighty four percent have at least one computer in their classroom, 82% have a computer at home. According NCES the study carried out during the years 2000-2001, 57% of teachers in public schools in the

United States said they had sufficient computers available, 25% of all teachers strongly agreed that this was the case, however 35% of the teaches disagreed with this and another 15% strongly disagreed. Of the K-6 teachers concerning the same question, 58% agreed, 7% didn't agree, and 35% strongly disagreed. The purpose of this study is to explore Puerto Rico's current situation regarding these aspects.

It's one of the researcher's goals to highlight the importance of having a permanent classroom, the implications and influences on the daily learning activities taking place in Puerto Rican schools.

CHAPTER III

Methodology

This chapter will explain the research design. The population and sample of teachers who were surveyed are presented. A discussion of the instruments, the data collection process, the data analysis is provided and the procedures used to carry out the study.

As stated in chapter one, the purpose of this study is to explore the level of technology implementation of English teachers in the elementary schools of A school district of a large urban city of Puerto Rico. Information was gathered among English teachers who have a permanent classroom and those who do not have a permanent classroom, known as roomless teachers. The teachers' level of technology implementation was explored.

The No Child Left Behind Act (2002) states specific statutory provisions regarding how research is to be conducted and, to some extent, what is to be studied in that research. Within these statutory provisions one major goal of the United States Department of Education is to identify and disseminate conclusive information about "what works" in education. Through this mandate, the United States Department of Education wants to identify the instructional input that highly qualified teachers will provide to students in order to improve student outcomes in academic achievement and language proficiency.

The statutory provisions describe "scientifically-based research" as that which,

    (i) at minimum, employs systematic, empirical methods;

    (ii) involves rigorous data analyses that, when relevant to the line of inquiry or purpose of the investigation, are adequate to test a stated hypothesis and to justify general conclusions drawn;

    (iii) relies on measurements or observational methods that provide reliable and valid data from the investigators and observers involved in the study, and provides reliable and valid data from multiple measurements used, and observations made in the study; and

    (iv) uses every opportunity to conduct experimental or quasi-experimental designs in which individuals, entities, programs, or activities are assigned to different conditions and with appropriate controls to evaluate the effects of the condition of interest. ¶ 4

These descriptions provide guidelines to do research in the educational field. The research design used on this study complies with these descriptions and seeks to answer the research questions that may provide information to the Puerto Rico Department of Education. The data gathered provides information about the current technology implementation processes and if they are meeting the requirements of the NCLB Act.

Research Design

This is a quantitative descriptive study using a cross sectional survey research design. According to Fraenkel & Wallen (1996) a descriptive study describes a given state of affairs as fully and carefully as possible. Descriptive research is used to answer the question "What is happening now?" Rather than

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trying to determine differences between groups, or whether one educational method is more successful than another, this type of research collects information about the current status of events, and creates a report without doing any statistical analyses. Cross-sectional survey is a "survey in which data is collected at one point in time from a predetermined population" (Fraenkel & Wallen, 1996 p. 581). The researcher gathered the participants' characteristics and preferences with reference to technology implementation through the use of the LoTi, a survey designed by Moersch (1994) to accurately measure authentic classroom technology use.

Variables

Variable refers to a property of members of a group that differ from one another. This study focuses on two variables, the first is the variable classroom and the second variable is level of technology implementation. The variable classroom has two strands, teachers with permanent classrooms and roomless teachers. It is important to differentiate the sample of these two strands since one of the purposes of this study is to explore whether having a permanent classroom or not having one affects technology implementation.

Context and Sample Description and Selection

The population refers to all possible people or classrooms who could be involved in the study. The sample refers to members of the population who are selected to take part in the study. How the sample is selected is important for determining an appropriate method for analyzing the data and for the generalizations that can be made based on the study. It is rarely possible to include an entire population in a study, regardless of how narrowly it is defined. Therefore the researcher must select a sample from the population is similar so one can generalize the information back to the population.

This study was conducted in a school district of a large urban city of Puerto Rico. The participants are English teachers of public elementary schools in that school district. There are 12 elementary schools within the district, with approximately 50 English teachers. The researcher wanted to include all the teachers, but only the ones who voluntary accepted to participate in the study constituted the sample. The elementary English teachers were chosen for this study since the roomless phenomenon is particular to that level. The majority of the students of this district are from low income families, who may not have access to certain technologies such as computers and Internet. Within this district almost every school is developing an improvement plan to achieve the goals of the No Child Left Behind-Act.

Demographic findings of the survey categorize the sample into two groups of participants 13 roomless and 11 permanent classroom teachers. (see Figure 1).

Figure 1.   Sample Demographics
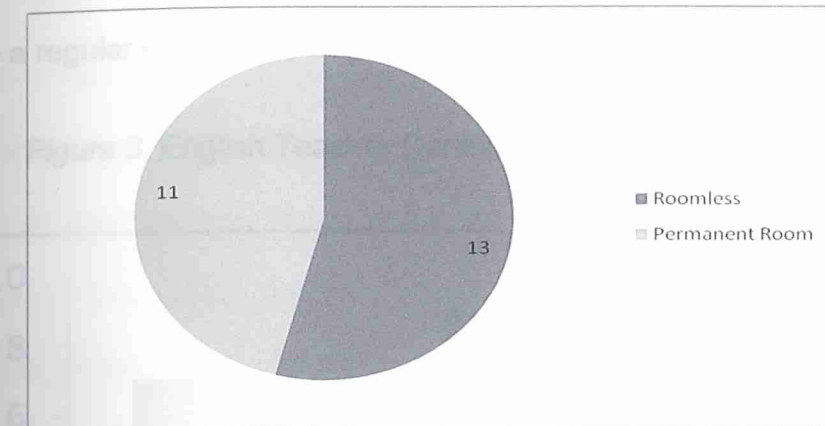
The demographics findings of the participating sample in terms of years of teaching experience are as follows: (See figure 2).

Figure 2. Years of Teaching Experience
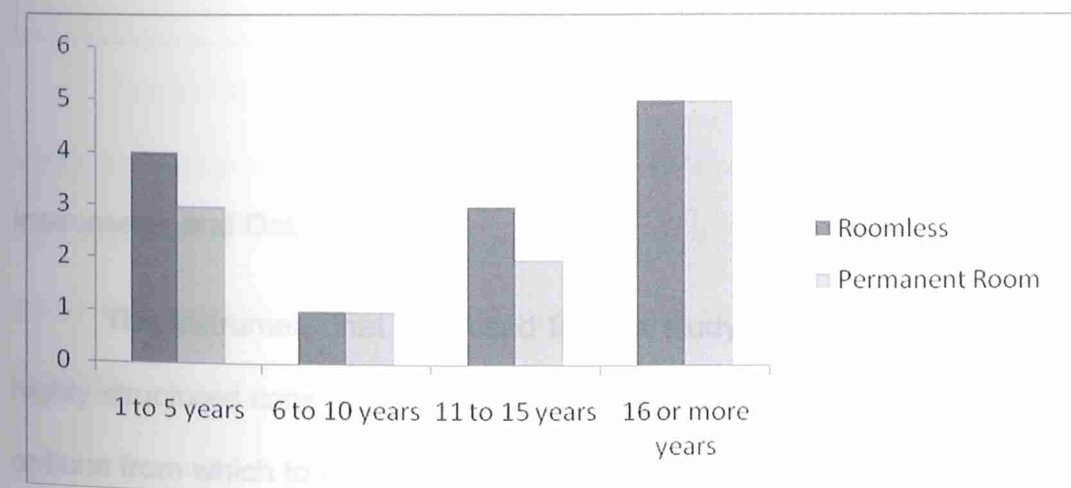
Item number two of the survey, asked if the teachers were certified by the Puerto Rico Department of Education as Elementary English Teachers. Seven (54%) of the roomless teachers and nine (82%) of the permanent classroom teachers have a regular elementary English teacher certification. Six (46%) of the roomless teachers and two (18%) of the permanent classroom teachers do not have a regular elementary English teacher Certification. (see Figure 3).

Figure 3. English Teacher Certification
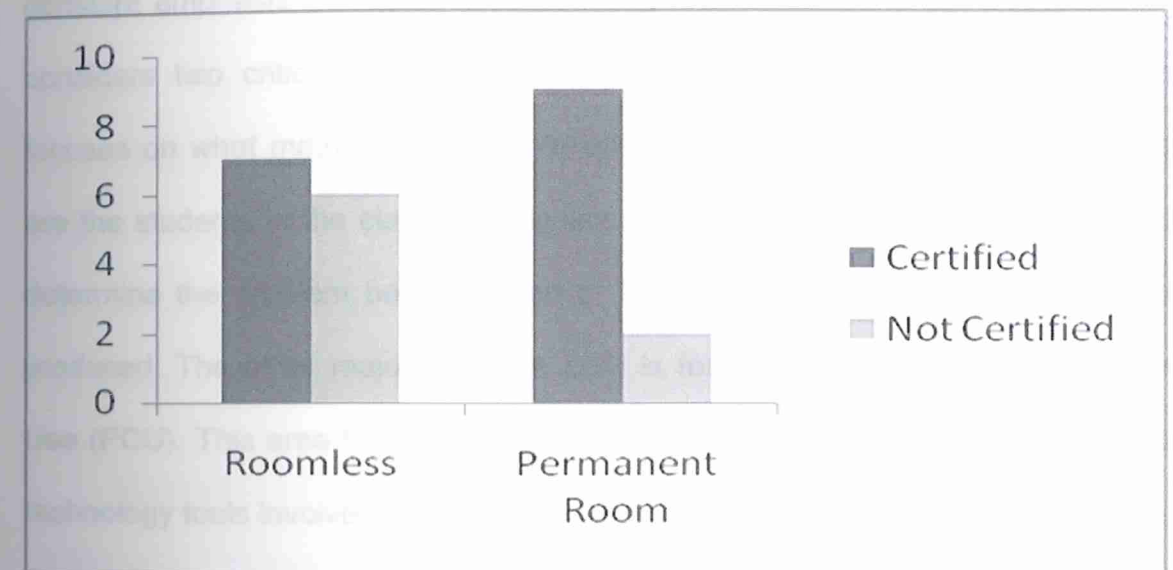
Instruments and Data Collection

The instrument that was used for this study is a survey. Surveys can be highly structured constructed with specific questions with a set group of response options from which to choose. Survey can also be unstructured constructed with general questions with the respondent providing whatever responses she or he

feels appropriate. The Levels of Technology Implementation (LoTi) is the survey instrument used for the purposes of this study and it was designed by Moersch (1994) to accurately measure authentic classroom technology use.

As states are required to meet the Average Yearly Progress (AYP), they have used different assessment instruments in order to determine their improvement of the NCLB Act. The LoTi framework focuses on the use of technology as a tool within the context of student based instruction with a constant emphasis on higher order thinking. That is why the LoTi assessment considers two critical areas. Current Instructional Practices (CIP). This area focuses on what methods the teacher uses to deliver instruction. How involved are the students in the classroom decision-making process and if students help determine the problem being studied or have input in the final product that is produced. The other major area the LoTi is focused on is Personal Computer Use (PCU). This area focuses on how comfortable are the teachers in using the technology tools involved in integration.

The LoTi assessment instrument (LoTi, 2006) underwent an extensive validation study conducted by Dr. Stoltzfus at Temple University in Philadelphia, Pennsylvania in 2005 that determined the questionnaire went beyond these two areas and gave administrators a clearer picture of the professional development that was needed.

The results of the validation study revealed the following:

- Each of the domains embedded in the LoTi survey (LoTi Levels, CIP, and PCU) achieved content validity.

- The domains, PCU (Personal Computer Use) and CIP (Current Instructional Practices) emerged as statistically reliable and therefore, are empirically valid.

- The domain, LoTi Level 0 (Non-use) emerged as statistically reliable and therefore, is empirically valid.

Ten states and thousands of school systems worldwide have adopted the LoTi standard to gauge their efforts toward improving instructional technology practices. The LoTi Framework is also aligned with state and national frameworks including the Texas and Florida School Technology and Readiness (STaR) Chart, with the National Educational Technology Standards (NETS) of the International Society for Technology in Education (ISTE) and with the Technology Standards for School Administrators (TSSA).

Each area of the LoTi framework consists on levels that categorize the participants. The levels of technology implementation are divided as follows:

Level 0 - Nonuse: Nonuse implies there is a perceived lack of access to technology-based tools (e.g., computers) or a lack of time to pursue electronic technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector).

Level 1 - Awareness: Awareness implies that the use of technology-based tools is either (1) one step removed from the classroom teacher (e.g., integrated learning system labs, special computer-based pull-out programs, computer literacy classes, central word processing labs), (2) used almost exclusively by the classroom teacher for classroom and/or curriculum management

tasks (e.g., taking attendance, using grade book programs, accessing email, retrieving lesson plans from a curriculum management system or the internet) and/or (3) used to embellish or enhance teacher-directed lessons or lectures (e.g., multimedia presentations).

Level 2 - Exploration: Exploration implies that technology-based tools supplement the existing instructional program (e.g., tutorials, educational games, basic skill applications) or complement selected multimedia and/or web-based projects (e.g., internet-based research papers, informational multimedia presentations) at the knowledge/comprehension level. The electronic technology is employed either as extension activities, enrichment exercises, or technology-based tools and generally reinforces lower cognitive skill development relating to the content under investigation.

Level 3 - Infusion: Infusion implies that technology-based tools including databases, spreadsheet and graphing packages, multimedia and desktop publishing applications, and internet use complement selected instructional events (e.g., field investigation using spreadsheets/graphs to analyze results from local water quality samples) or multimedia/web-based projects at the analysis, synthesis, and evaluation levels. Though the learning activity may or may not be perceived as authentic by the student, emphasis is, nonetheless, placed on higher levels of cognitive processing and in-depth treatment of the content using a variety of thinking skill strategies (e.g., problem-solving, decision-making, reflective thinking, experimentation, scientific inquiry).

Level 4a - Integration (Mechanical): Integration (Mechanical) implies that technology-based tools are integrated in a mechanical manner that provides rich context for students' understanding of the pertinent concepts, themes, and processes. Heavy reliance is placed on prepackaged materials and/or outside resources (e.g., assistance from other colleagues), and/or interventions (e.g., professional development workshops) that aid the teacher in the daily management of their operational curriculum. Technology (e.g., multimedia, telecommunications, databases, spreadsheets, word processing) is perceived as a tool to identify and solve authentic problems as perceived by the students relating to an overall theme/concept. Emphasis is placed on student action and on

issues resolution that require higher levels of student cognitive processing and in-depth examination of the content.

Level 4b - Integration (Routine): Integration (Routine) implies that technology-based tools are integrated in a routine manner that provides rich context for students' understanding of the pertinent concepts, themes, and processes. At this level, teachers can readily design and implement learning experiences (e.g., units of instruction) that empower students to identify and solve authentic problems relating to an overall theme/concept using the available technology (e.g., multimedia applications, internet, databases, spreadsheets, word processing) with little or no outside assistance. Emphasis is again placed on student action and on issues resolution that require higher levels of student cognitive processing and in-depth examination of the content.

Level 5 - Expansion: Expansion implies that technology access is extended beyond the classroom. Classroom teachers actively elicit technology applications and networking from other schools, business enterprises, governmental agencies (e.g., contacting NASA to establish a link to an orbiting space shuttle via internet), research institutions, and universities to expand student experiences directed at problem-solving, issues resolution, and student activism surrounding a major theme/concept. The complexity and sophistication of the technology-based tools used in the learning environment are now commensurate with (1) the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach to teaching and learning and (2) the students' level of complex thinking (e.g., analysis, synthesis, evaluation) and in-depth understanding of the content experienced in the classroom.

Level 6 - Refinement: Refinement implies that technology is perceived as a process, product (e.g., invention, patent, new software design), and/or tool for students to find solutions related to an identified "real-world" problem or issue of significance to them. At this level, there is no longer a division between instruction and technology use in the classroom. Technology provides a seamless medium for information queries, problem-solving, and/or product development. Students have ready access to and a complete understanding of a vast array of technology based tools to accomplish any particular task at school. The instructional

curriculum is entirely learner-based. The content emerges based on the needs of the learner according to his/her interests, needs, and/or aspirations and is supported by unlimited access to the most current computer applications and infrastructure available.

These levels are applied according to the data obtained from the survey. The LoTi framework also establishes levels of the Participants' Personal Computer Usage.

These levels are:

PCU Intensity Level 0: A PCU Intensity Level 0 indicates that the participant does not feel comfortable or have the skill level to use computers for personal use. Participants at Intensity Level 0 rely more on the use of overhead projectors, chalkboards, and/or traditional paper/pencil activities than using computers for conveying information or classroom management tasks.

PCU Intensity Level 1: A PCU Intensity Level 1 indicates that the participant demonstrates little skill level with using computers for personal use. Participants at Intensity Level 1 may have a general awareness of various technology-related tools such as word processors, spreadsheets, or the internet, but generally are not using them.

PCU Intensity Level 2: A PCU Intensity Level 2 indicates that the participant demonstrates little to moderate skill level with using computers for personal use. Participants at Intensity Level 2 may occasionally browse the internet, use email, or use a word processor program; yet, may not have the confidence or feel comfortable troubleshooting simple "technology" problems or glitches as they arise. At school, their use of computers may be limited to a grade book or attendance program.

PCU Intensity Level 3: A PCU Intensity Level 3 indicates that the participant demonstrates moderate skill level with using computers for personal use. Participants at Intensity Level 3 may begin to become "regular" users of selected applications such as internet browsers, email, or a word processor program. They may also feel comfortable troubleshooting simple "technology" problems

such as rebooting a machine or hitting the "Back" button on an internet browser, but mostly rely on technology support staff or others to assist them with any troubleshooting issues.

PCU Intensity Level 4: A PCU Intensity Level 4 indicates that the participant demonstrates moderate to high skill level with using computers for personal use. Participants at Intensity Level 4 commonly use a broader range of software applications including multimedia (e.g., Microsoft PowerPoint), spreadsheets, and simple database applications. They typically have the confidence and are able to troubleshoot simple hardware, software, and/or peripheral problems without assistance from technology support staff.

PCU Intensity Level 5: A PCU Intensity Level 5 indicates that the participant demonstrates high skill level with using computers for personal use. Participants at Intensity Level 5 are commonly able to use the computer to create their own web pages, produce sophisticated multimedia products, and/or effortlessly use common productivity applications (e.g., Microsoft Excel, FileMaker Pro), desktop publishing software, and web-based tools. They are also able to confidently troubleshoot most hardware, software, and/or peripheral problems without assistance from technology support staff.

PCU Intensity Level 6: A PCU Intensity Level 6 indicates that the participant demonstrates high to extremely high skill level with using computers for personal use. Participants at Intensity Level 6 are sophisticated in the use of most, if not all, multimedia, productivity, desktop publishing, and web-based applications. They typically serve as "troubleshooters" for others in need of assistance and sometimes seek certification for achieving selected technology-related skills

PCU Intensity Level 7: A PCU Intensity Level 7 indicates that the participant demonstrates extremely high skill level with using computers for personal use. Participants at Intensity Level 7 are expert computer users, troubleshooters, and/or technology mentors. They typically are involved in training others on any technology-related tasks and are usually involved in selected support groups from around the world that allow them access to answers for all technology-based inquiries they may have.

For the LoTi Framework the values assigned to each alternative answer were; does not apply with a value of cero, not true of me now with a value of two, somewhat true of me now with a value of four and very true of me now with a value of six. The LoTi Framework data analysis was provided to the researcher as part of the services to the administrators of the survey. The researcher was granted access and rights to administer this questionnaire.

This is the first time the instrument is used in Puerto Rico. An alternate paper format was administered in this study due to the lack of Internet access in the target district. Since the main purpose of this study was to analyze the impact of not having a permanent classroom assigned during the school year on the technology implementation some questions were eliminated. The researcher made an adaptation of the original in-service survey designed by Loti in order to tailor it to the purposes of the study and the characteristics of the population. The final instrument used (see appendix A) consisted of 5 demographic questions and 33 statements. The participants had four alternatives to choose for each statement, these alternatives are; does not apply, not true of me now, somewhat true of me now and very true of me now.

Procedure

The first step to conduct this study was to obtain written permission from the English Zone Supervisor (see appendix B). In order to obtain a large sample of the elementary English teachers of this district for the study the questionnaire

was administered at a meeting held by the English zone supervisor on January, 2008. The researcher gave a brief introduction explaining the study to the teachers, the confidentiality and their participation as volunteers. An informed consent form (see appendix C) was given to the interested teachers who agreed to participate in the study.

Data Analysis

The data collected with the survey was divided into two groups, participants with a permanent classroom and roomless participants. For this study descriptive statistical analysis was performed consisting of frequencies and percentages. The Microsoft Excel program was used for this purpose and displayed in graphs. The teacher participants' LoTi technology profile was statistically analyzed by Learning Quest Inc. Descriptive statistics was also used. Frequencies, the mode and the mean were computed to determine levels of technology implementation and personal computer use.

Note that the main focus of this study are the roomless teachers phenomenon description, but in order to provide data to serve as evidence of the variable classroom and its implications, the data of the teachers with a permanent classroom was also included. The profiles were categorized by groups, roomless teachers and permanent classroom teachers.

CHAPTER 4

Results

This chapter presents the findings of the study as well as the data analysis. This quantitative descriptive study was conducted through the administration of a survey among elementary English teachers of a school district of a large urban city of Puerto Rico. The instrument used was the Level of Technology Implementation survey created by Moersch (1994). This instrument was designed to accurately measure authentic classroom technology use. The sample who participated in this study consists of 24 English teachers of which 11 are teachers with an permanent classrooms during the school year and 13 are roomless teachers.

The purpose of this study was to collect information about the current situation of the level of technology implementation of English teachers. The findings will provide data to answer the following research questions:

1. What is the technology implementation level of teachers with permanent classrooms?

2. What is the technology implementation level of roomless teachers?

3. What factors influence the teacher's level of technology implementation?

4. It will further explore if there is a difference in technology implementation between a roomless elementary English teacher and one that has a permanent classroom.

After administering the survey, the findings are presented by each statement included in the instrument. An analysis of the data is also presented by each of the two sample groups which are; the permanent classroom teachers and the roomless teachers.

Item number three of the survey asked about the existence of a technology or computer resource room in the participants' school. Four (31%) roomless teachers and four (36%) permanent classroom teachers answered that there is none available in their schools while 8 (62%) roomless teachers and 7(64%) permanent classroom teacher answered yes. (See Figure 4).

Figure 4. Technology or Computer Resource Classroom
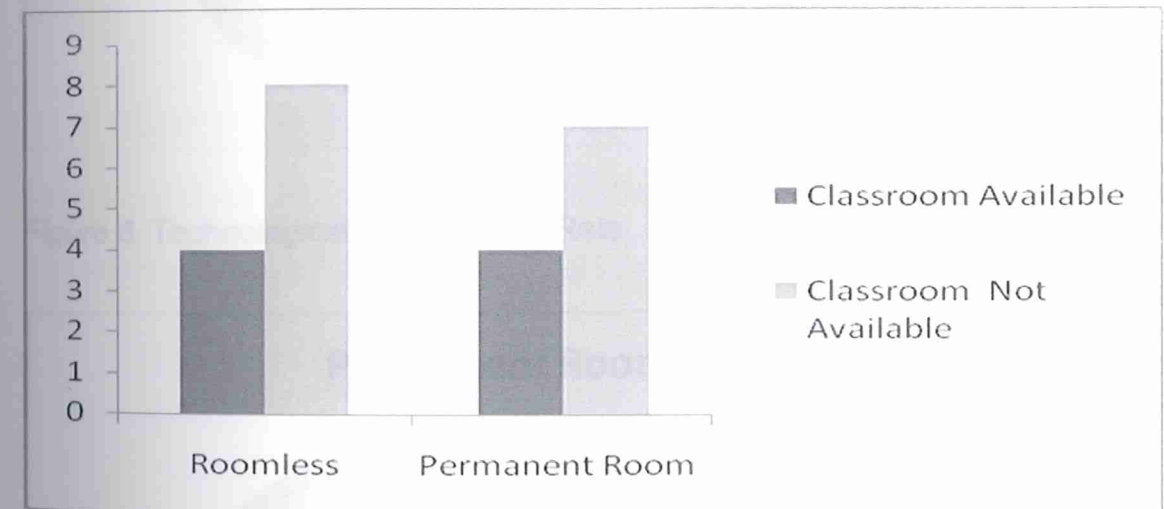
The participants were asked to rate the technological infrastructure of their school. Of the roomless teachers, three (23%) gave it a poor rating, six (46%) responded as in need of some improvement and four (31%) responded, in need of great improvement. None of the roomless teacher participants responded, in perfect conditions. (See figure 5). Participants of the permanent classroom

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teachers' category rated the technological infrastructure of their school as follow: five (45%) respond, poor, four (36%) responded, in need of some improvement, two (18%) responded, in need of great improvement and none responded, in perfect conditions. (see Figure 6).
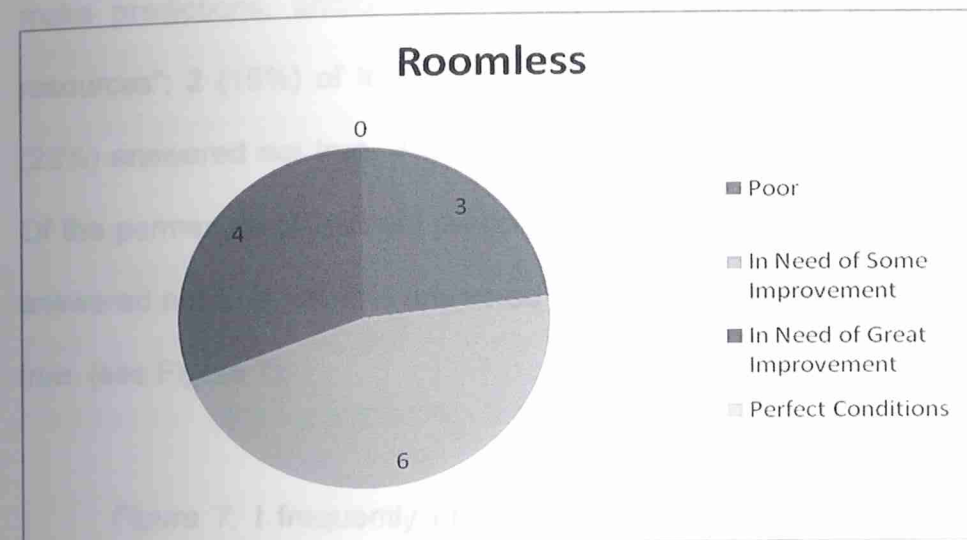
Figure 5. Technological Infrastructure Rate

Figure 6. Technological Infrastructure Rate
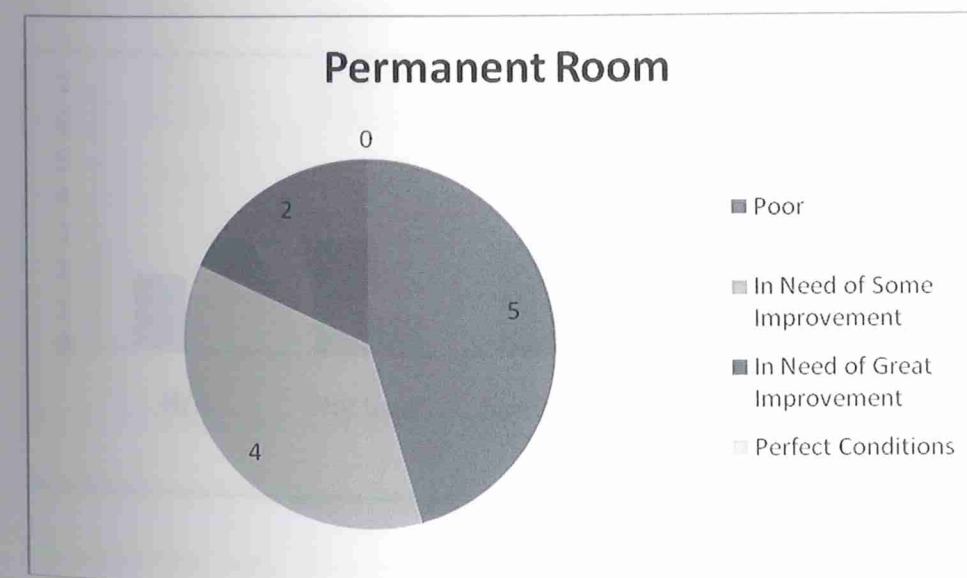
In statements six to 38 the participants were asked to answer by choosing one of the following options: Does not apply, Not true of me now, Somewhat true of me now and Very true of me now.

In statement number 6 of the questionnaire "I frequently engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the classroom technology resources"; 2 (15%) of the roomless participants answered does not apply, 3 (23%) answered not true, 3 (23%) answered somewhat true 5 (38%) Very true. Of the permanent classroom participants none answered does not apply, 1(9%) answered not true, 6(55%) answered somewhat true and 4(36%) answered very true. (see Figure 7).

Figure 7. I frequently engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the classroom technology resources.

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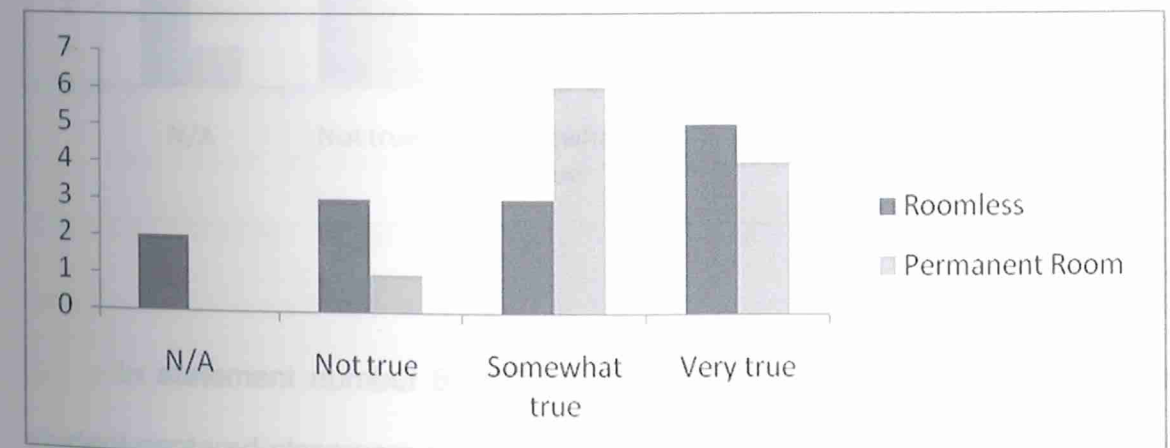
In statement number 7, I frequently present information to students using multimedia presentations or electronic "slideshows" to reinforce the content standards that I am teaching and better prepare students to take standardized tests.; 5 (38%) of the roomless teachers answered does not apply, 3 (23%) answered not true, 5 (38%) answered somewhat true and none answered very true. Of the permanent classroom teachers 1(9%) answered does not apply, 6 (55%) answered not true, 2(18%) answered somewhat true, 2 (18%) answered very true. (see Figure 8).

Figure 8. I frequently engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the classroom technology resources.
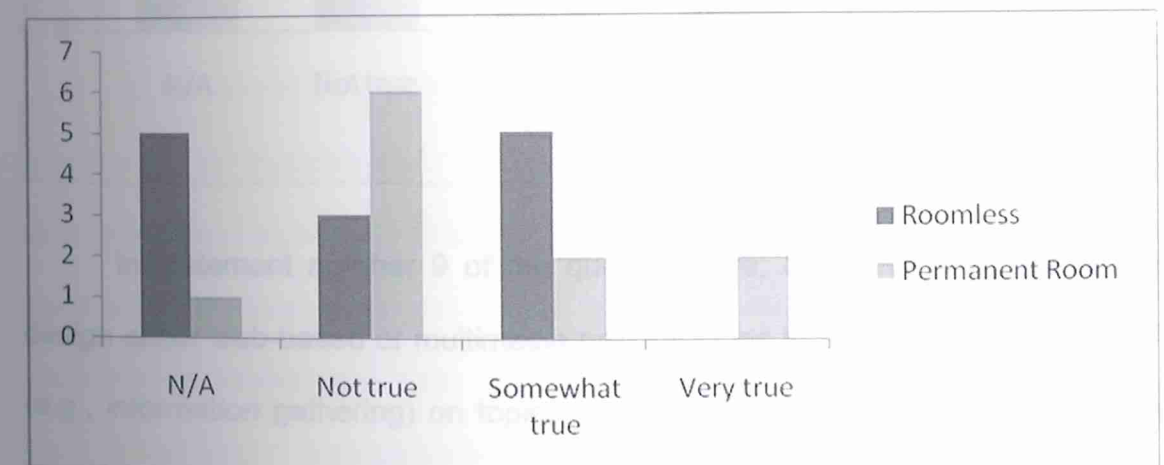
In statement number 8 of the questionnaire; I have trouble managing a student-centered classroom using the available technology resources and would welcome the help of a peer coach or mentor; 7 (54%) roomless participants

responded does not apply, 3 (23%) answered not true, 2 (15%) answered very true and 1(8%) answered very true. Of the permanent classroom teachers 3 (27%) answered does not apply, 1 (9%) answered not true, 5(45%) answered somewhat true and 2 (18%) answered very true. (see Figure 9).

Figure 9. I have trouble managing a student-centered classroom using the available technology resources and would welcome the help of a peer coach or mentor.
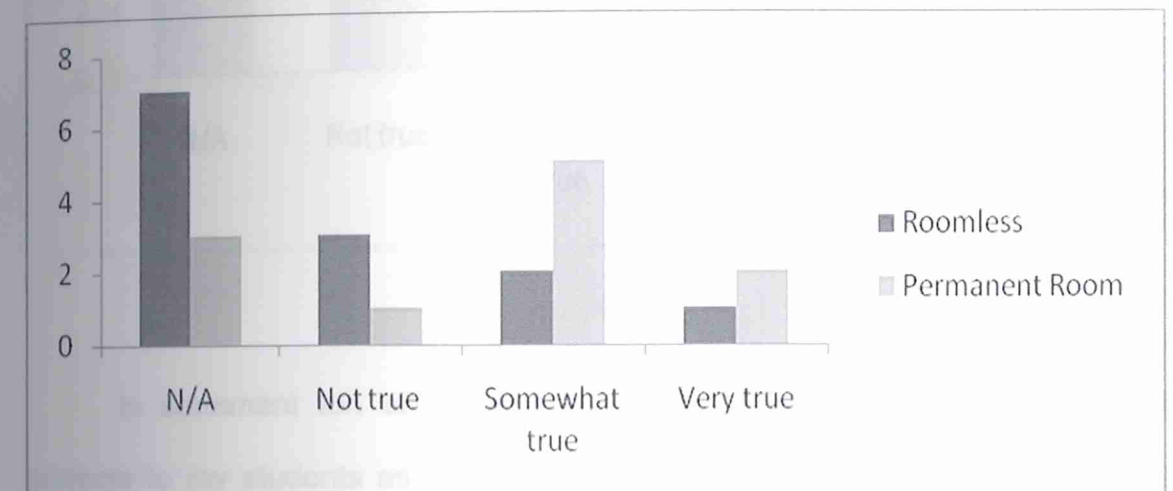
In statement number 9 of the questionnaire; Students in my classroom design either web-based or multimedia presentations to showcase their research (e.g., information gathering) on topics that I assign in class.; 8 (62%) roomless teachers answered does not apply, 3 (23%) answered not true, 2 (15%) answered somewhat true and none of the participants answered very true. Of the permanent classroom teachers 4(36%) answered does not apply, 6 (55%) answered not true, none of the participants answered somewhat true and 1(9%) answered very true to the premise. (see Figure 10)

Figure 10. Students in my classroom design either web-based or multimedia presentations to showcase their research (e.g., information gathering) on topics that I assign in class.
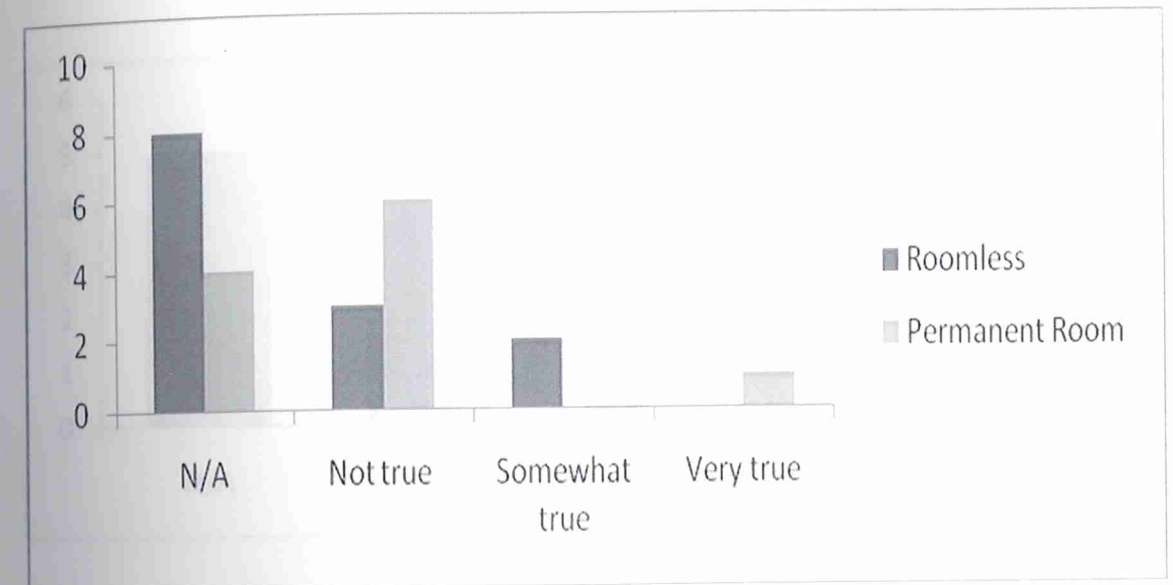
In statement ten of the questionnaire; I frequently assign web-based projects to my students as a means of emphasizing specific complex thinking skill strategies aligned to the content standards.; 5 (38%) of the roomless teachers answered does not apply, 4 (31%) answered not true, 4 (31%) answered somewhat true and none of the roomless participants answered very true. Of the permanent classroom teachers 5 (45%) answered does not apply, 5 (45%) answered not true, none of the participants answered somewhat true and 1 (9%) answered very true to the premise. (see Figure 11).

Figure 11. I frequently assign web-based projects to my students as a means of emphasizing specific complex thinking skill strategies aligned to the content standards.
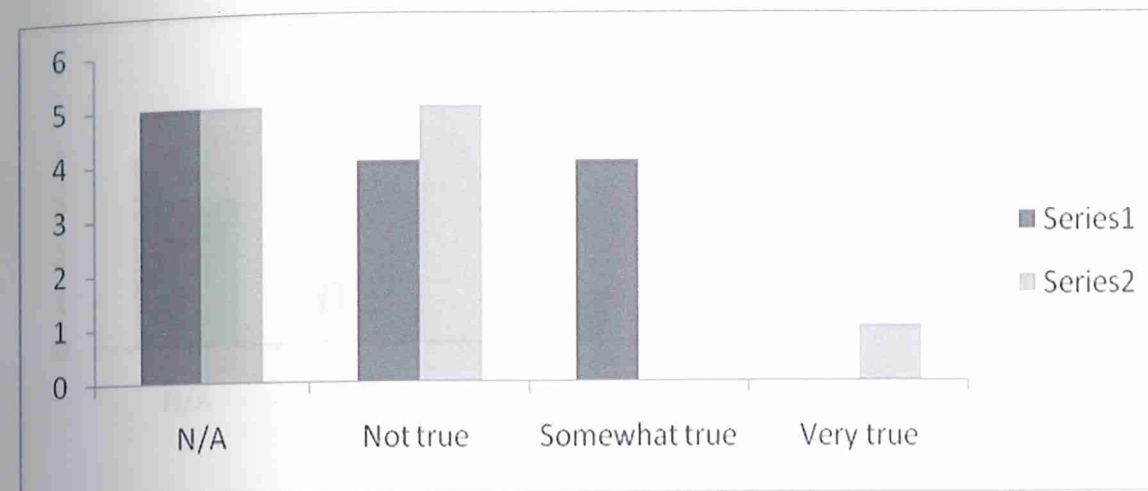
In statement 11; Using the most current and complete technology infrastructure available, I have maximized the use of the learning technologies in my classroom and at my school.; 4 (31%) of the roomless teachers answered does not apply to the premise, 4 (31%) answered not true, 4 (31%) answered somewhat true and none of the participants answered very true to the premise. Of the permanent classroom participants 3 (27%) answered does not apply, 5 (45%) answered not true, 1 (9%) answered somewhat true and 2 (18%) answered very true to the premise. (see Figure 12).

Figure 12. Using the most current and complete technology infrastructure available, I have maximized the use of the learning technologies in my classroom and at my school.
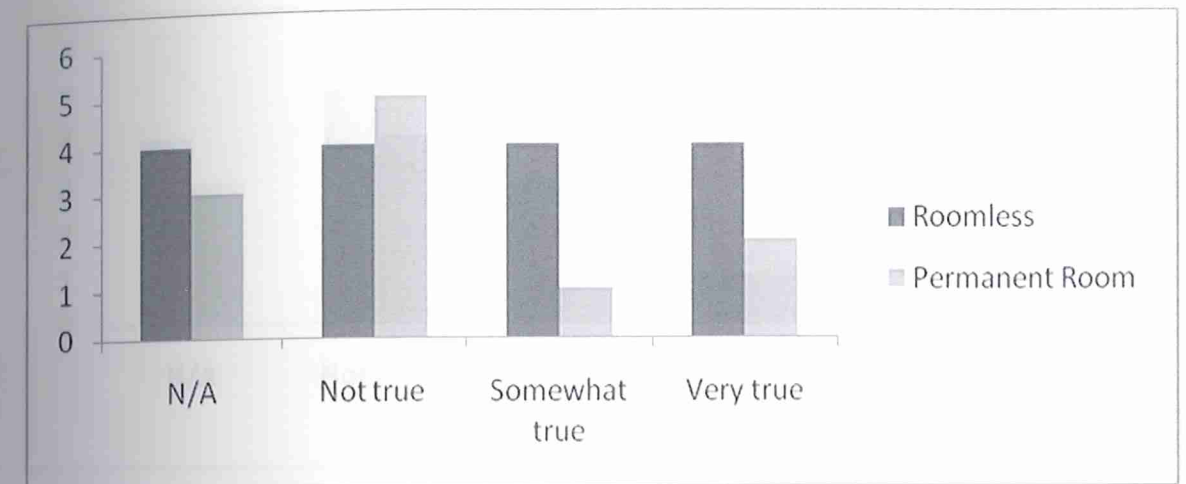
In statement 12 of the questionnaire; I use the classroom technology resources exclusively to take attendance, record grades, present content to students, and/or communicate with parents via email.; 4 (31%) of the roomless participants answered does not apply to the premise, 5 (38%) answered not true to the premise, 3 (23%) answered somewhat true and 1(8%) answered very true. Of the permanent classroom participants 3 (27%) answered does not apply to the premise, 4 (36%) answered not true, 3 (27%) answered somewhat true and 1 (9%) answered very true. (see Figure 13).

Figure 13. I use the classroom technology resources exclusively to take attendance, record grades, present content to students, and/or communicate with parents via email.
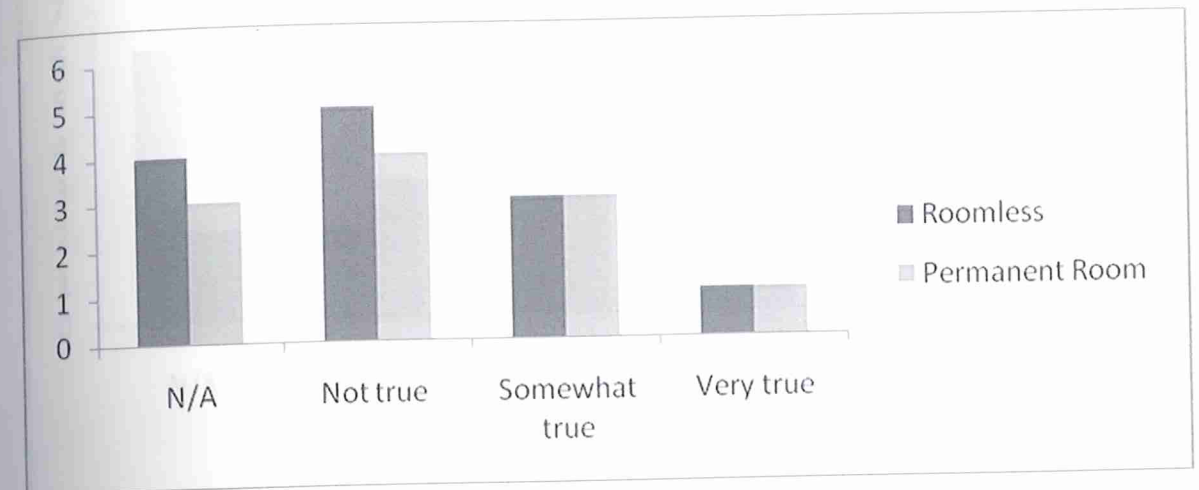
In statement 13 of the questionnaire; Constant technical problems prevent me and/or my students from using the classroom technology resources during the instructional day.; 6 (46%) of the roomless teachers answered does not apply to the premise, 2 (15%) answered not true, 3 (23%) answered somewhat true and 2 (15%) answered very true to the premise. Of the permanent classroom teachers 2 (18%) answered does not apply to the premise, 3 (27%) answered not true, 4 (36%) answered and 1 (9%) answered very true to the premise. (see figure 14).

Figure 14. Constant technical problems prevent me and/or my students from using the classroom technology resources during the instructional day.
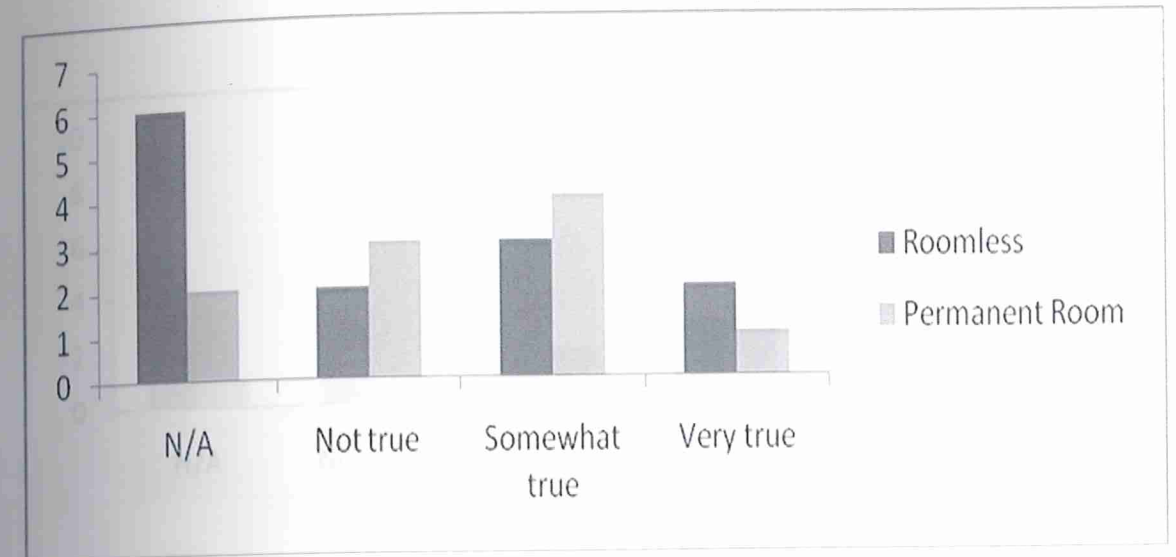
In statement 14 of the questionnaire; I am proficient with basic software applications such as word processing tools, internet browsers, spreadsheet programs, and multimedia presentations.; 1 (8%) of the roomless teachers answered does not apply to the premise, 1 (8%) answered not true to the premise, 8 (62%) answered somewhat true and 3 (23%) answered very true. Of the permanent classroom teachers 1 (9%) answered does not apply to the premise, 1 (9%) answered not true, 2 (18%) answered somewhat true and 7 (64%) answered very true to the premise. (see Figure 15).

Figure 15. I am proficient with basic software applications such as word processing tools, internet browsers, spreadsheet programs, and multimedia presentations.
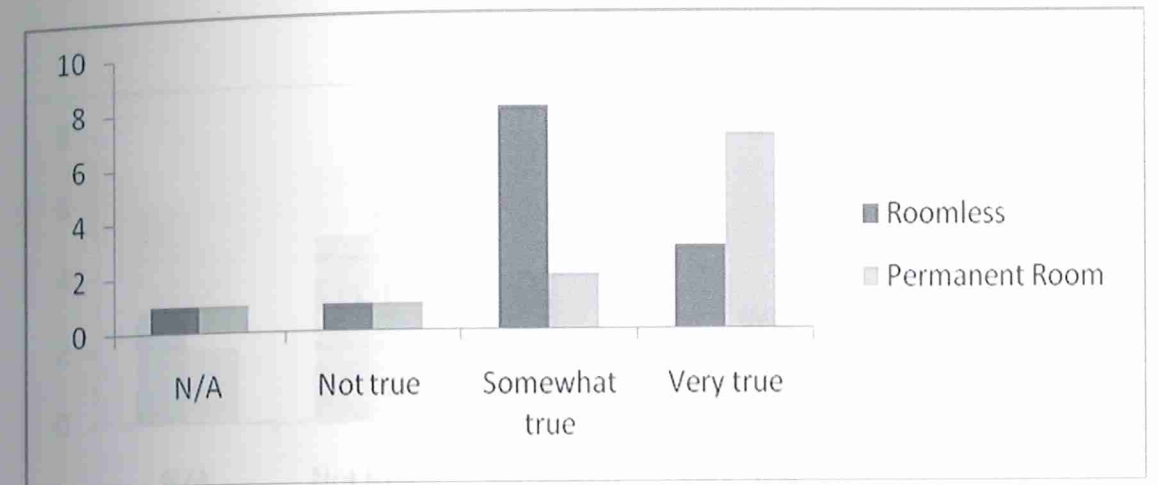
In statement 15 of the questionnaire; I can solve most technical problems with our classroom's technology resources during the instructional day without calling for technical assistance.; 3 (23%) of the roomless participants answered does not apply, 5 (38%) answered not true, 4 (31%) answered somewhat true and 1 (8%) answered very true. Of the permanent classroom participants 2 (18%) answered does not apply, 5 (45%) answered not true, 1   (9%)   answered somewhat true and 3 (27%) answered very true. (see Figure 16)

Figure16. I can solve most technical problems with our classroom's technology resources during the instructional day without calling for technical assistance.

In statement 16 of the questionnaire; Locating quality software programs, websites, or CD's to supplement my curriculum and reinforce specific content standards is a priority of mine at this time.; 3 (23%) of the roomless participants answered does not apply to the premise, 4 (31%) answered not true, 6 (46%) answered somewhat true and none of the participants answered very true to the premise. Of the permanent classroom participants 2 (18%) answered does not apply to the premise, 1 (9%) answered not true, 3 (27%) answered somewhat true and 5 (45%) answered very true to the premise. (see Figure 17).
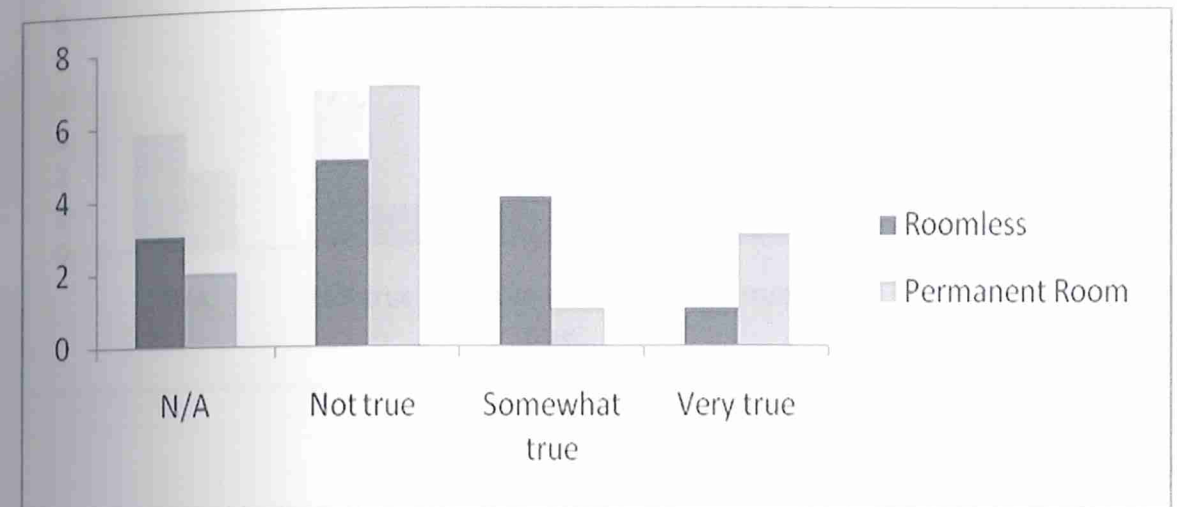
Figure17. Locating quality software programs, websites, or CD's to supplement my curriculum and reinforce specific content standards is a priority of mine at this time.
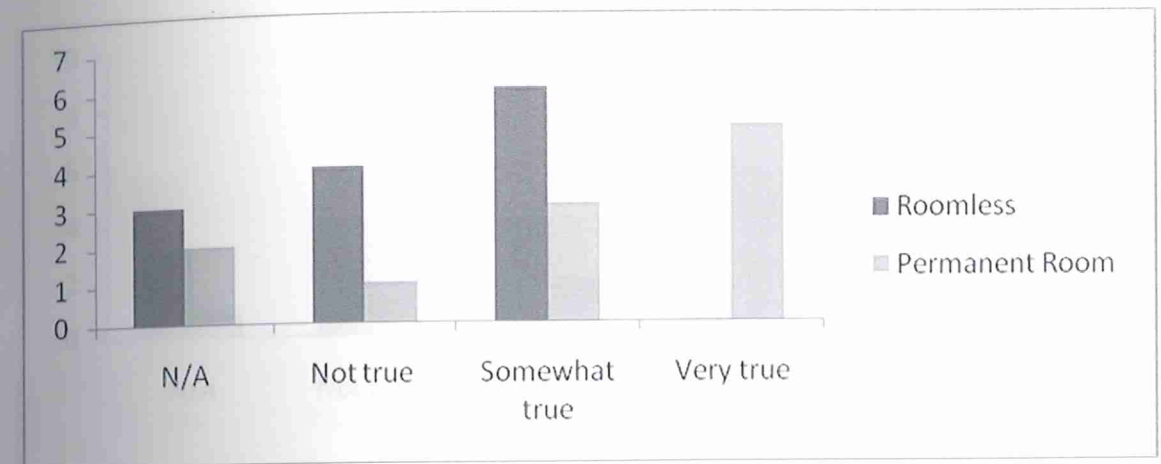
In statement 17 of the questionnaire; Though I may use technology for teacher preparation, I am not comfortable using my classroom technology resources as part of my instructional day.; 3 (23%) of the roomless teachers answered does not apply to the premise, 4 (31%) answered not true, 4 (31%) answered somewhat true and 2 (15%) answered very true. Of the permanent classroom teachers answered 1 (9%) answered does not apply, 8 (73%) answered not true, 2 (18%) answered somewhat true and none of the participants answered very true. (see Figure 18).

Figure 18. Though I may use technology for teacher preparation, I am not comfortable using my classroom technology resources as part of my instructional day.
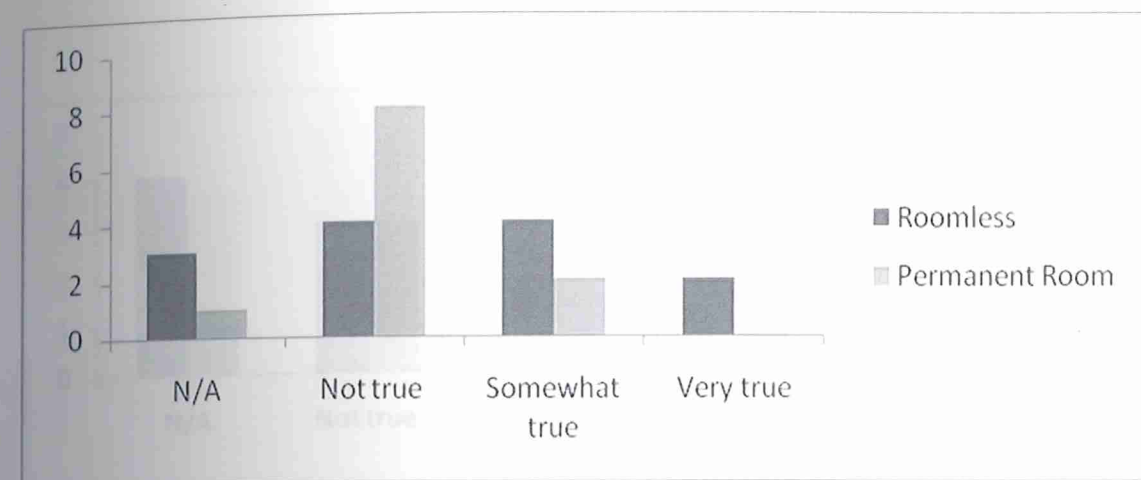
In statement 18 of the questionnaire; I am comfortable training others in using basic software applications, browsing/searching the Internet, and using specialized technologies unique to my grade level or content area.; 4 (31%) of the roomless participants answered does not apply to the premise, 3 (23%) answered not true, 3 (23%) answered somewhat true and 3 (23%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 3 (27%) answered not true, 3 (27%) answered somewhat true and 4 (36%) answered very true to the premise. (see Figure 19).

Figure 19. I am comfortable training others in using basic software applications, browsing/searching the Internet, and using specialized technologies unique to my grade level or content area.
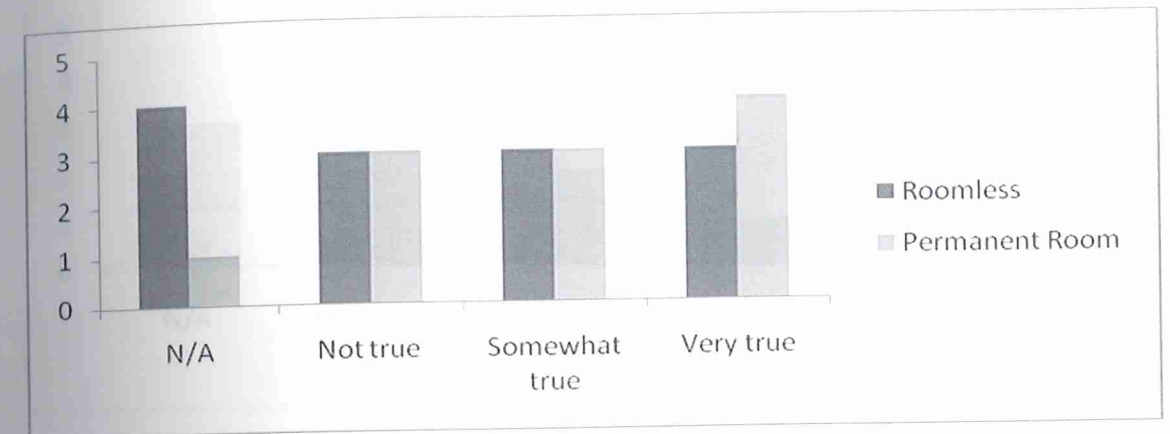
In statement 19 of the questionnaire; Computers and related technology resources in my classroom are not used during the instructional day, nor are there any plans to include them at this time.; 2 (15%) of the roomless teachers answered does not apply to the premise, 5 (38%) answered not true, 3 (23%) answered somewhat true and 3 (23%) answered very true. Of the permanent classroom teachers 3(27%) answered does not apply to the premise, 5 (45%) answered not true, 2 (18%) answered somewhat true and 1 (9%) answered very true. (see Figure 20).

Figure 20. Computers and related technology resources in my classroom are not used during the instructional day, nor are there any plans to include them at this time.
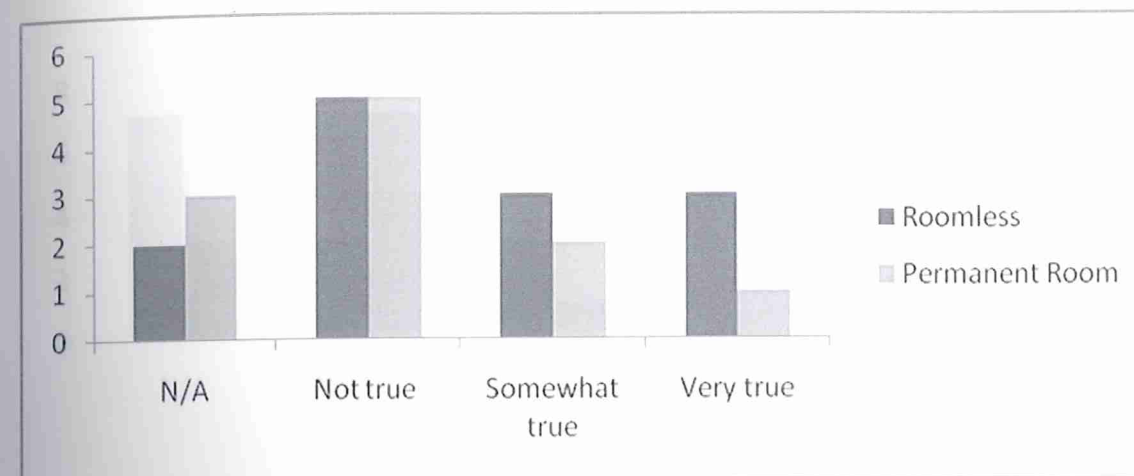
In statement 20 of the questionnaire; My students use the Internet for (1) collaboration with others, (2) publishing, (3) communication, and (4) research to solve issues and problems of personal interest that address specific content standards.; 7 (54%) of the roomless teachers answered does not apply to the premise, 3 (23%) answered not true, 3 (23%) answered somewhat true and none of the roomless participants answered very true to the premise. Of the permanent classroom teachers, 3 (27%) answered does not apply to the premise, 7 (64%) answered not true, 1 (9%) answered somewhat true and none of the participants answered very true to the premise. (see Figure 21).

Figure 21. My students use the Internet for (1) collaboration with others, (2) publishing, (3) communication, and (4) research to solve issues and problems of personal interest that address specific content standards.
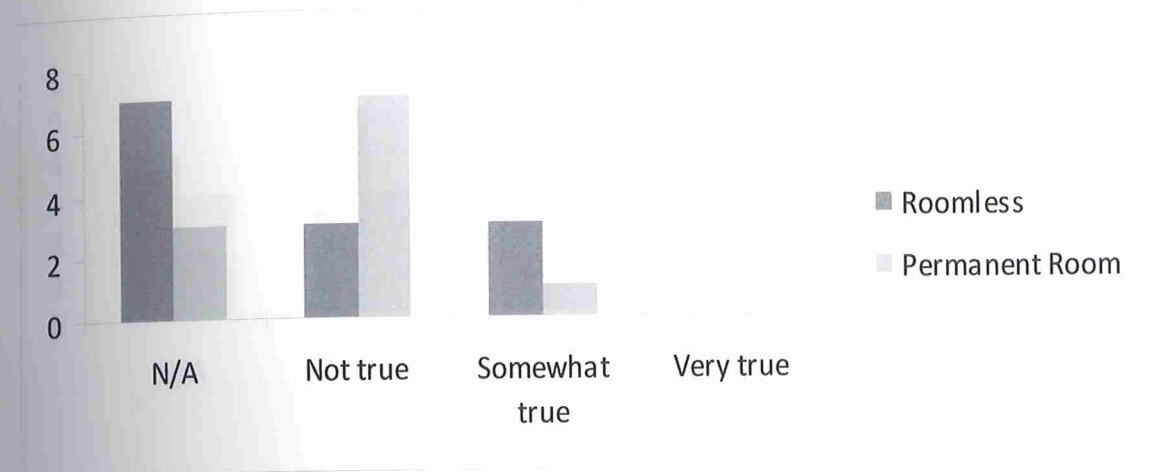
In statement 21 of the questionnaire; Given my current curriculum requirements and class size, it is much easier and more practical for my students to learn about and use computers and related technology resources outside of my classroom (e.g., computer lab, resource center).; 4 (31%) of the roomless participants answered does not apply, 5 (38%) answered not true, 4 (31%) answered somewhat true and none of the roomless participants answered very true to the premise. Of the permanent classroom participants; 3 (27%) answered does not apply to the premise, 3 (27%) answered not true, 1 (9%) answered somewhat true and 4 (36%) answered very true to the premise. (see Figure 22).

Figure 22. Given my current curriculum requirements and class size, it is much easier and more practical for my students to learn about and use computers and related technology resources outside of my classroom (e.g., computer lab, resource center).
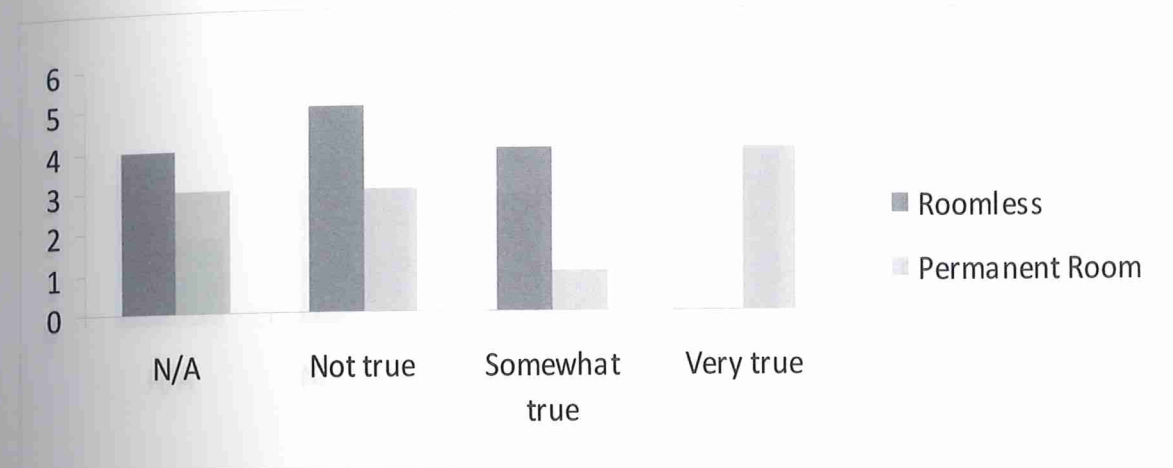
In statement 22 of the questionnaire; I use the classroom technology resources most frequently to locate lesson plans I can use in class that are appropriate to my grade level and are aligned with our content standards.; 4 (31%) of the roomless participants answered does not apply to the premise, 5 (38%) answered not true, 3 (23%) answered somewhat true and 1 (8%) of the participants answered very true to the premise. Of the permanent classroom participants, 2 (18%) answered does not apply to the premise, 5 (45%) answered not true, none of the participants answered somewhat true and 4 (36%) of the participants answered very true to the premise. (see Figure 23).

Figure 23. I use the classroom technology resources most frequently to locate lesson plans I can use in class that are appropriate to my grade level and are aligned with our content standards.
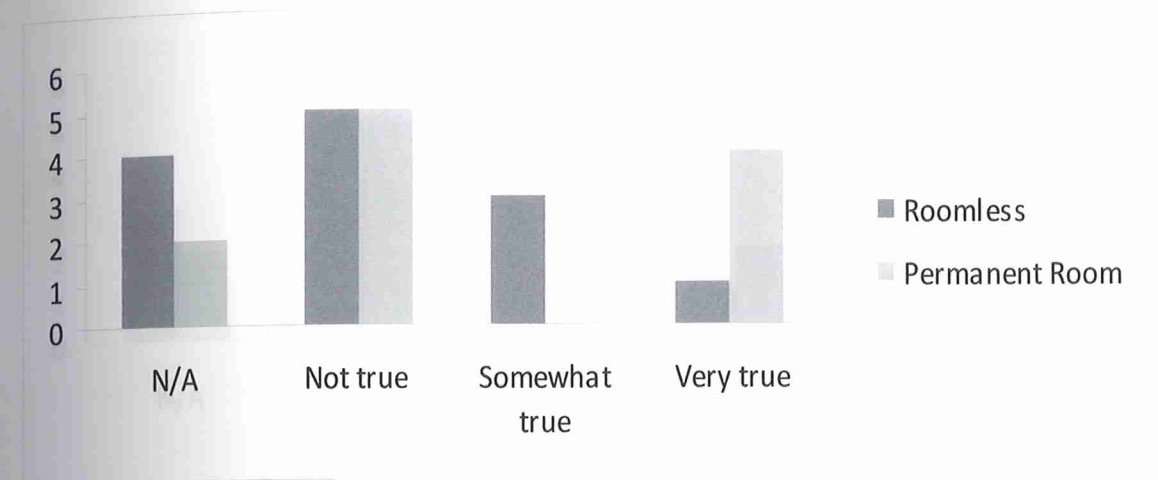
In statement 23 of the questionnaire; My current instructional program is effective without the use of technology; therefore, I have no current plans to change it to include any technology resources.; 3 (23%) of the roomless participants answered does not apply to the premise, 5 (38%) answered not true, 3 (23%) answered somewhat true and 1 (8%) of the participants answered very true to the premise. Of the permanent classroom participants, 2 (18%) answered does not apply to the premise, 6 (55%) answered not true, 1 (9%) answered somewhat true and 2 (18%) answered very true to the premise.

Figure 24. My current instructional program is effective without the use of technology; therefore, I have no current plans to change it to include any technology resources.
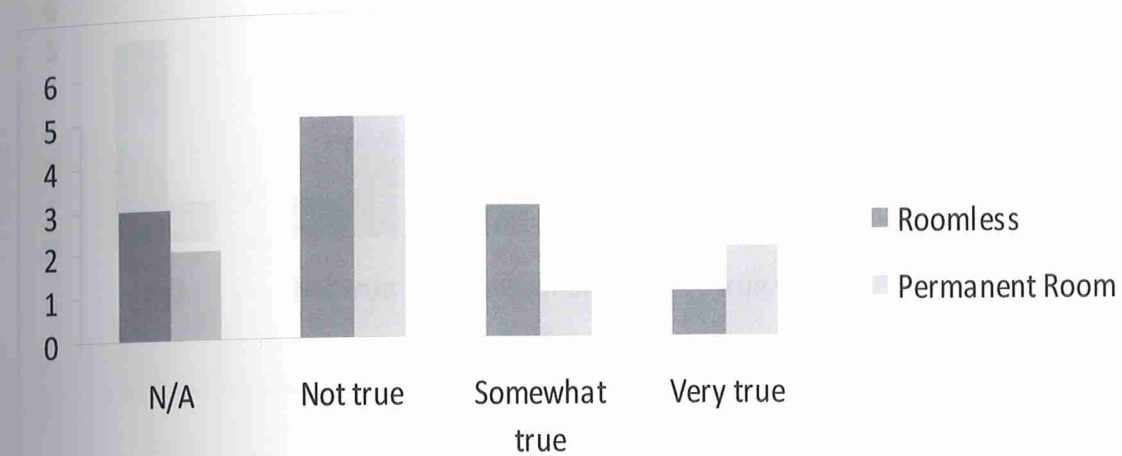
In statement 24 of the questionnaire; I use our technology resources daily to access the Internet, send email, and/or plan classroom activities.; 5 (38%)of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 4 (31%) answered somewhat true and none of the participants answered very true to the premise. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 4 (36%) answered not true, 2 (18%) answered somewhat true and 3 (27%) answered very true. (see Figure 25).

Figure 25. I use our technology resources daily to access the Internet, send email, and/or plan classroom activities.
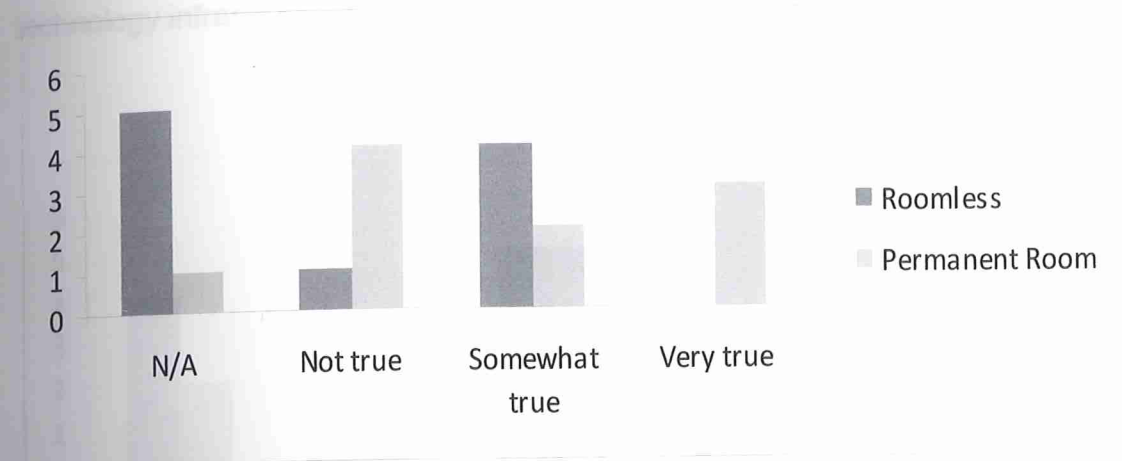
In statement 25 of the questionnaire; My personal professional development involves investigating and implementing the newest innovations in instructional design and learning technologies that take full advantage of my school's most current and complete technology infrastructure.; 4 (31%) of the roomless participants answered does not apply to the premise, none of the participants answered not true, 5 (38%) answered somewhat true, and 3 (23%) answered very true. Of the permanent classroom participants, 2 (18%) answered does not apply to the premise, 1 (9%) answered not true, 5 (45%) answered somewhat true and 3 (27%) answered very true. (see Figure 26).

Figure 26. My personal professional development involves investigating and implementing the newest innovations in instructional design and learning technologies that take full advantage of my school's most current and complete technology infrastructure.
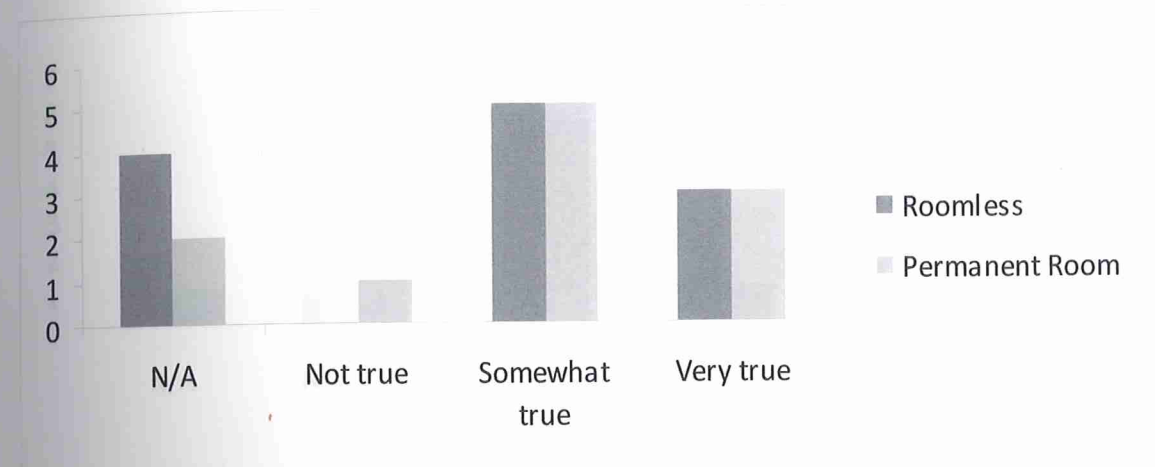
In the statement 26 of the questionnaire; I have an immediate need for some outside help with designing student-centered performance assessments using the available technology that involve students applying what they have learned to make a difference in their school/community.; 2 (15%) of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 6 (46%) answered somewhat true and 4 (31%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 3 (27%) answered not true, 6 (55%) answered somewhat true and 1 (9%) answered very true. (see Figure 27).

Figure 27. I have an immediate need for some outside help with designing student-centered performance assessments using the available technology that involve students applying what they have learned to make a difference in their school/community.
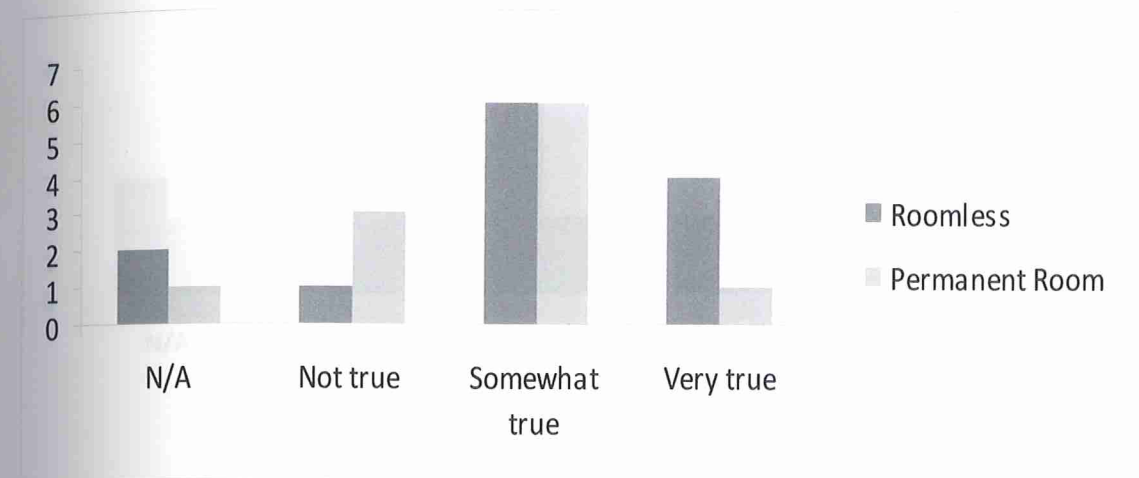
In statement 27 of the questionnaire; My instructional use of our classroom technology resources is frequently altered according to the latest innovations and research in the areas of instructional technology, teaching strategies, and/or learning theory.; 3 (23%) of the roomless participants answered does not apply to the premise, 2 (15%) answered not true, 5 (38%) answered somewhat true and 2 (15%) answered very true. Of the permanent classroom participants, 2 (18%) answered does not apply, 4 (36%) answered not true, 2 (18%) answered somewhat true and 2 (18%) answered very true. (see Figure 28).

*Figure 28.* My instructional use of our classroom technology resources is frequently altered according to the latest innovations and research in the areas of instructional technology, teaching strategies, and/or learning theory.
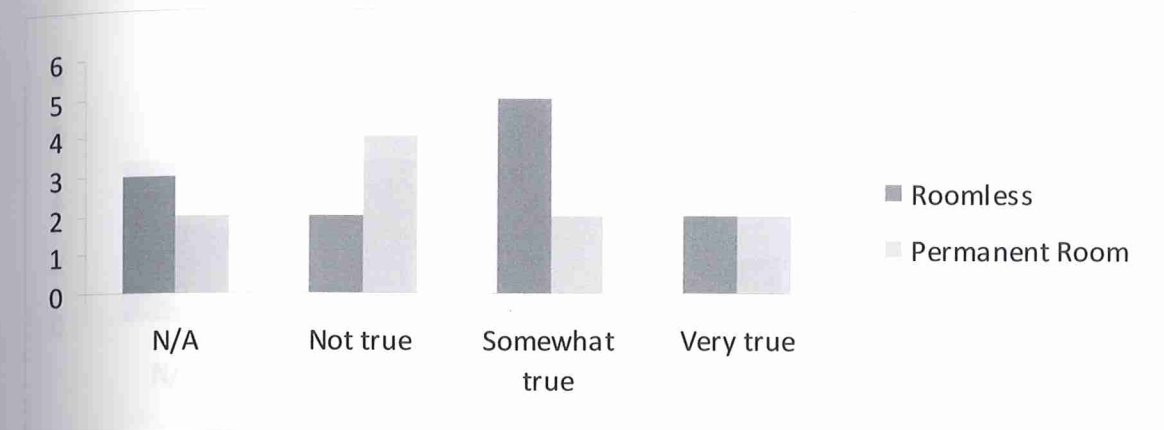
In statement 28 of the questionnaire; I regularly implement a student-centered approach to teaching that takes advantage of our classroom technology resources to engage students in their own learning.; 5 (38%) of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 7 (54%) answered somewhat true and none of the participants answered very true. Of the permanent classroom participants, 3 (27%) answered does not apply to the premise, 5 (45%) answered not true, none of the participants answered somewhat true and 2 (18%) answered very true. (see Figure 29).

Figure 29. I regularly implement a student-centered approach to teaching that takes advantage of our classroom technology resources to engage students in their own learning.
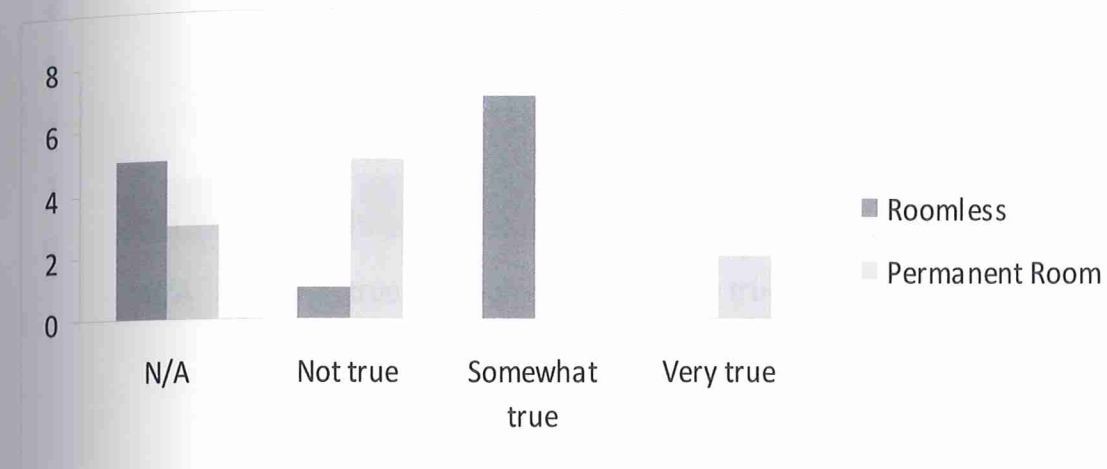
In statement 29 of the questionnaire; I frequently consider (1) my students' interests, experiences, and desire to solve relevant problems and (2) the available human resources outside of the school when planning student-centered learning activities that include technology.; 1 (8%) of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 7 (54%) answered somewhat true and 4 (31%) answered very true. Of the permanent classroom participants, 2 (18%) answered does not apply to the premise, 2 (18%) answered not true, 4 (36%) answered somewhat true and 2 (18%) answered very true. (see Figure 30).

Figure 30. I frequently consider (1) my students' interests, experiences, and desire to solve relevant problems and (2) the available human resources outside of the school when planning student-centered learning activities that include technology.
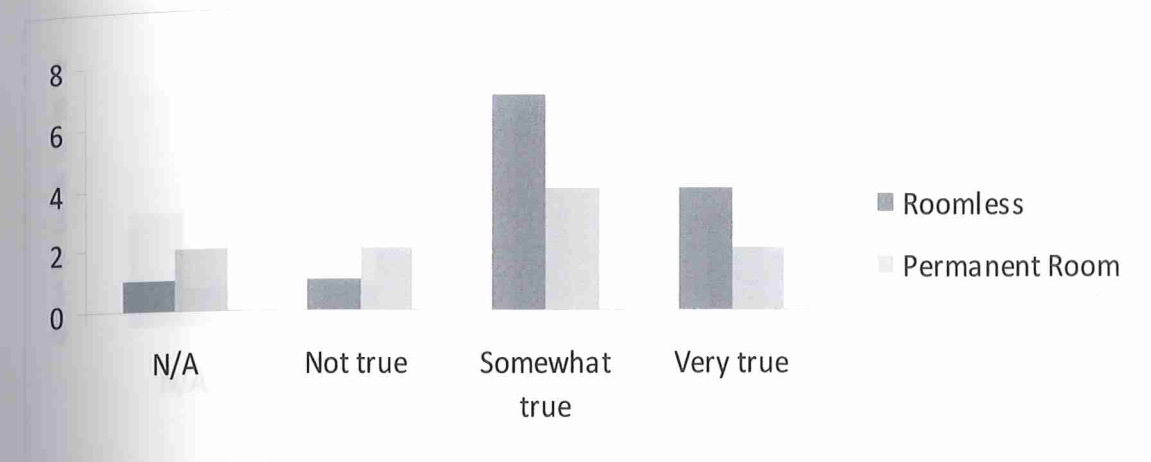
In statement 30 of the questionnaire; I have an immediate need for professional development opportunities that place greater emphasis on using my classroom technology resources with challenging and differentiated learning experiences rather than using specific software applications to support my current lesson plans.; 3 (23%) of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 6 (46%) answered somewhat true and 3 (23%) ,answered very true. of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 2 (18%) answered not true, 6 (55%) answered somewhat true and 2 (18%) answered very true. (see Figure 31).

Figure 31. I have an immediate need for professional development opportunities that place greater emphasis on using my classroom technology resources with challenging and differentiated learning experiences rather than using specific software applications to support my current lesson plans.
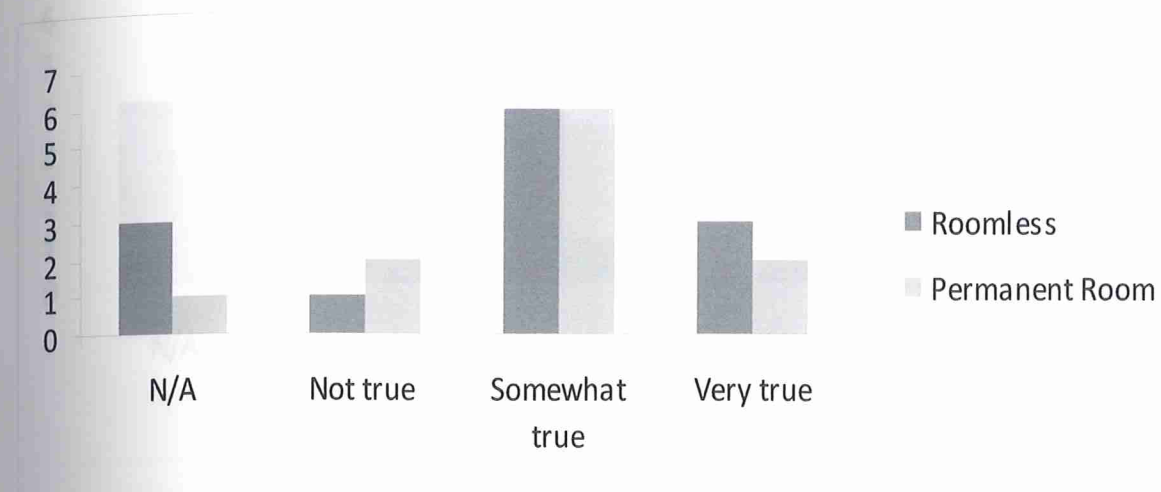
In statement 31 of the questionnaire; My students create their own web pages or multimedia presentations to showcase what they have learned in class rather than preparing traditional reports.; 9 (69%) of the roomless participants answered does not apply to the premise, 3 (23%) answered not true, 1 (8%) answered somewhat true and none of the participants answered very true. Of the permanent classroom participants, 6 (55%) answered does not apply to the premise, 5 (45%) answered not true, none of the participants answered somewhat true and or very true. (see Figure 32).

Figure 32. My students create their own web pages or multimedia presentations to showcase what they have learned in class rather than preparing traditional reports.
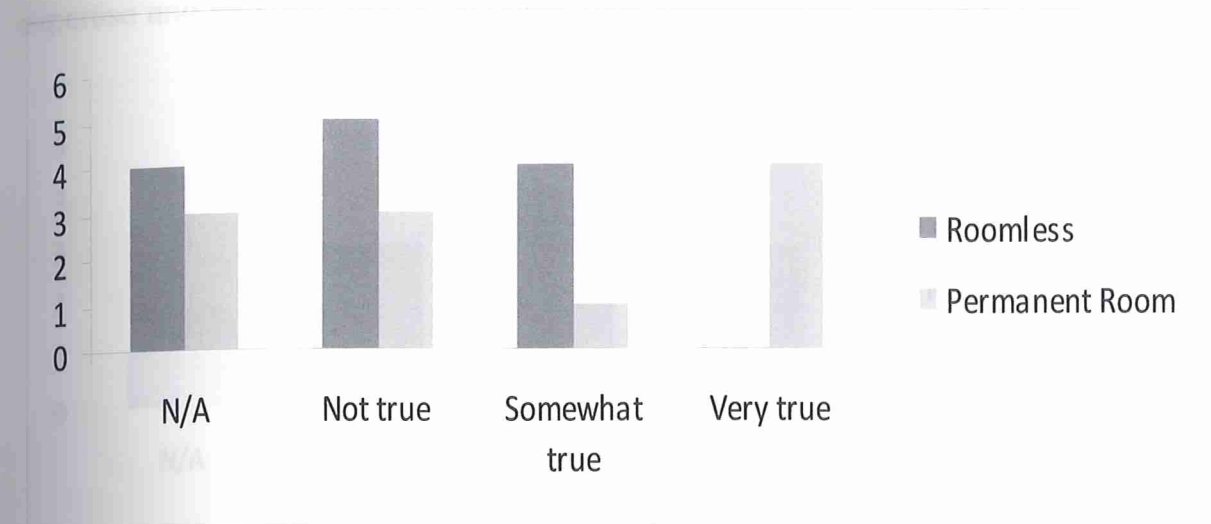
In statement 32 of the questionnaire; The types of professional development offered through our school system do not satisfy my need for more engaging and relevant experiences for my students that take full advantage of both my "technology" expertise and personal interest in developing learner-based curriculum units."; 1 (8%) of the roomless participants answered does not apply to the premise, 3 (23%) answered not true, 4 (31%) answered somewhat true and 4 (31%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 3 (27%) answered not true, 4 (36%) answered somewhat true and 3 (27%) answered very true. (see Figure 33).

Figure 33. The types of professional development offered through our school system do not satisfy my need for more engaging and relevant experiences for my students that take full advantage of both my "technology" expertise and personal interest in developing learner-based curriculum units.
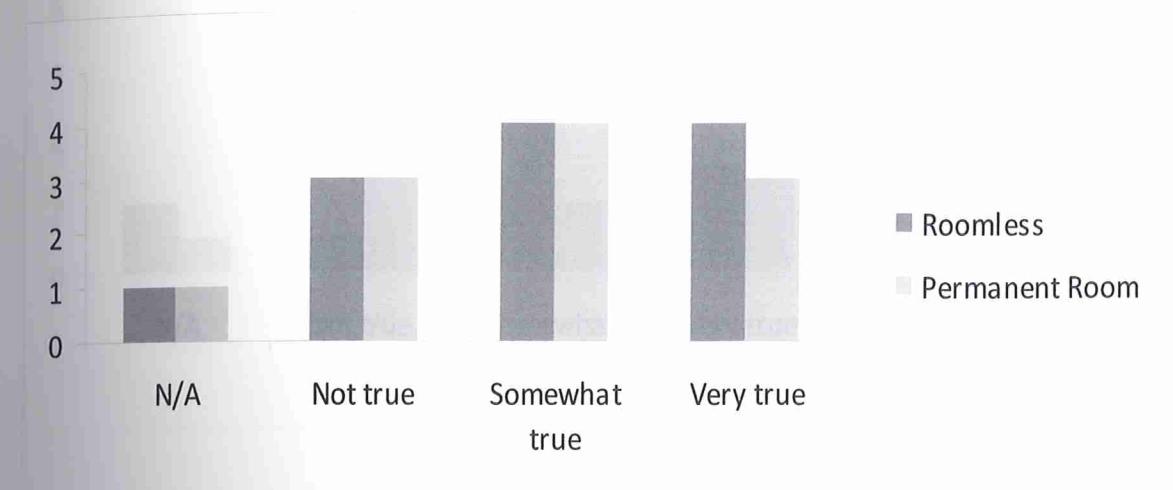
In statement 33 of the questionnaire; Curriculum requirements, scheduling, and/or budget constraints at our school have prevented me from using any of the available technology resources during the instructional day.; 2 (15%) of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 7 (54%) answered somewhat true and 3 (23%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 3 (27%) answered not true, 2 (18%) answered somewhat true and 5 (45%) answered very true. (see Figure 34).

Figure 34. Curriculum requirements, scheduling, and/or budget constraints at our school have prevented me from using any of the available technology resources during the instructional day.
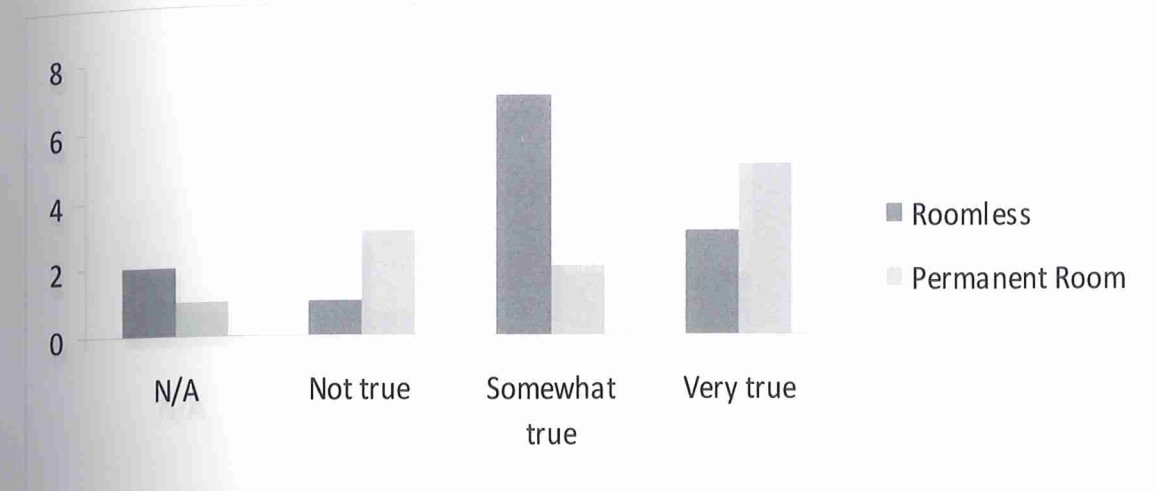
In statement 35 of the questionnaire; I am skilled in merging the classroom technology resources with relevant and challenging, student-directed learning experiences that address the content standards.; 2 (15%) of the roomless participants answered does not apply to the premise, 3 (23%) answered not true, 5 (38%) answered somewhat true and 2 (15%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 1 (9%) answered not true, 2 (18%) answered somewhat true and 7 (64%) answered very true. (see Figure 35).

Figure 35. I am skilled in merging the classroom technology resources with relevant and challenging, student-directed learning experiences that address the content standards.
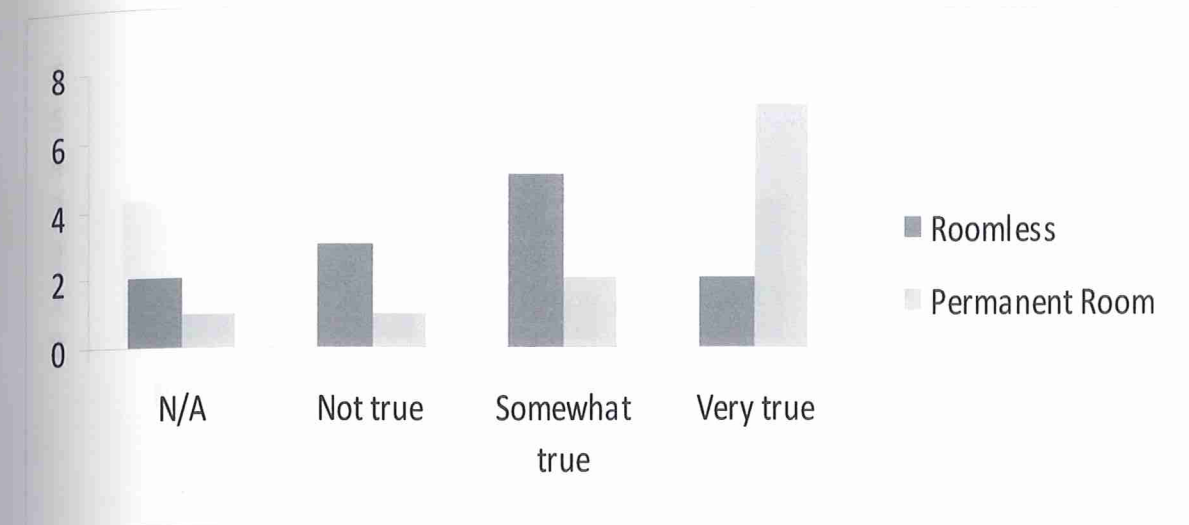
In statement 35 of the questionnaire; My immediate professional development need is to learn how my students can use our classroom technology resources to achieve specific outcomes aligned to the content standards.; 3 (23%) of the roomless participants answered does not apply to the premise, 2 (15%) answered not true, 5 (38%) answered somewhat true and 3 (23%) answered very true. Of the permanent classroom participants 1 (9%) answered does not apply to the premise, 5 (45%) answered not true, 1 (9%) answered somewhat true and 3 (27%) answered very true. (see Figure 36).

Figure 36. My immediate professional development need is to learn how my students can use our classroom technology resources to achieve specific outcomes aligned to the content standards.
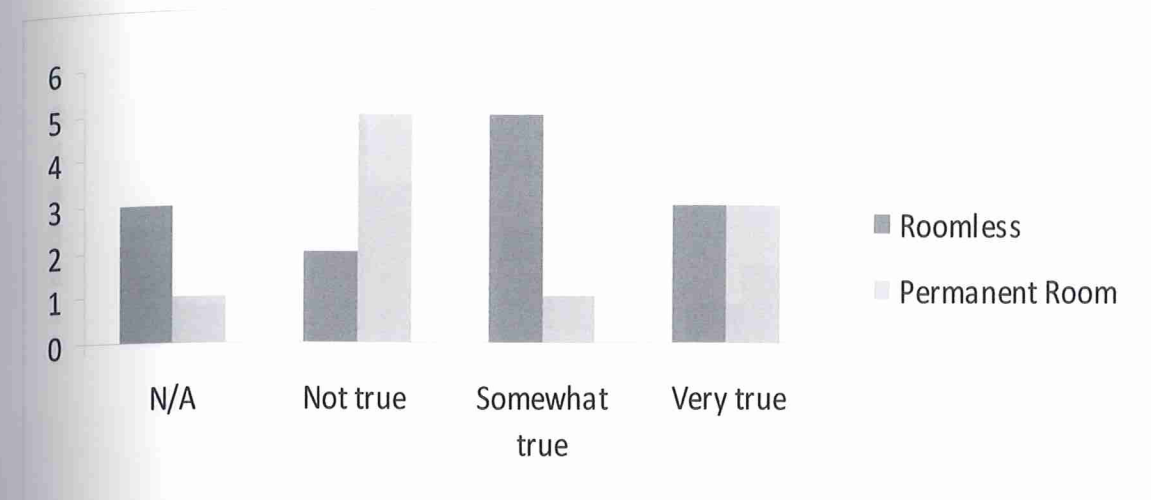
In statement 36 of the questionnaire; It is easy for me to identify and implement software applications, peripherals, and web-based resources that support student's complex thinking skills and promote self directed problem solving.; 3 (23%) of the roomless participants answered does not apply to the premise, 6 (46%) answered not true, 3 (23%) answered somewhat true and 1 (8%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 4 (36%) answered not true, 3 (27%) answered somewhat true and 2 (18%) answered very true. (see Figure 37).

Figure 37. It is easy for me to identify and implement software applications, peripherals, and web-based resources that support student's complex thinking skills and promote self directed problem solving.
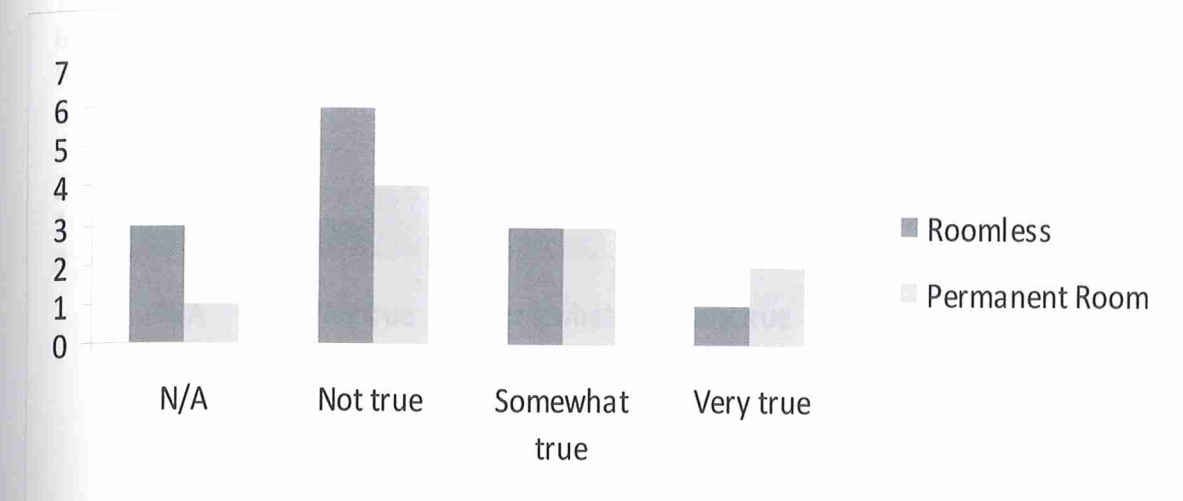
In statement 37 of the questionnaire; I need access to more resources and/or training to begin using the available technology resources as part of my instructional day.; 2 (15%) of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 4 (31%) answered somewhat true and 6 (46%) answered very true. Of the permanent classroom participants, 2 (18%) answered does not apply to the premise, 2 (18%) answered not true, 5 (45%) answered somewhat true and 2 (18%) answered very true. (see Figure 38).

Figure 38. I need access to more resources and/or training to begin using the available technology resources as part of my instructional day.
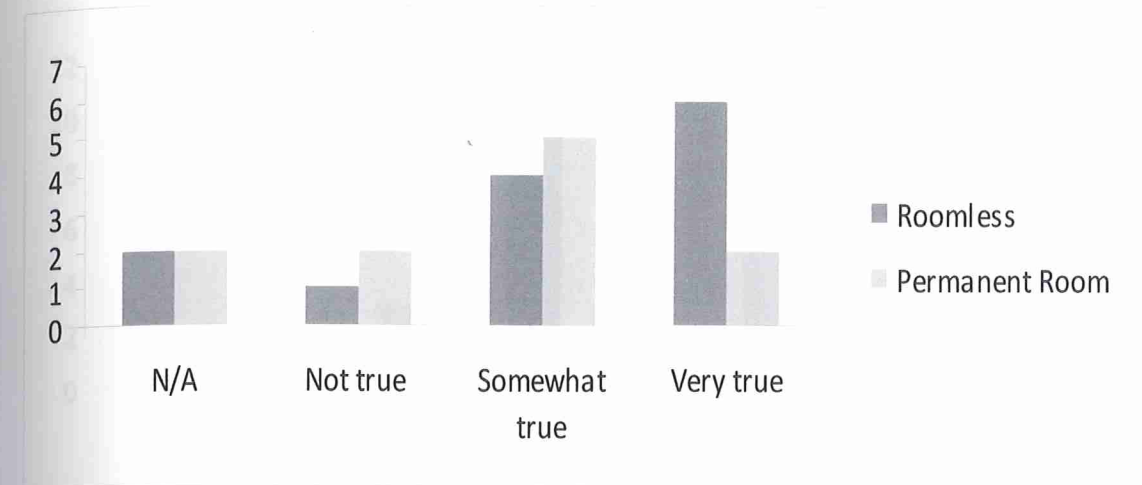
In statement 38 of the questionnaire; I regularly use different technology resources for personal or professional communication and planning.; none of the roomless participants answered does not apply to the premise, 1 (8%) answered not true, 10 (77%) answered somewhat true and 2 (15%) answered very true. Of the permanent classroom participants, 1 (9%) answered does not apply to the premise, 3 (27%) answered not true, 2 (18%) answered somewhat true and 5 (45%) answered very true. (see Figure 39).

Figure 39. I regularly use different technology resources for personal or professional communication and planning.
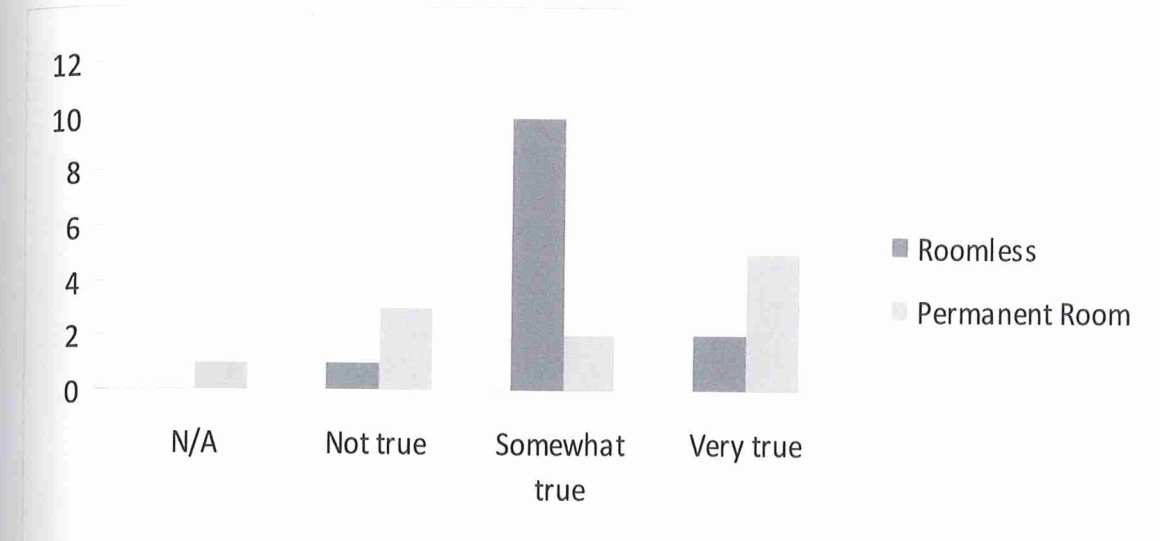
Figure 40 displays the Level of Technology Implementation (LoTi) ranking for the 13 roomless participants from Study. The LoTi profile approximates the degree to which each participant is either supporting or implementing then instructional uses of technology in a classroom setting. Eight of the participants are at Level zero of Technology implementation according to the LoTi analysis, two are at level one, one participant is at level two and two participants are at level three. Based on their answers, the median and mode LoTi Level for the study corresponded with a Level 0 (Non-Use). A Level 0 (Non-Use) implies there is a perceived lack of access to technology-based tools (e.g., computers) or a lack of time to pursue electronic technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector) . (See figure 40).

Figure 40: Level of Technology Implementation (LoTi) roomless participants.
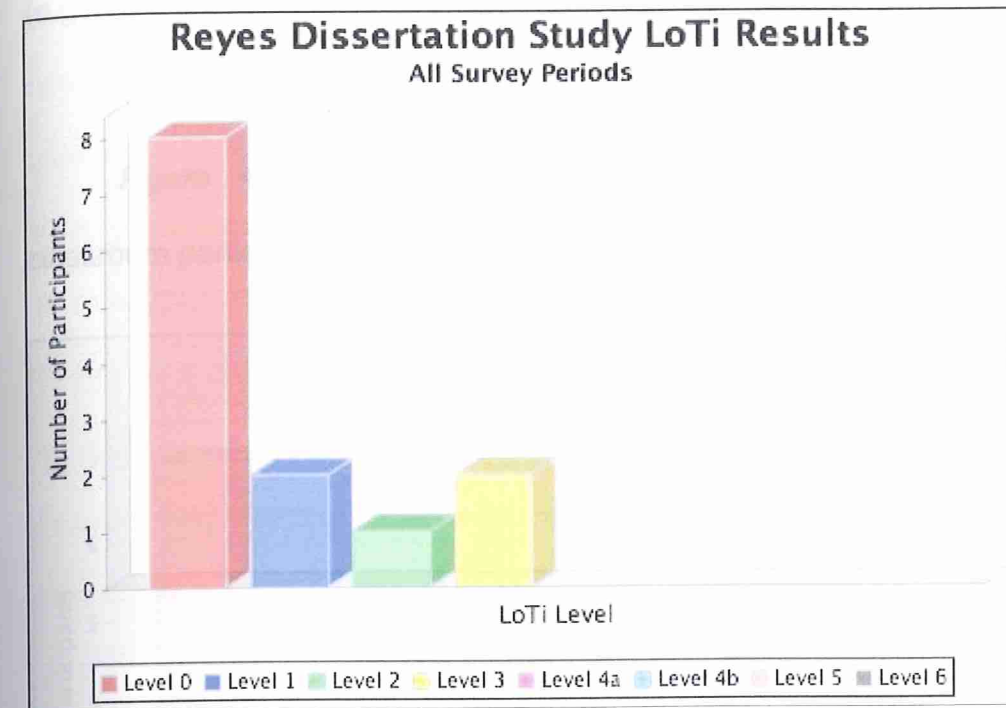
Figure 41 displays the Level of Technology Implementation (LoTi) ranking for the 11 permanent classroom participants. The LoTi profile approximates the degree to which each participant is either supporting or implementing the instructional uses of technology in a classroom setting. Seven participants are at Technology implementation level zero, three participants are at level one and one participant is at level three. Based on their answers, the median and mode LoTi Level for permanent classroom teachers corresponded with a Level 0 (Non-Use). A Level 0 (Non-Use) implies there is a perceived lack of access to technology-based tools (e.g., computers) or a lack of time to pursue electronic

technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector). (See Figure 41).

Figure 41: Level of Technology Implementation (LoTi) permanent classroom participants.
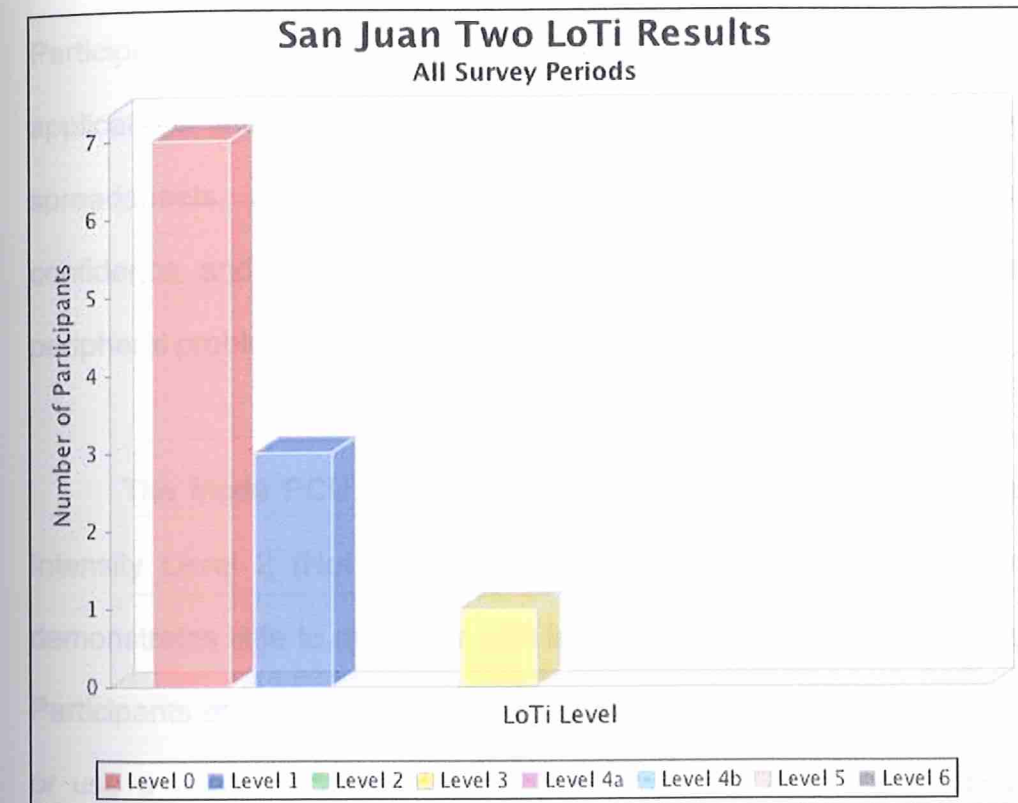
Figure 42 displays the perceptions of the permanent classroom participants toward questions involving their personal computer use. The PCU profile addresses each participant's comfort and proficiency level with using computers (e.g., troubleshooting simple hardware problems, using multimedia applications) at home or in the workplace. Three participants are at PCU Level

two, two participants are at level three, one participant is at level four, two participants are at level four, two are at level five and one participant is at level seven. Based on their answers, the median PCU Level for the permanent classroom participants corresponded with a PCU Intensity of Level 4 (Somewhat True of Me Now). A PCU Intensity Level 4 indicates that the participant demonstrates moderate to high skill level with using computers for personal use. Participants at Intensity Level 4 commonly use a broader range of software applications including multimedia (e.g., Microsoft Powerpoint, HyperStudio), spreadsheets, and simple database applications. They typically have the confidence and are able to troubleshoot simple hardware, software, and/or peripheral problems without assistance from technology support staff.

The Mode PCU Score for the permanent classroom participants is PCU Intensity Level 2 (Not True of Me Now) which indicates that the participant demonstrates little to moderate skill level with using computers for personal use. Participants at Intensity Level 2 may occasionally browse the internet, use email, or use a word processor program; yet, may not have the confidence or feel comfortable troubleshooting simple "technology" problems or glitches as they arise. At school, their use of computers may be limited to a grade book or attendance program.

Figure 42: Personal Computer Use (PCU) Permanent Classroom Participants
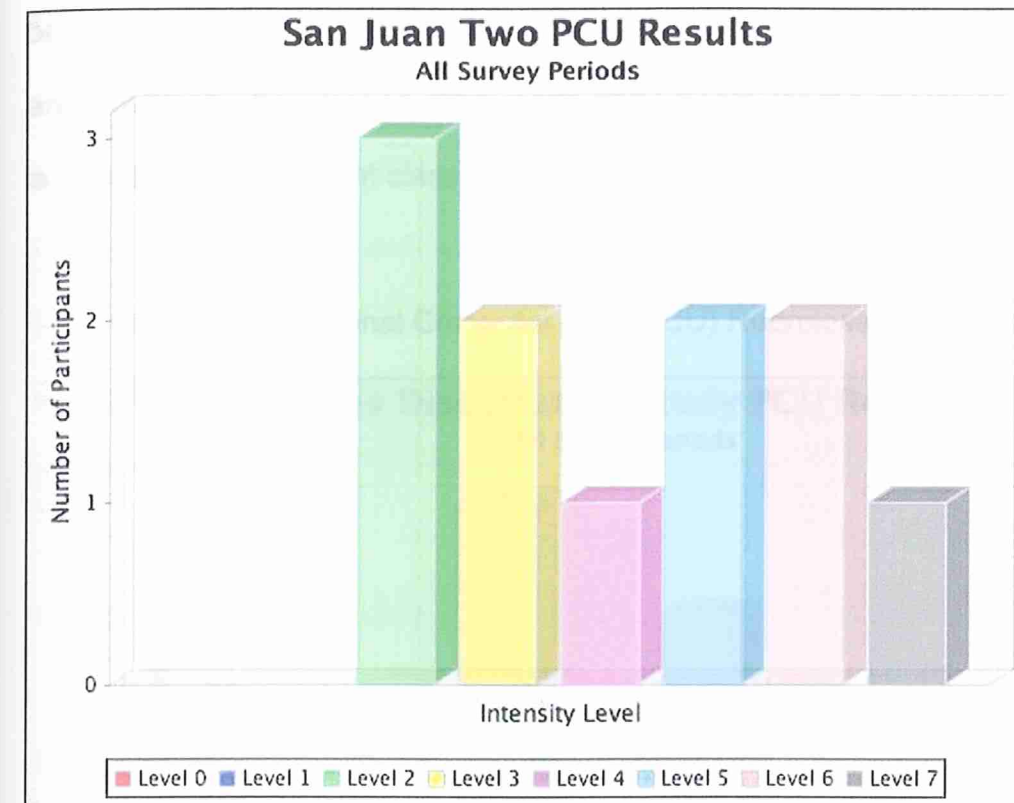
Figure 43 displays the perceptions of the roomless participants toward questions involving their personal computer use. One participant is at PCU level one, four participants are at level two, two participants are at level three, three participants are at level four, one participants is at level five and two participants are at level six. Based on their answers the median PCU Score is PCU Intensity Level 3 (Somewhat True of Me Now). A PCU Intensity Level 3 indicates that the participant demonstrates moderate skill level with using computers for personal use. Participants at Intensity Level 3 may begin to become "regular" users of

selected applications such as internet browsers, email, or a word processor program. They may also feel comfortable troubleshooting simple "technology" problems such as rebooting a machine or hitting the "Back" button on an internet browser, but mostly rely on technology support staff or others to assist them with any troubleshooting issues. The mode PCU Score for the roomless participants is also as the permanent classroom PCU Intensity Level 2 (Not True of Me Now).

Figure 43: Personal Computer Use (PCU) Roomless Participants
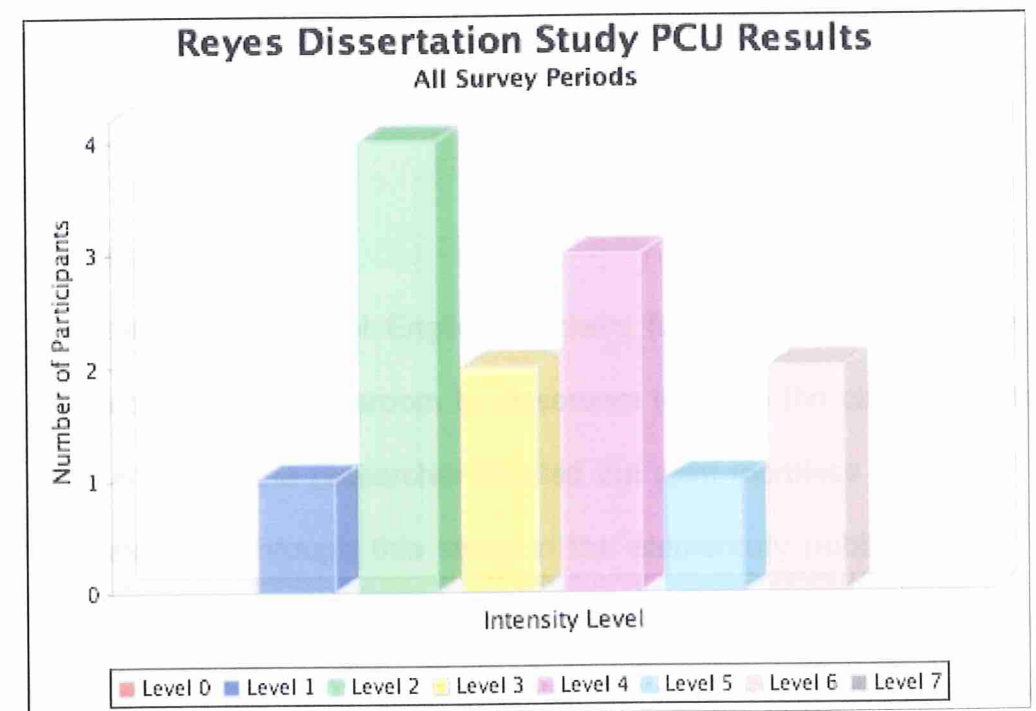
This information was analyzed and interpreted by the LoTi framework as well as by the researcher to answer the research questions proposed in chapter one. The discussion of the results presented on this chapter is offered in chapter five.

Chapter Five

Discussion, Conclusions and Recommendations

Introduction

This chapter presents a discussion of the results of this study. An analysis of the collected data provided by the LoTi services, a tool provided by the LoTi Connection server as part of the implementation of the Level of Technology Implementation' questionnaire is also presented. The implications of the findings, conclusions and recommendations for further studies are also presented in this chapter.

Restatement of the Problem

The elementary school English teachers face a difficult situation when they have to travel from classroom to classroom to teach the class. In order to refer to this situation, the researcher created the term roomless teachers. This situation is explored through this study in the elementary public schools of a school district of a large urban city of Puerto Rico. The Department of Education of Puerto Rico and the No Child Left Behind Act require teachers to implement technology on a regular basis. Is it possible to be a roomless teacher and comply with these requirements? To what extent are teachers able to implement technology? Is there a difference in the level of technology implementation of permanent classroom teachers and roomless teachers? These were questions that this study attempted to answer with the data collected.

Discussion of the Results

Questionnaire findings revealed that 13 (54%) of the participating teachers are roomless and 11 (46%) are permanent classroom teachers. When asked about the existence of a technology resource room in their schools four of the 13 roomless teachers answer positively to the existence of such classroom and equally four out of 11 permanent classroom teachers gave the same answer. It is interesting to report that eight of the 13 roomless teachers do not have a technology resource room in their school while at the same time they do not have a classroom. Questions concerning the classrooms' capacity in terms of technological equipment arise from these finding. At what level it is possible to implement technology in an educational setting if classrooms are not technologically equipped and schools do not an alternative setting for this purpose. To gather more information concerning this situation, more questions needed to be answered.

Infrastructure

When teachers were asked to rate the technological infrastructure of their school, none of the participating teachers rated it as in perfect conditions, 10 out of 24 participants rated the infrastructure as in need of some improvement, 6 of the 24 participants rated it as in need of great improvement and 8 rated it as poor. In complete detriment to the implementation of technology for the pedagogical process, more of the roomless teachers reported having poor technological infrastructure and in need of great improvement. These findings

revealed the importance of assessing the needs of each particular learning community, in order to provide the essential foundations for technology implementation processes.

In the item regarding technical problems preventing the participants from implementing technology, 33 % of the teacher participants answered; does not apply to the premise, 75 % of the participants who answered does not apply were roomless teachers. Over 80 % of the participants considered themselves to be proficient with technological tools and software. In the item regarding having troubles managing a student-centered classroom using the available technology 42 % of the sample answered, does not apply and 70 % of these, were roomless teachers. One can infer that technical problems are not what prevent use of technology but the simple fact that it is not available in their schools. It is important to highlight that the majority of the roomless teachers were the ones who answered does not apply to the technical problems and technology management problems in the classrooms. When analyzing these findings, another important aspect must be taken into consideration; time management. Roomless teachers have a limitation in terms of time to prepare the technological equipments and devices as well as the setting, since they are traveling from classroom to classroom and that is very time consuming. It takes a considerable amount of time for a roomless teacher to turn on the equipment, have the students focused on the target content, prepare the learning environment, give the lesson, turn the equipments off and leave on time for the next classroom.

This is a multi-task skill that takes a great deal of time from a fifty minute class schedule.

Students' Use of Technology

In the item related to the use of current technologies in the classroom as active tools for students to engage in their own learning, a considerable number of participants (75 %) answered; somewhat true of me now and very true of me now. In contrast, in the item regarding the use of web based projects, multimedia presentations and Internet usage, the majority of the roomless teachers (62%) answered does not apply but the majority of the permanent classroom teachers (45%) answered not true of me now.

According to The LoTi profile which approximates the degree to which each participant is either supporting or implementing the instructional uses of technology in a classroom setting. The median and mode LoTi score for the roomless teachers is considered a Level 0 (Non-Use). A Level 0 (Non-Use) implies there is a perceived lack of access to technology-based tools (e.g., computers) or a lack of time to pursue electronic technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector). The median and mode LoTi score for the permanent classroom teachers was also considered a Level 0 (Non- Use). The researcher interprets that based on the findings of this study permanent classroom teacher and roomless teachers are not implementing technology in the teaching learning processes. Regardless if they have a classroom or not, apparently, there is a

low level of technology implementation that should be explored through qualitative studies that can give in depth insight into this phenomenon.

Teachers' Use of Technology

Regarding the item related to the teachers use of technological tools to provide lessons and present information to the students as part of a daily instructional plan, over 50 % of all the participants reported does not apply and not true of me now. In contrast almost all the roomless teachers answered positively to the use of different technology resources for personal or professional communication and planning while 64 % of permanent classroom teachers answered positively. A study with more detailed questions should be conducted in order to explore if there are technology resources available to teachers in their schools. Based on the researcher's experience as a teacher in the public system there is some technology available, but it is either useless, outdated, damaged or requires adequate infrastructure in order for it to function.

The LoTi Personal computer Use (PCU) profile addresses each participant's comfort and proficiency level with using computers (e.g., troubleshooting simple hardware problems, using multimedia applications) at home or in the workplace. In terms of the perceptions of the roomless teachers concerning questions involving their personal computer use; based on their responses, the median PCU Level for this study corresponded with a PCU Intensity of Level 3 (Somewhat True of Me Now). A PCU Intensity Level 3 indicates that the participant demonstrates moderate skill level with using

computers for personal use. Participants at Intensity Level 3 may begin to become "regular" users of selected applications such as the internet, email, or a word processor program. They may also feel comfortable troubleshooting simple "technology" problems such as rebooting a machine or hitting the "Back" button on an internet browser, but rely on mostly technology support staff or others to assist them with any troubleshooting issues.

The perceptions of the permanent classroom participants toward questions involving their personal computer use, based on their responses, the median PCU Level corresponded with a PCU Intensity of Level 4 (Somewhat True of Me Now). A PCU Intensity Level 4 indicates that the participant demonstrates moderate to high skill level with using computers for personal use. Participants at Intensity Level 4 commonly use a broader range of software applications including multimedia (e.g., Microsoft PowerPoint, Hyper Studio), spreadsheets, and simple database applications. They typically have the confidence and are able to troubleshoot simple hardware, software, and/or peripheral problems without assistance from technology support staff.

The mode PCU score of the roomless participants registered a PCU Intensity Level 2 (Not true of me now). A PCU Intensity Level 2 indicates that the participant demonstrates little to moderate skill level with using computers for personal use. Participants at Intensity Level 2 may occasionally browse the internet, use email, or use a word processor program; yet, may not have the confidence or feel comfortable troubleshooting simple "technology" problems or glitches as they arise. At school, their use of computers may be limited to a grade

book or attendance program. The mode PCU score of the permanent classroom participants also registered a PCU Intensity Level 2.

The data analysis performed by the LoTi framework establishes that there is no difference between the level of technology implementation of the permanent classroom teachers and the roomless teachers. On the level of personal computer use the roomless teachers reported lower scores than the permanent classroom teachers. It has to be explored if the roomless teachers reported lower scores because of the lack of access to technology resources. For example a permanent classroom teacher may have at least one computer in the classroom, while the roomless teachers has to ask permission to use the library, the office or another classroom to have access to a computer. From the results obtained, serious and more in depth studies should be conducted in the schools, to explore this situation.

Implications

The findings of this study revealed the lack of or the poor capacity of teachers to develop and implement technology in the teaching learning processes as suggested by the NCLB Act. The opportunities to implement technology under circumstances, such as but not limited to, not having a permanent classroom assigned, multilevel buildings with no elevators, and poor infrastructure, are very low. For the permanent classroom teachers and more so, for the roomless teachers, poor infrastructure conditions are a great disadvantage. Even the most skilled teacher will take around 5 minutes to travel

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from one classroom to another, carrying bags and carts with the technological devices he or she intends to use in a classroom with no equipment. Serious considerations arise when the school organization is complex.

When students are not accustomed to using technology as part of their learning experiences they get easily distracted when technology implementation is attempted. Students may be more focused on the equipment rather than on the content. This situation can be a result of the limitations or constraints but not limited to, technological devices, infrastructure, and time management among some other factors.

The use of technology should be part of the daily teaching learning process and students should see it as a natural event of a daily class. Their attention and focus should be geared towards the content of the class rather than on the means used to provide the content. Teachers should be able to use technology tools to empower the learning process and students should be able to identify technology as powerful learning devices.

Under the current circumstances and from the data collected by this study there are no evident difference among roomless teachers and permanent classroom teachers in terms on technology implementation levels. On the levels of personal computer use, the permanent classroom teachers reported more use than roomless teachers; therefore the LoTi levels are higher for the permanent classroom teacher.

The apparent lacks of technological tools prevents the technology implementation process in the educational environment. These teachers'

reported constant technical problems and need of more precise and effective professional development, as well as the lack of equipment or inefficient infrastructures as the reasons for the low levels of technology implementation. This study was conducted to explore if there were differences between permanents classroom teachers and roomless teachers and their levels of technology implementation. Yet the researcher found no such evidence at this time, under the current circumstances.

Another important finding was that roomless teachers answered do not apply to the majority of the statements regarding the actual technology implementation processes and activities in the educational-learning environment. This again may be as result of the lack of technology resources available to them. Further research must be conducted in order to confirm if this is in fact the reason. An assessment of technology implementation in the schools is needed to determine if the requirements of the NCLB and the Puerto Rico Department of Education are being met.

Delimitations

This study was conducted during difficult times, during a possible strike by the teachers' organization, which may have influenced the emotions and motivation of the participants.

The study was conducted in a single school district of a big metropolitan city. This study is not a representation of the general circumstances of the island

therefore the results of this study cannot be generalized to other school districts unless the characteristics are the same.

Recommendations

More in-depth studies should be conducted in order to assess the true needs and reality of technology implementation within the schools of the public system of Puerto Rico. Observations and interviews may also provide additional information regarding the circumstances of the equipment, infrastructure and teachers' needs for professional development in terms of technology usage and implementation. Assessment of the conditions of existing equipment and if it is really used in the teaching-learning processes is needed.

If the Department of Education wants to meet the requirements of the NCLB Act, a technology needs assessment study should be performed in all school districts. The conditions of technology implementation need to be assessed, since it is the observation of the researcher and information from colleagues of other districts that the Department of Education is purchasing hardware and software that may not be the most appropriate for the students' needs. The administration of the educational system should take in consideration the specific needs of each learning environment and the reality of the community it serves, in order to provide the needed resources.

Based on the findings of this study, the researcher recommends the Department of Education to establish at least one technology resource room per school. This room should be available to the entire school population. For teachers to use the technology resource room an appointment system can be used, in order to provide access to all. Another recommendation is that every teacher should have his/her classroom in order to provide adequate learning environments. The current study indicates the need for teachers' professional development activities and workshops. These professional development activities should be carefully monitored and supervised in order to ensure their effectiveness.

Suggestions for Additional Research

Since this is the first study on this topic, additional research is greatly needed. In depth research should take place, taking into consideration the reality of each learning community. Observations and visual inspections of the existing infrastructures and equipments should provide additional information that may clarify what factors are influencing the implementation of technology at the classroom level. To explore teachers' concepts and beliefs in terms of what is technology, what is technology implementation and how to make this process an effective and natural one, should also be assessed. Which kinds of technology are teachers actually using and implementing in the learning environment will also provide effective data in terms the NCLB Act requirements.

Part of the goals of the researcher is to promote and stimulate interest in the importance of every teacher having a classroom and technology implementation on the English classroom.

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Appendix A

Instrument

Please circle the alternative that best describes your current situation

1	Do you have a permanent Classroom all year long?	Yes	No		
2	Do you have a regular Elementary English Certification?	Yes	No		
3	Is there a technology or computer resource room that is available to you and your students?	Yes	No		
4	How many years have you been teaching Elementary English	1 to 5	6 to 10	11 to 15	16 or more
5	How would you rate the technological infrastructure of your school?	Poor	In need of some improvement	In need of Great improvement	Perfect Conditions

	Read each response and assign a score based on the following scale:	N/A 0	Not true of me now 1	Somewhat true of me now 2	Very true of me now 3
1	I frequently engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the classroom technology resources.				
2	I frequently present information to students using multimedia presentations or electronic "slideshows" to reinforce the content standards that I am teaching and better prepare students to take standardized tests.				
3	I have trouble managing a student-centered classroom using the available technology resources and would welcome the help of a peer coach or mentor.				
4	I frequently assign web-based projects to my students as a means of emphasizing specific complex thinking skill strategies aligned to the content standards.				
5	Using the most current and complete technology infrastructure available, I have maximized the use of the learning technologies in my classroom and at my school.				
6	I use the classroom technology resources exclusively to take attendance, record grades, present content to students, and/or communicate with parents via email.				
7	My students use the classroom technology resources most frequently to improve their basic math and literacy skills via practice testing software, integrated learning systems (ILS), or tutorial programs.				
8	Constant technical problems prevent me and/or my students from using the classroom technology resources during the instructional day.				

Read each response and assign a score based on the following scale:	N/A 0	Not true of me now	Somewhat true of me now 2	Very true of me now 3
9 I am proficient with basic software applications such as word processing tools, internet browsers, spreadsheet programs, and multimedia presentations.				
10 My students frequently discover innovative ways to use our school's advanced learning technologies to make a real difference in their lives, in their school, and in their community.				
11 I can solve most technical problems with our classroom's technology resources during the instructional day without calling for technical assistance.				
12 Locating quality software programs, websites, or CD's to supplement my curriculum and reinforce specific content standards is a priority of mine at this time.				
13 Though I may use technology for teacher preparation, I am not comfortable using my classroom technology resources as part of my instructional day.				
14 I am comfortable training others in using basic software applications, browsing/searching the Internet, and using specialized technologies unique to my grade level or content area.				
15 Computers and related technology resources in my classroom are not used during the instructional day, nor are there any plans to include them at this time.				
16 My students use the Internet for (1) collaboration with others, (2) publishing, (3) communication, and (4) research to solve issues and problems of personal interest that address specific content standards.				
17 Given my current curriculum demands and class size, it is much easier and more practical for my students to learn about and use computers and related technology resources outside of my classroom (e.g., computer lab, resource center).				
18 I use the classroom technology resources most frequently to locate lesson plans I can use in class that are appropriate to my grade level and are aligned with our content standards.				

Read each response and assign a score based on the following scale:	N/A 0	Not true of me now 1	Somewhat true of me now 2	Very true of me now 3
19 My current instructional program is effective without the use of technology; therefore, I have no current plans to change it to include any technology resources.				
20 I use our technology resources daily to access the Internet, send email, and/or plan classroom activities.				
21 Due to time constraints and/or lack of experience, I prefer using instructional units recommended by my colleagues that emphasize complex thinking skills, student technology use, content standards, and student relevancy to the real world.				
22 My students' creative thinking and authentic problem-solving opportunities are supported by the most advanced and complete technology infrastructure available.				
23 My personal professional development involves investigating and implementing the newest innovations in instructional design and learning technologies that take full advantage of my school's most current and complete technology infrastructure.				
24 I have an immediate need for some outside help with designing student-centered performance assessments using the available technology that involve students applying what they have learned to make a difference in their school/community.				
25 My instructional use of our classroom technology resources is frequently altered according to the latest innovations and research in the areas of instructional technology, teaching strategies, and/or learning theory.				
26 I regularly implement a student-centered approach to teaching that takes advantage of our classroom technology resources to engage students in their own learning.				
27 I frequently consider (1) my students' interests, experiences, and desire to solve relevant problems and (2) the available human resources outside of the school when planning student-centered learning activities that include technology.				
28 I have an immediate need for professional development opportunities that place greater emphasis on using my classroom technology resources with challenging and differentiated learning experiences rather than using specific software applications to support my current lesson plans.				

Read each response and assign a score based on the following scale:	N/A 0	Not true of me now 1	Somewhat true of me now 2	Very true of me now 3
29 My students create their own web pages or multimedia presentations to showcase what they have learned in class rather than preparing traditional reports.				
30 The types of professional development offered through our school system does not satisfy my need for more engaging and relevant experiences for my students that take full advantage of both my "technology" expertise and personal interest in developing learner-based curriculum units.				
31 Curriculum demands, scheduling, and/or budget constraints at our school have prevented me from using any of the available technology resources during the instructional day.				
32 I am skilled in merging the classroom technology resources with relevant and challenging, student-directed learning experiences that address the content standards.				
33 My immediate professional development need is to learn how my students can use our classroom technology resources to achieve specific outcomes aligned to the content standards.				
34 It is easy for me to identify and implement software applications, peripherals, and web-based resources that support student's complex thinking skills and promote selfdirected problem solving.				
35 My students have immediate access to all forms of the most advanced and complete technology infrastructure available that they use to pursue problem-solving opportunities surrounding issues of personal and/or social importance.				
36 I need access to more resources and/or training to begin using the available technology resources as part of my instructional day.				
37 I regularly use different technology resources for personal or professional communication and planning.				

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Appendix B

English Zone Supervisor

Authorization Letter

February 26-27, 2008.

English Teachers
School District
Puerto Rico

Dear English Teacher:

I am a graduate student from Universidad el Sagrado Corazón. As a requirement for the master's degree in Sistemas de Instrucción y Tecnología Educativa with a major in English, I have to develop a research investigation. I chose the following topic: **"Roomless teachers: Implications for Technology Implementation".** The purpose of this research is strictly academic.

The study involves answering a questionnaire that has the purpose of knowing the levels of technology implementation of teachers with a permanent classroom and those without a permanent classroom (roomless). Confidentiality and anonymity will be guaranteed, as well as the right to choose not to complete the questionnaire in any moment that you feel necessary.

As English Supervisor, I require your authorization to conduct this study and allow me to administer this questionnaire to the English Teachers of this District. The Department of Education is not responsible for any claim that could arise as a result of your participation in this study.

I greatly appreciate you cooperation and the valuable time you are taking to help me complete my Master's Thesis.

Sincerely yours,

Vilmarie Lugo Reyes
Graduate Student
Universidad del Sagrado Corazón

I as English Zone Supervisor, have been informed and gave the authorization to conduct this study to Vilmarie Lugo Reyes.

_____
English Zone Supervisor Signature

Appendix C

Participants Informed

Written Consent

February 26-27, 2008.

English Teachers
School District
Puerto Rico

Dear English Teacher:

I am a graduate student from Universidad el Sagrado Corazón. As a requirement for the master's degree in Sistemas de Instrucción y Tecnología Educativa with a major in English, I have to develop a research investigation. I chose the following topic: **"Roomless teachers: Implications for Technology Implementation".** The purpose of this research is strictly academic.

The study involves answering a questionnaire that has the purpose of knowing the levels of technology implementation of teachers with a permanent classroom and those without a permanent classroom (roomless). Confidentiality and anonymity will be guaranteed, as well as the right to choose not to complete the questionnaire in any moment that you feel necessary.

The English Supervisor, has knowledge of this study and allowed me to administer this questionnaire to the English Teachers of this District. The Department of Education is not responsible for any claim that could arise as a result of your participation in this study.

I greatly appreciate you cooperation and the valuable time you are taking to help me complete my Master's Thesis.

Sincerely yours,

Vilmarie Lugo Reyes
Graduate Student
Universidad del Sagrado Corazón

I have been informed by Vilmarie Lugo Reyes about the study and I have been asked to participate. I agree to participate in the study by answering this questionnaire.

_____
Teacher's Signature