TECHNOLOGY USE, TEACHERS' ATTITUDES, AND STUDENT MOTIVATION
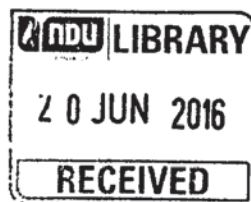
A Thesis
Submitted in partial fulfillment
Of the requirements for the degree of
Master of Arts in Education: School Management and Educational Leadership
Program

By

Lisa A. Der-Bedrossian

Department of Psychology, Education, and Physical Education
Notre Dame University – Louaize
Lebanon

Fall, 2013

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ACKNOWLEDGMENTS

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TECHNOLOGY USE, TEACHERS' ATTITUDES, AND STUDENT MOTIVATION

Lisa A. Der-Bedrossian

Abstract

The purpose of the research was twofold: the first purpose was to discover if the teachers' attitude towards technology influenced the use of technology in class. The second purpose was to detect if students found technology use motivating when teachers used the technology in the classroom. Quantitative research method was used of descriptive design to answer four of the research questions raised in the case study. Through the descriptive statistics, the teachers' attitude, technology use, and students' motivation were analyzed. The research was conducted in a Private Catholic School in the Metn area, Lebanon. Questionnaires were distributed to both the teachers and students to gather statistical data on the teachers' attitudes towards computer use and students' motivation. The results showed high teacher attitude and student motivation scores. The results indicated that all the teachers had a positive attitude towards technology use which in turn influenced the students' motivation in class. The results also showed that technology use was a motivating factor to the students since all had high motivation scores and concentrated more regardless of the teachers' methodology. Although all students concentrated more in class when technology was used, not all found the lesson more interesting through the use of technology. Thus, it was concluded from this research that the teachers' technology use in class highly affected the students' attention and concentration. However, what motivated students

more was the way teachers delivered the lesson through different technology

applications and programs.

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Chapter One

Introduction

Education is one of the many realms where technological advancements have undeniably played a significant role in changing the core of teaching and learning. Since the late 1990's, incorporating technology into the classrooms has been something that both students and parents insist on. One of the very simplest reasons is that technology use motivates students, and when used by both students and teachers, many "unique, powerful, and effective opportunities may arise" (Shelly, 1999, p. 277). However, one of the most common concerns in schools that have newly introduced and imposed technology use on their teachers is the teachers' attitude (Overbay, Patterson, & Grable, 2009). Based on Wiken (2005), students were intrinsically motivated in the classroom once technology was integrated in the teaching-learning process. However, the teachers' attitude and the way they utilized technology in their classroom affected the students' motivation to learn. Thus, the way teachers manipulated technology to deliver instruction was what motivated students rather than technology itself. For that reason, the teacher's attitude towards technology was measured in the research study in order to determine their disposition when it came to the use of technology to deliver instruction in their classes.

A number of researches have been conducted on 1) the effect of technology integration on the attitudes of teachers and their students, 2) the teachers' attitude and perception on their ability to integrate technology, 3) the effect of technology on motivation in EFL classrooms, and 4) motivation in education. However, little has been researched to investigate the effect of the teachers' attitude on the students'

motivation in Lebanon. The present study measured thirteen Lebanese teachers' attitudes towards technology in the Lebanese educational setting. It also measured the 84 students' motivation in relation to the implementation of technology. It is important to mention that the school studied began to encourage the integration of technology as part of instruction during the academic year 2012-2013 by installing the "Promethean Interactive Whiteboard" in every classroom. The curricula in almost all departments were not yet adapted to suit the recent change: technology use in teaching. Since technology tools and usage were not yet set and legitimately imposed as part of the curricula, teachers had the complete freedom to deliver their lessons through the use of technology in ways that they deemed suitable. As a result, teachers were free to bring in their own resources to the classroom. The surveys that were handed to the teachers determined their disposition and attitudes towards technology use in the classroom.

The purpose of the research was twofold. The first purpose was to discover if the teachers' attitude towards technology influenced the use of technology in class. The second purpose was to detect if students found the use of technology motivating when teachers used the technology during the instruction.

Rationale

During the past decade, the private schools in Lebanon have invested significant amount of resources in order to integrate technology use in the classrooms such as smart boards and computers. However, the presence of teachers who develop negative attitude towards technology is inevitable in any school or institution

(Overbay et al. 2009). As a result, the present research may shed light on how the teachers' attitude, technology use, and students' motivation may work together to enhance the teaching learning environment.

Research Questions

- What factor(s) influence(d) the teachers' technology use in class?

- Would the use of Smart Board relate to the teachers' self-perceived degree of technology adoption outlined by the stages?

- Would a teachers' outlook towards technology significantly influence their attitude towards technology?

- What prompted the students' motivation in class? Was it the teachers' attitude towards technology or the use of technology?

As the purpose of the research was twofold, the above research questions were raised throughout the research in order to 1) discover if the teachers' attitude towards technology influenced the use of technology in class and 2) to detect if students found the use of technology motivating when teachers used the technology in the classroom.

Definition of terms

In order to avoid confusion and to better understand the key words used in the research, a brief definition of motivation, attitude, and technology tools is found below.

Motivation. Motivation in the research was defined as "the force that energizes, sustains, and directs behavior toward a goal" (Pinrick & Schunk, 2002 p. 35). Motivation was also described as "the tendency to find academic activities meaningful and worthwhile" (Brophy, 1998, p. 162). In addition, motivation was directly related to the students' engagement in the classroom; the more motivated they were, the more they were engaged.

Attitude. Attitude in the research was defined as ones disposition towards technology use.

Technology tool. It was important to mention that technology tools in the research were limited to: Smart Boards and computers (desktops or laptops).

Chapter Two

Review of Related Literature

Education is one of the many realms where technological tools can be utilized to improve the teaching and learning process. However, one of the most common concerns in schools that newly introduce and impose technology use on their teachers is the teachers' resistance to change (Alexiou-Ray, Wilson, Wright, & Ann-Marie Peirano, 2003, p.59). Some teachers continue to welcome and embrace change as part of their new challenge while others develop a negative attitude towards technology from fear of failure or the unknown (Overbay et al., 2009).

According to Teo (2012), the teachers' attitude towards technology highly depended on the way computers were utilized in the classrooms. Teachers usually tended to avoid the integration of technology into their teaching when they developed a conviction that technology use would neither be fruitful to them nor the students.

Based on Diem (2000), teachers became more productive and developed a positive attitude towards technology once they were given the required support pertaining to technology use. On the other hand, teachers developed a negative attitude when technology use was imposed on them without being provided with technical support. Thus, based on Bataineh & Brooks (2003), organizing workshops and tutorials ahead of time would "[magnify] the advantages of incorporating technology while diminishing the disadvantages" teachers face (p. 473). Accordingly, teachers' attitude towards technology would play an integral role in affecting the students' motivation and interest in any subject matter. Therefore, based on Diem

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(2000), the teachers' positive attitude towards technology allowed them to use technology more freely whereas the negative attitude hindered them from using technology properly mainly due to the lack of technical support.

Motivation "is a force that energizes, sustains, and directs behavior toward a goal" (Pintrick & Schunk, 2002, p. 35). Based on Eggen and Kauchak (2006), motivated students found learning interesting and studying enjoyable since they believed that the attained information was valuable and worth to understand. Furthermore, based on Williams & Williams (2011, p. 1), "motivation [was] probably the most important factor that educators could target in order to improve learning."

Mackay (2006) conducted a research in which he measured the impact of technology on student motivation and achievement in Grade Nine music classes. The results of the study showed positive outcomes, and the "data collected showed that computer-based technology was a motivating factor in engaging the students with the subject and also showed that the students could take charge of their own learning and assimilate the required concepts successfully" (p, 45). That showed that the use of technology could act as a motivating factor to students even in Music class.

In addition, the teachers' attitude towards technology was extremely important since according to Tolmie (2002), the presence of technological equipment in the classroom alone did not necessarily promote the students' learning. Accordingly, many factors had to be considered when integrating technology in the educational setting such as 1) administration, students, parents, and teacher's attitude towards technology, 2) the educator's teaching style and philosophy, 3) the subject and

Chapter One

Introduction

Education is one of the many realms where technological advancements have undeniably played a significant role in changing the core of teaching and learning. Since the late 1990's, incorporating technology into the classrooms has been something that both students and parents insist on. One of the very simplest reasons is that technology use motivates students, and when used by both students and teachers, many "unique, powerful, and effective opportunities may arise" (Shelly, 1999, p. 277). However, one of the most common concerns in schools that have newly introduced and imposed technology use on their teachers is the teachers' attitude (Overbay, Patterson, & Grable, 2009). Based on Wiken (2005), students were intrinsically motivated in the classroom once technology was integrated in the teaching-learning process. However, the teachers' attitude and the way they utilized technology in their classroom affected the students' motivation to learn. Thus, the way teachers manipulated technology to deliver instruction was what motivated students rather than technology itself. For that reason, the teacher's attitude towards technology was measured in the research study in order to determine their disposition when it came to the use of technology to deliver instruction in their classes.

A number of researches have been conducted on 1) the effect of technology integration on the attitudes of teachers and their students, 2) the teachers' attitude and perception on their ability to integrate technology, 3) the effect of technology on motivation in EFL classrooms, and 4) motivation in education. However, little has been researched to investigate the effect of the teachers' attitude on the students'

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the computer based instruction was more enjoyable than the traditional instructional methods. It can be concluded from this research that more than 70% of the student population were motivated through the use of technology, and more than 60% of the population found it more enjoyable to learn through the use of technology rather than traditional methods of teaching. Based on the students, however, the daily use of technology would end up being "boring". Given what the students have said, it can be concluded that technology use can be a very motivating factor only if used moderately.

Since technology use in the Catholic School where the research was carried out was limited to interactive boards and computers, the study conducted by Beeland (2002) was highly significant. Beeland (2002) conducted an action research to determine the effect of the use of interactive whiteboards as an instructional tool on student engagement. The participants in the research were 10 middle school teachers and 197 students. By the end of the study, it was found that the use of interactive whiteboards led to the significant increase in the students' engagement in the learning process.

According to Beeland (2002), the use of interactive boards targeted the needs of the learners as it was categorized based on the three modalities of learning; visual, auditory, and kinesthetic. Visuals including PPT presentations aided the visual learners. Listening activities such as audio books, oral presentations, or speeches aided auditory learners. Finally, activities that involved movement aided kinesthetic learners. As a result, teaching became exciting, effective, and most importantly motivating to the students. Thus, students exhibited motivation and displayed more

engagement in the classroom. Therefore, the effective use of technology played an integral role in raising the students' motivation in class (Beeland, 2002).

Gourneau (2005) asserted that the teacher's attitude was important as it affected students' positively and resulted to a major change in their life. Furthermore, students were motivated when their teachers came up with lessons that incorporated their interests and needs. In addition, through motivation, students "[became] agents of their own learning" (p. 2). That showed that the teachers' attitude had a direct impact on students' motivation.

Christensen (2002) conducted a research on the "Effects of Technology Integration Education on the Attitudes of Teachers and Students." Based on the research, Christensen found that the effects of technology integration in education had a direct effect on the teachers' and students' attitudes. Teacher training regarding technology was found to be crucial as it reflected the way teachers manipulated and used technology in the classroom. Therefore, technology integration affected the teachers' attitudes by allowing them to perceive the importance of the roles computers played in the classroom. Once teachers became confident while using the technology, their anxiety was automatically reduced. For that reason, Christensen (2002) suggested ongoing funding for technology integration in order to make a significant difference in the education of students through the use of technology. That implied that training opportunities would be essential in boosting the teachers' attitude towards technology use.

In addition, based on the Academy for Educational Development (AED, 2005), research showed that the use of Information Communication Technology (ICT) in the classrooms promoted the learning process in numerous ways such as:

1) allowing materials to be presented in multiple media for multichannel learning; 2) motivating and engaging students in the learning process; 3) bringing abstract concepts to life; 4) enhancing critical thinking and other higher levels of cognitive skills and processes; 5) providing opportunities for students to practice basic skills on their own time and at their own pace; 6) allowing student use the information acquired to solve problems, formulate new problems, and explain the world around them; 7) providing for access to worldwide information resources; 8) offering the most cost-effective means for bringing the world into the classroom; and 9) granting teachers and students a platform through which they can communicate with colleagues from distant places, exchange work, develop research, and function as if there were no geographical boundaries (AED, p. 7).

Furthermore, Rana (2012) conducted a research in one of the schools in India whereby she assessed the "Teacher Educators' Attitudes toward Technology Integration in Classrooms." The participants in her Study were 21 male and female teacher educators from a prestigious school in North India. She hypothesized that 1) teacher educators do not have positive attitude towards technology ICT, 2) there was no significant difference in the attitude of teacher educators in relation to their gender, and 3) there was no significant difference in the attitude of teacher educators in relation to their age. She used the "Teacher Educators' Attitude towards ICT" scale by

Sharma, 2010 to measure the teachers' attitudes. After conducting the survey and analyzing the mean value of the teacher educators' scores and the mean value of the subscales, she found that teachers had positive attitudes towards technology use. Thus, her initial hypothesis was proven to be wrong. In addition, the summary of the teachers' scores on their attitude towards ICT with respect to their gender and age were analyzed. Her results showed that there was no significant difference between the teachers' attitude towards technology with respect to their gender and age. To conclude, most of the participants in her research had a positive attitude towards technology regardless of age and gender. Once again, the assumption that teachers developed negative attitudes towards technology was related to barriers such as lack of training opportunities. Therefore, such opportunities could make teachers feel more comfortable towards the use of technology. The positive attitudes developed would then act as a catalyst towards a better education.

To add, Al-Zaidiyeen, Mei, and Fook (2010) conducted a research in Jordan on the "Teachers' Attitudes and Levels of Technology Use in Classrooms: The Case of Jordan Schools." The results indicated that the teachers had a positive attitude towards technology and their attitudes highly reflected the way they used the ICT in their classrooms.

Coming to the Lebanese setting, Mo'dad (2011) conducted a research in Lebanon on "The Effect of The Teachers' Attitudes and Perceptions on Their Ability to Integrate Technology." Her study was conducted in five different schools in Beirut through three data collection methods; teachers' attitude scale, questionnaire, and semi-structured interviews. Based on her research, the Lebanese teachers considered

the integration of technology as "a set of activities that motivated students" rather than an essential component that enhanced the teaching-learning process. In addition, she mentioned two types of barriers, first and second order barriers that she felt had to be identified and understood in order to come up with effective technology integration plans. The first order barriers were those that were extrinsic to teachers such as the lack of available resources, lack of time, and teaching only for tests. Second order barriers, however, were those that were intrinsic to teachers such as the teachers' beliefs, perceptions, and roles in the process of implementing technology in their classes. Considering the two barriers was important since little research was done in Lebanon to identify the barriers that restrain the smooth integration of technology (Mo'dad, 2011).

Mo'dad (2011) found that Lebanese teachers, especially in five of the schools where her research was conducted, did not integrate technology in their classes due to first order barriers: teaching for the official exams. Furthermore, the Lebanese curriculum did not impose the integration of technology in teaching. Thus, teachers in Lebanon avoided using technology in teaching. Also, it was found that the teachers' attitudes and perceptions of technology highly affected its integration into their teaching. Lastly, Mo'dad (2011) stated that "effective technology integration can be achieved by demoting the effect of first order and second order barriers." Finally, since second order barriers are highly personal and cannot be directly spotted, emphasizing the effectiveness of technology in education would aid schools evade second order barriers and increase the students' attitude toward technology use (p. 93).

In addition, Sabieh (2011) conducted a research on the adoption of interactive whiteboards (IWB) in a university setting. Sabieh's research centered around analyzing:

1) the role of the educator, 2) the role of training to use technology in education setting, and 3) role of training to use interactive whiteboard effectively to enhance teaching and learning setting (pp. 1036, 1037). She concluded that when the participants did not receive fruitful and productive training opportunities to carry out hands-on activities through the IWB, the outcome did not lead to a "win-win" situation. The educators felt they had the "lack of application knowledge" which resulted from the training opportunities that had not effectively enhanced the teaching learning setting. To conclude, she gave three recommendations regarding the use of Interactive White Boards:

- To hold workshops to help educators create content based interactive teaching/learning lesson plans, active learning opportunities, and assessment rubrics.

- To conduct hands-on training to build confidence and familiarity in the use of interactive whiteboards.

- To conduct hands-on and follow up workshops to train practitioners to use the technology interactively and effectively to enhance the teaching and the learning climate (p, 1038).

Moreover, Newby, Stepich, Lehman, and Russell (2006) asserted that the barriers towards technology integration in schools or institutions could be surmounted

- Work with administrators and the district's technology committee to develop and implement a technology plan;

- Work with teachers to support and promote technology integration;

- Plan and oversee hardware and software purchases and installations;

- Install and maintain the school's computer network;

- Maintain up-to-date records of the school's hardware and software;

- Arrange for, or conduct, repairs of equipment;

- Assemble and disseminate information about instructional technologies;

- Write grants to seek support for the school's technology activities;

- Provide in-service training for faculty and staff (p. 266).

Also asserted by Newby et al. (2006), Issues such as training, planning, and support were one of the most prominent factors that had to be considered when attempting to integrate technology in teaching. Without training, planning, and support, teachers developed a negative attitude that influenced their technology use in the classroom.

Additionally, Duffy, McDonald, and Mizell (2005) affirmed that in order to maximize the students' learning potential, teachers had to develop a positive and caring attitude. For that reason, lessons had to be designed in such a way that promoted the learners' self-confidence and positive attitude. However, many factors such as workload inhibited the teachers from creating effective classroom environments and triggered the development of negative attitude. Therefore, workload shifted the teachers' attention from important duties.

For that reason, Duffy et al., (2005) suggested the usage of a learning environment rubric to help teachers be consciously aware of the processes that

encouraged learning. The rubric evaluated the effectiveness of the learning environment across three dimensions: physical space, classroom climate, and attitudes. To them, effective learning environments were those that 1) met the needs of most learners and the student arrangement promoted safety and positive interaction, 2) the climate was flexible and met most learners' needs, minimal competitiveness was in evidence, and active learning was supported, and 3) teacher attitude was mostly positive, friendly, and nurturing. Thus, students appeared confident and were usually risk takers (p. 209). These all showed that the teacher's attitude played a significant role in either fostering or impeding the students' enthusiasm and motivation in the classroom. For that reason, displaying a positive attitude was the key to having a successful classroom environment.

In Wiken's (2005) research on "The Effect of Technology on Student Engagement, Motivation, and Interest," he found that technology integration itself did not have a direct effect in triggering the students' engagement, motivation, and interest. However, the approach by which technology was implemented in the teaching affected all three factors. For that reason, he suggested teachers' enthusiasm and motivation be paired with technology use for effective results. In the end, he believed that the use of technology motivated the students intrinsically due to the use of computers. Lastly, Wiken (2005) recommended that schools provide teachers with training and resources in order to feel their sense of achievement while motivating their students through technology use.

In summary, the literature revealed that the teachers' attitude towards technology could be both positive and negative. The negative attitude, however, can

always be turned into a positive one through guided support such as training opportunities and tutorials. Moreover, the teachers' attitude, positive or negative, may greatly influence the students' motivation in the classroom. For that reason, the teachers' positive attitude towards technology could be essential to bring about a generation of motivated learners through the use of technology in class. In Mo'dad's research (2011), the Lebanese teachers were prone to avoiding technology use in their classes due to second order barriers. Thus, the current research may have value as its purpose was twofold: 1) to discover if the teachers' attitude towards technology influenced the use of technology in class, and 2) to detect if students found it motivating when teachers used technology in the classroom.

Chapter Three

Methodology

In the methodology chapter the researcher practitioner included detailed information about the participants, design, instruments, and procedures.

Participants

The participants were 84 intermediate level students and 13 intermediate/secondary teachers from a Catholic school in the Metn area, Lebanon. This particular school was selected since the educator-researcher was a teacher in the school. Eighty four intermediate level students and 13 intermediate/secondary teachers were selected based on convenience sampling. The researcher collected data from the students that she taught and the intermediate teachers who were willing to participate in the research. Thus, eighty four male and female intermediate level students, 13 to 16 years of age, Grades 8 and 9 American Program, participated in the research. In addition, 20 male and female teachers who had access to technology use in their classes were asked to participate in the research. However, only the following thirteen teachers returned the surveys: Art, Biology, Physics, Chemistry, Math, SAT, History, Geography, Arabic, French, and English. Twenty three percent of the teachers who participated were males and 77% of the teachers were females. Sixty two percent of the teachers were 21 to 30 years old, 15% of the teachers were more than forty years of age, and 23% of the teachers were 31 to 40 years of age. As for the years of experience, 15% of the teachers had 1-2 years of experience. In addition, 31% of the teachers had 3-5 years of experience, 31% had six to ten years of experience, and 23% had more than ten years of experience. Forty six percent of the teachers held

a Masters Degree, 31% Bachelors Degree, 15% Bachelors Degree and a Teaching Diploma, and 8% Teaching Diploma. The profile of the students and teachers were collected to describe the sample. The case study took place during the academic year 2012-2013.

Instruments

Four instruments were used in the research to gather the data.

1. Teachers' Attitudes Toward Computers Questionnaire (CAQ);

2. Student Motivation Survey;

3. Student Perception of Teacher Survey (SPT);

4. Teacher's Self Profile Survey (TSP).

1. Teachers' Attitudes Toward Computers Questionnaire (CAQ)

The first instrument was the modified version of Teacher's Attitude toward Computers (TAC) survey originally created by Knezek & Christensen (1997) University of North Texas (See Appendix A). The instrument was used to measure the teachers' attitude towards computers. The instrument consisted of 10 parts 8 of which consisted of Likert scale for answers. Part 1 targeted the teachers' interest; part 2, comfort; part 3, accommodation; part 4, interaction; part 5, concern; part 6, utility; part 7, perception; part 8, absorption; part 9, significance. The instrument was very reliable as the reliability coefficients of all the 9 parts ranged from 0.83 to 0.97 based on the institute for the integration of technology into teaching and learning.

2. Student Motivation Survey

The second instrument was the Student Motivation Survey that was originally created by Christensen & Knezek (1997) but modified by Beeland (2002) (See Appendix B). According to Beeland (2002), the students' classroom engagement depicted how motivated they were to learn. For that reason, the purpose of the instrument was to measure the students' attitude towards Smart Boards which reflected their motivation and engagement in class. The survey used the Likert Scale whereby the participants selected one of the 5 responses to a series of questions; strongly agreed (SA), agreed (A), were undecided (U), disagreed (D), or strongly disagreed (SD).

3. Student Perception of Teacher Survey (SPT)

The purpose of the Student Perception of Teacher Survey (SPT) was to gather statistical data on the teachers' disposition and attitudes towards technology use in class (See Appendix C). In addition, the purpose was to check whether students' found the way teachers used technology in class motivating.

4. Teacher's Self Profile Survey (TSP)

Through the Teacher's Self Profile Survey that was handed to the teachers, the researcher assembled statistical data on the demographic information of the participants and their disposition towards the use of computers/technology (See Appendix D).

To conclude, the four instruments allowed the researcher to collect data on the teachers' attitude, technology use, and student motivation.

Ethical considerations

The goodwill of the students and teachers were protected at all times. The surveys were done anonymously and served only the purpose of the research. The students and teachers were informed of the purpose of the study and their answers were kept confidential.

Design

The case study was a quantitative research method of descriptive design. Descriptive methodology was used whereby the participants answered surveys related to attitude towards computer use and motivation. The results determined whether the teachers' attitude towards technology influenced the use of technology in class. Next, the results determined whether the use of technology in the classroom was motivating to the students. The three variables in the research were 1) the teachers' attitude, 2) technology usage, and 3) students' motivation. The data was collected in a form of surveys to determine the results by calculating the percentage score of each item. Surveys were used in this research since they were less time consuming and more efficient than the interview. In addition, the surveys allowed the collection of data from a much larger sample (Gay, Mills, & Airasian, 2009, p.187). To conclude, having used descriptive data, the researcher was able to address the three variables; teachers' attitude, technology use, and student motivation. In the following chapter, the procedures are discussed.

Procedures

The Student Motivation Survey was given to 84 students who filled in the surveys during the last ten minutes of the English period. At the end of the survey, the students were asked to write the names of the teachers who used the technology in their classes. After having identified the teachers' names, the Teachers' Attitudes toward Computers Questionnaire and the Teacher's Self Profile Survey (TSP) was given to 20 teachers. They were asked to return the survey in two days. Only thirteen teachers filled and returned the surveys. Last, the Grade 8 and 9 students filled in the Student Perception of Teacher Survey through different intervals to gather data about the way they perceived each of their teachers' technology use in class.

Chapter Four

Results and Discussion

Survey results were compiled and analyzed using percentages. In addition, the data was analyzed through descriptive statistics to answer the research questions below:

- What factor influenced the teachers' technology use in class?

- Would the use of Smart Board relate to the teachers' self-perceived degree of technology adoption outlined by the stages?

- Would a teachers' outlook towards technology significantly influence their attitude towards technology?

- What prompted the students' motivation in class? Was it the teachers' attitude towards technology or the use of technology?

Moreover, the data was cross tabbed in order to further understand the teachers' attitudes and students' motivation through technology use. The overall results showed positive teacher attitude and student motivation scores.

Research Question 1

What factor influences the teachers' technology use in class?

To answer the first research question, thirteen intermediate teachers were asked to rate their attitude towards computers based on interest, comfort, accommodation, interaction, concern, perception, absorption, and significance. Figure 1 below

indicated the average score of the teachers' attitude towards computers based on interest, comfort, accommodation, interaction, concern, perception, absorption, and significance.

Figure 1: Average score of the teachers' attitude survey

		Part I	Part II	Part III	Part IV	Part V	Part VI	Part VII	Part VIII	Part IX
		Interest	*Comfort*	*Accom.*	*inter.*	*Concern*	*Utility*	*Perc.*	*Abs.*	*Sign.*
hers' ng of nit d on ale	**Range** (low-mid-hight)	16-36-56	38-30-22	47-33-19	10-30-50	46-30-14	10-30-50	7-28-49	18-32-42	18-42-66
	Average	48.2	23.3	22.4	36.9	30	36	41	33.3	56.7
	Sd.	3.45	5.31	4.78	6.62	7.51	4.11	4.99	3.62	4.90

Based on the rating of unit based on scale, all teachers showed a positive attitude when it came to the following unit parts: interest, accommodation, interaction, utility, perception, and significance. Each unit part was given a range belonging to that particular unit.

The results showed that the teachers had an overall positive attitude towards technology use since their average score in interest was 48.2; comfort, 23.3; accommodation, 22.4; interaction, 36.9; concern, 30; utility, 36; perception, 41; absorption, 33.3; and significance, 56.7. The results were in line with the findings of the studies by Al-Zaidiyeen et al. (2010) in Jordan; Aslam et al. (2013) in Pakistan; and Enayati, Modanloo, and Mir Kazemi (2012) in Iran, whereby teachers exhibited positive attitudes towards the use of technology in education.

Research Questions 2 and 3

Does the use of Smart Board relate to the teachers 'self-perceived degree of technology

adoption outlined by the stages? And Would a teachers' outlook towards technology significantly influence their attitude towards technology?

In order to answer the second and third research questions, the teachers' comfort, perception of themselves, and disposition towards technology use were analyzed. In addition, the variation of the teachers' perception of their technology adoption stage and the students' perceptions of their teachers were analyzed (See Appendix A).

Art teacher

The Art teacher had a high comfort score and believed she fell under stage 5. She thought that the computer was a tool to help her and she was no longer concerned about it as technology. She could use it through many applications and as an instructional aid. In addition, she encouraged technology use in class as its use was very beneficial. This showed that she had a positive attitude towards technology use. Unfortunately, she had no Smart Board in her class. To conclude, the Art teacher had a high comfort score and seemed to be technologically skilled. However, she had no SB in her class.

Biology teacher

The Biology teacher had a high comfort score and believed she fell under stage 6. The students' perception of the Biology teacher and what they had indicated about her technology skills matched the teacher's self-perception. The teacher believed she was at a stage where she could apply what she knew about technology in the classroom and was able to use it as an instructional tool. In addition, she believed she integrated technology into the curriculum. Her attitude towards technology was positive since she believed its

use targeted different types of learners especially the visual ones. To conclude, the Biology teacher had a high comfort score, was technologically skilled, and her attitude towards technology use was very positive. As a result, the students were very motivated. Based on Aslam, Ishtiaq, & Naseer-ud-Din's research in Pakistan (2013), it was found that technology oriented instruction highly motivated students and triggered their motivation in the classroom during the Science class.

Physics teacher

The Physics teacher had a high comfort score and believed she fell under stage 5 where she thought about the computer as a tool to help her. She believed she was no longer concerned about it as technology and she could use many computer and media files as an instructional tool. However, the students' perception of the Physics teacher was quite different. They believed she did not use many technology applications in class and that made her class dull. In addition, the majority of the students believed that the teacher used the Smart Board as a whiteboard and didn't take advantage of what was offered by the Smart Board. Therefore, there was discrepancy between the teacher's perception of herself and the students' perception of the teacher. Although the teacher saw herself as a person who was quite technologically advanced, the students saw otherwise. In addition, the Physics teacher believed that technology should be introduced in the classrooms; however, it should not replace the books. This showed that the Physics teacher had a positive outlook towards technology only when used in parallel with books. To conclude, the physics teacher had a high comfort score and used technology as an instructional tool. However, she believed technology should not

replace books. As a result, students were not motivated.

Math teacher 1

The Math teacher had a good comfort score; however, she believed she fell under stage 4. The students' perception of the Math teacher matched the way she perceived herself. The students believed that the teacher used the Smart Board and the many technology applications; however, she still was not very comfortable using it. The teacher herself believed that she was gaining a sense of confidence in using the computer for specific tasks. She also believed that she was starting to feel comfortable using the computers. The teacher said she used the Smart Board because it was the only available board in class. In addition, she believed both the students and her were interested when the concepts were introduced with colors and animations. She believed they both felt that they were up to date and technology made the teachers' work easier in many aspects. The teacher also believed that technology use should be limited to few hours a month since the use of technology with all the drawings and colors grabbed the students' attention and they became more interested. However, she believed that there was a disadvantage since the students no longer wrote their own notes but saved them on their USBs. This indicated that lack of motivation could have resulted from the students' perception of their teacher's technological skills or attitude. Thus, students seemed not to be motivated around teachers who did not feel comfortable using the Smart Board. Christensen (2002) believed that teacher training was important to reduce the teachers' anxiety and boost their attitudes towards the use of technology. With more training, the Math teacher could feel more comfortable when using technology and thus may change

her outlook towards its use.

Math teacher 2

The second Math teacher had a very high comfort score and believed she fell under stage 5. A good number of students found the Math class motivating for many reasons: they believed the teacher used many technology applications, made learning fun, and knew how to use a computer. The teacher believed she fell under stage 5 where she thought about technology as a tool to help her. She believed she was no longer concerned about it as technology. She also believed she could use many applications as an instructional tool. Her outlook towards technology was that technology could help and facilitate teaching and learning if used wisely. To conclude, the teacher's perception of herself and the students' perception of their teacher highly matched. The teacher had a high comfort score, was technologically skilled, and had a positive attitude towards technology use.

Geography teacher 1

The Geography teacher had a high comfort score and believed he belonged to stage 6. The students perceived the teacher as a better teacher through technology due to the way he delivered the instruction. In addition, 86% of the students found his class more interesting since the teacher triggered their interest through the use of technology. For example, almost all the time, the teacher displayed documentaries/movies related to the lesson and used various visual aids to help students understand the given lesson. This in turn acted as a motivating factor to the students. As for the teacher's perception of himself, he believed he could apply what he knew about technology in the classroom.

Also, he believed he was able to use it as an instructional tool and integrate into the curriculum. Thus, the students' perception of their teacher and the teacher's perception of himself highly matched. In addition, the teacher believed that technology in general should be used in the school with more applications. To conclude, the teacher had a high comfort score, was technologically skilled, and had a very positive attitude towards technology.

English teacher

The English teacher had a very high comfort score and believed she was on stage 6. Most of the students were interested, concentrated, and paid attention during the English teacher's class. This showed that the students were highly motivated when it came to the teacher's technology use. The English teacher used a variety of applications, programs, and visual aids to help students understand the given concept or lesson. This in turn highly motivated the students. The English teacher believed she could apply what she knew about technology in the classroom. She believed she was able to use it as an instructional tool and integrate it into the curriculum. This proved that the teacher's perception of herself and the students' perception of her highly matched. The teacher's attitude towards technology was very positive since she believed technology use was essential as it combined education with enjoyment. Furthermore, she believed technology allowed teachers to use multiple teaching strategies that targeted different types of intelligences. To conclude, the English teacher had a high comfort score, was skilled in using technology, and had a very positive attitude towards its use. As a result, the students were highly motivated.

The Geography teacher had a very high comfort score; however, he believed he fell under stage 4. The students' motivation during the Geography class was mostly low since most of the students believed he used the Smart Board as a white board. Although the teacher used the Smart Board in various ways such as PPT presentations, movies, and diagrams, the lack of motivation was mainly due to the way he delivered the lesson. Nevertheless, the teacher's perception of himself and the students' perception of him highly matched. The teacher believed he was at a stage where he was gaining a sense of confidence in using the computer for specific tasks. In addition, he believed he was starting to feel comfortable using a computer thus making his comfort score high. To conclude, the teacher believed technology helped a lot; however, he was aware that he was in the process of gaining a sense of confidence and comfort.

To conclude, the first and second research questions raised in this study were: What factors influenced the teachers' technology use in class? And would the use of the Smart Board relate to the self-perceived degree of technology adoption outlined by the stages? The answers were that the teachers' technology skills and attitude towards technology influenced the way they used technology in class. Similarly, the teachers' self-perceived degree of technology adoption outlined by the stages reflected 86% of the teachers' attitudes and the way they used technology in class.

Research Question 4

What prompted the students' motivation in class? Was it the teachers' attitude or the use of technology?

In order to answer the fourth research question, the students' motivation scores and perception of their teachers was analyzed. Next, the results of the two different Geography and Math teachers were compared and analyzed. Last, the students' concentration and interest scores were analyzed with respect to the teachers' age, years of experience, and highest degree attained.

First, the students' motivation was measured as they responded to twenty of the Student Motivation Survey questions on a 1 to 4 scale. Response 1 indicated that the students' strongly disagreed, 2 disagreed, 3 agreed, and 4 strongly agreed. On the students' survey, most of the answers ranged between 3 and 4, agree and strongly agree respectively. The overall score of each of the questions was above 2. The results indicated that the average score of each of the individual questions was above 2. In addition, the average score of the 84 students who participated in the survey and answered 20 of the questions was 3.1.

The results showed that the students' overall motivation score was very positive when it came to the use of technology in class. Figure 1 below indicates the overall student average score on each item.

Figure 1: The overall student average score of the student motivation survey on each item

Q		Average score	Sd.
1	I enjoy learning with a whiteboard.	3.42	0.62
2	I do (do not) like receiving instruction through a whiteboard.	3.15	0.77
3	I will be able to get a good job if I learn how to use technology.	3.14	0.69
4	I concentrate better in class when a whiteboard is used to deliver instruction.	2.96	0.75
5	I would work harder if my teacher used the whiteboard more often.	2.71	0.82
6	I know that using technology gives me opportunities to learn many new things.	3.30	0.67
7	I can learn many things when my teacher uses a whiteboard.	3.08	0.66
8	I enjoy lessons on the whiteboard.	3.24	0.73
9	I believe that the more often teachers use whiteboards, the more I will enjoy school.	2.77	1.01
10	I believe that it is important for me to learn how to use a whiteboard.	2.82	0.77

11	I feel comfortable using a whiteboard.	3.12	0.84
12	I enjoy using the whiteboard.	3.31	0.74
13	I do (not) think that it takes a longer amount of time to learn when my teacher uses a whiteboard.	2.90	0.87
14	Using a whiteboard does not scare me at all.	3.49	0.76
15	Using a whiteboard does (not make) make(s) me nervous.	3.31	0.9
16	Using a whiteboard is (not) very frustrating.	3.08	0.86
17	I will (not) do as little work as possible with technology.	3.06	0.81
18	Whiteboards are (not) difficult to use.	3.25	0.84
19	I can (not) learn more from books than the whiteboard.	2.81	1.01
20	I (do not) get a sinking feeling when I think of trying to use a whiteboard.	3.25	0.83

On the students' survey, all the answers when rounded ranged between 3 and 4, agree and strongly agree respectively. No question was rated below 2. The results indicated that the students were in agreement with the items hence showing a very positive overall motivation score. For the individual student motivation score per item see Appendix F.

In addition, in Figure 2 below, the average score and the standard deviation of the student motivation survey is included.

Figure2: Average score and standard deviation of the student motivation survey.

Q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Average	3.42	3.15	3.14	2.96	2.71	3.30	3.08	3.24	2.77	2.82	3.12	3.31	2.90	3.49	3.31	3.08	3.06	3.25	2.81	3.25
Sd.	0.6	0.8	0.7	0.8	0.8	0.7	0.7	0.7	1	0.78	0.84	0.74	0.87	0.77	0.9	0.87	0.81	0.85	1.01	0.83

The frequency count of each of the twenty questions based on the 4 responses: strongly disagree, disagree, agree, and strongly agree are included in Appendix G.

Next, the students filled in the Student Perception of Teacher Survey. Appendices J to S fully illustrate the students' perception of the Math, Biology, Physics, Art, English, Geography, Music, Arabic, and French teachers.

Subsequently, the students' perception of the teachers' technology use in class and the effect of the teachers' attitude towards technology on the students' motivation were analyzed.

The students' perception of the Geography teacher

The results indicated that 86% of the students found the Geography class more interesting through the use of technology and 14% believed it was the same. In addition, 64% of the students believed that the teacher was a better teacher when he/she used technology in class and 36% a neutral teacher. However, based on the results, only 50% of the students agreed that they concentrated more and paid more attention when technology was used in class and 50% disagreed. The discrepancy lied in the fact that 86% of the students found the class more interesting, yet only 50% concentrated more and paid more attention. However, most of the students believed that technology helped them better understand the lesson through visual aids such as PPT presentations, maps, and documentaries. They believed that the teacher delivered the instruction in new and better ways through technology and in turn learned from this experience. Finally, according to some students technology was simply fun, interesting, and more appealing. To conclude, 86% of the students found the Geography class more interesting when the teacher used technology. To see the complete raw data of the students' perception of the Geography teacher, see Appendix P.

The students' perception of the second Geography teacher

The results indicated that 52% of the students agreed that the instruction was the same through the use of technology. Forty six percent of the students found the

instruction more interesting when technology was used and 2% of the students found it less interesting. To add, 35% of the students thought the teacher was a better teacher when he/she used technology since technology was fun, interesting, and helpful. They believed they understood the lesson more when visual aids related to the lesson were involved such as documentaries, movies, and videos. They believed that the teacher was a better teacher once he/she demonstrated computer knowledge and skill. However, 27% of the students asserted that the teacher was an average teacher and 38% a neutral one. The teacher was an average teacher since "nothing changed." Furthermore, the teacher was a neutral teacher since the Smart Board could not change a teacher, and his/her knowledge was not related to the availability of the Smart Board in class. In addition, some students believed that the teacher did not have enough computer knowledge. Nevertheless, 71% of the students agreed that they concentrated more and paid more attention during the Geography class when the teacher used technology. It can be concluded that technology itself was not a motivating agent to the students. Although a large number of students concentrated and paid more attention through the use of technology, only 35% of the students believed that the teacher was a better teacher through technology. Even though the smart board was fun, interesting, and a new way of delivering the lesson, the teacher's role was far more important than the availability of the tool.

The above is in support of Wiken's research (2005) on "The Effect of Technology on Student Engagement, Motivation, and Interest." He asserted that the approach by which technology is implemented in the teaching, and not the technology integration itself, effects the students' engagement, motivation, and interest. To see

the complete raw data of the students' perception of the second Geography teacher, see Appendix Q.

The students' perception of the Biology teacher

Based on the results, the Biology teacher had a group of students who were very motivated. Sixty four percent of the students found the instruction more interesting when technology was used in class and 35% found it the same. Also, 58% of the students believed that the teacher was a better teacher when he/she used the technology in class, 18% an average teacher, and 24% a neutral one. Furthermore, 89% percent of the students concentrated more and paid more attention when technology was used in class and 11% did not pay much attention. One of the factors that motivated students was the visual aids used by the Biology teacher. The students believed it was important as it affected their understanding, helped them concentrate more, and presented things in a clearer way. This is in support of Aslam et al.'s research in Pakistan (2013) whereby they concluded that students were motivated during the science class since technology made the understanding of concepts easier for them (p. 93, 94). In addition, the students liked learning through different aspects of technology. The teacher's motivation and enthusiasm through technology use was yet another motivating factor to the students. It was concluded that the students were motivated in the Biology class since they were interested, concentrated more, and participated in the classroom. It was also concluded that technology use played a major role in triggering the students' motivation in the Biology class. That is in support of Beeland's research (2002) whereby he found that the use of interactive whiteboards significantly motivated the students and engaged them in the learning

process. According to Beeland (2002), one of the three modalities of learning that motivated students was the visual aids which the Biology teacher mostly used. To see the complete raw data of the students' perception of the Biology teacher, see Appendix J.

The students' perception of the Physics teacher

Based on the results, most of the students in the Physics teacher's class were not motivated through the use of technology. Seventy seven percent of the students found the instruction the same through the use of technology and only 20% found it more interesting. Additionally, 60% of the students believed the teacher was a neutral teacher through the use of technology, 28% an average teacher, and 12% a better teacher. On the other hand, 60% of the students asserted they concentrated more and paid attention when technology was used in class, 32% did not pay much attention, and 8% did not concentrate or pay attention. The instruction was the same to the students since the teacher did not bring in new things through technology. In addition, they believed technology "did not change a teacher or make his/her class more interesting." They mainly expected the teacher to enrich the class through various visual aids such as PPT presentations, documentaries, and videos. They also believed that the use of Smart Board as a whiteboard was not interesting at all. Although 60% of the students concentrated more and paid more attention because they liked technology, colorful pens, and clearer handwriting, the majority of the students were not motivated in the Physics classroom. Their lack of motivation stemmed from the lack of variety of visual aids. Finally, we could conclude from this survey that the visual aids affected the students, interest, concentration, attention, and their positive

perception of the teacher. To see the complete raw data of the students' perception of the Physics teacher, see Appendix K.

The students' perception of the English teacher

The results indicated that the students were very motivated during the English teacher's class. Seventy eight percent of the students believed that the teacher was a better teacher when technology was used, 7.7% an average teacher, and 14.2% a neutral teacher. In addition, 91% of the students concentrated more and paid more attention when technology was used and 9% did not pay much attention. Most importantly, 80.5% of the students found the topic more interesting when technology was used and 19.4% believed that the instruction was the same. Some students believed that technology itself was a motivating factor and experiencing things with technology was entertaining. Others asserted that the lesson became more interesting since the teacher was technologically skilled and varied the use of technology applications. In addition, a group of students believed that the teacher was a better teacher since he/she was interested in the lesson herself and was very enthusiastic. They also believed the teacher was a better teacher with technology since she showed her technological abilities and her words came to life. As Wikens (2005) asserted, once the teacher's enthusiasm and students' motivation were paired, effective results were achieved. To conclude, the results indicated that during the English class the students were highly motivated when technology was involved. To see the complete raw data of the students' perception of the English teacher, see Appendix L.

The students' perception of the Math teacher

Based on the results, most of the students had a very positive attitude and were motivated when it came to the teachers' technology use in class. 60% of the students found Math more interesting when the teacher used technology in class. Forty two percent of the students believed that the teacher was a better teacher when technology was used in class, and 37.5% believed that the teacher was a neutral teacher. In addition, 72% of the students concentrated more and paid more attention when technology was used in class. According to some students, technology use was fun and for that reason they found the lesson more interesting. Furthermore, some students believed that their teacher was a better teacher when he/she used technology since modern teachers "knew more of technology." The use of technology showed that their teacher was knowledgeable when it came to computer use. Finally, some students responded that they concentrated more and paid more attention since they felt "more comfortable with technology." The data showed that the students were motivated and had a positive attitude toward the Math teacher's technology use in class. To see the complete raw data of the students' perception of the Math teacher, see Appendix M.

The students' perception of the second Math teacher

Based on the results, 61% of the students believed that during the Math teacher's class the instruction was the same, 36% more interesting, and 22% less interesting. In addition, only 34% of the students believed that the teacher was a better teacher when she used technology, 27% an average teacher, and 38.6% a neutral teacher. However, 77% of the students indicated that they concentrated more when

technology was used in class. The results indicated that the use of technology and concentration did not necessarily make the lesson more interesting to the students. Nonetheless, some students commented that technology was fun compared to books and its use made them participate more in class. Some students also added that watching videos grabbed their attention, and the tools the teacher used made the explanation clearer and more accurate. To conclude, this showed that technology use was a motivating factor during the Math teacher's class but not to the majority of the students. To see the complete raw data of the students' perception of the Math teacher, see Appendix N.

The students' perception of the Arabic teachers

Based on the students' perception of the Arabic teachers, 75% of the students believed that their teachers mostly used the Smart Board as a white board to either write notes or explain the lesson. According to the students, when Arabic teachers used the SB, the instruction was not interesting since teachers became average or neutral if they were not technologically skilled. As a result, 25% of the students believed the Arabic teachers were average teachers and 58% believed they were neutral teachers. On the other hand, 58% of the students believed they concentrated more and paid more attention when technology was used since they liked technology and thus found the class more interesting. Furthermore, 19% of the students found technology use interesting since they were exposed to more visual aids and clearly understood the written words. Finally, 6% of the students thought that technology use was less interesting since the teachers barely knew how to use the Smart Board and it took a lot of time to set the SB up. As Al Bataineh & Brooks (2003); Christensen

(2002); Diem (2000); Newby et al. (2006); Wiken (2005); and Sabieh (2011) have asserted, training opportunities were extremely important to help teachers develop a certain level of comfort and confidence while using technology. In addition, based on Sabieh (2009), "tool integration [promoted] increased learner participation in the learning process and [strengthened] the task focus." Thus, the Arabic teachers failed to integrate tools that increased the students' participation and attention. Consequently, Sabieh (2009) believed it was of key importance for educators to identify:

- the learning technologies needed;

- their objectives in using such technologies;

- the strategies required to maximize their usage;

- the know-how needed by both educators and students when it came to using them (p, 15).

To conclude, although four of the Arabic teachers did not seem to be technologically skilled and capable of delivering a technology oriented instruction, 58% of the students concentrated more and paid more attention through the use of technology. To see the complete raw data of the students' perception of the Arabic teachers, see Appendix O.

Based on the results, 56% of the students found the French teachers' instruction the same through technology use. Thirty nine percent of the students found the instruction more interesting when technology was used and only 5% found it less interesting. To add, 32% of the students believed that the teacher was a better teacher when he/she used technology, 19% an average teacher, and 49% a neutral teacher. The results showed that the students were not motivated since 49% believed the teacher was a neutral teacher and 39% only believed that the lesson was more interesting. However, 58.5% believed they concentrated more and paid more attention when technology was used. The students indicated that they found the lesson more interesting and concentrated more when technology was used. Wiken (2005) believed that technology use had no direct effect on the students' motivation, engagement, and interest; however, its use motivated them intrinsically. This showed that regardless of the teachers' methodology, technology itself was still a motivating factor to the students. Through technology use, the students believed the lesson became more interesting, tidier, more fun, and easier to understand. Students specifically pointed out that the visual and auditory aids helped them greatly in understanding the lesson. From the results, it could be concluded that "educators must understand the relationship that exists between the teaching, the learning, and the tools used to ensure that needs are qualifiedly met" (Sabieh, 2009). To see the complete raw data of the students' perception of the French teachers, see Appendix R.

The students' perception of the Art teacher

The number of students in this survey was limited to 15 since Art was an elective course. The students were asked not to proceed with the survey if their teacher did not use the Smart Board in class. However, both the students and the Art teacher pointed out that there was no Smart Board in the Art room. For that reason, the teacher could not use technology in the Art class.

The students' perception of the Music teacher

Sixty seven percent of the students found the instruction more motivating when the Music teacher used technology in class and 33% found the instruction the same. In addition, 44% of the students believed the teacher was a better teacher when technology was used, 22% an average teacher, and 33% a neutral teacher. Finally, 78% of the students believed they concentrated more and paid more attention when technology was used, 11% believed they did not pay much attention, and 11% of the students believed they did not concentrate or pay attention. All in all, students found the Music class more motivating through technology since they got to view pictures, watch movies, sing along, and write the musical notes easily on the board. This is in support of Mackay's (2006) research on "The Impact of Technology on Student Motivation and Achievement in Music Class" whereby he came to the conclusion that students found technology oriented Music classes motivating. To see the complete raw data of the students' perception of the Music teacher, see Appendix S.

Finally, the answers to the questions 7, 8, 9, and 10 of the Students' Perception of the Teachers Survey overlapped among all the teachers. See Appendix I for the overlapping answers.

Next, in order to further understand what motivated students and answer the fourth research question: What prompted the students' motivation in class? Is it the teachers' attitude or the use of technology? It was necessary to analyze and compare the students' perception of the two different Geography and Math teachers. Both teachers integrated technology into their teaching in very similar ways such as explaining the lesson through documentaries, videos, graphs, and pictures. However, the students were motivated only in one of the two classes. The results indicated that the students found one of the classes less interesting since the teacher mostly used the Smart Board as a whiteboard. On the other hand, the other Geography teacher integrated technology into his teaching during every single period. As a result, the second Geography teacher, being more technologically skilled, exhibited a sense of comfort while integrating technology into the teaching. This in turn motivated the students as they found his instruction more interesting unlike the other Geography teacher. On the other hand, the second teacher's acceptable comfort level and technology skills affected the students' motivation. To conclude, the results indicated that the way teachers used and delivered instruction through technology played an integral role in triggering the students' motivation in class. This is in support of Tolmie's research (2002) whereby he believed that the availability of technological equipments did not necessarily influence the students' learning.

As for the Math teachers, both teachers integrated technology into teaching; however, only one of them varied the strategies through different technology applications such as Geogebra, YouTube videos, and other videos such as Khan's Academy. On the other hand, the second Math teacher mainly used the board to write notes, solve exercises, and illustrate graphs. As a result, 60% of the students found the first Math teacher's class more interesting when she used technology; however, only 32% of the students found the second Math teacher's class interesting. Conversely, an interesting factor was noted regarding the students' attention and concentration in both teachers' classes. More than 70% of the students indicated that they concentrated more and paid more attention when technology was used with both teachers. To conclude, although students were more interested through the various uses of technology, they still concentrated and paid attention when technology was used even though the class was not interesting to them.

To even further understand what factors motivated students through the use of technology, it was essential to examine whether factors such as the teachers' age, years of experience, and highest degree attained influenced the students' interest and concentration in class. Next, the percentage of the students' interest and concentration scores were analyzed with respect to the teacher's age, years of experience, and highest degree attained (See Figure 1 below).

Figure 1: Individual Teachers' Interest and Concentration Scores

	Age	Years of experience	Highest Degree	Student interest scores	Student concentration scores
Biology	21-30	6	M	64%	89%

Physics	21-30	3	B	20%	60%
Math1	31-40	11	B	36%	77%
Math 2	21-30	6	M	60%	72%
Geography1	More than 40	11	B	86%	50%
Geography2	31-40	3	B	46%	71%
English	21-30	6	BT	81%	91%

The teachers were divided into two groups based on age; below 31 and above 30. The teachers who were below the age of 31 had an average interest score of 56%. Similarly, the teachers who were above 30 years of age had an average interest score of 56%. Since the scores were identical, the teachers' age was no longer a factor that could have influenced the students' interest in the classroom. This is in support of Rana's research (2012) whereby she concluded that age was not a factor that significantly influenced the teachers' attitude towards technology integration in their classes. Next, the teachers' highest degrees were analyzed with respect to the students' interest scores. Consequently, the teachers were divided into two groups based on their degrees; Bachelors and Masters Degree. It was found that the average interest score of the teachers who held a Masters Degree was 68% and Bachelors Degree 47%. The results indicated that the degree a teacher held significantly influenced the students' interest in the classroom pertaining to technology use. Lastly, the teachers' years of experience was analyzed in relation to the students' interest scores. First, the highest and the lowest interest scores were analyzed. The results indicated that the lowest scores belonged to three teachers two of which had 1-3 years of experience and

one of whom had more than 11 years of experience. In addition, the highest interest scores belonged to two teachers who had 6-10 years of experience and more than 11 years of experience. Furthermore, the mid scores belonged to two teachers who had 6-10 years of experience. To conclude, the teachers' years of experience did matter in triggering the students' interest through the use of technology with one exception.

Subsequently, the students' concentration scores were analyzed with respect to the teachers' age, years of experience, and highest degree attained. The results indicated that concentration and attention through the use of technology had no direct relation with the teachers' age, years of experience, and highest degree attained. In all the classrooms, the students' concentration and attention scores were considerably high when technology was used in class regardless of the teachers' methodology. In support of this finding, based on Ilter's research (2009) on "the effect of motivation in EFL classrooms," about 70% of the students were more motivated through the use of technology in class. This showed that technology itself was a motivating factor to the students.

Finally, the teachers who had the highest and lowest interest scores were analyzed in terms of their methodologies and the way they used the Smart Board in their classes. The English and the Geography teachers had the highest interest scores, and the Physics and Math teachers had the lowest interest scores. It was pointed out by the students that both the Physics and the Math teachers mostly used the Smart Board as a whiteboard. For that reason, they found their class quite uninteresting although often technology was used through videos and PPT presentations. The Geography teacher, however, used the SB through PPT presentations, interesting videos,

documentaries, graphs, and other visual aids. The Geography teacher used technology in the classroom to deliver the instruction almost every day. This in turn highly caught the students' attention and interest. Similarly, the English teacher mostly used technology to deliver the instruction through PPT presentations, movies, documentaries, documents, and songs. However, the teacher used two different technology tools that none of the other teachers used. The students pointed out that the teacher received their homework through e-mail and shared important files and documents through Dropbox. As a result, the students were more motivated to learn. The result was congruent with Eggen and Kauchak's research (2006) whereby he asserted that motivated students enjoyed the lesson and found it interesting since they believed the information was valuable and worth to understand. In addition, Gourneau (2005) asserted that when teachers came up with lessons incorporating the students' interest and needs, the students became motivated. For that reason, the students found the Geography and the English classes more interesting.

To conclude, in answering the fourth research question: What prompted the students' motivation in class? Was it the teachers' attitude or the use of technology? It could be concluded that both technology use and the teachers' attitude influenced the students' motivation in class.

Chapter 5

Interpretations and Implications

Interpretations of the Research Questions

Research Question 1: *What factor influenced the teachers' technology use in class?*

The teachers' attitude towards technology was analyzed based on interest, comfort, accommodation, interaction, concern, perception, absorption, and significance. The results indicated that all teachers had an overall positive attitude towards the use of technology. The Teachers' Attitude towards Computers Questionnaire was analyzed to answer this research question. The results were in line with the findings of the studies by Al-Zaidiyeen et al. (2010) in Jordan; Aslam et al. (2013) in Pakistan; and Enayati, Modanloo, and Mir Kazemi (2012) in Iran, whereby teachers exhibited positive attitudes towards the use of technology in education.

Research Questions 2 and 3: *Does the use of Smart Board relate to the teachers' self-perceived degree of technology adoption outlined by the stages? And would a teachers' outlook towards technology significantly influence their attitude towards technology?*

To answer the above research questions, the educator-researcher analyzed the teachers' comfort scores, self-perception, and their disposition towards technology use with respect to the stages they had indicated related to the adoption of technology. In addition, the teachers' self perception and the students' perception of their teachers were compared.

The results indicated that the Art teacher had a high comfort score and seemed to be technologically skilled. However, she had no Smart Board in her classroom.

The Biology, English, and Geography teachers had high comfort scores, were technologically skilled, and had a very positive attitude towards technology. The students were motivated in their classroom since they varied the use of technology applications and created an enjoyable learning environment. All three teachers believed they were on the highest stage of the technology adoption journey. The latter and the students' perception of the teachers highly matched. The students were motivated with all three teachers.

The Physics teacher had a high comfort score and believed she could use many technology applications as an instructional tool. However, the students' perception of the teacher was different. They believed the teacher did not use varied technology applications in class. For that reason, they found her class boring and were not motivated.

The Math and the second Geography teacher had good comfort scores; however, they believed they were not comfortable using the computer for specific tasks. The latter matched the students' perception of both teachers. In general, the students were not motivated in both of the classrooms since they believed both teachers used the Smart Board as a whiteboard. To conclude, students did not seem to be motivated around teachers who were not competent technologically.

The second Math teacher had a very high comfort score and believed technology was a helpful tool that facilitated teaching and learning. Since the teacher was technologically skilled, she used many technology applications in the classroom and made learning fun and enjoyable. Therefore, the students found her class motivating since they believed she was technologically skilled. Thus, the students' perception of their teacher and the teacher's perception of herself highly matched.

Research Question 4: *What prompted the students' motivation in class? Was it the teachers' attitude or the use of technology?*

Although the students' overall motivation scores were very positive when it came to the teachers' use of technology in class, it was necessary to analyze and compare the students' perception of the two different Geography and Math teachers in order to answer the fourth research question. In addition, the students' concentration and interest scores were analyzed with respect to the teachers' age, years of experience, and highest degree attained.

The results indicated that the teachers' attitude towards technology and the way they delivered instruction through the use of technology motivated the students. The teachers who used the Smart Board as a whiteboard did not motivate the students; on the other hand, those who used the Smart Board and varied the technology applications prompted the students' motivation in class. It was found that the students' concentration and attention through the use of technology had no direct relation with the teachers' age, years of experience, and highest degree attained.

Finally, the overall results revealed that most of the students concentrated through the use of technology despite the methodology used. The results showed that technology itself was a motivating factor to the students. Therefore, it could be concluded that the teachers' attitude and technology use prompted the students' motivation in class.

Limitations of the Research

The limitations were few:

- Convenience sampling was selected since the researcher practitioner was a teacher at the school. Thus, she selected the samples that were most convenient to her.
- The students who filled in the surveys were the researcher's students, so their answers to her surveys may not be reliable.
- Thirteen out of the 20 teachers participated in the research.
- Students were often absent and thus certain surveys were either disregarded or postponed to another day.

Recommendations

The educator-researcher believed that the following recommendations should be addressed in the future.

First, In order to be able to generalize the results to the Lebanese school population, it is recommended to survey more Anglophonic schools that use Interactive Smart Boards as an instructional tool since the case study showed positive results.

Second, a larger sample should be selected that includes younger students to quantify their input regarding their motivation through the teachers' use of the Smart Board.

Third, it is recommended that teachers use technology in the classroom since it was proven to be a factor that motivated students and triggered their concentration, attention, and interest.

Most importantly, the literature revealed that training opportunities were essential. Therefore, prior to the integration of technology use in the curriculum, schools should provide teachers with the necessary support pertaining to technology use in class to reduce their anxiety.

Finally, an interesting subject that may also be studied would be: "Would the results be the same if iPads were used instead of Smart Boards?"

To conclude, the case study indicated that the integration of technology into teaching and learning motivated students and attracted their attention. Students, regardless of the subject, found technology use attention grabbing. The students who participated in the study enjoyed the visual aids, variety of the computer programs used, and the various teaching techniques. They concentrated in class because they believed "technology was fun" and the visual aids grabbed their attention. In addition, they were interested because they "found the class more interesting and felt more comfortable with technology." It can be concluded from this case study that the teachers' technology use in class highly affected the students' attention and concentration. Moreover, the teachers' attitude, teaching strategy, and technology

skills highly motivated the students in class. The students were motivated around teachers who felt comfortable using the Smart Board. Both the teachers and students had high attitude and motivation scores. It can be concluded that the students concentrated in class through the use of the SB regardless of the teachers' methodology since "technology" was used; however, their interest was only triggered with teachers who were technologically skilled, enthusiastic, and brought something new through the use of technology.

References

AL-Bataineh, A., & Brooks, L. (2003). Challenges, Advantages, and Disadvantages Of Instructional Technology In The Community College Classroom. Community College Journal of Research and Practice, 27(6), 473-484.

Al-Zaidiyeen, J., Mei, L. L., & Fook, F. S. (2010). Teachers' Attitudes and Levels of Technology Use in Classrooms. *International Education Studies*, *3*(2), 211-216.

Alexiou-Ray, J., Wilson, E., Peirano, A., & Wright, V. (2003).Changing Instructional Practice: The Impact on Technology Integration on Students, Parents, and School Personnel *Electronic Journal for the Integration of Technology in Education*, *2*(2), 58, 59.

Aslam, H., Ishtiaq, H., & Naseer-ud-Din, M. M. (2013).Role of Instructional Technology in Enhancing Students" Educational Attainment in General Science at Elementary Level in District Karak (Pakistan).*Journal of Sociological Research*, *4*(1), 94-96.

Beeland, W. (2002). Student engagement, visual learning and technology. Retrieved May 26, 2013, from http://citeseerx.ist.psu.edu.

Brophy, J. (1998). *Motivating students to learn*. Boston: McGraw-Hill.

Christensen, R. (2002). *Effects of technology integration*. International Society for Technology in Education. Retrieved May 6, 2013, from

mytechtips.pbworks.com/f/Effects%20of%20Technology%20Integration%20E

ducation%20on%20the%20Attitudes%20of%20Teachers%20and%20Students

%20(1).pdfhttp://

Diem, R. A. (2000). *Can it make a difference? Technology and the social studies.* Theory and Research in Social Education, 28, 493-501.

Duffy, J., McDonald, J. B., & Mizell, A. P. (2005).*Designing and planning technology-Enhanced Instruction. Teaching and learning with technology* .2nd ed. Boston: Pearson.

Eggen, P. D., & Kauchak, D. P. (2006).*Strategies and models for teachers: Teaching content and thinking skills* (5th ed.). Boston: Pearson/Allyn and Bacon.

Gay, L. R., Mills, G. E., & Airasian, P. W. (2009).*Selecting measuring instruments.* Educational research: competencies for analysis and applications (Pearson International ed., 9th ed., p. 187). London: Pearson Education.

Gourneau, B. (2005). *Five attitudes of effective teachers: Implications for teacher training.* Essays in Education, vol.13, p. 1-8. Retrieved April 1, 2013, from www.usca.edu/essays/vol132005/gourneau.pdf?q=attitudes

Haddad, W. (2005).*AED: Academy for Educational Development.* New York: The Academy.

Ilter, B. G. (2009). Effect of Technology on Motivation in EFL Classrooms. *Turkish Online Journal for Distance Education, 10*(4). Retrieved February 12, 2013, from http://tojde.anadolu.edu.tr/tojde36/articles

Institute for the Integration of Technology into Teaching and Learning. (n.d.). *Institute for the Integration of Technology into Teaching and Learning.* Retrieved May 26, 2013, from http://www.iittl.unt.edu/instruments/caq/caq

Mackay, G. (2006). The impact of technology on student motivation and achievement in grade nine music classes. Canada: Cape Breton University.

Mo'dad, L. (2011). *The Effect of Teachers' Attitudes and Perceptions on Their Ability to Integrate Technology.* (Master's thesis). Retrieved from ProQuest Dissertations and Theses. (Accession Order No. [na])

Newby, T. J., Stepich, D. A., Lehman, J. D., & Russell, J. D. (2006). *Issues in integrating technology. Educational technology for teaching and learning.* 3rd ed. Upper Saddle River, N.J.: Merrill.

Overbay, A., Patterson, A. S., & Grable, L. (2009). *On the outs: Learning styles, resistance to change, and teacher retention.* Contemporary Issues in Technology and Teacher Education, 9(3), 356-370.

Pintrick, P., & Schunk, D. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Pintrich, P. R., & Schunk, D. H. (1996).*Motivation in education: Theory, research, and applications*. Ohio: Merrill.

Rana, N. (2012). A study to assess teacher educators' attitudes towards technology integration in classrooms. Journal of Educational Studies, Trends & Practices, 2, 190-205.

Sabieh, C. (2009). Enhancing the Educational Environment through Learning Technologies: Only a Question of Curriculum? *TESOL Arabia Perspectives, 16*(No. 2), 11-15.

Sabieh, C. (2011). Adopting Interactive Whiteboards: An Education Win-Win Set Up?. In M. Koehler & P. Mishra (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conferences 2011* (pp. 1034-1039). Chesapeake, VAL AACE. Retrieved October 7, 2013 from http://www.editlib.org/p/36420.

Shelly G.B., Cashman, T J. et al. (1999) Teachers Discovering Computers: A link to the Future-Web and CNN Enhanced. Cambridge, MA: Course Technology

Taraneh, E., Yasaman, M., & Mir Kazemi, F. S. (2012).Teachers' Attitudes towards the Use of Technology in Education.*Journal of Basic and Applied Scientific Research, 2*(11), 10961.

Teo, T. (2012). Influence of gender and age, on teachers' attitudes towards computer use: A multiple indicators, multiple causes modeling approach. *Assessment Handbook*.

Tolmie, A. (2001). *Examining learning in relation to the contexts of use of ICT.* Journal of Computer Assisted Learning, 17(3), 235-241.

Wiken, D. (2005). The Effect of Technology Integration on student Motivation, Engagement and Interest. LT 185 Thesis, Dakota State University.

Williams, C., & Williams, K. (2011).Five key ingredients for improving student motivation. Madison: University of Wisconsin.

Appendix A

Teachers' Attitudes toward Computers Questionnaire (CAQ)

The questionnaire below is adopted from Christen and Knezek's research (1997).

> The purpose of the survey is to gather data on the teachers' attitudes toward technology. The survey will take about 10 minutes of your time. Kindly respond with your first impression and move on to the next question to avoid second thoughts. Your answers will remain confidential and will be solely used for educational purposes.

Part I

Instructions: Select one level of agreement for each statement to indicate how you feel.

SD = Strongly Disagree, **D** = Disagree, **U** = Undecided, **A** = Agree, **SA** = Strongly Agree

		SD	D	U	A	SA
1	I think that working with computers would be enjoyable and stimulating.					
2	I want to learn a lot about computers.					
3	The challenge of learning about computers is exciting.					
4	Learning about computers is boring to me.					
5	I like learning on a computer.					
6	I enjoy lessons on the computer.					
7	I can learn many things when I use a computer.					
8	I believe that it is very important for me to learn how to use a computer.					
9	A job using computers would be very interesting.					
10	The people who give me the best ideas for improving teaching also tend to know a lot about computers.					
11	I concentrate on a computer when I use one.					
12	I believe that I am a better teacher with technology.					

Part II

Instructions: Select one level of agreement for each statement to indicate how you feel.

		SD	D	U	A	SA
1	I get a sinking feeling when I think of trying to use a computer.					
2	Working with a computer makes me feel tense and uncomfortable.					
3	Working with a computer makes me nervous.					
4	Computers intimidate me.					
5	Using a computer is very frustrating.					
6	I feel comfortable working with a computer.					
7	Computers are difficult to use.					

		SD	D	U	A	SA
8	I think that computers are very easy to use.					
9	I have a lot of self confidence when it comes to working with computers.					
0	Computers are hard to figure out how to use.					

Part III
Instructions: Select one level of agreement for each statement to indicate how you feel.

		SD	D	U	A	SA
1	If I had a computer at my disposal, I would try to get rid of it.					
2	Studying about computers is a waste of time.					
3	I can't think of any way that I will use computers in my career.					
4	I will probably never learn to use a computer.					
5	I see the computer as something I will rarely use in my daily life					
6	Knowing how to use a computer is a worthwhile skill.					
7	I look forward to having a computer in my home.					
8	Using a computer prevents me from being creative.					
9	You have to be intelligent to work with computers.					
10	Not many people can use computers.					
11	I would never take a job where I had to work with computers.					

Part IV
Instructions: Select one level of agreement for each statement to indicate how you feel.

		SD	D	U	A	SA
1	The use of Electronic mail (E-mail) makes the student feel more involved.					
2	The use of E-mail helps provide a better learning experience.					
3	The use of E-mail makes a class more interesting.					
4	The use of E-mail helps the student learn more.					
5	The use of E-mail increases motivation for class.					
6	More courses should use E-mail to disseminate class information and assignments.					
7	The use of E-mail creates more interaction between students enrolled in the course.					
8	The use of E-mail creates more interaction between student and instructor.					
9	E-mail provides better access to the instructor.					
10	E-mail is an effective means of disseminating class information and assignments.					

Part V		SD	D	U	A	SA
	Instructions: Select one level of agreement for each statement to indicate how you feel.					
1	Computers are changing the world too rapidly.					
2	I am afraid that if I begin to use computers I will become dependent upon them.					
3	Computers dehumanize society by treating everyone as a number.					
4	Our country relies too much on computers.					
5	Computers isolate people by inhibiting normal social interactions among users.					
6	Computers have the potential to control our lives.					
7	Working with computers makes me feel isolated from other people.					
8	Use of computers in education almost always reduces the personal treatment of students.					
9	Working with computers means working on your own, without contact with others.					
10	The Internet will help narrow the societal gap between the "haves" and "have nots".					

Part VI		SD	D	U	A	SA
	Instructions: Select one level of agreement for each statement to indicate how you feel.					
1	Computers could increase my productivity.					
2	Computers can help me learn.					
3	Computers are necessary tools in both educational and work settings.					
4	Computers can be useful instructional aids in almost all subject areas.					
5	Computers improve the overall quality of life.					
6	If there was a computer in my classroom it would help me to be a better teacher.					
7	Computers could enhance remedial instruction.					
8	Computers will improve education.					
9	Computers can be used successfully with courses which demand creative activities.					
10	Having a computer available to me would improve my general satisfaction.					

Part VII

Instructions: Choose one location between each adjective pair to indicate how you feel about computers.

Computers are...

1	Unpleasant								Pleasant
2	Suffocating								Fresh
3	Dull								Exciting
4	Unlikable								Likeable
5	Uncomfortable								Comfortable
6	Bad								Good
7	Unhappy								Happy

Part VIII

Instructions: Select one level of agreement for each statement to indicate how you feel.

		SD	D	U	A	SA
1	I like to talk to others about computers.					
2	It is fun to figure out how computers work.					
3	If a problem is left unsolved in a computer class, I continue to think about it afterward.					
4	I like reading about computers.					
5	The challenge of solving problems with computers does not appeal to me.					
6	When there is a problem with a computer that I can't immediately solve, I stick with it until I have the answer.					
7	Computers can be exciting.					
8	I don't think I would do advanced computer work.					
9	I will use computers many ways in my life.					
10	I like to scan computer journals.					

Part IX Instructions: Select one level of agreement for each statement to indicate how you feel.	SD	D	U	A	SA
1 It is important for students to learn about computers in order to be informed citizens.					
2 Students should understand the role computers play in society.					
3 All students should have some understanding about computers.					
4 All students should have an opportunity to learn about computers at school.					
5 Computers could stimulate creativity in students.					
6 Computers could help students improve their writing.					
7 Computers can help accommodate different learning styles.					
8 Students work harder at their assignments when they use computers.					
9 Students help one another more while doing computer work.					
10 Student time on the Internet is time well-spent.					
11 Learning about computers is worthwhile.					
12 Having computer skills helps one get better jobs					
13 I am sure that with time and practice, I can be comfortable working with computers.					
14 Learning to operate a computer is like learning any new skill – the more you practice, the better you become.					

Part X

Instructions: Please read the descriptions of each of the six stages related to adoption of technology. Choose (checkmark) the stage that best describes where you are in the adoption of technology.

	Stage 1: Awareness I am aware that technology exists but I have not used it - perhaps I'm even avoiding it. I am anxious about the prospect of using computers.
	Stage 2: Learning the process I am currently trying to learn the basics. I am sometimes frustrated using computers. I lack confidence when using computers.
	Stage 3: Understanding and application of the process I am beginning to understand the process of using technology and can think of specific tasks in w might be useful.
	Stage 4: Familiarity and confidence I am gaining a sense of confidence in using the computer for specific tasks. I am starting to feel comfortable using the computer.
	Stage 5: Adaptation to other contexts I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.
	Stage 6: Creative application to new contexts I can apply what I know about technology in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum.

Appendix B

Student Motivation Survey

This survey consists of 20 questions related the students' view point towards technology use; Smart Boards. For each statement please indicate whether you strongly disagree (1), disagree (2), agree (3), or strongly agree (4).

N.B. Whiteboard refers to Smart Board in the survey below.

		Strongly disagree	Disagree	Agree	Strongly agree
1	I enjoy learning with a whiteboard.				
2	I do not (do) like receiving instruction through a whiteboard.				
3	I will be able to get a good job if I learn how to use technology.				
4	I concentrate better in class when a whiteboard is used to deliver instruction.				
5	I would work harder if my teacher used the whiteboard more often.				
6	I know that using technology gives me opportunities to learn many new things.				
7	I can learn many things when my teacher uses a whiteboard.				
8	I enjoy lessons on the whiteboard.				
9	I believe that the more often teachers use whiteboards, the more I will enjoy school.				
10	I believe that it is important for me to learn how to use a whiteboard.				
11	I feel comfortable using a whiteboard.				
12	I enjoy using the whiteboard.				
13	I (do not) think that it takes a longer amount of time to learn when my teacher uses a whiteboard.				
14	Using a whiteboard does not scare me at all.				
15	Using a whiteboard (does not make) makes me nervous.				
16	Using a whiteboard is (not) very frustrating.				
17	I will (not) do as little work with technology as possible.				
18	Whiteboards are (not) difficult to use.				
19	I can (not) learn more from books than the whiteboard.				
20	I (do not) get a sinking feeling when I think of trying to use a whiteboard.				

Kindly list the names of the teachers (Ex: Ms. Lisa; English Teacher) who use technology or the Smart Board in class.

Appendix C

Student Perception of Teacher Survey (SPT)

The purpose of this questionnaire is to gather data about the students' motivation towards the teachers' use of technology in the classroom. The information gathered is completely confidential and will be used as part of the thesis for educational purposes. The survey takes approximately 10 minutes to complete. If you have any queries, kindly address the person who handed the questionnaire to you. Thank you in advance for your time and participation.

Questionnaire:

1) Does teacher X use technology/the Smart Board in the classroom?

    a. Yes

    b. No

If you answered "No" to question number 1, do not proceed. Thank you for your willingness to participate in the survey.

2) If yes, how often?

    a. Every time you have class

    b. Most of the time you have class

    c. Rarely; the teacher hardly ever uses the smart board

3) If yes, in what way/how? List the ways.

4) Since teacher X uses technology in class, the instruction is:

    a. the same

    b. more interesting

c. Less interesting

Explain why?

5) When teacher X uses technology/Smart Board in class, do you think he/she is a:

   a. better teacher

   b. average teacher

   c. neutral teacher

Explain why you think the teacher is better, average, or neutral?

6) When the Smart Board is used in class, you feel

   a. you concentrate more and pay more attention

   b. you do not pay much attention

   c. you do not concentrate or pay attention

Explain why?

7) What do you like most about having the Smart Board used in class?

8) What do you like least about having the Smart Board used in class?

9) Do you use the Smart Board during the teacher X's class?

   a. Yes

   b. No

10) If you answered "yes" to question number 9, list the ways you use the Smart Board in class.

11) You are...

    a. an elementary student

    b. an intermediate student

    c. a secondary student

Thank you for your willingness to participate in the survey.

Appendix D

Teacher's Self Profile Survey (TSP)

The purpose of this questionnaire is to gather data on the teachers' demographic information and their attitude/disposition towards the use of technology. The information gathered is completely confidential and will be used as part of the thesis for the Masters Degree. Filling in the questionnaire will take approximately 5 minutes. If you have any queries, kindly address them to the researcher. Thank you in advance for your time and participation.

Questionnaire:

I. **Demographical information**

1) **Gender**

   a. Male

   b. Female

2) **Age**

   a. Less than 20

   b. 21-30

   c. 31-40

   d. More than 40

3) **Years of experience**

   a. 1-2

   b. 3-5

   c. 6-10

   d. More than 10

4) **Highest degree attained**

   a. Bachelors

   b. Bachelors Degree and Teaching Diploma

d. Masters Degree

e. Doctorate Degree

5) **Which department do you teach in?**

    a. Elementary

    b. Intermediate

    c. Secondary

6) **Which subject/subjects do you teach?**

7) **Do you use technology/Smart Board in class?**

    a. Yes

    b. No

8) **If you answered "yes" to question number 6, please answer the following question:**

    a. How/in what way do you use the Smart Board/technology in class?

9) **Why do you use the Smart Board/technology in class?**

10) **What is your disposition towards the use of technology in class?**

Thank you for your time and patience.

Appendix E

Teachers' Overall Computer Attitude Scores With Respect to the Unit Factors

		Part I Interest	Part II Comfort	Part III Accom.	Part IV inter.	Part V Concern	Part VI Utility	Part VII Perc.	Part VIII Abs.	Part IX Sign.	Part X Stages	Total
1	Art	43	19	23	39	22	40	• 40	32	67	5	325
2	Biology	53	20	20	40	31	41	49	32	57	6	343
3	Physics	46	19	23	22	38	35	35	25	48	6	291
4	Chemistry	53	28	27	32	38	48	42	35	49	5	352
5	Math	49	26	23	38	25	39	45	32	57	4	334
6	Math	49	20	12	30	29	42	49	37	55	5	323
7	SAT	49	20	29	50	40	50	48	34	61	5	382
8	History	47	22	25	35	22	45	43	33	57	6	331
9	Geography	45	21	16	40	21	40	49	32	54	6	318

10	Geography	47	21	19	43	37	43	49	33	60	4	352
11	Arabic	46	26	28	32	22	40	36	40	56	4	326
12	French	45	39	27	39	41	40	49	30	55	6	365
13	English	55	22	20	40	24	48	49	38	62	6	358

Appendix F

Individual Student Motivation Score per Item

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Total
St 1	3	4	3	3	3	3	2	3	1	3	3	3	3	3	3	3	3	3	1	3	56
St 2	4	4	3	3	4	4	3	4	3	3	3	3	3	4	4	4	3	3	3	4	69
St 3	3	3	3	3	2	3	3	3	2	2	3	3	2	4	4	4	3	4	3	4	61
St 4	4	4	3	3	4	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	70
St 5	3	4	2	3	3	2	3	3	1	2	2	3	3	4	4	4	3	4	4	4	61
St 6	2	3	4	2	2	3	3	2	2	3	2	2	3	4	2	2	3	3	2	3	52
St 7	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	61
St 8	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	4	70
St 9	3	3	3	3	3	3	2	3	2	2	3	3	2	3	3	3	2	2	3	2	53
St 10	3	3	2	2	3	2	3	3	3	2	1	2	3	3	3	3	3	3	2	2	51
St 11	3	3	2	3	2	3	3	3	2	3	3	4	4	4	3	3	3	3	2	3	59
St 12	4	2	3	2	2	3	3	3	2	2	1	4	3	4	2	2	3	3	2	3	53
St 13	4	4	4	3	3	4	3	3	3	3	3	3	3	4	3	3	3	3	3	3	65
St 14	4	4	2	3	2	3	2	3	3	2	4	4	3	4	3	3	3	3	2	3	61
St 15	4	3	2	3	2	3	2	3	3	3	3	3	3	3	3	3	3	3	2	3	57
St 16	4	3	4	3	2	4	2	3	2	2	4	4	3	4	4	4	3	4	4	3	66
St 17	4	3	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	3	4	77
St 18	4	3	3	2	2	3	3	3	2	3	3	4	3	4	4	2	4	4	2	4	62
St 19	3	3	3	2	2	2	2	2	3	2	2	4	3	2	2	2	2	2	4	3	50
St 20	3	3	4	3	3	2	2	3	3	2	2	3	3	2	4	2	2	3	4	4	57
St 21	3	3	2	2	1	2	3	3	3	2	1	2	2	3	2	3	2	3	4	3	49
St 22	3	3	3	4	1	3	2	3	2	2	3	3	1	4	4	4	4	4	4	4	61
St 23	4	3	2	4	3	2	3	4	3	2	3	4	2	3	3	3	4	3	3	4	62
St 24	4	4	3	2	3	4	3	4	4	3	3	4	1	3	2	1	2	4	2	3	59
St 25	4	3	4	4	3	4	4	3	4	3	3	4	3	1	4	4	3	3	3	3	67
St 26	3	3	3	2	3	3	2	3	2	2	3	3	3	3	3	2	3	3	3	1	53
St 27	2	1	2	2	1	3	3	4	3	3	1	3	3	4	3	3	4	3	3	1	52
St 28	2	1	4	2	1	3	2	1	1	2	3	1	2	3	3	2	3	1	2	3	42
St 29	3	3	4	3	3	4	3	3	1	4	3	4	3	3	3	3	3	2	3	1	59
St 30	4	4	4	4	3	3	3	4	4	3	3	4	4	4	4	2	3	4	3	3	70
St 31	3	4	4	2	2	3	3	4	3	3	4	3	3	3	4	4	3	3	1	2	61
St 32	3	3	3	4	2	3	3	4	4	3	3	3	3	3	3	3	3	4	3	3	63
St 33	3	2	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	2	3	59
St 34	3	2	4	3	3	4	4	3	2	3	3	3	3	3	3	3	4	4	3	3	63
St 35	3	4	3	2	2	3	4	4	4	3	3	4	2	3	2	3	4	4	4	4	65
St 36	3	4	3	2	2	3	3	3	4	3	3	3	2	4	3	3	3	3	3	3	60
St 37	3	2	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	2	3	3	60
St 38	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80
St 39	4	4	3	4	3	4	4	4	3	3	4	3	2	4	4	4	4	4	4	4	73
St 40	2	2	2	2	2	3	2	2	2	3	2	2	1	3	3	2	3	2	3	2	45

St 41	4	4	3	4	4	4	4	4	3	3	4	4	4	4	4	3	4	4	4	4	76
St 42	4	2	3	3	3	3	4	4	1	4	4	4	3	4	4	4	4	4	4	3	69
St 43	2	4	4	2	2	4	3	3	2	2	3	3	3	4	3	3	4	4	4	4	63
St 44	3	3	3	2	3	4	3	4	2	3	4	4	3	4	4	2	3	4	3	3	64
St 45	4	3	3	4	3	4	4	4	4	3	4	4	4	4	4	3	4	3	4	3	73
St 46	3	4	4	3	3	4	4	4	4	4	4	4	3	4	4	3	3	4	1	3	70
St 47	3	3	3	3	2	3	3	2	2	3	3	2	3	3	3	2	2	2	4	1	52
St 48	3	3	1	4	2	4	3	3	2	2	4	4	3	4	4	4	2	3	1	4	60
St 49	3	4	3	2	3	3	3	3	2	3	3	3	3	4	4	4	3	3	4	1	61
St 50	4	3	3	3	2	3	3	3	2	3	3	3	3	3	4	2	3	2	2	3	57
St 51	4	3	3	3	4	4	4	4	4	3	3	3	3	4	4	2	3	2	2	4	66
St 52	3	3	2	2	2	2	2	2	2	1	1	1	3	3	3	2	2	2	2	3	43
St 53	4	3	3	3	3	3	3	3	4	4	4	4	2	4	4	2	2	4	2	4	65
St 54	3	2	4	3	2	4	3	3	2	2	3	3	2	4	4	2	4	3	1	4	58
St 55	4	2	4	3	4	4	3	4	4	4	4	4	3	4	4	4	4	4	4	4	75
St 56	3	3	3	3	2	3	3	3	3	3	2	3	3	1	2	4	3	1	1	3	52
St 57	4	4	4	3	4	4	4	4	4	3	4	4	4	4	4	3	3	3	4	4	75
St 58	4	4	3	3	3	4	4	4	3	3	4	4	4	4	4	4	3	4	3	4	73
St 59	4	3	3	4	3	4	3	3	4	4	4	4	3	1	4	3	3	4	3	4	68
St 60	4	3	3	3	3	4	4	4	3	3	4	4	1	4	4	4	4	4	3	4	70
St 61	3	3	2	2	2	3	3	3	2	1	3	3	4	4	4	4	2	4	2	3	57
St 62	3	1	3	2	2	3	3	3	3	2	3	3	3	2	2	3	3	3	3	4	54
St 63	4	3	4	3	3	4	3	4	3	3	3	3	2	4	4	4	4	4	1	4	67
St 64	2	3	3	4	2	4	2	2	2	1	1	2	3	4	4	3	4	4	4	3	57
St 65	3	3	4	2	2	4	3	1	1	2	3	3	3	4	1	4	1	4	1	2	51
St 66	3	3	2	3	2	3	3	3	1	2	3	2	4	2	1	3	2	3	3	2	50
St 67	4	4	3	4	4	4	4	4	4	4	4	4	1	4	1	1	2	1	1	4	62
St 68	4	4	3	2	3	4	3	4	1	2	4	4	1	3	1	4	4	2	3	3	59
St 69	4	4	4	4	4	3	4	4	4	3	4	4	4	4	4	4	4	4	4	4	78
St 70	3	3	3	2	2	1	2	2	1	2	2	2	1	4	4	4	3	4	2	3	50
St 71	4	4	4	4	3	4	4	3	4	3	4	4	4	4	4	4	4	4	4	4	77
St 72	4	2	3	3	2	3	3	3	2	3	3	3	3	4	1	4	3	3	3	3	58
St 73	3	3	4	2	3	3	3	3	2	3	4	4	3	4	2	1	2	4	3	4	60
St 74	4	3	3	3	3	3	4	4	4	4	4	3	4	4	4	1	4	4	4	4	71
St 75	4	4	3	4	4	3	3	4	4	3	3	3	4	3	3	3	1	3	3	3	65
St 76	3	4	3	3	2	3	2	2	1	2	3	3	3	4	4	3	3	4	4	4	60
St 77	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	59
St 78	4	4	3	4	4	3	3	4	4	4	3	4	2	2	2	4	3	3	2	3	65
St 79	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	1	4	2	4	73
St 80	4	4	4	3	2	4	4	3	3	4	4	4	4	4	4	3	4	3	4	4	73
St 81	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	77
St 82	3	2	3	2	2	3	3	2	2	2	3	3	1	3	3	3	4	4	1	3	52
St 83	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80
St 84	4	3	4	3	2	3	3	4	3	2	3	4	4	3	4	3	3	3	3	4	65

Appendix G

Frequency Count of the Students' Motivation Survey

		Strongly disagree	Disagree	Agree	Strongly agree
1	I enjoy learning with a whiteboard.	0	5	38	41
2	I do (do not) like receiving instruction through a whiteboard.	3	10	42	29
3	I will be able to get a good job if I learn how to use technology.	1	12	45	26
4	I concentrate better in class when a whiteboard is used to deliver instruction.	0	25	38	21
5	I would work harder if my teacher used the whiteboard more often.	4	32	32	16
6	I know that using technology gives me opportunities to learn many new things.	1	7	42	34
7	I can learn many things when my teacher uses a whiteboard.	0	15	47	22
8	I enjoy lessons on the whiteboard.	2	8	41	33
9	I believe that the more often teachers use whiteboards, the more I will enjoy school.	10	24	25	25
10	I believe that it is important for me to learn how to use a whiteboard.	3	25	40	16
11	I feel comfortable using a whiteboard.	6	8	42	28
12	I enjoy using the whiteboard.	2	8	36	38
13	I do (not) think that it takes a longer amount of time to learn when my teacher uses a whiteboard.	8	12	44	20
14	Using a whiteboard does not scare me at all.	2	5	24	53
15	Using a whiteboard does (not make) make(s) me nervous.	4	10	23	47
16	Using a whiteboard is (not) very frustrating.	4	12	37	31
17	I will (not) do as little work as possible with technology.	3	18	37	26
18	Whiteboards are (not) difficult to use.	3	9	32	40
19	I can (not) learn more from books than the whiteboard.	13	21	27	23
20	I (do not) get a sinking feeling when I think of trying to use a whiteboard.	5	8	34	37

Appendix H

Teachers' Self Profile Survey Results

		Q1	Q2	Q3	Q4	Q5	Q6	Q7
		Gender	Age	Yrs of exp.	Highest Degree	Department	Subject taught	Do you use technology in class?
1	**Art**	F	41	3	M	E. I	Visual Art	N
2	**Biology**	F	21	6	M	I	Biology	Y
3	**Physics**	F	21	3	B	I	Physics	Y
4	**Chemistry**	F	21	1	M	S	Science/Chemistry	Y
5	**Math1**	F	31	11	B	I	Math	Y
6	**Math2**	F	21	6	M	I. S	Math	Y
7	**SAT**	F	21	1	BT	I. S	Critical skills. SAT	Y
8	**History**	M	31	11	M	S	History/Geography	Y
9	**Geography1**	M	41	11	B	S	History/Geography	Y
10	**Geography2**	M	31	3	B	I	Geography	Y
11	**Arabic**	F	21	3	M	I	Arabic	Y
12	**French**	F	21	6	T	E. I	French	Y
13	**English**	F	21	6	BT	I	English	Y

		Q8	Q9	Q10
		In what way do you use the Smart Board in class?	*Why do you use the Smart Board in class?*	*What is your disposition/outlook towards the use of technology in class?*
1	Art	NA	NA	I encourage technology use in class.
2	Biology	PPT. animations. drawings	It's a teaching tool that helps teaching Biology in class	It is very important. It teaches different types of learners (especially visual learners).
3	Physics	You tube videos. PowerPoint presentations. pictures.	I use the Smart Board so that students see some figures on a magnified scale and usually students like to see the concepts taught rather than imagining. especially in Biology.	Technology has to be introduced to classes so that visual aids are used more but it shouldn't replace the book.
4	Chemistry	Drawing molecules. writing notes. watching videos	I use it to make the teaching process easier	Time saving Creating activities
5	Math	I use the Smart Board in class to show students videos about certain topics such as: graphing functions. graphing linear inequalities. pie-charts. bar-graphs. etc...	In fact I use the Smart Board because it is the only available board in class. in addition to the fact that the students and I feel interested in displaying some ideas with colors and animations. we feel that we are up to date and this technology makes my work easier in many aspects.	I believe that the use of technology in class should be given in a limited number of hours per month and this is due to the fact that the use of technology with all the drawings and colors grabs the attention of the student and he/she becomes more interested in the lesson. However. I believe that there is a disadvantage for that use of technology since the student is no longer writing his/her own notes. instead he/she is just saving notes on their USB.
6	Math	I also use the Smart Board to do constructions by using mathematical tools.	In math. the use of a smart Board helps in many ways. There are many concepts that can be explained through geogebra. it helps the students visualize things. using the geometric tools to draw figures is easy and saves a lot of time. displaying the extra practice on the board saves me the trouble of making a copy for each student...	Technology is a tool that can help and facilitate teaching and learning if we know how to use it wisely.

7	SAT	Sometimes I open a flip chart containing a prepared quiz for students, I use the timer to give them the appropriate time needed, and at the end I use the Magic Ink to display the answers on the same flip chart.	I use it to make the explanation look more colorful and to motivate the students to participate	It is very helpful and motivates students to take part in the classroom.
8	History	I often use Microsoft Word and PowerPoint as it is easier for me to display the required material.	It is easier for me to display the required material	It is much helpful since it aids students visualize and interact faster and more effectively.
9	Geography/History	For PowerPoint and video	I think teaching history and Geography require the use of maps and images and for short video clips	Should use it even more and with more applications
10	Social Studies	Explaining lessons, illustrating ideas	I use it since it's more efficient for the learning skills	It helps a lot
11	Arabic	PowerPoint presentations	I use it to give students examples and to explain.	It is helpful in delivering information.
12	French	Exercises and lesson explanation	The Smart Board motivates the students and makes the lesson more interesting. As a result, the students become more active and attentive.	The Smart Board motivates the students and makes the lesson more interesting. As a result, the students become more active and attentive.
13	English	PowerPoint presentations, interactive exercises, informative YouTube videos, documentaries, educational movies. Student homework correction, displaying documents, pictures, themes...	Using the Smart Board makes the lives of both the teachers and students easier. It makes the understanding of difficult concepts easier through visual and auditory aids.	Technology use is essential as it combines education with enjoyment. Furthermore, technology allows teachers to use multiple teaching strategies that target different types of intelligences.

Overlapping Answers

7	What do you like most about Smart Boards?	"Videos and activities can be viewed" "Videos help students visualize what they're learning" "PPT presentations, images, movies, and videos" "It's technology" "Fun to use and makes class interesting" "Its diverse uses and advantages" "Ability to save the notes" "I like technology so I enjoy its presence and Windows 7 operating system" "Saving data on the USB and not panicking with the missing information" "It's more entertaining and we no longer need to clean the board to be clearer" "More accurate than the whiteboard" "We can save notes on the USB" "It has many options" "The work is neater and organized" "The simplicity and features" "It's fun to use even though we students barely use the board during the Physics period" "It makes things easier and it's more fun than the whiteboard" "It makes life easier" " Nothing – it's the same" "You can watch videos" "YouTube and ActivInspire" "Graphics, visual aids, and more interaction" "We can use graphs, maps, videos, and movies" "We can get more useful examples on it" "It's fun to use and teachers can use more visual aids with the Smart Board" "We can have fun and learn the lesson in many creative ways" "Because it gets my attention" "More ways to teach and to be able to understand better" "I like the fact that I can say that my school is upgrading the way information is given to the students" "Since we can open new tools which couldn't be done before"

		▪ "The features and programs make it easier to understand"	
		▪ "You don't have to erase, you can just go to the next page"	
8	What do you like least about Smart Boards?	▪ "I can't see very well"	
		▪ "Viruses and sudden and unpredictable shutdowns"	
		▪ "I prefer writing on a paper than a laptop at home and sometimes it gets confusing when the info is displayed on the Smart Board"	
		▪ "It constantly requires calibration and takes more time to operate than the normal board"	
		▪ "We waste time till it reboots"	
		▪ "It sometimes burns by eyes"	
		▪ "The sound quality and brightness"	
		▪ "Technical problems"	
		▪ "Some teachers waste time"	
		▪ "Responsibility"	
		▪ "It makes hard for the students to keep up with all the work"	
		▪ "We have to turn off the lights"	
		▪ "We cannot have different pens"	
		▪ "It's a bit complicated"	
		▪ "It's very annoying when others use it but you don't"	
		▪ "The students play with it"	
		▪ "It takes time to startup"	
		▪ "errors in the computers"	
		▪ "Viruses"	
		▪ "Fake Windows"	
		▪ "The crashing down and the lagging system since the school doesn't buy the real Windows"	
		▪ "It takes time to open and close the software and the computer itself. Not everything goes according to plan"	
		▪ "Sometimes we can't see because of the light"	
		▪ "I can't see some stuff"	
		▪ "My eyes burn when I look at the screen for long"	
		▪ "I dislike that we have to wait for the supervisor to turn it on in the morning and after every break."	
		▪ "The board needs constant calibration"	
		▪ "The visual aids could get confusing and some teachers haven't changed/improved their teaching skills with the use of Smart Boards"	

Appendix J

Students' Perception of the Biology Teacher

The data below is the result of the students' Biology teacher survey based on frequency count. The total number of students who participated in the survey was 55.

		a	/55	b	/55	c	/55
1	Does teacher X use technology	Yes	55	No	0		
2	If yes, how often?	Every time you have class	52	Most of the time you have class	3	Rarely, the teacher hardly ever uses the Smart Board	0
4	Since teacher X uses technology in class, the instruction is	the same	19	more interesting	35	less interesting	1
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	32	average teacher	10	neutral teacher	13
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	49	you do not pay much attention	6	you do not concentrate or pay attention	0
9	Do you use the Smart Board during the teacher X's class?	Yes	25	No	30		
11	You are	an elementary student	0	an intermediate student	55	a secondary student	0

The data below is the students' perception of the Biology teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	"Movies, ActivInspire, PPT, videos about the lesson, presentations..." "Homework correction" "Writing notes" "To learn, to write, to draw" "Small clips" "PPTs including images, graphs, and visuals" "Whiteboard" "Microsoft Word" "Documentaries" "Exercises" "Explain the lesson by graphs"
4a	Why is the instruction the same	"Because she uses it as a whiteboard" "There is no difference" "It doesn't change a teacher"
4b	Why is the instruction more interesting?	"Better explanation" "It's easy to understand" "She uses materials like digital compasses" "Because of the videos" "Because we have more presentations and scientific movies" "The videos and PPTs she gets make us participate" "I can understand more" "I rather see a PPT with visuals than listen to an explanation without visual aids" "Videos and PPTs are helpful" "Visuals can make us more involved" "Everything is clearer" "The teacher explains more enthusiastically" "Videos in Biology give more information"
4c	Why is the instruction less interesting?	"Nothing is new"
5a	Do you think he/she is a better teacher?	"She shows her technological skills" "She uses the Smart Board while explaining" "The writing is clearer" "We get so much information" "She is a smart and good teacher" "She explains better" "She is more interested" "She gives more examples to help us understand" "Using technology is more interesting" "Because we see live things" "She uses many applications" "It makes things easier for her"
5b	Do you think he/she is an	"The explanation through the use of PPT

	average teacher?	presentation is good, but the Smart Board can also be used for other purposes to make the Bio class fun. ▪ "She explains in the same way"
5c	Do you think he/she is a neutral teacher?	▪ "Her explanations are more entertaining but it doesn't change the teacher's way of explanation and his/her ability to pass the message to us" ▪ "She explains in the same way" ▪ "Because it makes no difference" ▪ "A Smart Board won't change a teacher" ▪ "I don't understand anything in class"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	▪ "More attention grabbing" ▪ "It's more interesting" ▪ "I like the PPT presentations" ▪ "Because it's technology" ▪ "We like technology" ▪ "She uses it in an interesting and fun way" ▪ "I am more acquainted with technology" ▪ "Visual aids help me concentrate" ▪ "I concentrate more because I can see it wherever I sit" ▪ "The big and clear words on presentations are easy to read" ▪ "Easier to understand" ▪ "Biology is fun with pictures and videos" ▪ "I love Biology and I participate"
6b	When the Smart Board is used in class, you feel you do not pay much attention	▪ "There's no difference" ▪ "Bio-chem is always boring"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	▪ NA
7	What do you like most about Smart Boards?	▪ "Many new ideas of teaching" ▪ "It makes learning faster"
8	What do you like least about Smart Boards?	▪ "It makes things harder on us"

Appendix K

Students' Perception of the Physics Teacher

The data below is the result of the students' Physics teacher survey based on frequency count. The total number of students who participated in the survey was 60.

		a	/60	b	/60	c	/60
1	Does teacher X use technology	Yes	60	No	0		
2	If yes, how often?	Every time you have class	48	Most of the time you have class	12	Rarely, the teacher hardly ever uses the Smart Board	0
4	Since teacher X uses technology in class, the instruction is	the same	46	more interesting	12	less interesting	2
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	7	average teacher	17	neutral teacher	36
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	36	you do not pay much attention	19	you do not concentrate or pay attention	5
9	Do you use the Smart Board during the teacher X's class?	Yes	29	No	31		
11	You are	an elementary student	0	an intermediate student	60	a secondary student	0

The data below is the students' perception of the Physics teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	"ActivInspire" "To solve exercises and correct exercises" "To draw and write" "Draws a figure, labels, and makes us copy" "He/she uses it as a whiteboard" "He/she writes notes" "He/she explains the lesson through graphs" "Videos to teach the lesson" "Microsoft Word" "PPT presentations" "He/she uses the Smart Board for everything"
4a	Why is the instruction the same	"The information remains the same" "Nothing changes" "She uses both boards the same way" "It's the same without internet" "Nothing is special about it now" "It doesn't make a difference unless she has a PPT for us" "I don't like Physics" "It's all writing and we copy" "Technology didn't change anything" "There haven't been many changes. She uses it as a whiteboard" "Nothing new" "She doesn't bring documentaries or videos" "There are more visuals" "The teacher hasn't done anything interesting or different since they got the Smart Board"
4b	Why is the instruction more interesting?	"More accurate" "Physics gets easier with rulers on the board" "It has more features" "Because technology is interesting" "YouTube videos" "We understand more"
4c	Why is the instruction less interesting?	"No YouTube videos" "She doesn't know how"
5a	Do you think he/she is a better teacher?	"Easier for her and us" "Because it organizes things, puts the documents in files on the desktop where it's all clear" "She's a great teacher because she does her work with ease" "She is better because the handwriting is neater and we can understand more" "She is using equipment we have... faster when it comes to writing" "I understand more"

5b	Do you think he/she is an average teacher?	"In no way does a Smart Board make a teacher smarter" "Because she uses it the same way" "Not only the Smart Board will help us understand, but also the teacher's explanation"
5c	Do you think he/she is a neutral teacher?	"The teacher stays the same no matter what" "Nothing changes when she explains. She explains in the same way." "Doesn't know how to use technology" "Not interesting" "Nothing changes since she uses it as a whiteboard" "She doesn't change her ways using the Smart Board" "It's the same I don't enjoy the lesson" "The teacher will be the same whether he/she uses a whiteboard or a Smart Board" "Having technology doesn't make you a better teacher" "He/she was the same when we had no Smart Board in class"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	" I like Physics and I always concentrate during the Physics period" "Because the information is clear" "It's more interesting" "Because I like Smart Boards" "Because she uses technology" "There are more pen colors" "Because I could see the board wherever I sit unlike the whiteboard" "It attracts my attention" "We like technology" "It makes things easier" "I always concentrate" "ActivInspire makes the lesson alive" "It's more entertaining" "I enjoy the lessons with her"
6b	When the Smart Board is used in class, you feel you do not pay much attention	"The subject isn't more interesting. Everything is the same" "I get bored just solving exercises" "It's the same" "It doesn't affect my attention" "Because everything is still dull" "Because she doesn't explain much" "The teacher keeps writing and scrolling down instead of stopping and explaining well"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	"We keep on restarting because it freezes" "Physics is boring"

Appendix L

Students' Perception of the English Teacher

The data below is the result of the students' English teacher survey based on frequency count. The total number of students who participated in the survey was 77.

		a	/77	b	/77	c	/77
1	Does teacher X use technology	Yes	77	No	0		
2	If yes, how often?	Every time you have class	54	Most of the time you have class	22	Rarely, the teacher hardly ever uses the Smart Board	1
4	Since teacher X uses technology in class, the instruction is	the same	15	more interesting	62	less interesting	0
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	60	average teacher	6	neutral teacher	11
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	70	you do not pay much attention	7	you do not concentrate or pay attention	0
9	Do you use the Smart Board during the teacher X's class?	Yes	30	No	47		0
11	You are	an elementary student	0	an intermediate student	77	a secondary student	0

The data below is the students' perception of the English teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	"ActivInspire, Microsoft word , PowerPoint, documents, notepad, whiteboard, movies, videos, writing answers and definitions, exercise correction, writing notes, YouTube videos, Dropbox files, USB use, every way possible, typing, writing essays, documentaries.." "Shows videos and songs based on the lesson" "email"
4a	Why is the instruction the same	"it's the same lesson" "It doesn't change at all" "It's mostly writing, so it's the same" "It's the same if you explain verbally" "The Smart Board is not any different from the whiteboard"
4b	Why is the instruction more interesting?	"She makes it more interesting" "It's more interesting with the use of videos, presentations, and summaries..easier to understand" "More visual aids help students understand more and become more interested" "You can understand more and it's more fun" "I enjoy watching videos" "Because I like learning with technology" "It is more interesting since she provides visual aids and displays a lot of information on the interactive board" "We understand quickly" "It's more active and videos grab our attention" "We understand more through the files sent through dropbox" "Watching a play is more entertaining than reading it from the book" "We can experience the life of computers" "More interaction and clearer" "Because the teacher can do plenty of things through the Smart Board. When we used whiteboards we never had the opportunity to watch YouTube videos in class or documentaries" "English needs a further explanation than a simple whiteboard" "Because Ms. X is teaching" "Because the teacher knows how to use technology" "She uses in a better way than the whiteboard"

		▪ "She uses several applications" ▪ "Her instruction is more interesting since the teacher goes deeper into analysis" ▪ "It's more interesting...there are some things I had never witnessed being done"
4c	Why is the instruction less interesting?	▪ NA
5a	Why do you think teacher X is a better teacher?	▪ "She has computer knowledge" ▪ "She always uses the Smart Board and teaches us through technology" ▪ "Because she shows how fun it is" ▪ "I understand more" ▪ "Explains in a clearer way" ▪ "Everything is easier" ▪ "She is a better teacher because when using technology more lessons are explained in a better way" ▪ "More explanation, more details" ▪ "Lessons are easier with visuals" ▪ "The teacher can learn even more" ▪ "Since she helps us achieve better grades through the Smart Board" ▪ "She is more interested in the lesson herself" ▪ "She entertains us from time to time" ▪ "It's much easier and we always understand everything" ▪ "She doesn't always stick to the same application" ▪ "It's more interactive" ▪ "She makes it wonderful and interesting to study in class" ▪ "Because we get to do more activities" ▪ "The teacher is more comfortable using the Smart Board" ▪ "She is unique while explaining on the Smart Board and helps us understand through her own methods" ▪ "Students learn more through Dropbox" ▪ "She is better by showing us many things and benefit more with the Smart Board" ▪ "She's always good but the Smart Board makes her a bit more fun" ▪ "Better since it shows her technological skills and knowledge and gets to show more examples of what we are learning" ▪ "The teacher is more motivated to explain" ▪ "Even the teacher is more enthusiastic about teaching"

		▪ "Her words come to life through the use of technology" ▪ "Students learn more when technology is involved"
5b	Why do you think teacher X is an average teacher?	▪ "All teachers use Smart Boards" ▪ "The Smart Board is not any different from the whiteboard" ▪ "Having technology doesn't make you a better teacher but makes you more resourced"
5c	Why do you think teacher X is a neutral teacher?	▪ "The explanation is the same" ▪ "She doesn't change, she's always good" ▪ "It won't make a difference on the teacher, she's always the best" ▪ "She is the same whether technology is involved or not"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	▪ "Videos make it more interesting" ▪ "Her words come to life through technology" ▪ "I enjoy the presence of technology in class" ▪ "It's more interesting and grabs my attention" ▪ "Visual aid" ▪ "It helps the teacher explain better" ▪ "It's more entertaining and appealing to the eye" ▪ "Technology is more interesting" ▪ "Because there are interesting things on the board, and learning from the board is better" ▪ "We watch movies and videos related to the lesson" ▪ "We understand more" ▪ "I feel relaxed by saving data" ▪ "More attractive and interactive" ▪ "Because there are documentaries and videos" ▪ "Because you get more information" ▪ "The visual aids applied in class for poems and stories is entertaining and informative" ▪ "The teacher uses variety of applications" ▪ "More organized" ▪ "Revision is much faster" ▪ "She brings interesting ways to teach"
6b	When the Smart Board is used in class, you feel you do not pay much attention	▪ "I find verbal learning more interesting than visuals"
6c	When the Smart Board is	▪ "I feel bored and lose interest"

Appendix M

Students' Perception of the Math Teacher

The data below is the result of the students' Math teacher survey based on frequency count. The total number of students who participated in the survey was 40.

		a	/40	b	/40	c	/40
1	Does teacher X use technology	Yes	40	No	0		
2	If yes, how often?	Every time you have class	39	Most of the time you have class	1	Rarely, the teacher hardly ever uses the Smart Board	0
4	Since teacher X uses technology in class, the instruction is	the same	15	more interesting	24	less interesting	1
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	17	average teacher	8	neutral teacher	15
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	29	you do not pay much attention	11	you do not concentrate or pay attention	0
9	Do you use the Smart Board during the teacher X's class?	Yes	27	No	13		
11	You are	an elementary student	0	an intermediate student	40	a secondary student	0

The data below is the students' perception of the Math teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	"Using figures" "ActivInspire, Geogebra, calculator" "Geogebra, shapes, YouTube" "Movies" "She writes the lesson and exercises on the board" "She explains and solves math problems" "Videos – Khan academy, whiteboard, and timer" "She works too fast"
4a	Why is the instruction the same	"I do not see a difference in the explanation" "Because it is similar to a whiteboard" "The teacher gives out instructions on the Smart Board, explains the lessons, and then writes the numbers we have to do" "It's the same information" "It's just a board" "The same can be done on a regular board" "I'm not interested in Math and the use of Smart Board doesn't really change that" "In Math both Whiteboard and Smart Board is the same since we only answer questions" "Because Math is boring in any way"
4b	Why is the instruction more interesting?	"It's more fun" "We use PPTs, videos, etc... in Math" "Since there's Geogebra, she uses it and she puts videos sometimes so it's more interesting" "I understand more" "Because she uses Geogebra and movies to explain the lesson which makes the lesson more interesting" "More technology" "easier to explain" "The use of graphs and scales makes the lesson more interesting to listen to. However, it's more confusing" "We are able to understand more since we can visually learn as she solves problems for us" "It is more interesting because it is more accurate and provides visual aids" "We concentrate more" "It shows easier ways to use mathematical graphs and equations" "Because using technology is fun"
4c	Why is the instruction less interesting?	"I don't understand the lesson when she uses Geogebra"
5a	Do you think he/she is a	"Because she makes it fun" "She uses some videos and applications to help us understand better"

	better teacher?	"She shows us what she needs to explain in a different way" "Since she gives us more details and shows what she needs to explain in a different way" "The teacher can explain better with accurate results" "Since it shows that she also knows about computer" "Modern teachers know more of technology" "She is better because it helps her put her point across more easily" "She uses different colors to stress on important parts" "Because it's easier and we concentrate more" "She can be more understandable through technology"
5b	Do you think he/she is an average teacher?	"She is an average teacher because she doesn't take advantage of the privileges given such as grids and charts" "Because not only the Smart Board will help us but also the teacher's explanation" "Because the teacher doesn't change her attitude or is not more interested using it"
5c	Do you think he/she is a neutral teacher?	"Since all the teachers use technology" "She still uses the same teaching techniques" "Nothing is changing" "She stays the same" "She explains the lesson just the same way it would be usually done" "Neutral teacher since sometimes half of the class doesn't understand" "I don't judge a teacher through the way she uses the Whiteboard but through the way she teaches" "The resources you have doesn't make you a better teacher"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	"Because it is more interesting" "Because technology is being used" "Because you are obliged to pay attention in class" "Nice way to learn" "We can have more examples on the lesson" "Because the notes are in a neat way and we can understand more" "Because I am more comfortable with technology" "I concentrate and pay more attention because I'm more comfortable and acquainted with technology" "More visuals" "Because technology is easier" "Pretty colors"
6b	When the Smart Board is used in class, you feel you do not pay much attention	"We keep turning them on and off" "I hate Math" "Because I'm personally not very attentive with or without the Smart Board" "It always crashes because of her USB (it's full of viruses)" "It's the same as the Whiteboard"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	NA

Appendix N

Students' Perception of the Second Math Teacher

The data below is the result of the students' Math teacher survey based on frequency count. The total number of students who participated in the survey was 44.

		a	/44	b	/44	c	/44
1	Does teacher X use technology	Yes	44	No	0		
2	If yes, how often?	Every time you have class	43	Most of the time you have class	1	Rarely, the teacher hardly ever uses the Smart Board	0
4	Since teacher X uses technology in class, the instruction is	the same	27	more interesting	16	less interesting	1
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	15	average teacher	12	neutral teacher	17
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	34	you do not pay much attention	10	you do not concentrate or pay attention	0
9	Do you use the Smart Board during the teacher X's class?	Yes	40	No	4		
11	You are	an elementary student	0	an intermediate student	44	a secondary student	0

The data below is the students' perception of the second Math teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	• "By using "active inspire" and saving it on the desktop, equations graphing, to explain, for examples, solve exercises, correction of exercises, normal Whiteboard, practice exercises, writing, studying, writing notes, sketching, drawing, problem solving, writing answers, making certain geometric shapes, homework correction, teaching new lesson, turns it to a board and teaches"
4a	Why is the instruction the same	• "I don't think the Smart Boards did anything for the school, they only made things easier for teachers and lessons, but harder for students" • "At the beginning it was more interesting because the Smart Board was new to the system, but now it's not interesting anymore because we got used to it" • "She still explains in the same way; using the Smart Board as a White board, thus nothing changed much." • "There is no difference between whiteboards and Smart Boards." • "Because learning is learning no matter where or what you use." • "It is the same because it makes no difference for using White board and the Smart Board." • "There is nothing new." • "It's the same thing as the White board" • "Because the teaching style did not change" • " It doesn't change the experience, we are still learning" • "Because it stays Math" • "She uses it as a Whiteboard (just her lines are straighter :)"
4b	Why is the instruction more interesting?	• "Faster, more understanding, less hassle" • "Because it is more entertaining" • " Technology is fun compared to books" • "Since the teacher uses technology in class, it's more interesting because students will participate more and there is a lot of advanced way of explaining on the Smart Board" • "There are more tools; It's more fun when we solve exercises on the Smart Board" • "Different colors, sizes…" • "Watching her use the Smart Board grabs my

			attention and it is easier to understand"
			• "Because the board got neater and we can understand more"
			• "We understand more"
			• "There are geometric shapes so it would be clearer"
			• "It's easier to draw graphs and for Geometry"
			• "Because it is easier and clearer to see. Also, it is more accurate"
			• "There are rulers and more technology in the Smart Board to make the explanation clearer"
			• "Because it feels more fun"
4c	Why is the instruction less interesting?		• "Nothing is new"
5a	Do you think he/she is a better teacher?		• "Easier to explain on Smart Board"
			• "Because she draws neater straight lines and she can save her work to continue next time"
			• "She knows everything about it"
			• "Because her explanations are more accurate"
			• "It's easier and clearer for her to show examples"
			• "Better, since in math, rulers and protractors are used, and they are useful in the Smart Board"
			• "Because the Smart Board helps the teacher operate many math problems such as graphs or shapes for geometry"
			• "Because she uses the Smart Board"
			• "Better teacher because it gives an exciting mood in the class"
			• "She is better with the Smart Board and her lessons become more interesting and faster"
			• "Because there are more shapes, lines, and tables which make it more interesting"
			• "She uses applications to help her graph equations"
			• "She explains well"
5b	Do you think he/she is an average teacher?		• "She makes a lot of mistakes, and it takes time to finish because she redoes the whole question and she doesn't give time to copy!!"
			• "She is average because having a Smart Board doesn't change the style of explanation"
			• "It is hard to understand"
			• "Because she is ok"
			• "The Whiteboard doesn't make a teacher better or worse"
			• "Because she is not used to it"
			• "Because there is nothing new about it. I got used to it and the teacher doesn't change the

		way of teaching…no videos, no games..only writing on that Smart Board"
5c	Do you think he/she is a neutral teacher?	■ "All that is done on Smart Board can be done on a Whiteboard" ■ "Because it is the same" ■ "The teacher is a good teacher with or without a Smart Board" ■ "Because the teacher explains the same way she does when she uses the normal board" ■ "The board does not affect the teacher's teaching methods" ■ "Because it's only a board, it doesn't affect the teacher" ■ "The Smart Board does not contribute in making her better, she has always been good" ■ "Nothing changed, every time she uses it, it gets stuck"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	■ "Because it's new" ■ " To do well" ■ "Because it is more fun" ■ "Because I like technology" ■ "It is interesting to use technology and there are a variety of tools in it" ■ "Because it's more attractive and appealing" ■ "It is faster and clears stuff for me" ■ "The board catches my attention" ■ "Because it's easier to copy things" ■ "Everyone is into it" ■ "Easier" ■ "More entertaining" ■ "Because it helps us feel more interested in studying" ■ "It's more interesting and clearer" ■ "The board makes the studies clear and visual"
6b	When the Smart Board is used in class, you feel you do not pay much attention	■ " It acts as a normal board" ■ "There is nothing special about the math class, it's boring" ■ "Because students always want to go use the board" ■ "It's the same" ■ "The board causes a distraction"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	■ NA

Appendix O

Students' Perception of the Arabic Teachers

The data below is the result of the students' Arabic teachers' survey based on frequency count. The total number of students who participated in the survey was 50 and the total number of teachers was 4.

		a	/50	b	/50	c	/50
1	Does teacher X use technology	Yes	36	No	14		
2	If yes. how often?	Every time you have class	21	Most of the time you have class	10	Rarely. the teacher hardly ever uses the Smart Board	5
4	Since teacher X uses technology in class. the instruction is	the same	27	more interesting	7	less interesting	2
5	When teacher X uses technology/Smart Board in class. do you think he/she is a	better teacher	6	average teacher	9	neutral teacher	21
6	When the Smart Board is used in class. you feel	you concentrate more and pay more attention	21	you do not pay much attention	10	you do not concentrate or pay attention	5
9	Do you use the Smart Board during the teacher X's class?	Yes	8	No	28		
11	You are	an elementary student	0	an intermediate student	50	a secondary student	0

The data below is the students' perception of the Arabic teachers' technology use in class.

3	In what way does teacher X use the Smart Board?	"Traditional teaching" "Microsoft Office and PPT" "ActivInspire. videos. word document" "To write the explanation" "The teacher types Arabic" "Writing notes" "Music"
4a	Why is the instruction the same	"The instruction is the same since she only uses it as display and reads from her own notes" "The teacher uses it as a whiteboard" "She barely uses the board" "It's the same as the old board" "Same with or without the Smart Board" "The teacher doesn't use the interactive features of the board" "The explanation doesn't change" "The teachers explains the same with or without technology" "The active board doesn't make a difference in Arabic" "Because she rarely uses it"
4b	Why is the instruction more interesting?	"Because I understand more" "More visual" "Technology is easier to use" "He writes and types" "Typed Arabic words make reading easier" "I understand more"
4c	Why is the instruction less interesting?	"Barely has any knowledge about computers" "Because it takes more time to set up"
5a	Do you think he/she is a better teacher?	"She herself learns more" "She explains in a better way" "The writing is clear" "We pay more attention"
5b	Do you think he/she is an average teacher?	"She is average because she doesn't know how to use it" "She is a good teacher who does average work" "No change" "We read from the book and she doesn't use the board"
5c	Do you think he/she is a neutral teacher?	"He is neutral because he uses it as a whiteboard" "She uses the SB seldom in class so it doesn't make a difference" "Doesn't use the SB the way it should be used" "Nothing changed since the school bought the SBs"

		▪ "He is doing his job the same way" ▪ "She only writes so it doesn't change anything" ▪ "The teacher hasn't changed with or without the board"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	▪ "I concentrate more because I'm more accustomed to technology" ▪ "We like technology" ▪ "I can see the board wherever I sit" ▪ "More visuals" ▪ "More interesting" ▪ "Vibrant and clear" ▪ "We learn more" ▪ "The brain responds more to technology" ▪ "Writing is more accurate" ▪ "We watch videos and see pictures so we understand more" ▪ "I enjoy technology"
6b	When the Smart Board is used in class, you feel you do not pay much attention	▪ "She barely uses it" ▪ "It's similar to the whiteboard"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	▪ "It's not interesting"

Appendix P

Students' Perception of the First Geography Teacher

The data below is the result of the students' Geography teacher survey based on frequency count. The total number of students who participated in the survey was 22.

		a	/22	b	/22	c	/22
1	Does teacher X use technology	Yes	21	No	1		
2	If yes, how often?	Every time you have class	4	Most of the time you have class	12	Rarely, the teacher hardly ever uses the Smart Board	6
4	Since teacher X uses technology in class, the instruction is	the same	0	more interesting	19	less interesting	3
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	14	average teacher	0	neutral teacher	8
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	11	you do not pay much attention		you do not concentrate or pay attention	11
9	Do you use the Smart Board during the teacher X's class?	Yes	9	No	13		0
11	You are	an elementary student		an intermediate student	22	a secondary student	

The data below is the students' perception of the Geography teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	"By showing us maps and explaining the lesson through a PPT" "He writes notes on the board" "Writing, drawing, visual representations" "Watching documentaries" "Interesting videos, graphs, pictures" "Plugs in his laptop and shows us videos about our lessons and sometimes movies"
4a	Why is the instruction the same	"I don't see a difference" "Same information" "He just write notes just like a whiteboard"
4b	Why is the instruction more interesting?	"Since we can watch movies about what we're going to study instead of writing the lesson" "He delivers the instruction in new and better ways" "We get to watch the wars" "I find the Smart Board more fun and interesting" "Since we have visual aid" "He displays videos of tornadoes and volcanoes that are part of the lesson" "Videos help us visualize and understand the concepts better" "Because we all participate" "Technology makes learning fun" "We all participate"
4c	Why is the instruction less interesting?	"Using the Smart Board as a whiteboard is boring and less appealing"
5a	Do you think he/she is a better teacher?	"He himself is learning new things as well" "Knows about computer" "Usually students get bored reading from a book all the time. Since we use technology we are more interested in the lesson." "Because the teacher uses the Smart Board" "Because when I use technology I find it much more interesting than books and studying on the Smart Board has made learning more fun and appealing" "Because when a lesson is explained, it is better viewed and understood" "It's interactive" "It allows the students to visualize what they're learning than understanding blindly" "Because we can watch entertaining videos and animations that can encourage us to

		learn more and with more interest in the lesson"
5b	Do you think he/she is an average teacher?	▪ NA
5c	Do you think he/she is a neutral teacher?	▪ "Nothing changes" ▪ "Whiteboard or Smart Board It's the same"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	▪ "Because we like technology" ▪ "I find it more interesting" ▪ "More visuals for me" ▪ "We view videos and pictures" ▪ "The teacher makes presentations to explain the lesson"
6b	When the Smart Board is used in class, you feel you do not pay much attention	▪ "It's the same" ▪ "It's something more active, fun, and interesting"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	▪ " It's the same as using a whiteboard" ▪ "It actually depends on the subject and the teacher"

Appendix Q

Students' Perception of the Second Geography Teacher

The data below is the result of the students' Geography teacher survey based on frequency count. The total number of students who participated in the survey was 48.

		a	/48	b	/48	c	/48
1	Does teacher X use technology	Yes	48	No	0		
2	If yes, how often?	Every time you have class	32	Most of the time you have class	14	Rarely, the teacher hardly ever uses the Smart Board	2
4	Since teacher X uses technology in class, the instruction is	the same	25	more interesting	22	less interesting	1
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	17	average teacher	13	neutral teacher	18
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	34	you do not pay much attention	12	you do not concentrate or pay attention	2
9	Do you use the Smart Board during the teacher X's class?	Yes	22	No	26		
11	You are	an elementary student	0	an intermediate student	48	a secondary student	0

The data below is the students' perception of the Geography teachers' technology use in class.

3	In what way does teacher X use the Smart Board?	"PPT presentations" "He writes notes on the board" "Watching movies" "ActivInspire, Microsoft Word" "Writing, drawing, visual representations" "Notes/homework" "Watching documentaries" "Interesting videos, graphs, pictures" "Gives PPT presentations as projects" "Diagrams and clips"
4a	Why is the instruction the same	"I don't see a difference" "Same information" "It is used as a normal whiteboard" "It won't change a teacher" "He is not always very clear when he draws, but his notes are excellent" "He doesn't express himself through the Smart Board and he should" "His techniques are the same"
4b	Why is the instruction more interesting?	"We watch documentaries, movies, and we do PPT presentations" "More interactive" "We understand more since the presentations and movies make it more interesting" "We are able to see things more clearly" "The explanation is more fun, more understandable, and more tidy" "We are able to pay attention and be able to see the visual aids related to the lesson and explanation" "Since we can watch movies about what we're going to study instead of writing the lesson" "He delivers the instruction in new and better ways" "We see the wars in movies" "I find the Smart Board more fun and interesting" "Since we have visual aid"
4c	Why is the instruction less interesting?	"Using the Smart Board as a whiteboard is boring and less appealing" "With the Smart Board the class is boring"
5a	Do you think he/she is a better teacher?	"We do presentations and watch movies" "HHE knows how to use technology" "It is easier for us and the teacher" "It's a fun way of learning through his

		explanations"
		▪ "less hassle, no time is wasted"
		▪ "I can understand the lesson more through the presentations and movies"
		▪ "He/she gets to know how to use the board"
		▪ "Technology helps me understand more even though I'm an A+ student in his class. Technology helps a lot"
		▪ "The handwriting is much better"
		▪ "I understand and get high grades"
		▪ "He himself is learning new things as well"
		▪ "Knows about computer"
5b	Do you think he/she is an average teacher?	▪ "Since the lesson isn't different"
		▪ "The teacher explains the lesson in the same way"
		▪ "Not much of a difference"
		▪ "Because he's lazy"
		▪ "It's the same program"
5c	Do you think he/she is a neutral teacher?	▪ "Nothing changes"
		▪ "Whiteboard or Smart Board It's the same"
		"He only writes"
		▪ "It doesn't change who the teacher is"
		▪ "The same... all we do is copy"
		▪ "He isn't very well educated about how to use it"
		▪ "The education of the teacher is not related to the Smart Board"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	▪ "I find it more interesting"
		▪ "More visuals for me"
		▪ "We view videos and pictures"
		▪ "The teacher makes presentations to explain the lesson"
		▪ "It's easier"
		▪ "Because I like Social Studies"
		▪ "It is fast and clear"
		▪ "Once can catch up and follow lessons easily"
		▪ "The teacher gets to know what we want through technology"
		▪ "Less waste of time"
		▪ "It is more fun and more interesting"
		▪ "The lesson is descriptive"
		▪ "If I don't catch up, I can simply save data on my USB without panicking"
		▪ "Since screens attract people's attention"
		▪ "It's something more active, fun, and interesting"
6b	When the Smart Board is used in class, you feel you do not pay much	▪ "Nothing changes"
		▪ "I don't feel motivated in the classroom"
		▪ "Because it's a lot of information and it makes

	attention	me bored" ■ "He doesn't often use the Smart Board, but he usually explains"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	■ " It's the same as using a whiteboard" ■ "It actually depends on the subject and teacher" ■ "Sometimes I can't see it clearly because of the reflection"

Appendix R

Students' Perception of the French Teachers

The data below is the result of the students' French teachers' survey based on frequency count. The total number of students who participated in the survey was 45 and the total number of teachers was 3.

		a	/41	b	/41	c	/41
1	Does teacher X use technology	Yes	41	No	4		
2	If yes, how often?	Every time you have class	7	Most of the time you have class	14	Rarely, the teacher hardly ever uses the Smart Board	20
4	Since teacher X uses technology in class, the instruction is	the same	23	more interesting	16	less interesting	2
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	13	average teacher	8	neutral teacher	20
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	24	you do not pay much attention	16	you do not concentrate or pay attention	1
9	Do you use the Smart Board during the teacher X's class?	Yes	16	No	25		
11	You are	an elementary student	0	an intermediate student	45	a secondary student	0

The data below is the students' perception of the French teachers' technology use in class.

3	In what way does teacher X use the Smart Board?	"ActivInspire, movies, CD" "As a whiteboard" "Voice notes" "Notes and explanation" "Media player" "Oral quizzes" "She uses the board to display visual aids" "She uses to teach a new lesson or for correction" "PPTs and exercises" "Audio files"
4a	Why is the instruction the same	"The teacher's IQ stays the same no matter what" "Material hasn't changed" "She uses it as a whiteboard" "The teacher should change not the board" "I don't see a difference between a Smart Board and a whiteboard" "Because she seldom uses it"
4b	Why is the instruction more interesting?	"We listen to people speak French" "It's tidy" "Easier to understand" "Because of the presentations and videos" "We can learn more and watch movies" "Because it's a Smart Board" "Because we understand more" "Because of the way she teaches and because she helps us understand" "More visuals" "The audio files which help us understand more" "You hear the French accent" "It's a better way to show examples and make things clear"
4c	Why is the instruction less interesting?	" nothing's new"
5a	Do you think he/she is a better teacher?	"Everything is easier to understand" "Everything is tidy" "Easier and faster for her" "More interesting" "Clearer handwriting" "Because she uses the Smart Board" "We can get more information from videos and movies" "It is better explained" "She is a great teacher who helps us learn"
5b	Do you think he/she is an	"The teacher hasn't changed"

	average teacher?	• "Because we barely use it"
5c	Do you think he/she is a neutral teacher?	• "The teacher teaches the same way" • "She uses the Smart Board as a whiteboard" • "Same explanation"
6a	When the Smart Board is used in class, you feel you concentrate more and pay more attention	• "The light attracts my eyes" • "Because technology is being used" • "I like French" • "It's more interesting" • "Because of the animation" • "Because of the teacher who uses it" • "Because I like technology" • "We have fun watching movies" • "We understand more through the videos and the pictures we see" • "More vibrant color" • "Media player helps us during tests" • "It's easier to see the lesson"
6b	When the Smart Board is used in class, you feel you do not pay much attention	• "I find it the same" • "I get bored reading exercises" • "I'm generally not very attentive, and the Smart Board doesn't attract my attention" • "I find French easy" • "It's dull" • "Every student wants to use the board"
6c	When the Smart Board is used in class, you do not concentrate or pay attention	• "It's the same"

Appendix S

Students' Perception of the Music Teacher

The data below is the result of the students' Music teacher survey based on frequency count. The total number of students who participated in the survey was 9.

		a	/9	b	/9	c	/60
1	Does teacher X use technology	Yes	9	No	0		
2	If yes, how often?	Every time you have class	5	Most of the time you have class	4	Rarely, the teacher hardly ever uses the Smart Board	0
4	Since teacher X uses technology in class, the instruction is	the same	3	more interesting	6	less interesting	0
5	When teacher X uses technology/Smart Board in class, do you think he/she is a	better teacher	4	average teacher	2	neutral teacher	3
6	When the Smart Board is used in class, you feel	you concentrate more and pay more attention	7	you do not pay much attention	1	you do not concentrate or pay attention	1
9	Do you use the Smart Board during the teacher X's class?	Yes	2	No	7		
11	You are	an elementary student	0	an intermediate student	9	a secondary student	0

The data below is the students' perception of the Music teacher's technology use in class.

3	In what way does teacher X use the Smart Board?	"Movies" "PDFs and explanation" "ActivInspire" "Music karaoke" "We listen to the music and sing" "We watch movies" "Learning the notes" "Videos"
4a	Why is the instruction the same	"We see lyrics"
4b	Why is the instruction more interesting?	"Interactive" "We do note waste 10 minutes to draw the musical staff" "We can sing in class and watch movies" "To sing and learn more about the singers and their image"
4c	Why is the instruction less interesting?	NA
5a	Do you think he/she is a better teacher?	"Easier for her to use" "More interactive" "We listen to music"
5b	Do you think he/she is an average teacher?	"The teacher is the same" "It is normal but fun to use"
5c	Do you think he/she is a neutral teacher?	"He/she is here to teach..that's all"
6a	When the Smart Board is used in class. you feel you concentrate more and pay more attention	"Videos and pictures" "It is more fun" "It's better because everything can be done in class" "The explanation is easier to understand"
6b	When the Smart Board is used in class. you feel you do not pay much attention	"We sing most of the time"
6c	When the Smart Board is used in class. you do not concentrate or pay attention	"I don't know how to sing and the teacher tells me don't sing"