

2013

An investigation of the effects of interactive whiteboards as perceived by Ohio high school foreign language teachers

Julie Langan-Pérez
The University of Toledo

Follow this and additional works at: <http://utdr.utoledo.edu/theses-dissertations>

Recommended Citation

Langan-Pérez, Julie, "An investigation of the effects of interactive whiteboards as perceived by Ohio high school foreign language teachers" (2013). *Theses and Dissertations*. 124.
<http://utdr.utoledo.edu/theses-dissertations/124>

This Dissertation is brought to you for free and open access by The University of Toledo Digital Repository. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of The University of Toledo Digital Repository. For more information, please see the repository's [About page](#).

A Dissertation

entitled

An Investigation of the Effects of Interactive Whiteboards as Perceived by Ohio High
School Foreign Language Teachers

by

Julie Langan-Pérez

Submitted to the Graduate Faculty as partial fulfillment of the requirements for
the Doctor of Philosophy Degree in Curriculum & Instruction: Secondary Education

Dr. Berhane Teclehaimanot, Committee Chair

Dr. Svetlana Beltyukova, Committee Member

Dr. Leigh Chiarelott, Committee Member

Dr. Dwayne DeMedio, Committee Member

Dr. Patricia R. Komuniecki, Dean
College of Graduate Studies

The University of Toledo

December 2013

Copyright 2013, Julie Langan-Perez

This document is copyrighted material. Under copyright law, no parts of this document may be reproduced without the expressed permission of the author.

An Abstract of
An Investigation of the Effects of Interactive Whiteboards as Perceived by Ohio High
School Foreign Language Teachers

by

Julie Langan-Perez

Submitted to the Graduate Faculty in partial fulfillment of the requirements for
the Doctor of Philosophy Degree in Curriculum & Instruction: Secondary Education

The University of Toledo
December 2013

Grounding education in technology with a global orientation is relevant to educating students in the United States today. A technology-oriented education with a global orientation can prepare students to be in a position to use technology and interact with others on a global scale. One example of a technology tool is Interactive Whiteboards (IWBs). Some teachers have access to IWBs and some teachers do use them for instruction, but there is a lack of information pertaining to which teachers have access to IWBs and IWB instructional use by subject area and grade level. This leaves open to question if Ohio high school foreign language teachers are contributing to the preparation of students to participate in a global setting through technology-integrated instruction by using IWBs in their lessons as they teach students a foreign language and about other cultures.

The purpose of this study is to investigate the relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching and student learning, their perceptions of motivational effects of IWBs on teachers and their perceptions of effects of IWBs on student engagement. Investigating if there is a relationship between Ohio

high school foreign language teachers' self-reported instructional use of IWBs and their perceptions of instructional effects of IWBs on teaching and student learning, their perceptions of motivational effects of IWBs on teachers and their perceptions of effects of IWBs on student engagement may help identify why Ohio high school foreign language teachers may or may not choose to use an IWB for instruction and reveal what divides those teachers who do attempt to incorporate IWB technology into the classroom from those who do not make such an attempt. This study was also conducted with the aim of creating awareness of IWB instructional use among high school foreign language teachers and school administrators in Ohio.

This investigation revealed that teachers who do not use IWBs for instruction, regardless of IWB access, do not necessarily have poorer perceptions of IWBs in comparison to those who do use IWBs for instruction. Among high school foreign language teachers who have IWB access and use IWBs for instruction, the more frequently IWBs were used for instruction, the more positive their perceptions were regarding the effects of IWBs.

I would like to dedicate this dissertation to my grandmothers, my parents, my husband and my son. Grammy, thank you for your support and always encouraging me to test and surpass of what I thought I was capable. Little, thank you for your support and being a role model in the field of education. Mom, I don't know how I could have done this without you. Daddy, thank you for sending "the George" movie and for your calming words of wisdom. César, thank you for your understanding and loving your crazy wife. Aurelio, thank you being patient with me so I could work on this. Mama is all done!

Acknowledgements

I would like to thank my committee for your expertise and guidance on this journey.

Thank you, Dr. Teclehaimanot. Thank you, Dr. Belyukova. Thank you, Dr. Chiarelott.

Thank you, Dr. DeMedio.

Contents

Abstract	iii
Acknowledgements	vi
Contents	vii
List of Tables	xi
List of Figures	xii
1 Introduction	1
1.1 Introduction.....	1
1.2 Study Background.....	2
1.3 Problem Statement.....	6
1.4 Purpose of the Study.....	7
1.5 Research Questions.....	8
1.6 Delimitations and Limitations.....	9
1.7 Definitions.....	9
1.8 Summary.....	11
2 Literature Review	13
2.1 Introduction, P21.....	13
2.2 The National Standards in Foreign Language Education: The Five C’s of Foreign Language Instruction.....	14
2.3 Ohio K-12 World Language Academic Content Standards.....	14
2.4 Ohio K-12 World Language Academic Content Standards	

Revision.....	17
2.5 Current Application of the Five C’s in Foreign Language Instruction.....	18
2.6 Technology can Enhance the 5C’s.....	19
2.7 The Call to Incorporate Technology in Instruction.....	22
2.8 Teachers: an Obstacle to Technology in the Classroom.....	25
2.9 IWBs as Technology Tools in the Classroom.....	27
2.10 Lack of Teacher Motivation towards the Use of IWBs.....	28
2.11 Relevance of IWB Professional Development.....	29
2.12 Enhancement of Classroom Instruction Through IWBs.....	32
2.13 Consistent IWB Access.....	32
2.13.1 Teacher Self-efficacy in Using an IWB.....	33
2.13.2 IWBs Aid Teacher Efficiency.....	34
2.13.3 IWB Multimedia Capabilities0.....	35
2.13.4 The IWB as the Classroom Focal Point.....	36
2.13.5 IWBs Promote Student Engagement, Attention and Motivation.....	36
2.13.6 Enhancement of Classroom Interaction through IWB Use.....	37
2.13.7 IWBs: Reconnecting Students in the Public Learning Sphere....	38
2.13.8 Flexibility in IWB-Based Instruction.....	39
2.13.9 IWBs Support Differentiated Instruction.....	40
2.13.10 Student Perspectives of IWBs.....	41
2.14 Summary.....	43

3 Methodology

3.1	Purpose of the Study.....	46
3.2	Research Questions and Hypotheses.....	46
3.3	Variables.....	50
3.4	Population and Sample.....	52
3.4.1	Sampling.....	52
3.5	Research Design and Procedures.....	53
3.5.1	Instrumentation.....	53
3.5.2	Data Collection and Procedures.....	57
3.5.3	Data Management.....	59
3.6	Data Analysis.....	60
4	Results	62
4.1	Participant Characteristics.....	62
4.2	Research Question One.....	65
4.2.1	The Instructional Effects of IWBs on Teaching.....	66
4.2.2	Relationship Between Self-Reported IWB Instructional Use and the Instructional Effects of IWBs on Teaching.....	67
4.2.3	Summary of Results for Research Question One.....	68
4.3	Research Question Two.....	69
4.3.1	The Instructional Effects of IWBs on Student Learning.....	69
4.3.2	Relationship Between Self-Reported IWB Instructional Use and The Instructional Effects of IWBs on Student Learning.....	70
4.3.3	Summary of Results and Relationship for Research Question Two.....	71

4.4	Research Question Three.....	72
4.4.1	The Motivational Effects of IWBs on Teachers.....	73
4.4.2	Relationship between Self-reported IWB Instructional Use and The Motivational Effects of IWBs on Teachers.....	74
4.4.3	Summary of Results and Relationship for Research Question Three.....	75
4.5	Research Question Four.....	84
4.5.1	The Effects of IWBs on Student Engagement.....	76
4.5.2	Relationship between Self-reported IWB Instructional Use and The Effects of IWBs on Student Engagement.....	77
4.5.3	Summary of Results and Relationship for Research Question Four.....	79
5	Conclusions and Implications	80
5.1	Research Question One.....	81
5.2	Research Question Two.....	83
5.3	Research Question Three.....	84
5.4	Research Question Four.....	86
5.5	Relationships between the Five Groups.....	88
5.6	Implications for Practice.....	90
5.7	Recommendations for Further Research.....	91
	References	94
	Appendices	
	Appendix A: Electronic Letter of Permission to Adapt Survey	102

Appendix B: Electronic Letter of Permission from P21	103
Appendix C: Letter of Permission from The Ohio Foreign Language Association	104
Appendix D: Electronic Letter of Consent	105
Appendix E: Instrument	108

List of Tables

4.1	Cross Tabulation of Age and Years Teaching a Foreign Language.....	63
4.2	Demographic Characteristics of Participants.....	64
4.3	The Five Groups of Participants According to IWB Access.....	65
4.4	Means and Standard Deviations of the Five Groups.....	65
4.5	ANOVA Results of Perceptions of the Instructional Effects of IWBs on Teaching.....	66
4.6	ANOVA Results of Perceptions of the Instructional Effects of IWBs on Student Learning.....	70
4.7	ANOVA Results of Perceptions of the Motivational Effects of IWBs on Teachers.....	73
4.8	ANOVA Results of the Effects of IWBs on Student Engagement.....	77

List of Figures

4.1	The relationships between self-reported IWB instructional use and the instructional effects of IWBs on teaching.....	68
4.2	The relationships between self-reported IWB instructional use and the instructional effects of IWBs on student learning.....	71
4.3	Linear relationships between self-reported IWB instructional use and the motivational effects of IWBs on teachers.....	75
4.4	Linear relationships between self-reported IWB instructional use and the motivational effects of IWBs on students.....	78
5.1	Group averages of total scores per variable.....	90

Chapter 1

Introduction

1.1 Technology-supported Education

Grounding education in technology with a global orientation is relevant to educating students in the United States today. According to The United States Department of Education Office of Educational Technology (2010), ensuring that technology is a component of education is “key to America’s economic growth and prosperity and to our ability to compete in the global economy” (p. 1). The *National Educational Technology Plan 2010* (2010) projects long-term benefits of incorporating technology in classrooms which will lead to students developing skills to solve “real-world problems” and become “productive members of a globally competitive workforce” (p. xi). Use of technology in the classroom can also provide immediate instructional benefits. Technology can assist teachers in providing “engaging and powerful learning content, resources, and experiences and assessment systems that measure student learning in more complete, authentic, and meaningful ways” (U.S. Department of Education, 2010, p. 6).

In addition to supporting the use of technology in classrooms, The United States Department of Education Office of Technology (2010) recognizes that current students must be prepared to work collaboratively with others from around the world, “because

only individuals and nations working together will solve many of today's challenges" (p. 4). To work collaboratively with people from other countries, students must be prepared to communicate with people who are not native speakers of English and also be receptive of other cultures. If the United States is to participate in the global community, it should be observant of The United States Department of Education Office of Technology's statement and immerse students in learning environments in which technology is used as an instructional tool and is partnered with the study of foreign language. If upcoming generations are going to contribute to a global, technologically-dominated environment it is necessary that they are educated to be "capable of navigating an interdependent world and collaborating across borders and cultures to address today's great problems" (U.S. Department of Education, 2010, p. 4). A technology-oriented education with a global orientation can prepare students to be in a position to use technology and interact with others on a global scale.

1.2 Study Background

When technology is incorporated into the classroom setting, it is imperative that it be used appropriately to enhance teaching and learning. Gow (1995) emphasized that technology can be defined as a tool used to assist learners in accomplishing goals. The Interstate Teacher Assessment and Support Consortium (InTASC) (2010) also clarified the appropriate use of technology in the classroom setting when it referred to "technology not as an end in itself, but as a tool for learning and communication" (p. 5). Cuban (1986) gave a widely applicable definition of instructional technology as he defined it to be "any device available to teachers for use in instructing students in a more efficient and

stimulating manner than the sole use of the teacher's voice" (p. 4). The Association for Educational Communications and Technology (AECT) (2004) specifically defined educational technology as, "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (p. 1). For this investigation, technology will be conceptualized according to the InTASC (2010) and Gow's (1995) definitions of technology, as well as Cuban's (1986) definition of instructional technology and the AECT's (2004) definition of educational technology. The definition of technology for this study will be viewed as a tool that is used and managed with the purpose of making learning and instruction "more efficient and stimulating" and improving student performance (Cuban, 1986, p. 4).

In 2008, the International Society for Technology in Education (ISTE) developed the *National Educational Technology Standards for Teachers* (NETS•T) and the *National Educational Technology Standards for Students* (NETS•S). According to the ISTE's NETS•T (2008), teachers should use technology "as they design, implement, and assess learning experiences to engage students and improve learning" (p. 1). In 2010, the InTASC supported this motion for technology integration stating that technology was one of the "key cross-disciplinary skills" (p. 6) and teachers should constantly strive to use technology to create innovative ways to fully engage students (p. 16). The InTASC (2010) also noted that it was actually a responsibility of teachers to use technology in the classroom and to be cognizant of how content and skill development could be enhanced by multiple media and technology (p. 18). Also in 2010, The United States Department of Education Office of Technology called upon teachers to integrate technology into their

classrooms with the objective of preparing students to function in a technology-oriented, post-educational environment (p. xi).

The goals and objectives of Ohio's foreign language programs are reflective of the 2006 version of the *Standards for Foreign Language Learning in the 21st Century*, which are supported by the American Council on the Teaching of Foreign Languages (ACTFL). The standards are divided into five areas: Communications, Cultures, Connections, Comparisons and Communities (ACTFL, 1996, p. 4).). *The Ohio K-12 World Language Academic Content Standards* (2012a) also include the same five areas of Communication, Cultures, Connections, Comparisons and Communities (Ohio Department of Education, 2002, p. 10) as they are intended to be reflective of the national standards (Ohio Department of Education, 2002, p. 2). However, *The Ohio K-12 World Language Academic Content Standards* (2012a) differ from the national standards in that they include technology components which are to be integrated into the study of foreign languages. Just as Ohio foreign language teachers are expected to organize the foreign language content of their lessons to meet national and state standards, they are also called upon to integrate technology into their lessons.

On a state level, the 2002 version of *Ohio's Foreign Language Academic Content Standards* foreshadowed the 2010 call of The United States Department of Education Office of Technology to merge technology with the study of another language and culture and included the need for technology to be incorporated in the classroom. According to the 2002 version of Ohio's standards, students were to "interpret a variety of authentic live, print and technology-based resources to access knowledge related to all content areas" (Ohio Department of Education, 2002, p. 22). Additionally, Ohio foreign language

teachers were encouraged to, “Incorporate the appropriate use of multimedia technology to facilitate learning for all students (Ohio Department of Education, 2002, p. 23). The Ohio Department of Education has recently enhanced the call for technology in the renamed and revised edition of *The Ohio K-12 World Language Academic Content Standards* (2012a). When addressing the skills which are necessary for college and and/or a career, *The Ohio K-12 World Language Academic Content Standards* stated that high school graduates should “use appropriate technologies when interpreting messages, interacting with others and producing written, oral and visual messages” (Ohio Department of Education, 2012b, p. 1). The updated Communication Standard now explicitly states that students must learn to, “Communicate in languages other than English in person and via technology (Ohio Department of Education, 2012a, p. 1).

“In 1987, SMART invented the first interactive whiteboard” (SMART Technologies, 2009b, p. 8) and manufactured the first interactive whiteboard (IWB) in 1991 (SMART Technologies, 2006, p. 5). IWBs were intended to be used in the business environment, yet they have made their way into classrooms as a technology tool under the guarantee of “increased student engagement (frequently glossed as pleasure, motivation and involvement) and, as a result, enhanced student achievement” (Jones, Kervin & McIntosh, 2011, pp. 38 – 9). An IWB requires a “data projector, computer and touch sensitive screen with multiple layers. It offers the functionality of a computer (for example, online connections, videoconferencing, hard drive access, instant authoring and publishing etc.) and a range of peripherals for alternative inputs” (Jones, et al., 2011, p. 38). Morgan (2008) presents the argument in favor of IWBs as practical technology tools of the classroom in that one IWB can be used in a classroom with a multitude of students

at once, whereas a limited number of students can benefit from a single computer at one time (p. 9). As noted by Morgan (2008), when compared to the cost of purchasing single computers to meet the needs of an entire student body, purchasing IWBs to be installed in classrooms “can be successfully integrated in [K-12] schools’ technology plans at low[er] cost for the school” (p. 9).

There is evidence supporting the integration of IWB into classrooms. It has been reported that over 1.9 million IWBs made by SMART Technologies alone have been incorporated in K-12 classrooms worldwide, impacting “more than 40 million students and teachers” (SMART Technologies, 2012). According to the National Center for Education Statistics (NCES) (2010), IWBs are currently present in schools in the United States. McIntyre-Brown (2011) reported in 2010 the IWB penetration rate in the United States to be 35% (p. 2). The NCES reported in 2010, that 28% of teachers reported that an IWB was “available as needed” and 23% of those teachers reported that an IWB was available “in the classroom every day” (p. 3). Fifty-seven percent of the teachers who confirmed access to an IWB indicated to have used it “sometimes or often” in their lessons (NCES, 2010, p. 3). Although these statistics reported by McIntyre-Brown (2011) and the NCES (2010) indicated that some teachers have access to IWBs and that some teachers do use them for instruction, there is no indication of access and instructional use by subject, grade level or state. This lack of information leaves open to question which teachers in specific locations have access to IWBs and the instructional use of IWBs by subject area.

1.3 Problem Statement

As noted by Morgan (2008), studies have been conducted by the British Educational Communications & Technology Agency (BECTA), or by researchers associated with BECTA, to document an accurate picture of IWBs in British classrooms (p. 15), yet there is a deficit in studies pertaining to teacher's self-reported IWB instructional use and perceptions of IWBs within high schools in the United States, especially in foreign language classrooms.

The problem addressed in this study is the lack of information revealing if Ohio high school foreign language teachers are contributing to the preparation of students to participate in a global setting through technology-integrated instruction by using IWBs in their lessons as they teach students a foreign language and about other cultures.

Investigating if there is a relationship between Ohio high school foreign language teachers' self-reported instructional use of IWBs and their perceptions of instructional effects of IWBs on teaching and student learning, their perceptions of motivational effects of IWBs on teachers and their perceptions of effects of IWBs on student engagement may help identify why Ohio high school foreign language teachers may or may not choose to use an IWB for instruction and reveal what divides those teachers who do attempt to incorporate IWB technology into the classroom from those who do not make such an attempt.

1.4 Purpose of the Study

Gall, Gall & Borg (2003) reminded us that, "Unless researchers generate an accurate description...they lack a firm basis for explaining or changing" a concept or planning a direction in which to proceed (p. 290). The purpose of this study is to investigate the

relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching and student learning, their perceptions of motivational effects of IWBs on teachers and their perceptions of effects of IWBs on student engagement. The proposed study may help identify how perceptions of IWBs could affect Ohio high school foreign language teachers' use of IWBs for instruction, what may impact the decision of whether or not to incorporate an IWB for instruction and to create awareness of IWB instructional use among high school foreign language teachers and school administrators in Ohio.

Administrators who are aware of teachers' self-reported instructional use of IWBs and their perceptions of IWBs are able to make more informed decisions pertaining to staff training and development, best practices for enhancing foreign language programs and appropriate allocation of resources for IWB supported classrooms.

1.5 Research Questions

1. Is there a positive relationship between instructional use of IWBs and their effect on teaching, as perceived by Ohio high school foreign language teachers?
2. Is there a positive relationship between instructional use of IWBs and their effect on student learning, as perceived by Ohio high school foreign language teachers?
3. Is there a positive relationship between instructional use of IWBs and their effect on teacher motivation, as perceived by Ohio high school foreign language teachers?
4. Is there a positive relationship between instructional use of IWBs and their effect on student engagement, as perceived by Ohio high school foreign language teachers?

1.6 Delimitations and Limitations

This research is specific to high school foreign language teachers in Ohio who are Ohio Foreign Language Association (OFLA) members and may not be applicable to high school foreign language teachers in all fifty states. It may also not be applicable to other populations, such as K-8 teachers or post-secondary level foreign language educators, because the investigation focuses only on the high school level. This study is specific to IWBs and does not address other technology tools.

Participants responding to the survey may not respond according to their actual perceptions because they are aware that they are responding to a survey and may feel compelled to provide particular responses which seem to be more correct than other responses out of concern that their anonymity may be compromised. To encourage participants to respond honestly, the surveys will be submitted anonymously. There may be a bias in the data collected because particular study participants have purposely chosen to respond.

1.7 Definitions

American Council on the Teaching of Foreign Languages (ACTFL): A “national organization dedicated to the improvement and expansion of the teaching and learning of all languages at all levels of instruction throughout the U.S.” (ACTFL, 2012).

Foreign language: See “Target language”

Instructional use of an IWB: Includes at least one of the following or a combination of the following during a lesson: interactive pedagogy; teacher to student,

student to student, and student to teacher interactions; creative use of IWB and non-IWB tools; use of images and digital resources to support instruction; pacing that efficiently moves the lesson forward; wait time that allows students to react, interact, and determine the flow of the lesson; use of the IWB to support instruction not provide it; higher order questioning, inquiry, and discussion; differentiation [and] opportunities for all students to respond to lesson activities and investigations (Royer & Richards, 2011, p. 8)

The Interstate Teacher Assessment and Support Consortium (InTASC): The InTASC which developed the Model Core Teaching Standards: A Resource for State Dialogue in 2010.

Interactive whiteboard (IWB or IW): A “touch-sensitive screen that works in conjunction with a computer and a projector” (SMART Technologies, 2006, p. 5).

International Society for Technology in Education (ISTE): The ISTE is responsible for the publication of the National Educational Technology Standards for Students (NETS•S) in 2007 and *the* National Educational Technology Standards for Teachers (NETS•T) in 2008.

L2: Language 2 or second language

Learning: Banks (2000) defined *learning* as “the process of assimilating information with a resultant change in behavior” (p. 1).

Multimedia: A “technique (as the combining of sound, video, and text) for expressing ideas (as in communication, entertainment, or art) in which several media are employed” (Merriam-Webster, Incorporated, 2012).

National Foreign Language Standards (The Standards): These are “content standards” which are intended to serve as a guide to “what students should know and be able to do—in foreign language education” (ACTFL, 1996, p. 2).

Ohio K-12 World Language Academic Content Standards: The revised standards for foreign language programs in Ohio, updated in 2012.

Ohio Foreign Language Association (OFLA): A professional association “...committed to world language study beginning in the primary grades, so that every learner, from early childhood through adult, acquires a high level of communicative and intercultural competence” (OFLA, 2012).

Second language or L2: See “Target language”

SMART Technologies Inc.: A company that distributes interactive whiteboards, which under the company’s brand are referred to as SmartBoards. “The first interactive whiteboard was manufactured by SMART Technologies Inc. in 1991” (SMART Technologies, 2006, p. 5).

Target language: A “language other than one’s native language that is being learned” (Merriam-Webster, Incorporated, 2012).

Teaching: Banks (2000) defined *teaching* as “an active process in which one person shares information with others to provide them with the information to make behavioral changes (p. 1).

Technology: “Information technology such as computers, devices that can be attached to computers (e.g., LCD projector, interactive whiteboard, digital camera), networks (e.g., Internet, local networks), and computer software” (NCES, 2010, p. 12).

World language: See “Target language”

1.8 Summary

Chapter two presents a review of relevant literature to this investigation pertaining to national and Ohio academic standards for foreign languages, technology in education and IWBs as technology tools in high school foreign language classrooms. Chapter three explains the research design and procedure, including the population, the sample and sampling method, the instrument for data collection, the data collection procedure and the method employed for statistical analysis. Chapter four will delineate the findings and statistical analysis of the research data. Conclusions derived from the data collection and statistical analysis, as well as implications for further study will appear in chapter five.

Chapter 2

Literature Review

2.1 Introduction

The Partnership for 21st Century Skills (P21) is a national organization which published the *Framework for 21st Century Learning* (P21, 2009, p. 1). This framework outlines “skills, knowledge and expertise” that students must possess to be successful in professional and non-professional areas of their lives in today’s global economy (P21, 2009, p. 1). It is now vital that students are adept at “critical thinking and problem solving, communication, collaboration, and creativity and innovation,” also known as the 4Cs. To accompany these 4Cs, P21 (2009) also recommended that languages other than English be included as subjects that comprise a basic education (p. 2). Becoming proficient in another language will give students the ability to communicate in an effective manner in settings in which the ability to communicate only in English will not suffice (P21, 2009, p. 4). In addition to communicating in another language, students should be prepared to collaborate with others from diverse cultural backgrounds and form an appreciation of those whose backgrounds have been formed in non-English speaking countries and cultures (P21, 2009, p.2). To accomplish the foreign language goals of the *Framework for 21st Century Learning*, the study of another language and culture should be rooted in the *Standards for Foreign Language Learning in the 21st Century*.

2.2 The National Standards in Foreign Language Education: The Five C's of Foreign Language Instruction

The *Standards for Foreign Language Learning: Preparing for the 21st Century* was first published after the project received funding from the Goals 2000: Educate America Act (Phillips & Abbott, 2011, p. 1). The national publication outlined standards which are applicable to all second-language instruction (Phillips & Abbott, 2011, p.1). The aim of these standards was to create “performance outcomes” as opposed to “curriculum, methodologies, or approaches” (Phillips, 2008, p. 96). The National Standards for foreign languages were created to be generic enough in outlining student knowledge and capabilities to award states the freedom to implement their own standards for foreign language programs, which would still be reflective of the National Standards (Phillips & Abbott, 2011 p. 1). The second edition was expanded and updated in 1999 and received the new title, *Standards for Foreign Language Learning in the 21st Century* (Phillips & Abbott, 2011 p. 2). The most recent edition of *Standards for Foreign Language Learning in the 21st Century* followed in 2006 (Phillips & Abbott, 2011 p. 2). The five standards in the publication are also referred to as the Five C's: Communications, Cultures, Connections, Comparisons and Communities (ACTFL, 1996, p. 3). The Five C's were written with the intention of complementing each other throughout the study of a target language and being appropriate to implement at all levels of instruction (Phillips, 2008, p. 94).

2.3 Ohio K-12 World Language Academic Content Standards

The state of Ohio adopted content standards for foreign language on December 9, 2003. The purpose of the standards is to clearly layout the content knowledge with which students should come in contact and the skills students should acquire (Ohio Department of Education, 2002, p. 23) as they develop the linguistic and cultural proficiency necessary to “function in a multilingual, multicultural world” (Ohio Department of Education, 2002, p. 22). The ability to communicate in another language will enable students to communicate effectively in a “pluralistic American society” and in a global setting, as well as to form an appreciation of “other cultures’ world views, unique ways of living and behavior patterns, and their contributions to humankind” (Ohio Department of Education, 2002, p. 22). The standards, Communication, Cultures, Connections, Comparisons and Communities (Ohio Department of Education, 2002, p. 10), were intended to function in alignment with the *Standards for Foreign Language Learning in the 21st Century* (Ohio Department of Education, 2002, p. 2). Ohio’s standards differ slightly in that they have a futuristic, real-world orientation and place specific importance on “the writing process and on career exploration and employability skills” (Ohio Department of Education, 2002, p. 11). The content standards look beyond the classroom and serve as a guide to prepare students to communicate effectively using their knowledge of another language and culture on a global level (Ohio Department of Education, 2002, p. 2), as well as to be successful in their careers and continued education (Ohio Department of Education, 2002, p. 3).

Ohio’s standards are not intended to stand alone, but rather be implemented in connection to one another, as well as to connect to the standards of other subject areas (Ohio Department of Education, 2002, p. 2). This intertwined, interdisciplinary approach

was planned with the intention of connecting the study of a foreign language and other disciplines and encouraging “students to develop rich, conceptual frameworks that lead to broader understandings of issues affecting people locally and around the world” (Ohio Department of Education, 2002, p. 3). If the content within the study of the foreign language draws on what students are learning in other subjects, is proper for the age level, has relevance and allows students to connect new information with experiences, then students will have enhanced foreign language learning experiences. Two key elements to providing students with such learning experiences are that the target language be set in realistic contexts that are based in everyday school, life and employment situations and that students encounter these situations as they exist within the community of the target language (Ohio Department of Education, 2002, p. 3).

As students learn a foreign language, they should be learning “to be able to interact appropriately, interpret authentic materials, and present information and opinions to others both within and beyond the classroom” (Ohio Department of Education, 2002, p. 3). Target communities, native speakers and authentic materials are not always readily available in a student’s community or classroom; therefore, technology can award students the opportunity come into contact with others in different parts of the world as well as with information available in the target language (Ohio Department of Education, 2002, p. 3). As technology enables students to access the target language, target community and other authentic materials, they can become accustomed to interpreting the target language from the point of view of the target culture, as is intended by the standards (Ohio Department of Education, 2002, p. 3).

2.4 The Ohio K-12 World Language Academic Content

Standards Revision

The revised *Ohio K-12 World Language Academic Content Standards* were adopted in June 12, 2012 (Ohio Department of Education, 2012c). During the 2012 – 2013 academic year they will be revised, with the revision projected to be adopted in June 2013 (Ohio Department of Education, 2010, p. 1). Changes were drafted for the Communication and Cultures standards and instead of referring to the discipline as “foreign language” (Ohio Department of Education, 2002, p. i), it will now be referred to as “world language” (Ohio Department of Education, 2012a, p. 1). Ohio’s standards also received a greater emphasis on using technology. The Communication standard will now require students to “Communicate in languages other than English in person and via technology” (Ohio Department of Education, 2012a, p. 1). The Communication standard still includes emphasis on the interpretive, interpersonal and presentational modes.

Interpretive Communication in Ohio’s revised standards requires students to “understand and interpret authentic texts ranging from articles in contemporary magazines, newspapers and Internet sources” (Ohio Department of Education, 2012a, p. 1). Additionally, learners are required to “derive meaning through the use of listening, viewing and reading strategies” and “reinforce and expand their knowledge across disciplines as they acquire information and distinctive viewpoints directly through authentic print, non-print and digital language and culture sources” (Ohio Department of Education, 2012a, p. 1).

The Cultures standard is intended to guide students in becoming “globally competent citizens” and reveals “that language and culture are inextricably linked” (Ohio

Department of Education, 2012a, p. 15). As in the Communication standard, this standard has also seen the addition of a technology component and now will require students to “understand and abide by the constraints and freedoms afforded to individuals in the target culture(s) and their own” as they “participate in multilingual communities and various cultures at home and around the world in person and via technology” (Ohio Department of Education, 2012a, p. 15).

The underlying goal of the *Ohio K-12 World Language Content Standards* is to prepare students to further their education beyond high school, establish a career and be able to communicate with and interact with people from around the world in a language other than English. The study of a foreign language should be supported by the use of technology because as students move beyond classroom settings, they must know how to employ technology appropriately to engage in communication with others, including “written, oral and visual messages” (Ohio Department of Education, 2012b, p. 1).

2.5 Current Application of the Five C’s in Foreign Language

Instruction

Phillips and Abbott (2011) led an investigation to reveal the status and impact of the National Standards on foreign language teachers’ instructional practices. Phillips and Abbott (2011) concluded that the Five C’s have been adopted by foreign language teachers; however, data collected with a survey revealed that the National Standards were not emphasized equally in foreign language classrooms. Heavy focus was placed on Communication (79%), yet the three communicative modes received unequal emphasis: Interpersonal (63%), Interpretive (31%) and Presentational (24%) (Phillips & Abbott, 2011, p. 11). Cultures (22%) received coverage based on a teacher’s own comfort level

with “knowledge and experience” (Phillips & Abbott, 2011, p. 11). The reason behind focusing on Culture 22% of the time is that teachers not familiar with the target culture expressed difficulty in teaching about the culture and did not have a strategy to use the Culture Framework” to educate themselves about it (Phillips & Abbott, 2011, p. 11). The Connections (11%) and Communities (8%) Standards received relatively little attention, which detracted from the standards’ interdisciplinary nature (Phillips & Abbott, 2011, p. 11). Foreign language teachers seemed to have the greatest difficulty incorporating Communities into lessons, as they interpreted this standard to be “not assessable” and realizable only if they physically take their students to visit a local community or travel abroad (Phillips & Abbott, 2011, p. 11). On the other hand, Sieloff Magnan (2008) questioned if Communities received less attention on account that teachers considered it to have a lower level of importance (p. 359).

2.6 Technology Can Enhance the Five C’s

Just as foreign language teachers have the obligation to organize lessons that meet the *Standards for Foreign Language Learning in the 21st Century*, they are now expected to integrate technology into their lessons. In addition to supporting the Five C’s, ACTFL supports technology use for foreign language instruction. Lessons should be infused with the Five C’s, all of which lend themselves to be enhanced through the application of technology. Becoming accustomed to using technology to deliver instruction begins before teachers are responsible for their own classrooms. ACTFL (2002) includes a technology component in its guidelines for teacher training, with the intention that teacher candidates themselves receive instruction that is enhanced by technology, as well as incorporate technology in their own classrooms (ACTFL, 2002, p. 3). It is also

important for these candidates to become accustomed to the practice of accessing “target language materials via technology” for their personal and professional development, as well as to incorporate materials accessed by technology in their target language curriculum once they become independent classroom teachers (ACTFL, 2002, p. 7). For example, foreign language teachers should be able to deliver presentations enhanced by technology (ACTFL, 2002, p. 21), as well as explain how technology can be used to incorporate the Five C’s into instruction (ACTFL, 2002, p. 31). Rather than rely solely on a textbook and accompanying textbook materials to create lessons, foreign language teachers should be resourceful enough to develop materials which include “visuals, realia, authentic printed and oral texts, and other authentic materials obtained through technology” (ACTFL, 2002, p. 30).

According to Arnold (2007), “If technology is supposed to be an effective component of classroom foreign language learning, we must ensure that it be used in the most valuable way pedagogically to justify teachers’ and students’ investment of time” (p. 175), otherwise the educational contribution to instruction is questionable. Investing in technology for foreign language classrooms could be justified if it is used to provide students with opportunities to communicate (Phillips & Abbott, 2011, p.11). ACTFL (2002) further sees a purpose for technology in the classroom as it stated that technology can allow students can to connect with target-language communities (p. 28). One example of technology that can be used in the classroom is the Internet. According to Darhower (2006), the Internet “can complement and enhance classroom instruction by providing learners immediate access to information in and about the L2 and its associated cultures, as well as opportunities to connect with native speakers of the language via

computer-mediated communication” (p. 84). Through “social networking and other technological advances” teachers should be able to ensure that students come into contact with native speakers and “global communities” (Phillips & Abbott, 2011, p.11).

Technology can be employed as a tool to assist students in reflecting on and understanding the target culture (ACTFL, 2002, p. 16). To provide students with access to authentic products, teachers can take access the target community assisted by technology to acquire resources necessary to teach and integrate culture (ACTFL, 2002, p. 16). Technology can give language learners access to reading, listening about or even seeing practices as they occur in another country which would otherwise be inaccessible.

The necessary means to expose students to the target culture and community may only be through the use of technology, considering that native speakers may not be readily available to spend considerable amounts of time in classrooms. Technology could make it possible for students to learn through the target community, rather than just from afar (Sieloff Magnan, 2008, p. 358). Constructing a community within the classroom solely with language learners does not fulfill the Communities Standard, because American students communicating with each other in their own classroom do not possess the cultural environment that the target community can contribute (Sieloff Magnan, 2008, p. 359). An environment that includes target community members is vital in assisting learners in deriving meaning from a new cultural context and supporting learning in the new language (Sieloff Magnan, 2008, p. 359). To address this need, the internet is being used to include “virtual communities” in instruction (Sieloff Magnan, 2008, p. 360). Without the support of an authentic community, American students may be using the target language, but are limited to an American context. Through the use of technology,

students can be exposed to authentic language experiences as they practice communicating in the interpersonal, interpretive and presentational communicative modes. Unless the students are fortunate enough to visit a country where the target language is spoken and experience the culture firsthand, technology may be the only avenue to expose students authentically to another culture or community. With technology at their fingertips, students are able to increase language proficiency, search for information which they find interesting, reflect on the content, make comparisons to information obtainable in their own language, and judge linguistic and cultural similarities and differences (ACTFL, 1996, p. 6).

2.7 The Call to Incorporate Technology in Instruction

Technology was given such importance that it was specifically included in the revised 2010 Interstate Teacher Assessment and Support Consortium (InTASC) Standards. The intent of the InTASC (2010) in “The Model Core Teaching Standards” was to draw a clear picture of what “effective teaching and learning” in updated systems of education (p. 4). As technology contributes to updating the education system, the technology components in these standards should serve as guides for teachers when designing and implementing instruction. The InTASC (2010) did not look upon technology as entertainment or something extra to include in a lesson, but rather an important cross-disciplinary skills that is importance for students (p. 6). The InTASC (2010) recommended using technology as a tool can allow teachers “to maximize and individualize learning” (p. 4). If technology use can allow students to personalize their learning experiences, then the use of technology could enable students to be more

autonomous learners, leading to a more student-centered classroom full of driven, independent learners (InTSAC, p. 6, 2010).

The International Society for Technology in Education (ISTE) emphasized that technology should be incorporated into instruction. The National Educational Technology Standards for Teachers (NETS•T) “provide a framework” to guide educators “as they transition schools from Industrial Age to Digital Age places of learning” (ISTE, 2011). The National Educational Technology Standards for Students (NETS•S) named “digital citizenship as critical for students to learn effectively for a lifetime and live productively in our emerging global society” (ISTE, 2011). The NETS•T and NETS•S are applicable to all subjects in grades K- 12. They promote a collection of skills vital for students to be ready to compete successfully in a “global and digital world” (ISTE, 2011). According to the ISTE (2011), the National Educational Technology Standards (NETS) are the key to effective teaching and professional growth in a world which is becoming more and more digitalized (ISTE, 2011). Modern education, therefore, should evolve to include a technology component.

The Partnership for 21st Century Skills (P21) (2009) explained that a 21st century learning environment should provide students with “equitable access to quality learning tools, technologies and resources,” all of which should contribute to ensuring that students become literate in the three areas related to technology use: “Information Literacy, Media Literacy and ICT Literacy” (p. 5). These areas of literacy are specifically intended for the 21st century, as it is a time in which people exist “in a technology and media- suffused environment” which includes: “1) access to an abundance of information, 2) rapid changes in technology tools, and 3) the ability to collaborate and

make individual contributions on an unprecedented scale” (P21, 2009, p. 5). The 21st century requires people to employ “functional and critical thinking skills related to information, media and technology” (P21, 2009, p. 5). Information literacy requires students to “access information efficiently (time) and effectively (sources) [and] evaluate information critically and competently” (P21, 2009, p. 5). P21 (2009) suggested that “students should be prepared to utilize information with accuracy and creativity to solve problems and learn to adeptly cope with a flood of information from an array of sources” (p. 5). Responsibility accompanies access to and the use of information. As students learn to use information for their own purposes, they should develop a basic competency of the ethical and legal responsibilities that accompany the privilege to access and use information (P21, 2009, p. 5). Media literate students should be able to analyze media, which encompasses understanding of how and for what purpose media messages may be constructed (P21, 2009, p. 5). Media literate students should also have the ability to reflect on “how individuals interpret messages differently, how values and points of view are included, or excluded, and how media can influence beliefs and behaviors” (P21, 2009, p. 5). Media literate students are also ICT literate and should learn to recognize “technology as a tool to research, organize, evaluate and communicate information” (P21, 2009, p. 5). Media literate students are not limited to merely accessing and using media products, but also have the skills to create their own products by “using digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks” (P21, 2009, p. 5). Mastering the skills of independent creation allows students of the 21st century to participate interactively in a “knowledge economy” (P21, 2009, p. 5). If students intend for their media products to have an impact, they

should be able to discriminate between which tools, “characteristics and conventions” will support the appropriate creation of the media and have the ability to “effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments” (P21, 2009, p. 5). As students communicate “to inform, instruct, motivate and persuade,” they should have the background knowledge to use “multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact” (P21, 2009, p. 4).

2.8 Teachers: An Obstacle to Technology in the Classroom

The current education system was not designed to educate the students of today (Prensky, 2001, p. 1). It is currently run by an older generation, known as “digital immigrants,” who did not grow up in a technology-drenched environment, and are not adopting the new ways of technology (Prensky, 2001, p. 1). One glaring difference between students of the past and today’s students, whom Prensky (2001) named “digital natives” (p. 1), is that they have become quite accustomed to digital media and using technology as a means to meet everyday needs. Items such as “computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age,” as well as “computer games, email, the Internet...and instant messaging” are not rare items only to be used on special occasions or while closely supervised by an adult. To capture the attention of students in the classroom, it is the teachers who need to adapt their instruction to a new, technology rich way of learning (Prensky, 2001, p. 2). It is not the “digital natives” who need to adapt to learning environments similar to how generations before them learned. The manner in which information is presented plays a large role in whether or not the students will learn it (Prensky, 2001, p. 5). The National Center for

Education Statistics (NCES) (2010) provided evidence that effort has been made to provide teachers in general with training on how to incorporate technology into instruction (p. 4). The NCES (2010) reported that 61% of teachers were introduced to technology tools in professional development settings and 61% of teachers received training from staff at their schools (p. 4). However, access to technology tools and attending training sessions does not necessarily mean that teachers subsequently applied the new knowledge and skills to instruction.

Abel (2010) examined the development of technology in classrooms between 1995 and 2010 (p. 1). Abel (2010) named “evolving learning technology standards, development environment [and] the state of mainstream adoption of learning technology” as contributors to the incorporation of technology in classrooms (p. 205). The standards movement was supported by organizations that viewed standards as a means to develop up-dated strategies to use technology to support learning (Abel, 2010, p. 206). In following what the standards were suggesting, technology made its way into classrooms. It has become the norm to see the incorporation of “technical infrastructure in terms of networks, Internet connections, interactive white boards, classroom management systems, etc...” in educational settings (Abel, 2010, p. 211). Despite the availability in classrooms, technology has not always been used in a pedagogically appropriate manner (Abel, 2010, p. 211). The presence of technology in the classroom has given teachers and learners the means to complete old tasks in a new way (Abel, 2010, p. 211), but only if they are open to using or learning to use the technology in their favor. Lack of change in teacher behavior may be contributing to the seemingly ill-fit of technology and as a result, teachers may not be using technology tools to their full potential or in a proper means-to-

end manner (Abel, 2010, p. 211). Appropriate use of technology is a component of technology-promoting standards. If a teacher has not changed his or her behavior in the classroom to incorporate the proper use of technology, then both the teacher and students may be shortchanged. Therefore, there is value to investigating what behaviors and perceptions are exhibited by teachers in the classroom that may be preventing them from properly using technology in accordance with technology standards and the intended operation of a technology tool.

2.9 IWBs as Technology Tools in the Classroom

An IWB is a technology tool which can help bridge the gap between the learning style of the “digital natives” and teaching style of the “digital immigrants” (Prensky, 2001, p. 1). Having an IWB in the classroom can connect the digital lifestyle students lead outside of the classroom to what students experience in school (SMART Technologies, 2009a, p. 10). An IWB itself is “a projection surface, not a monitor” and can only display what a projector displays onto it (SMART Technologies, 2010, p. 138). The greatest difference between an IWB and other technologies which combine the use of a data projector and computer is the feature which allows the computer to be operated if the screen is touched (Smith, Higgins, Wall & Miller, 2005, p. 93). An IWB operator can apply touch technology with his or her own finger or a nonproprietary pen (SMART Technologies, 2007, p. 2). The advantage of touch-sensitive technology is that the operator can directly “interact with digital content and multimedia” in front of a group of students, rather than try to teach from a stationary position, such as behind a computer (SMART Technologies, 2006, p. 5). As teachers maintain a presence in front of students, they are able to maintain “traditional ‘control’ of the group” during a lesson (Glover & Miller,

2001, p. 260). This traditional and strategic position in front of the class may give teachers the encouragement to use IWBs, considering that teachers may be hesitant to use new technology unless they feel they have classroom management under control (Glover & Miller, 2001, p. 271).

Türel and Johnson (2012) reported that nearly half of the teachers in their study “agreed or strongly agreed” that delivery of instruction had been altered due to IWB use, which led Türel and Johnson (2012) to conclude that “some level of pedagogical change may have occurred due to IWB technologies” (p. 390). In accordance with a change in pedagogy as a result of IWB use for instruction, Jones, Kervin and McIntosh (2011) cautioned that an IWB:

is by no means a neutral tool; its impact on the classroom is considerable. Entering into the discourse as a bearer of content, it influences the design and pacing of activity and hence interactivity. It has the potential to shape the nature of curriculum knowledge under construction in classrooms.” (p. 57)

An IWB is more than a technology-based source for entertainment in the classroom, but rather can be used to enhance instruction. Possible benefits of using an IWB for instruction include: “flexibility and versatility, multimedia/multimodal presentation, efficiency, supporting planning and the development of resources, modeling ICT skills, and interactivity and participation in lessons” (Smith et al., 2005, p. 92). Despite the instructional advantages reported about IWBs, possible benefits supported by evidence from “longitudinal studies” have not been clearly established (Smith et al., 2005, p. 94). Jones et al. (2011) draw attention to the fact that there are opposing opinions pertaining to whether or not there is justification if IWBs fulfill the economic investment in educational environments (p. 38).

2.10 Lack of Teacher Motivation towards the Use of IWBs

Even if an IWB is accessible, teachers may not be motivated to use IWBs for instruction if they lack the proper resources and training. Teachers may not be motivated to use IWBs if they have to go out of their way just to use an IWB. For example, preparing an IWB-based lesson to be used with an IWB, preparing the same lesson in a traditional version to be delivered without an IWB in case an IWB is not accessible for all of their classes, and going through the process of relocating a class to different room just to use an IWB can be discouraging (Levy, 2002, p. 16). Teachers may be further unmotivated to develop IWB-based lessons as sporadic use of an IWB does not contribute to developing advanced IWB skills, thus making IWB lesson planning more of a time investment rather than a time saver (Levy, 2002, p. 16). Teachers who have little IT experience felt that creating IWB resources consumes more time (Levy, 2002, p. 16). A valid concern expressed by teachers is “technological ineptitude” (Glover & Miller, 2001, p. 268), which prevents them from using an IWB. Organizing “linked multimedia” to use for instruction places a demand on preparation time and also requires training. If there is a deficit in IWB “technical competency,” then this may contribute to teachers not using IWBs (Somyürek, Atasoy & Özdemir, 2009, p. 370). Teachers also view “technical difficulties and failure in the classroom” to be problematic as they interrupt lessons and “undermine teachers’ confidence” (Levy, 2002, p. 16). To avoid being caught off guard, teachers must be prepared in the event that the IWB is not working properly and spend time planning a back-up lesson. Thus, teachers must complete twice the amount of work to deliver one lesson.

2.11 Relevance of IWB Professional Development

Prior knowledge and experience with technology tools in the educational setting can influence the approach and implementation of a new technology tool (Armstrong, Barnes, Sutherland, Curran, Mills & Thompson, 2005, p. 456). Teachers adjusting instruction to include IWBs in lessons may “make sense of it in terms of previous experiences of older technologies...[and] are likely to use digital whiteboards as an extension of the non-digital whiteboard” (Armstrong et al., 2005, p. 456). It is imperative to recognize however, that IWBs are not traditional whiteboards and should be perceived as tools to aid presentation of information and materials (Armstrong et al., 2005, p. 457). Both students and teachers have raised concerns pertaining to the necessity of sufficient professional development to make teachers fully aware of how to completely exploit IWB operation (Smith et al., 2005, p. 98). Armstrong et al. (2005) supported the idea that without professional development, teachers may not know how to or have the skills necessary to use IWBs to their fullest potential (p. 465). Teachers who wish to incorporate IWBs for instruction with an interactive focus may fail to do so and become frustrated if there is a lack of “practical and methodological” professional development (Smith et al., 2005, p. 98). Even using IWBs as extensions of computers “limits full interactivity with spontaneous use of the full range of multimedia resources” (Glover & Miller, 2001, p. 271). Teachers who are not receptive to using IWBs for instruction may not believe they have been developed the necessary skills to integrate IWBs into instruction (Beeland, 2002, p. 6). Integrating IWBs into the classroom goes beyond installing them, as professional development and continued support are required for successful IWB integration (Armstrong et al., 2005, p. 466). SMART Technologies (2009b) insisted that before the advantages IWBs can bring to a classroom can be

realized, teachers must be prepared through proper professional development and be provided appropriate resources (p. 9). If there is no support system for teachers, installing IWBs only places more pressure on them as inexperienced IWB users (SMART Technologies, 2009b, p. 9). In the absence of professional development and resources, any technology tool can become an unnecessary source of stress, thus defeating the purpose of technology as a helpful tool (SMART Technologies, 2009b, p. 3).

In an effort to promote the use of IWBs, “the literature and marketing of [IWBs] focuses on their potential to transform pedagogy, that is, to offer alternatives to teacher-centered styles of delivery...and to expand the opportunities for classroom discourse beyond teacher presentation of facts” (Jones et al., 2011, p. 39). If technology is to become a “transformative device to enhance learning” then a pedagogical change must occur (p. 258). Teachers may be initially cautious to change pedagogically for fear of being disappointed by “their ineptitude with the basic technology” (Glover & Miller, 2001, p. 267). Teachers may be hesitant to use or altogether avoid using IWBs if they feel that “pedagogical competency” for integrating IWBs into the classroom is missing (Somyürek et al., 2009, p. 370). To counteract lack of knowledge of pedagogical application, Levy (2002) emphasized the relevance of professional development activities which are more in-depth than “basic technical training” (p. 19). Teachers “...need opportunities to explore broader pedagogic issues from the outset” in addition to developing skills in IWB operation (Levy, 2002, p. 19). These needs can be met with support from colleagues across subject areas and even other schools as teachers share ideas pertaining to IWB use and IWB resources” (Levy, 2002, p. 19). Who actually provides the professional development is relevant, as Glover and Miller (2001) reported

that “general training provided by the suppliers had a great initial impact because of its slick presentation and high-quality prepared material.” but it leaves to question what teachers are prepared to develop and use in their own lessons (p. 261).

2.12 Enhancement of Classroom Instruction through IWBs

An IWB can be employed “as a tool to enhance teaching, and as a tool to support learning” (Smith et al., 2005, p. 92). If IWBs are accessible, they may aid teachers with efficiency in preparing and delivering lessons and allow them to easily include multimedia content in lessons. IWBs can become focal points in classroom and influence student motivation, attention, engagement and interaction. IWBs can also unite students in the classroom as learning takes place. IWBs may afford teachers a support system to more effectively integrate differentiated instruction and be more flexible as they react to the progress of the lesson and students’ learning needs.

2.13 Consistent IWB Access

If instruction is to be enhanced by IWBs, first teachers must have consistent IWB access. Glover and Miller (2001) concluded that teachers will be able to use IWBs to their fullest potential if they have daily access to IWBs in their own classrooms (p. 270). A case study conducted by Armstrong et al. (2005) revealed the importance for teachers to have “long-term, sustained engagement with new technologies” before a new technology can be used to “support and enhance students’ learning” to the fullest potential (p. 463). Prolonged access to an IWB prior to implementation may aid with “developing confidence and expertise in using the IWB’s full range of potentials” (Armstrong et al., 2005, p. 464). Beeland (2002) recommended that IWBs are permanently installed in classrooms, which would dismiss many uncertainties teachers and students share pertaining to IWB use for

instruction (p. 6). Although formal professional development is beneficial to teachers, they also need time to familiarize themselves with an IWB and practice on their own. In a study conducted by the British Educational Communications and Technology Agency (BECTA) (2007a), one factor contributing to advancement of teachers' IWB skills is "exploratory use" (p. 5).

2.13.1 Teacher Self-efficacy in Using IWBs

The presence or absence of confidence to use an IWB for instruction is related to a teacher's self-efficacy of IWB use. There are several factors which contribute to the level of a teacher's self-efficacy of IWB use. For example, the level of self-efficacy of IWB use which teachers report is related to frequency of IWB instructional use, training and support and perceived value of IWBs as technology tools in the classroom. Peled, Medvin and Domanski (2012) concluded that participants who "perceived higher levels of school training and support had higher perceived IWB value, IWB self-efficacy, and perceptions of student achievement" resulting from IWB use (p. 6). Participants in the same study reported lower levels of anxiety towards IWB use if they also reported, "Higher levels of training and support, particularly the technological aspects, and higher teacher self-efficacy, and perceived value" of IWBs (Peled, Medvin & Domanski, 2012, p. 6). Participants in a study by Gregory (2009) indicated that collaboration with peers and forming a community centered on IWB instructional use "contributed to the growth of their skills when teaching with the IWB," which in turn increased their IWB self-efficacy (p. 57). Green (2005) concluded that if teachers are to experience an increase in self-efficacy, then they require time to collaborate and to learn from each other, as well as to practice what they are learning. Warwick & Kershner (2008) highlighted the need for

professional development opportunities that aid teachers in merging lesson content and pedagogy with the technical skills needed to operate IWBs. As demonstrated by the findings in these studies, self-efficacy in relation to IWB instructional use stems not only from using an IWB for instruction, but also the training and support that exist outside the classroom.

2.13.2 IWBs Aid Teacher Efficiency

IWBs may assist in reducing the amount of time teachers devote to planning, delivering and revising lessons than they would otherwise need without an IWB (SMART Technologies, 2009b, p. 1). Although teachers initially invest time in planning and developing materials to use with IWBs, time spent on lesson preparation should decrease as teachers “save, share and re-use lesson materials” (Smith et al., 2005, p. 94). A study led by BECTA (2005) revealed that if teachers are given the time to develop materials in conjunction with to access to technological support, IWBs can support “efficient and more effective learning, with tighter planning and the implementation of lesson plans” (p. 13). BECTA (2005) found that it was possible for teachers to efficiently revise lessons as needed to address the needs of the students (p. 16). The ability to refine lessons rather than preparing from scratch can allow lessons to be continuously improved and updated, as opposed to time lost reinventing lessons from year to year. A later BECTA (2007b) study supported the conclusion that IWBs do indeed aid teachers in saving time when planning and implementing lessons (BECTA, 2007b, p. 10). In the 2007 BECTA study, 47% of secondary teachers reported that they saved time in planning and 50% saved time when implementing lessons as a direct result of IWBs (BECTA, 2007b, p. 10). Although initial planning of IWB-supported lessons may require a time investment, teachers

recognize that time dedicated to preparing IWB lessons is not ill-used, as lessons can be reused and enhanced as needed (Levy, 2002, p. 16).

IWBs allow teachers to save time in lesson planning and delivery as they edit, record changes and build “a sequential lesson that flows seamlessly from the one control point” (Glover & Miller, 2001, p. 260). Content recorded during a lesson is never lost to erasing due to the capability of saving images and notes as needed, whereby, anything written on the screen with the electronic pens can be saved and can be revisited as needed (SMART Technologies, 2009b, p. 6). Levy (2002) concluded that teachers “value the practical and educational benefits of saving work that is generated dynamically during classes” (Levy, 2002, p. 9). In order for teachers to fully benefit from the timesaving aspects associated with the use of an IWB, the ability to prepare lessons at home on a computer or laptop with IWB software is vital for teachers when developing IWB incorporated lessons” (Glover & Miller, 2001, p. 269).

2.13.3 IWB Multimedia Capabilities

Because an IWB “acts as a multi-modal portal” teachers can include “still, moving images and sound” when presenting lessons (BECTA, 2007a, p. 5). Glover and Miller (2001) discovered that teachers do appreciate the multimedia capability of IWBs (p. 262). The ability to “present a range of multimedia resources efficiently is also argued to help enhance pupils’ recall” (Smith et al., 2005, p. 96). Teachers with a multimedia instrument at their fingertips have the opportunity to manipulate a “wide range of materials during a lesson and to use a greater number and wider variety of resources” efficiently (Smith et al., 2005, p. 93). Multimedia capabilities can even allow teachers to “write over digital documents and Internet pages” which assists students in keeping track of concepts

introduced during instruction (SMART Technologies, 2006, p. 10). Smith et al. (2005) do caution about the use of multimedia as presently it is “not certain whether verbal and visual information are always best presented together, and if dynamic visuals are always better at promoting understanding than static visuals” (p. 97). As a teacher includes more and more information into a lesson, there may be a point when students are overloaded with information, thus canceling any potential benefits for which the IWB might have allowed (Smith et al., 2005, p. 97).

2.13.4 The IWB as the Classroom Focal Point

IWBs fulfill the role of a focal point, which can provide constant “visual reinforcement to complement instruction” and encourage students to remain focused and engaged on the task at hand (SMART Technologies, 2009a, p. 9). A study by BECTA (2007a) also concluded that IWBs provide a place to which students can direct their attention and supports participation in “whole-class teaching” (p. 5). As students direct their focus to the IWB, teachers can visually “reinforce ideas and concepts” and “provide more vivid illustrations and better explanations” than would be possible without the use of an IWB” (Levy, 2002, p. 10). If students are encouraged to use IWBs to present their own work, the IWB becomes a point of focus for “teacher-student and student-student discussion and feedback” (Levy, 2002, pp. 9 - 10).

2.13.5 IWBs Promote Student Engagement, Attention and Motivation

Classroom observations in a study conducted by Levy (2002) supported “that the quality of students’ attention in many IW-based lessons is generally high” (p. 10). Levy (2002) explained further that student engagement and interest in IWB-based lessons may be due to the larger pool of available resources and means to provide enhanced explanation,

which allows students to have an easier time in comprehending ideas and concepts (p. 10). Therefore, using IWBs for instruction may “improve learning outcomes and increase learners’ motivation” (Levy, 2002, p. 10). Additionally, Beeland (2002) supported IWB instructional use in concluding that IWBs positively affect student engagement in a lesson (p. 6). Based on results of a student survey, Beeland (2002) concluded that “there was a correlation between how highly the whiteboard was rated based on the type of media that was used” (p. 6). Beeland (2002) took into consideration “the frequency with which text, graphics, video, and sound” appeared during a lesson (p. 6). Beeland (2002) credited “the visual aspects” of IWBs as the main reason that IWBs do contribute to “increased student engagement” (p. 7). Despite evidence that IWBs are tools which support student engagement, attention and motivation, Levy (2002) revealed that some teachers expressed that increased attention levels may be credited to “novelty- value,” and that the impact of the IWB could decrease with use over time (p. 10). Glover and Miller (2001) speculated that the use of IWBs during lessons may appear to motivate students and drive them to be more attentive, but this could merely stem from students already being accustomed to a computer-oriented, digital world (p. 265).

2.13.6 Enhancement of Classroom Interaction through IWB Use

Conclusions by Levy (2002) revealed that a number of teachers suggested that introduction demonstrations and presentations can be made more efficiently with the IWB, which leaves “more time for interaction between the students and teacher and for task-related activity” (p. 9). Some teachers considered that IWB use encouraged “higher levels of student participation in whole-class discussion than would otherwise be the case, perhaps because of the strong visual and conceptual appeal of the information and

learning resources that are displayed” (Levy, 2002, p. 9). Levy (2002) reported that teachers felt incorporating an IWB in instruction may inspire “active and participatory approaches to learning in the sense that some students are keen to use the medium to present their work” (pp. 9-10).

2.13.7 IWBs: Reconnecting Students in the Public Learning Sphere

As a lesson transitions “between individual, small group and whole-class activities, learning can take place in two kinds of spaces: public and private (SMART Technologies, 2008, p. 2). Public learning engages students in “lectures, demonstrations, whole-class discussions, debates and question-and-answer sessions” whereas private learning provides students the opportunity to collaborate with peers in small groups, or as individuals in and even outside of school (SMART Technologies, 2008, p. 2). When handheld computing devices are used as tools for learning, they create “one-to-one computing environments” and allow students to work in the private space (Liu & Kao, 2007, p. 285). In classrooms that support handheld computing devices, one obstacle to be overcome is that handheld devices were intended for one user at a time and they “limit promotion of interaction among groups of learners” and individual students (Liu & Kao, 2007, p. 286). Students can become absorbed in their handheld computing devices and their own progress and neglect to work together, but rather end up working side-by-side (Liu & Kao, 2007, p. 286). Another drawback to using handheld computing devices in the private space is that students must be tightly packed together to even attempt to try to catch a glimpse of the device’s screen (Liu & Kao, 2007, p. 286). To transition between “whole-class, individual and small-group learning, and encourage student participation and interaction,” teachers can employ IWBs to reunite all students with each other in the

public space, (SMART Technologies, 2008, p. 3). Ideally, there should be one location where the entire class can focus at the same time as a classmate or small group explains what they have created, rather than everyone focusing on their individual devices in a room void of eye contact (Liu & Kao, 2007, p. 288). With a central focal point for all students to easily view, working with a sense of collaboration and effectively sharing individual or small group progress with all peers, learning opportunities are supported through smooth communication among individuals and small groups and ensures that every student will be included in information sharing (Liu & Kao, 2007, p. 286).

In a study conducted by Levy (2002), teacher feedback reinforced that an IWB can “facilitate cohesive and participative whole-class learning” as it unites the class and encourages participation across the class as a whole (p. 12). The use of individual computers cannot unite a class in the public space capacity where as IWBs promote the use of computer technology in lessons without asking a number of students to cram in front of one computer, which in turn does away with disruptive movement within the classroom (Levy, 2002, p. 8).

2.13.8 Flexibility in IWB-Based Instruction

The “flexibility and versatility” of an IWB can contribute to how lesson content is delivered and can also allow teachers to make accommodations for students with varied needs during instruction (Smith et al., 2005, p. 92). According to Levy (2002), IWBs can be used “flexibly and spontaneously” as teachers respond to different needs and situations (p. 8). Teachers do appreciate the “flexibility with which IW resources can be manipulated, and point out the advantages of being able to move easily between resources in response to needs that emerge during lessons” (Levy, 2002, p. 8). IWB

“flexibility and spontaneity allow teachers to readily display “more advanced resources” if students seem to be learning at a quicker pace than predicted (Levy, 2002, p. 8). Smith et al. (2005) credit the efficiency of an IWB with the support of “technical interactivity” as the reason teachers are able to speed up the pace of a lesson (p. 93). Flexibility in presenting materials ensures that “presentations can be adapted during lessons to suit the needs of higher and lower ability students” (Levy, 2002, p. 8). A study conducted by Levy (2002) also demonstrated that an IWB affords teachers “creative ways of responding spontaneously to questions or of developing ideas” which includes displaying information online (p. 8).

2.13.9 IWBs Support Differentiated Instruction

Classrooms of today have become diverse learning atmospheres, thus requiring teachers to plan and implement lessons that reach a multitude of diverse learners at the same time. Forlin (1998) reminded us that teachers “have become increasingly responsible for students with a wide range of abilities within their classrooms” as inclusive education has received support by federal and state legislation (p. 4). With this taken into consideration, teachers may have to differentiate instruction to meet the needs of the students, because it is an effective teacher who “is aware of and responds to the diversity of learning needs and learning styles within the group being taught” (Glover & Miller, 2001, p. 258). George (2005) explained differentiated instruction as “...the adaptation of classroom strategies to students’ different learning interests and needs so that all students experience challenge, success, and satisfaction” (p. 189). Differentiated instruction requires teachers to vary “content, instruction, and assessment to meet the needs of unique learners” (George, 2005, p. 189). When teachers design lessons with the purpose of differentiating

instruction, learning can take place that is “effective, efficient and meaningful” (George, 2005, p. 190). IWBs can potentially be used to meet the needs of students with diverse learning styles and to engage students in learning (Beeland, 2002, p. 2). BECTA (2005) reported that IWBs can be used to “generate efficient and more effective learning” in direct relation to differentiating instruction (p. 13). IWBs can allow for teachers to use the same prepared materials in several ways in order to reach different learners (BECTA, 2005, p. 13). Teachers can use IWBs in instruction based on “three modalities of learning,” which include visual, auditory and tactile learning (Beeland, 2002, p. 1). How extensively each modality is included in instruction may reveal the depth to which students are engaged in learning and are motivated to learn (Beeland, 2002, p. 1). IWBs can aid visual learners in that they profit from notes written on the IWB “in addition to diagramming and manipulating objects or symbols” (BECTA, 2007a, p. 5). On the other hand, some students may find text difficult as a singular mode of communication, therefore, including a variety of multimedia approaches in a lesson may more effectively meet the needs of diverse learners (BECTA, 2007a, p. 5). An auditory learner may benefit from the inclusion of sound in a lesson, whereas the needs of kinesthetic learners can be addressed as teachers “are able to reinforce learning through exercises involving touch, movement and space,” both of which are possible utilizing the capabilities of an IWB (SMART Technologies, 2006, p. 9). Smith et al. (2005) did not condone simply any interaction with an IWB and have concluded that, “It is debatable whether physical interaction with the board itself enhances learning, other than to motivate pupils to pay attention, unless the physical interaction is somehow directly relevant” (p. 97).

2.13.10 Student Perspectives of IWBs

Smith et al. (2005) uncovered that students have voiced opinions regarding lessons being overall “more enjoyable and interesting” with an IWB (p. 96). Teachers participating in Levy’s (2002) study supported the student perspective that an IWB can “...make learning more enjoyable and interesting” (p. 10) and that their students “enjoy IW-based lessons more than other lessons” and appear to have higher interest and be more engaged in IWB lessons (Levy, 2002, p. 10). When an IWB is used for instruction, it “encourages students to pay more attention” (Levy, 2002, p. 13). Students reported that they are “more able to focus their attention on IW-based presentations and explanations” (Levy, 2002, p. 13). Learning is viewed more favorably by some students with an IWB because “they are more interested, and because teachers’ explanations, multimedia resources and the large screen make subjects easier to understand” (Levy, 2002, p. 14). BECTA (2007a) concluded that an increase in student achievement was directly correlated with how long students have experienced an IWB as part of their lessons (p.3). Students appreciated the time an IWB saves in a lesson, which consequently allowed teachers to use time in the classroom more efficiently “in terms of the ease and speed with which pre-prepared materials can be accessed and presented” (Levy, 2002, p. 14). Students also recognized that IWBs alleviated the time teachers and students normally would devote to writing during a lesson (Levy, 2002, p. 14). IWBs allow students to share their own work with their classmates, which Levy (2002) concluded to be “enjoyable” for the students, as well as an “effective means of presenting and discussing personal work” (p. 12).

Problems with IWB use do not go unnoticed by students. For example, technical difficulties such as “projector breakdown and difficulties with IW system features” are seen as interruptions to successful IWB use (Levy, 2002, p. 14). Students also

acknowledge “poor visibility” due to “inappropriate colours and fonts,” poor positioning of the IWB in regard to sunlight and “inexperienced” users of IWBs as obstacles to be overcome in IWB-based lessons (Levy, 2002, p. 14). Students may be more aware of IWB capabilities than their teachers, thus leading to “disappointment and frustration” especially if they believe the IWB and “its capabilities are being under-exploited” (Levy, 2002, p. 15). It can lead to further displeasure when students are not awarded the opportunity to use IWBs themselves (Levy, 2002, p. 15). An IWB is not to be mistaken as “a guaranteed cure for boredom” either (Levy, 2002, p. 15). An overextended presentation is still an overextended presentation, with or without an IWB as the medium for delivery (Levy, 2002, p. 15). Students do appreciate technology integration, but only when it is used to directly engage them in potentially “too difficult and frustrating activities,” capture and hold their attention, and improve their understanding of “underlying concepts and relationships” (Hennessy, Ruthven & Brindley, 2005, p. 185). Although an IWB can help students understand lesson objectives, it can also become a boundary to understanding because “traditional media – or techniques – are sometimes more straightforward” (Levy, 2002, p. 15).

2.14 Summary

Eventually, studies will reveal if benefits that IWBs bring to classrooms are due to the IWBs themselves, or if the “the success of a new technology is perceived inevitable” because of the “bandwagon effect” (Smith et al., 2005, p. 93). According to Armstrong et al. (2005), “there are no absolute properties of the IWB which enable us to predict the effects which it will have on teaching and learning” (p. 457). The presence of IWBs alone will not guarantee that students will learn better, but rather it is how they are incorporated

in instruction that will impact teaching and learning. The manner in which a technology is implemented for instruction influences what students learn and “how a technology is used [for instruction] relates to the teacher’s (and students’) perceptions of how it can be used” (Armstrong et al., 2005, p. 457).

Chapter 3

Methodology

3.1 Purpose of the Study

The purpose of this study was to investigate the relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching and student learning, as well as their perceptions of motivational effects of IWBs on teachers and effects of IWBs on student engagement. The study was delimited to the state of Ohio.

3.2 Research Questions and Hypotheses

The following research questions were addressed in this study:

1. Is there a positive relationship between self-reported instructional use of IWBs and their effects on teaching, as perceived by Ohio high school foreign language teachers?
2. Is there a positive relationship between self-reported instructional use of IWBs and their instructional effects on student learning, as perceived by Ohio high school foreign language teachers?
3. Is there a positive relationship between self-reported instructional use of IWBs and their effects on teacher motivation, as perceived by Ohio high school foreign language teachers?

4. Is there a positive relationship between self-reported instructional use of IWBs and their effects on student engagement, as perceived by Ohio high school foreign language teachers?

The researcher expected to be able to provide evidence in support of the following hypotheses:

1. There is a positive relationship between self-reported instructional use of IWBs and their instructional effects on teaching, as perceived by Ohio high school foreign language teachers.

Existing research has suggested that teachers perceive IWBs to have positive instructional effects on teaching. For example, teachers in a study by Levy (2002) indicated that using an IWB for instruction enabled them to provide “more vivid illustrations and better explanations” (p. 10). Glover and Miller (2001) reported that IWB instructional use aided teachers in presenting lessons better in comparison to presenting lessons without an IWB (p. 262). According to Glover and Miller (2001), teachers reported that using IWBs for instruction allowed for a “more clearly defined structure and planned progression” of lessons (p. 262). Most teachers in a study conducted by Türel and Johnson (2012) reported that instructional use of IWBs aided them with time efficiency during instruction. Gray et al. (2006) concluded that IWB instructional use supported classroom management, pace and variety. Based on the evidence provided by these studies, it was hypothesized that there would be a positive relationship between foreign language teachers’ instructional use of IWBs and their perceptions of the instructional effects of IWBs on teaching.

2. There is a positive relationship between self-reported instructional use of IWBs and their instructional effects on student learning, as perceived by Ohio high school foreign language teachers.

In a study by Türel and Johnson (2012), 77% of teachers shared that “they believed that using IWBs helps student learning” (p. 390). In a study by BECTA (2005), participants reported that if they were allotted sufficient time to create materials and technological support were available, using an IWB for instruction contributed to “efficient and more effective learning” (BECTA, 2005, p. 13). It was reported that using an IWB for instruction capitalized on student focus, which in turn helped students to understand the content of the lesson (BECTA, 2005, p. 20). Teachers in a study conducted by Glover and Miller (2001) reported that students seemed to learn quicker when an IWB was used for instruction. Students reported that when an IWB was used for instruction their learning improved (Levy, 2002, p. 14). In a study by Beeland (2002), students also conveyed that IWB instructional use helped them to learn better and even pay better attention (p. 4). Teachers were in agreement with students that increased attention level due to IWB instructional use did contribute positively to student learning (Beeland, 2002, p. 5). In accordance with these studies’ findings, it was hypothesized that there would be a positive relationship between high school foreign language teachers’ instructional use of IWBs and their perceptions of the instructional effects of IWBs on student learning.

3. There is a positive relationship between self-reported instructional use of IWBs and their effects on teacher motivation, as perceived by Ohio high school foreign language teachers.

According to Türel and Johnson (2012), “increasing use of technology is strongly correlated to teachers’ acceptance and positive attitudes about the technology” (p. 383). Therefore, acceptance of a technology and viewing it positively may have been the impetus for use. BECTA (2005) reported that teachers were motivated by IWB instructional use. Teachers who participated in the study stated that knowing that they will deliver instruction with an IWB made lesson preparation and delivering instruction “more interesting and enjoyable” (p. 19). BECTA (2005) was surprised to reveal that some of the teachers even felt that using an IWB had “re-motivated” them pedagogically (p. 19). Türel and Johnson (2012) also revealed that teachers claimed that when an IWB was used for instruction it was “motivating, engaging and enjoyable” for both them and their students (p. 390). In a study by Glover, Miller and Averis (2004), it was revealed that teachers were “enthusiastic” about IWBs and the manner in which they delivered instruction had been changed as a result of using IWBs for instruction (p. 4). Teachers in the same study by Glover, et al. (2004) specifically stated that using an IWB for instruction was motivational (p. 4). According to conclusions drawn by these studies, it was hypothesized that there would be a positive relationship between high school foreign language teachers’ instructional use of IWBs and their perceptions of motivational effects of IWBs on teachers.

4. There is a positive relationship between self-reported instructional use of IWBs and their effects on student engagement, as perceived by Ohio high school foreign language teachers.

BECTA (2005) concluded that instructional IWB use motivated students to maintain interest in lessons and spurred their participation (p. 19). Glover and Miller

(2001) reported that there was increased student motivation with IWB instructional use (p. 266). Teachers reported that they had observed their students being “engaged” and “very attentive,” when they used IWBs, which had led students to actively participate in lessons and demonstrate “increased student interest” in the classroom (Beeland, 2002, p. 5). Levy (2002) reported that IWB instructional use encouraged students to pay attention (p. 13). If students had paid attention during instruction, then this would have indicated student engagement in a lesson. According to Levy (2002), teachers suggested that the “wider range of resources and formats at their disposal, and the capacity to offer better explanations” as they used IWBs for instruction aided students in understanding “ideas and concepts more easily” (p. 10). The same teachers in Levy’s (2002) study indicated that using an IWB for instruction led to increased student enjoyment, a higher level of interest and increased engagement (p. 10). As literature supported a connection with IWB instructional use and engagement, it was hypothesized that there would be a positive relationship between high school foreign language teachers’ IWB instructional use and their perceptions of the effects of IWBs on student engagement.

3.3 Variables

Self-reported instructional use of IWBs was an independent categorical variable defined as the frequency with which teachers reported they had used an IWB for instruction in the past year, with the possible range of values from 0 to 4 (*0 = No access, Never used it, 1 = Access, Never used it, 2 = Access, Used it sometimes, 3 = Access, Used it frequently and 4 = Access, Used it daily*).

The other four variables were dependent continuous variables and included: perceptions of instructional effects of IWBs on teaching, perceptions of instructional

effects of IWBs on student learning, perceptions of motivational effects of IWBs on teachers and perceptions of effects of IWBs on student engagement. Perceptions of instructional effects of IWBs on teaching were defined as the effects that IWBs had on instruction from the teacher's perspective in terms of their ability to enhance or hinder instruction. IWB instructional use may have helped teachers to effectively manage instructional time, increased the effectiveness of lessons, facilitated classroom management, allowed lessons to become more interactive, facilitated discussions on the content of a lesson, made course content more visual, altered the way instruction was delivered or even may have been used to incorporate technology into instruction. Teachers could have perceived IWBs as tools which enhanced teaching or hindered teaching. Perceptions of instructional effects of IWBs on student learning was defined as the effects that IWBs had on student learning from the teacher's perspective. Instructional use of IWBs may have aided student learning, assisted students in remembering what they learned in class, enabled students to learn faster or assisted students in learning concepts easier. Teachers could have perceived IWBs as tools which assisted students in learning or as tools which did not assist students in learning. Perceptions of motivational effects of IWBs on teachers was defined as the effects that IWBs had on teacher motivation to use IWBs for instruction. Teachers could have enjoyed teaching with IWBs, felt more prepared to deliver instruction, noticed gradual improvement of IWB skills, felt that learning how to use an IWB is important or even felt that their courses more enjoyable when IWBs were incorporated into instruction. Teachers could have perceived IWB as tools which teachers were motivated to use during instruction or as tools which teachers were unmotivated to use during instruction. Perceptions of the

effects of IWBs on student engagement was defined as the effects that IWBs had on student engagement in learning. IWB instructional use could have increased students' interest in lessons, assisted students to focus on lessons or promoted students' engagement in lessons. Teachers could have perceived IWBs as tools which promoted student engagement in lessons or which did not promote student engagement in lessons.

3.4 Population and Sample

The target population in this study was comprised of Ohio high school foreign language teachers who were both members of the Ohio Foreign Language Association (OFLA) and correspondents on the OFLA's listserv. The researcher, as a member of this association, had access to this population. As of February 2013, the OFLA reported a total of 1,336 high school foreign language teachers (R. Terek, personal communication, February, 14, 2013). Given the electronic nature of data collection, the researcher attempted to collect data from every member of the target population.

3.4.1 Sampling

Approval from the Human Subjects Board was obtained before the study began. As previously mentioned, OFLA members who had elected to be correspondents on the association's listserv were invited to participate in the study. To be eligible to participate in the study, teachers were not required to have access to an IWB or even be current users of IWBs. As a safeguard to ensure that only high school foreign language teachers responded to the survey, a choice of "other" was added to the item pertaining to grade level taught. Those participants who selected "other" as their answer to the question were directed to the conclusion of the survey and did not have the opportunity to provide responses to the other survey items. If "other" was selected in addition to possible high

school grade levels, then the participant was prompted to continue providing responses to other survey items.

3.5 Research Design and Procedures

3.5.1 Instrumentation

To capture foreign language teachers' self-reported IWB instructional use, their perceptions of the instructional effects of IWBs on teaching and student learning and their perceptions of motivational effects of IWBs on teachers and students, a survey method was used. This method of data collection was chosen because it allowed the researcher to gather data to “describe the attitudes, opinions, behaviors, or characteristics” of a population (Creswell, 2012, p. 376).

The survey (see Appendix A) was administered electronically through Survey Monkey (<https://www.surveymonkey.com/s/CRMHKQJ>). The survey was titled *Interactive Whiteboard Survey* and was developed by the researcher, yet based on an existing survey used in a study by Türel and Johnson (2012). This survey was developed to focus specifically on teachers' self-reported IWB use and how it related to their perceptions of IWBs. As a result, three sections from the original survey that did not pertain to this study were not included. In addition, several other questions pertaining to frequency of IWB use, instructional effects of IWBs on teachers, instructional effects of IWBs on student learning, motivational effects of IWBs on teachers and motivational effects of IWBs on students were omitted to make the survey as concise as possible and focused only on collecting information pertaining to this study's variables. Four new items were added to the *Interactive Whiteboard Survey*. The final survey consisted of 29 closed-ended items arranged into three sections.

Section I, General Demographics, contained seven closed-ended questions. Six of the items (1 - 6) were adapted from a study conducted by Teclehaimanot and DeMedio (2010) and included questions about participants' gender, age, years of teaching experience, type of school system (public or private), grade level(s) taught (participants selected more than one grade level if applicable), and language(s) taught (with possible choices listed as Arabic, Chinese, French, German, Italian, Japanese, Latin, Russian, Spanish and the option to indicate any additional languages). One new item (7) was added by the researcher to better understand the educational backgrounds of the participants. For Item 7, participants were asked to indicate their highest level of education. Demographic information was collected about each participant to describe the characteristics of the participants comprising the sample and to better understand the extent of generalizability of the study findings.

Section II, Interactive Whiteboard Access and Instructional Use, contained two closed-ended questions, items 8 and 9. Participants selected one choice for each item. Item 8 was created by the researcher to collect data for the independent variable of self-reported instructional use of IWBs. Item 8 inquired if a participant had access to an IWB (Yes/No). Knowing this was necessary because the researcher did not want to assume that all participants had access to IWBs. Item 9 was adapted from the survey created by Türel and Johnson (2012) to collect data for the independent variable of self-reported instructional use of IWBs. Item 9 inquired how frequently a participant had used an IWB in the last academic year (this included supervising students as they used an IWB). Participants were able to choose from the following response options: *0 = I never used it, 1 = I used it sometimes, 2 = I used it frequently (though not daily) and 3 = I used it daily.*

This study provided participants the opportunity to declare lack of use of IWBs, despite confirmed IWB access, whereas when inquiring about “Frequency of IWB Use,” Türel and Johnson (2012) provided participants with possible responses of *sometimes*, *frequently* or *always* (p. 318).

Finally, Section III, Perceptions of Effects of IWB Use, contained items 10 - 29 which were arranged into four subsections that separately inquired about perceptions of instructional effects of IWBs on teaching, perceptions of instructional effects of IWBs on student learning, perceptions of motivational effects of IWBs on the teacher and perceptions of effects of IWBs on student engagement. Depending on reported IWB use and access, participants provided responses to either declarative or hypothetical statements for the 20 items in Section III. Participants who reported lack of IWB access or participants who reported that they did not use IWBs, despite access, were able to convey their perceptions about the effects of IWBs by providing responses to hypothetical statements, whereas participants who reported to have IWB access and to use IWBs for instruction provided answers to declarative statements pertaining to the effects of IWBs. The same possible responses were presented to all participants on a 4-point Likert scale, with the choices of 0 = *Strongly Disagree*, 1 = *Somewhat Disagree*, 2 = *Somewhat Agree*, and 3 = *Strongly Agree*. All participants were instructed to select one choice per item.

The first subsection, items 10 – 17, inquired about perceptions of instructional effects of IWBs on teachers and provided information pertaining to the dependent variable, *perceptions of instructional effects of IWBs on teaching*. As on the survey used by Türel and Johnson (2012), participants considered statements pertaining to the

instructional effects of IWBs on teaching. For example, teachers considered if IWBs helped to manage instructional time effectively, made lessons more effective, facilitated classroom management, made lessons more interactive, facilitated discussions on the content in class, provided advantages to make course content more visual, had changed the way instruction was delivered and if IWBs could be used to integrate technology into instruction. Item 17, a new item created by the researcher, inquired if a participant used an IWB to integrate technology into instruction.

The second subsection, items 18 – 21, inquired about the instructional effects of IWBs on student learning and provided information for the dependent variable, *perceptions of instructional effects of IWBs on student learning*. Participants considered if using an IWB helped students to learn, made it easier for students to remember what they learned in class, enabled students to learn faster and if an IWB helped students to learn concepts easier when an IWB was used for instruction.

The third subsection, items 22 – 26, inquired about the motivational effects of IWBs on the teacher and provided information for the dependent variable, *perceptions of motivational effects of IWBs on teachers*. Participants considered if they enjoyed teaching with an IWB, if they felt more prepared for instruction, if their IWB skills were improving day by day, if learning how to use an IWB was essential and if using an IWB made their courses more enjoyable.

The fourth subsection, items 27 – 29, inquired about the effects of IWBs on student engagement and provided information for the dependent variable *perceptions of effects of IWBs on student engagement*. Participants considered if using an IWB increased students' interest in class, helped students to focus on lessons and increased students'

engagement in lessons. Item 29 deviated from Türel and Johnson's original Item 23 to better address the variable, *perceptions of effects of IWBs on student engagement* (2012). In contrast to the original item on the survey used by Türel & Johnson (2012), Item 29 in this study inquired about student engagement in learning, rather than "motivation towards the course."

3.5.2 Data Collection Procedures

To obtain a generalizable sample, a survey was used and all qualifying OFLA members were invited to participate in the study. Potential participants (n=1,336) received an informed consent letter, a link to the online survey and a response deadline. Further directions on how to complete the survey were included in the actual survey. The invitation to participate in the study and the link to the survey were sent through the OFLA listserv on January 25th, 2013. In an effort to persuade all teachers to participate, the researcher used an egotistical appeal in the informed consent letter that highlighted "the importance of the participant's opinions by stating that their opinions were important (King, Pealer & Bernard, 2001, p. 6). As recommended by King, Pealer and Bernard (2001), participants were ensured "that their information is crucial to the success of the study" (p. 10). It was also stated in the informed consent letter that this study was conducted in connection with the University of Toledo as "university... sponsorship may increase respondents' perceived importance of the study" (King, et al., 2001, p. 6). The survey attempted to capture and hold participants' interest by asking questions that were relevant to the participants, per suggestion by Mangione (1995). As King et al. (2001) encouraged, the survey, which contained 29 items, was "respondent-friendly and short" (p. 11). If a teacher decided to participate, he or she clicked on the link and anonymously

provided responses to the survey items. Creswell (2012) encouraged researchers to employ “good follow-up procedures” (p. 391) and King, et al. (2001) suggested that participants be contacted multiple times to encourage responses. As recommended by Creswell (2012) and King et al. (2001), a reminder was sent through the listserv one week after the initial invitation was sent. Those who had already provided responses to the survey were thanked and those who had not yet provided responses were encouraged to provide responses to the survey. It was the researcher's intention to close the survey two weeks after the initial invitation was sent, but within two weeks 64 participants had responded to the survey which yielded a response rate of 4.8%. After endorsement from two prominent OFLA members, 87 more participants completed the survey, increasing the response rate to 15.4%. A second message of encouragement was sent by the prominent OFLA members in conjunction with the researcher asking any additional OFLA members to respond within the next week and informing them that the survey would be closed on March 11th, 2013. The survey was actually closed on March 12th, 2013. In total, 260 OFLA members responded to the survey, which yielded a response rate of 19%. Out of the 260 participants who began the survey, 236 participants completed the survey (i.e., answered all questions as instructed), which produced a 91% completion rate. Twenty-four surveys were regarded as incomplete and discarded altogether. According to Creswell (2012), the low response rate may have been influenced by participants’ lack of interest in the study. Potential participants may not have been interested in responding to a survey inquiring about instructional use of IWBs and perceptions about IWBs. The completion rate may have decreased to 91% because once the participants started to respond to the survey items, they may have felt that the

survey was irrelevant and lost interest in completing it. Participants may have felt that they were investing too much time in completing the survey, which should have taken participants 10 – 15 minutes to complete, and stopped providing responses (Creswell, 2012). Lastly, technical difficulties may have prevented survey completion even after a participant had begun to provide responses (Creswell, p. 384, 2012).

3.5.3 Data Management

As soon as the survey was closed, the responses were downloaded from SurveyMonkey and saved in a Microsoft Excel spreadsheet. Identifying participants by a number ensured confidentiality. Only the researcher and the Principal Investigator had access to the data.

Prior to data analysis, participants were categorized into five groups based on their responses to survey item 8, which pertained to IWB access, and survey item 9, which pertained to IWB instructional use. A participant belonged to Group 1 if he or she answered *no (0)* to Item 8 and *I never used it (0)* to Item 9. Group 1 was coded as *0 = No access, Never used it*. A participant belonged to Group 2 if he or she answered *yes (1)* to Item 8 and *I never used it (0)* to Item 9. Group 2 was coded as *1 = Access, Never used it*. A participant belonged to Group 3 if he or she answered *yes (1)* to Item 8 and *I used it sometimes (1)* to Item 9. Group 3 was coded as *2 = Access, Used it sometimes*. A participant belonged to Group 4 if he or she answered *yes (1)* to Item 8 and *I used it frequently (though not daily) (2)* to Item 9. Group 4 was coded as *3 = Access, Used it frequently*. A participant belonged to Group 5 if he or she answered *yes (1)* to Item 8 and *I used it daily (3)* to Item 9. Group 5 was coded as *4 = Access, Used it daily*.

Four continuous dependent variables were computed by adding participants' responses to the items in each of the four subsections in Section III. Given that each item

was asked on a 4-point scale, the possible range of scores for perceptions of instructional effects of IWBs on teaching was from 0 to 24. The possible range of scores for perceptions of instructional effects of IWBs on student learning was from 0 to 12. The possible range of scores for perceptions of motivational effects of IWBs on teachers was from 0 to 15. Finally, the possible range of scores for perceptions of effects of IWBs on student engagement was from 0 to 9. Higher scores on each variable indicated more positive perceptions of what was captured by that variable.

In Group 1, 9 different participants provided two responses for items 11, 16, 18, 23, 25, 26 and 29. The responses to these items were determined to be invalid, yet this did not disqualify these participants from being included in the 91% completion rate. The participants' invalid responses were only omitted from the statistical analysis involving those seven items.

3.6 Data Analysis

Data were analyzed using Origin 6.1 Data Analysis and Graphing Software as well as Microsoft Excel. The statistical test that was used to answer the research questions was a One-Way Analysis of Variance (ANOVA). The significance level was set at .05. ANOVA determined if there was a statistical difference in the means of the four variables for the five groups. The Tukey-Kramer HSD post hoc test was conducted to determine which of the groups were significantly different from each other when paired specifically together, rather than all five groups at once.

In addition to the One-Way ANOVA, the averages of the participant total scores per group were examined for each research question to observe the relationships between the categorical independent variable, self-reported instructional use of IWBs, and each of

the four continuous dependent variables, perceptions of instructional effects of IWBs on teaching, perceptions of instructional effects of IWBs on student learning, perceptions of motivational effects of IWBs on teachers and perceptions of effects of IWBs on student engagement. The purpose of this was to examine if there was an observable trend that would shed light on the relationship of IWB instructional use and perceptions.

Chapter 4

Results

This chapter presents the results and analysis of the data collected for this investigation. First, the demographics of the participants are presented followed by the results for each research question.

4.1 Participant Characteristics

Demographically, the greater part (87.7%) of the participants were females. The majority of participants whose ages fell between 18 and 40 years of age reported to have been teaching between less than 1 year and 15 years. The majority of the participants whose ages fell between 41 and 45 had been teaching between 11 and 25 years. Participants who were 46 - 60 years old reported the widest range of years of teaching experience ranging from less than 1 year to 30+ years. Overall, as age increased, the range of the number of years a participant had been teaching increased (see Table 4.1).

Table 4.1

Cross Tabulation of Age and Years Teaching a Foreign Language

Years	<1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	30+	n	%
18-30	12.7 (30)	8.9 (21)	-	-	-	-	-	51	21.6
31-40	5.5 (13)	12.3 (29)	6.3 (15)	0.8 (2)	-	-	-	59	25
41-50	0.8 (2)	0.8 (2)	3.7 (9)	8.5 (20)	10.6 (25)	3 (7)	1.4 (1)	66	27.9
51-61+	0.4 (1)	2.5 (6)	2.1 (5)	3.8 (9)	3.3 (8)	6.4 (15)	6.8 (16)	60	25.5
n	46	58	29	31	33	22	17	236	-
%	19	25	12	13	14	9	7	-	100

Note. N = 236

The majority of participants (73.3%) specified having completed a Master's Degree. Less than a quarter of the participants (22.5%) indicated to have completed only a Bachelor's Degree, and very few participants (4.2%) indicated to have completed doctoral level degrees. The majority of the participants (84.7%) specified that they were employed at a public school. In terms of the languages taught, 59.7% of the participants indicated that they were strictly Spanish teachers. The majority of the participants in the sample (92%) were teaching only one foreign language. The majority of the participants (78.4%) reported teaching either all four high school grades or all four high school grades in addition to a grade level outside the high school grade range. The remaining 21.6% of the participants were teaching varied combinations of grades 9 – 12, with some participants also teaching grade levels in addition to the high school grades (see Table 4.2).

Table 4.2

Demographic Characteristics of Participants

Participant Characteristics	%	n
Highest Level of Education Completed		
Bachelor's Degree	53	22.5
Master's Degree	173	73.3
Ph.D. or Ed.D.	10	4.2
School System		
Public	200	84.7
Private	36	15.3
Foreign language(s) taught		
Arabic	1	0.4
Arabic and Other	2	0.8
Chinese	5	2.1
French	56	23.7
French and Other	5	2
German	11	4.7
German and Other	2	0.8
Latin	3	1.3
Russian	1	0.4
Spanish	141	59.7
Grades Taught		
One high school grade	6	2.5
One high school grade/other	1	0.4
Two high school grades	15	6.3
Two high school grades/other	2	0.8
Three high school grades	24	10.1
Three high school grades/other	3	1.2
All high school grades	135	57.2
All high school grades/other	50	21.2
Spanish and other	9	3.8

Note. N = 236

Based on their self-reported IWB instructional use, the majority of the participants (72%) indicated to have used an IWB for instruction sometimes, frequently or daily, and 28% of the participants indicated to not have used an IWB for instruction (see Table 4.3). Of the latter, 6% did not have access to an IWB.

Table 4.3

The Five Groups of Participants According to IWB Access

Groups	<i>n</i>	%
Group 1: No Access, Never Used an IWB	53	22
Group 2: Access, Never Used an IWB	14	6
Group 3: Access, Used an IWB Sometimes	28	12
Group 4: Access, Used an IWB Frequently	57	24
Group 5: Access, Used an IWB Daily	84	36

Note. *N* = 236

The results of the statistical testing of the differences among the five groups of participants are presented next and organized by research question. First, the results of the One-Way ANOVA are presented. Then, the results of the examination of the relationship between the five participant groups and the four dependent continuous variables are presented. The means and standard deviations used for the statistical analysis are presented in Table 4.4.

Table 4.4

Means and Standard Deviations of the Five Groups

Variable	Participant Group According to Self-Reported IWB Instructional Use									
	Group 1		Group 2		Group 3		Group 4		Group 5	
	M	SD	M	SD	M	SD	M	SD	M	SD
1	18.43	3.68	18.86	2.57	15.46	3.44	18.12	3.26	20.62	3.66
2	8.19	2.24	7.79	1.76	7.21	2.28	8.37	1.67	9.26	2.40
3	11.26	2.80	10.71	2.40	9.07	2.79	11.07	2.93	12.79	2.24
4	6.38	1.72	6.00	1.88	5.64	1.57	6.18	1.44	6.96	1.77

Note. $q = 3.63$, HSD = 0.47

4.2 Research Question One

Is there a relationship between self-reported instructional use of IWBs and their effects on teaching, as perceived by Ohio high school foreign language teachers? It was hypothesized that there would be a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching. In other words, the more frequently the

teachers reported using IWBs, the more positive would have been their perceptions of the instructional effects of IWBs on teaching.

4.2.1 The Instructional Effects of IWBs on Teaching

Participant total scores for the instructional effects of IWBs on teaching, ranging from 0 - 24, were used to calculate the mean and standard deviation for this variable (see Table 4.4). Group 5 (Access, Used an IWB Daily) had the highest mean, while Group 3 (Access, Used an IWB Sometimes) had the lowest mean.

The omnibus ANOVA test indicated that the five groups significantly differed in their perceptions of the instructional effects of IWBs on teaching based on self-reported IWB instructional use, $F(4, 231) = 12.78, p < 0.05$ (see Table 4.5).

Table 4.5

ANOVA Results of Perceptions of the Instructional Effects of IWBs on Teaching

Source	<i>df</i>	SS	MS	<i>F</i>	<i>p</i>
Between Groups	4	684.13	171.03	12.78	.0000
Within Groups	231	2813.65	12.18		
Total	235	3497.77			

Note. $p = .00000000204859$

The results of the Tukey-Kramer HSD post hoc test indicated that the perceptions of the group without IWB access of the instructional effects of IWBs on teaching were significantly higher than the perceptions of the group which used IWBs sometimes and significantly lower than the perceptions of the group which used IWBs daily. Also, the perceptions of the group which had IWB access yet never used IWBs of the instructional effects of IWBs on teaching were significantly higher than the perceptions of the group which used IWBs sometimes. In addition, the perceptions of the group which used IWBs sometimes were significantly lower than the perceptions of the group which used IWBs frequently and the group which used IWBs daily. Lastly, the perceptions of the group

which used IWBs frequently were significantly lower than the perceptions of the group which used IWBs daily (see Table 4.4).

4.2.2 Relationship between Self-Reported IWB Instructional Use and the Instructional Effects of IWBs on Teaching

A weak positive relationship was observed between the perceptions of the instructional effects of IWBs on teaching and the frequency of self-reported IWB instructional use (No Access, Never Used an IWB; Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.06$). There was also a weak positive relationship when the analysis was limited only to those groups that had access to IWBs (Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.1$). However, a very strong positive relationship was noted when only the three groups that reported using IWB were examined (Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.999$) (see Figure 4.1).

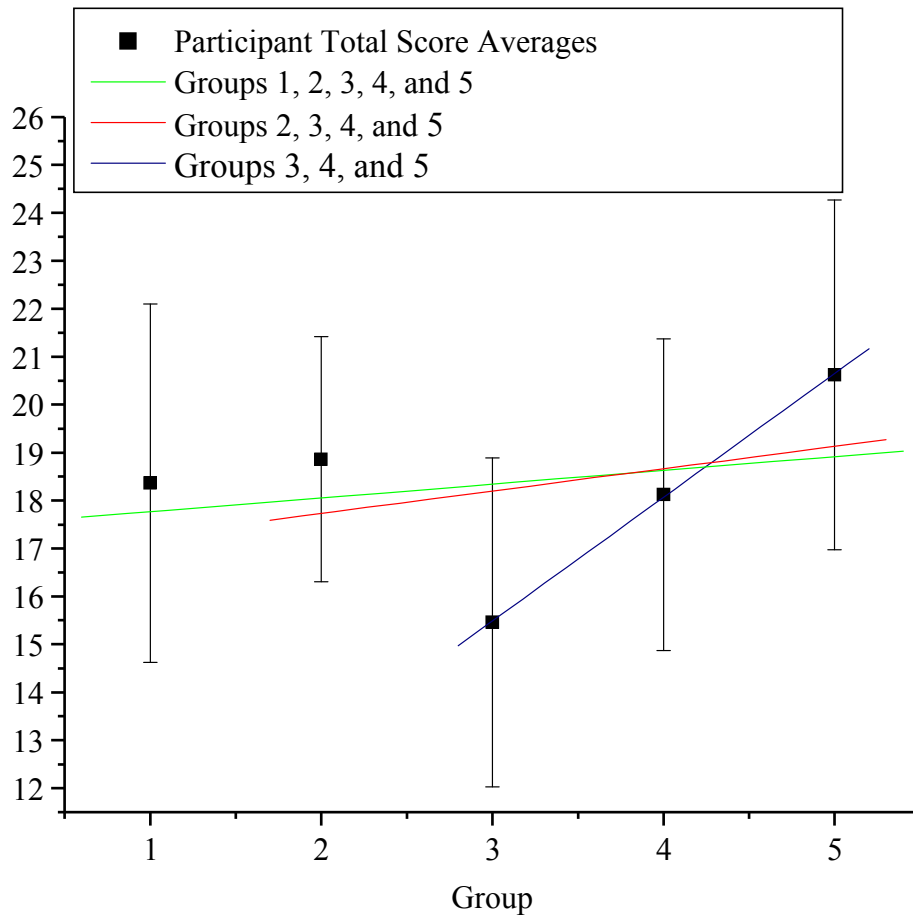


Figure 4.1. The relationships between self-reported IWB instructional use and the instructional effects of IWBs on teaching.

4.2.3 Summary of Results for Research Question 1

The ANOVA results for participant total scores on the instructional effects of IWBs on teaching supported the research hypothesis for Research Question One and revealed that there was a significant difference in teacher perceptions of the instructional effects of IWBs on teaching based on self-reported IWB instructional use. The findings indicated a significant positive relationship between high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs

on teaching. The effect size, $\eta^2 = 0.2$, was small and revealed that 20 % of the variance was caused by the frequency of IWBs instructional use (see Table 4.5).

The group which used IWBs daily had the most positive perceptions, followed by the group which had IWB access, yet did not use IWBs for instruction. The group without IWB access had the third most positive perceptions and was followed by the group which used IWBs frequently for instruction, though not daily. The group with the least positive perceptions was the group which used IWBs sometimes for instruction. Based on how positive a group's perception of the instructional effects of IWBs on teaching was, the relationship between the groups remained positive despite the weakening of the relationship with the addition of the groups of non-IWB users.

4.3 Research Question Two

Is there a relationship between self-reported instructional use of IWBs and their instructional effects on student learning, as perceived by Ohio high school foreign language teachers? It was hypothesized that there would be a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on student learning. In other words, the more frequently the teachers reported using IWBs, the more positive would have been their perceptions of the instructional effects of IWBs on student learning.

4.3.1 The Instructional Effects of IWBs on Student Learning

Participant total scores for the instructional effects of IWBs on student learning, ranging from 0 - 12, were used to calculate the mean and standard deviation for each group (see Table 4.4). Group 5 (Access, Used an IWB Daily) had the highest mean while Group 3 (Access, Used an IWB Sometimes) had the lowest mean.

The omnibus ANOVA test indicated that the five groups significantly differed in their perceptions of the instructional effects of IWBs on student learning based on self-reported IWB instructional use, $F(4, 231) = 12.78237, p < 0.05$ (see Table 4.6).

Table 4.6

ANOVA Results of Perceptions of the Instructional Effects of IWBs on Student Learning

Source	<i>df</i>	SS	MS	<i>F</i>	<i>p</i>
Between Groups	4	130.95	32.74	5.81	.0001
Within Groups	231	1074.69	4.65		
Total	235	1205.64			

Note. $p = .000178963$

The results generated from the Tukey-Kramer HSD post hoc test indicated that the perceptions of the group without IWB access regarding the instructional effects of IWBs on student learning were significantly lower than the perceptions of the group which used IWBs daily. Additionally, the perceptions of the group which used IWBs sometimes were significantly lower than the group which used IWBs daily (see Table 4.4).

4.3.2 Relationship between Self-reported IWB Instructional Use and the Instructional Effects of IWBs on Student Learning

Figure 4.2 shows the relationship between self-reported IWB instructional use and the instructional effects of IWBs on the instructional effects of IWBs on student learning. A moderate positive relationship was observed between the perceptions of instructional effects of IWBs on student learning and all five frequencies of self-reported IWB instructional use (No Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.352$). There was a moderate positive relationship between the perceptions of instructional effects of IWBs on student learning and the four of the self-reported frequencies of IWB instructional use

which indicated to have IWB access (Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.637$). There was a strong positive relationship between the perceptions of the instructional effects of IWBs on student learning and the three frequencies of self-reported IWB instructional use which indicated to use IWBs for instruction (Access; Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.991$).

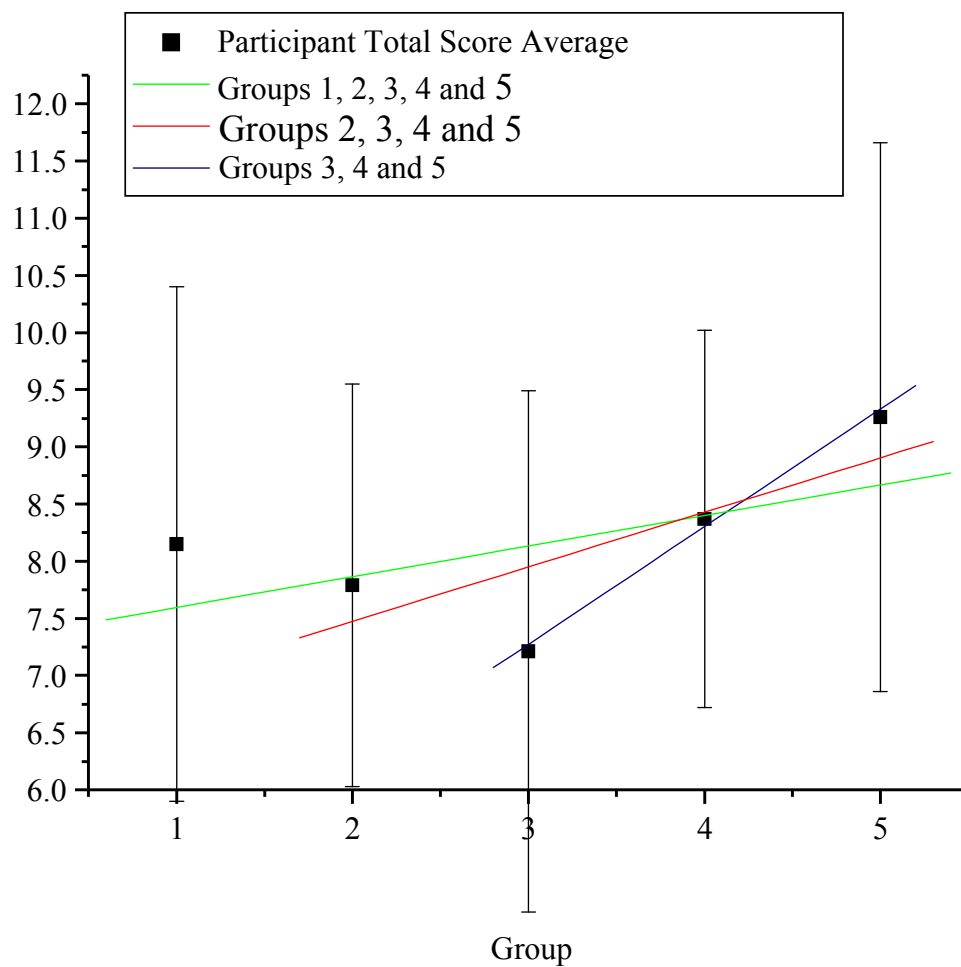


Figure 4.2. The linear relationships between self-reported IWB instructional use and the instructional effects of IWBs on student learning.

4.3.3 Summary of ANOVA Results and Relationships for Research

Question 2

The ANOVA results of participant total scores for the instructional effects of IWBs on student learning supported the research hypothesis for Research Question Two and revealed that there was a significant difference in teacher perceptions of the instructional effects of IWBs on student learning based on self-reported IWB instructional use. The findings supported a positive relationship between high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on student learning. The effect size, $\eta^2 = 0.11$, was small and revealed that 11 % of the variance was caused by the frequency of IWBs instructional use (see Table 4.6).

The group which used IWBs daily had the most positive perceptions, followed by the group which used IWBs for instruction frequently, though not daily. The group without IWB access had the third most positive perceptions regarding impact on student learning was followed by the group which had IWB access yet did not use IWBs for instruction. The group with the least positive perceptions was the group which used IWBs sometimes for instruction. Based on how positive a group's perception of the instructional effects of IWBs on teaching was, the relationship between the five groups remained positive despite the weakening of the relationship with the addition of the groups of non-IWB users.

4.4 Research Question Three

Is there a relationship between self-reported instructional use of IWBs and their effects on teacher motivation, as perceived by Ohio high school foreign language teachers? It was hypothesized that there was a positive relationship between Ohio high school foreign

language teachers' self-reported IWB instructional use and their perceptions of the motivational effects of IWBs on teachers. In other words, the more frequently the teachers reported using IWBs, the more positive would have been their perceptions of the motivational effects of IWBs on teachers.

4.4.1 The Motivational Effects of IWBs on Teachers

Participant total scores for the motivational effects of IWBs on teachers, ranging from 0 - 15, were used to calculate a mean and standard deviation for each group (see Table 4.4). Group 5 (Access, Used an IWB Daily) had the highest mean, while Group 3 (Access, Used an IWB Sometimes) had the lowest mean.

The omnibus ANOVA test indicated that the five groups significantly differed in their perceptions of the motivational effects of IWBs on teachers based on self-reported IWB instructional use $F(4, 231) = 11.8286, p < 0.05$ (see Table 4.7).

Table 4.7

ANOVA Results of Perceptions of the Motivational Effects of IWBs on Teachers

Source	<i>df</i>	SS	MS	<i>F</i>	<i>p</i>
Between Groups	4	381.35	95.34	11.83	.0000
Within Groups	231	1590.88	6.89		
Total	235	1972.23			

Note. $p = .00000000928805$

The results generated from the Tukey-Kramer HSD post hoc test (see Table 4) indicated that the perceptions of the group which did not have IWB access of the motivational effects of IWBs on teachers were significantly lower from the perceptions of the group which used IWBs daily for instruction. Also, the perceptions of the group which had IWB access yet did not use IWBs for instruction of the motivational effects of IWBs on teachers were significantly lower from the perceptions of the group which used IWBs daily for instruction. The perceptions of the group which used IWBs sometimes for

instruction of the motivational effects of IWBs on teachers were significantly lower from the perceptions of the groups which used IWBs frequently and daily for instruction.

Lastly, the perceptions of the group which used IWBs frequently for instruction of the motivational effects of IWBs on teachers were significantly lower from the perception of the group which used IWBs daily for instruction.

4.4.2 Relationship between Self-reported IWB Instructional Use and the Motivational Effects of IWBs on Teachers

Figure 4.3 shows the relationship between self-reported IWB instructional use and the motivational effects of IWBs on teachers. A moderate positive relationship was observed between the perceptions of the motivational effects of IWBs on teachers and all five frequencies of self-reported IWB instructional use (No Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.32$). A moderate positive relationship was maintained between the perceptions of the motivational effects of IWBs on teachers and four of the self-reported frequencies of IWB instructional use which indicated to have IWB access (Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.533$). There was a strong positive relationship between the perceptions of the motivational effects of IWBs on teachers and the three frequencies of self-reported IWB instructional use which indicated to use IWBs for instruction (Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.999$).

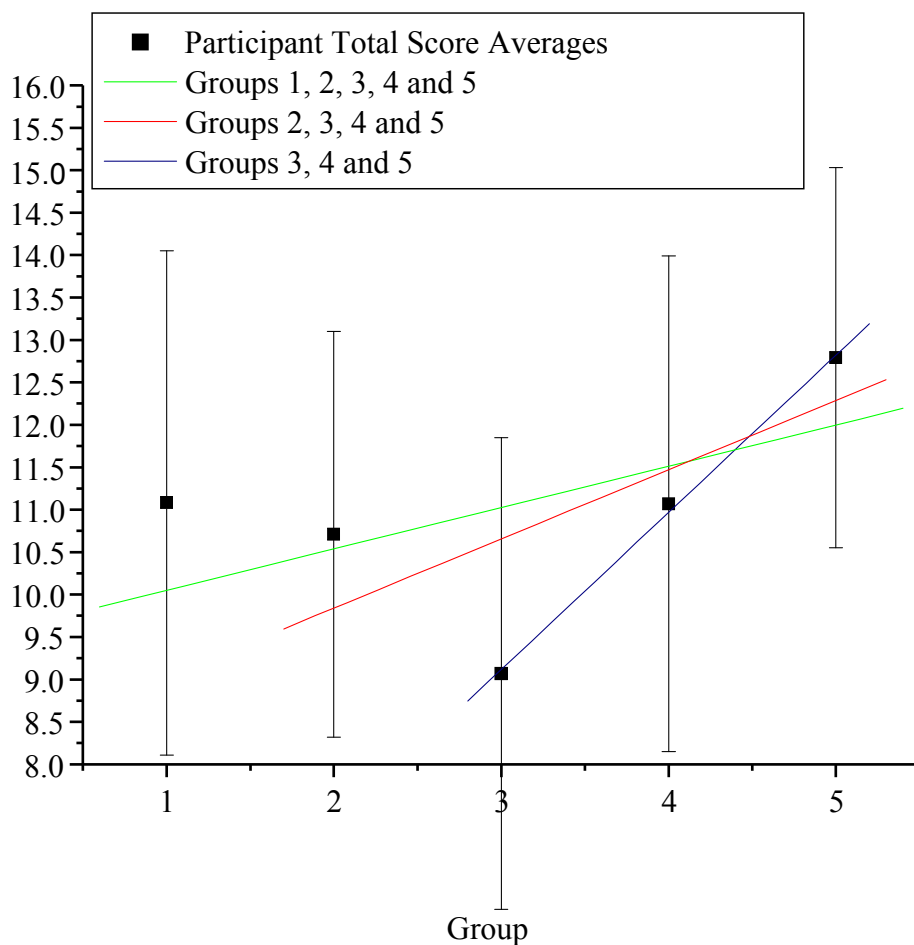


Figure 4.3. Linear relationships between self-reported IWB instructional use and the motivational effects of IWBs on teachers.

4.4.3 Summary of ANOVA Results and Relationships for Research

Question 3

The ANOVA results for participant total scores on the motivational effects of IWBs supported the research hypothesis for Research Question Three and revealed that there was a significant difference in teacher perceptions of the motivational effects of IWBs. The findings supported a positive relationship between high school foreign language teachers' self-reported IWB instructional use and their perceptions of the motivational

effects of IWBs on teachers. The effect size, $\eta^2 = 0.19$, was small and revealed that 19 % of the variance was caused by the frequency of IWBs instructional use (see Table 4.7).

The group which used IWBs daily had the most positive perceptions, followed by the group which did not have IWB. The group which used IWBs frequently for instruction had the third most positive perceptions and was followed by the group which did not use IWBs for instruction, despite access. The group with the least positive perceptions was the group which used IWBs sometimes for instruction. Based on how positive a group's perception of the instructional effects of IWBs on teaching was, the relationship between the groups remained positive despite the weakening of the relationship with the addition of the groups of non-IWB users.

4.5 Research Question 4

Is there a relationship between self-reported instructional use of IWBs and their effects on student engagement, as perceived by Ohio high school foreign language teachers? It was hypothesized that there is a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the effects of IWBs on student engagement. In other words, the more frequently the teachers reported using IWBs, the more positive would have been their perceptions of the effects of IWBs on student engagement.

4.5.1 The Effects of IWBs on Student Engagement

Participant total scores for perceptions of effects of IWBs on student engagement, ranging from 0 - 9, were used to calculate a mean and standard deviation for each group (see Table 4.4). Group 5 (Access, Used an IWB Daily) had the highest mean, while Group 3 (Access, Used an IWB Sometimes) had the lowest mean.

The omnibus ANOVA test indicated that the five groups significantly differed in their perceptions of IWBs on student engagement based on self-reported IWB instructional use $F(4, 231) = 4.28229, p < 0.05$ (see Table 4.8).

Table 4.8

ANOVA Results of the Effects of IWBs on Student Engagement

Source	<i>df</i>	SS	MS	<i>F</i>	<i>p</i>
Between Groups	4	56.82	14.21	4.28	.0023
Within Groups	231	644.02	2.79		
Total	235	700.84			

Note. $p = .00232$

The results generated from the Tukey-Kramer HSD post hoc test (see Table 4) indicated that for the effects of IWBs on student engagement, the perceptions of the group which used IWBs sometimes for instruction of the effects of IWBs on student engagement were significantly lower than the perception of the group which used IWBs daily for instruction. The perceptions of the group which used IWBs frequently for instruction of the effects of IWBs on student engagement were significantly lower than the perceptions of the group which used IWBs daily for instruction.

4.5.2 Relationship between Self-reported IWB Instructional Use and the Effects of IWBs on Student Engagement

Figure 4.4 shows the relationship between self-reported IWB instructional use and the instructional effects of IWBs on teaching. It was revealed that there was a weak positive relationship between the perceptions of the effects of IWBs on student engagement and all five frequencies of self-reported IWB instructional use instructional (No Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.206$). There was a moderate positive relationship between the perceptions of the effects of IWBs on student engagement and

the four self-reported frequencies of IWB instructional use which indicated to have IWB access (Access, Never Used an IWB; Access, Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.623$). There was a strong positive relationship between the perceptions of the effects of IWBs on student engagement and three frequencies of self-reported IWB instructional use which indicated to use IWBs for instruction (Used an IWB Sometimes; Access, Used an IWB Frequently; Access, Used an IWB Daily) ($r^2 = 0.987$).

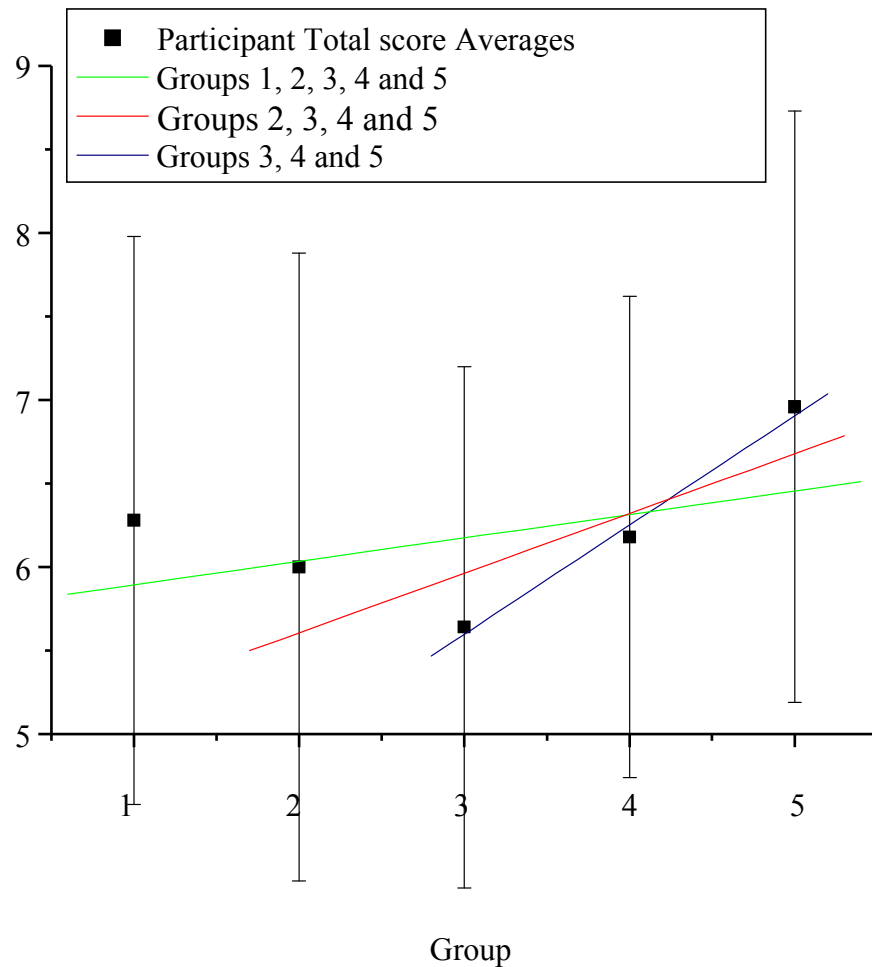


Figure 4. Linear relationships between self-reported IWB instructional use and the motivational effects of IWBs on students.

4.5.3 Summary of ANOVA Results and Relationships for Research

Question 4

The ANOVA results for participant total scores on the effects of IWBs on student engagement supported the research hypothesis for Research Question Four and revealed that there was a significant difference in teacher perceptions of the effects of IWBs on student engagement based on self-reported IWB instructional use. The findings indicated a significant positive relationship between high school foreign language teachers' self-reported IWB instructional use and their perceptions of the effects of IWBs on student engagement. The effect size, $\eta^2 = 0.08$, was small and revealed that 8 % of the variance was caused by the frequency of IWBs instructional use (see Table 8).

The group which used IWBs daily had the most positive perceptions, followed by the group which did not have IWB. The group which used IWBs frequently for instruction though not daily had the third most positive perceptions and was followed by the group which had IWB access yet did not use IWBs for instruction. The group with the least positive perceptions was the group which used IWBs sometimes for instruction. Based on how positive a group's perception of the instructional effects of IWBs on teaching was, the relationship between the groups remained positive despite the weakening of the relationship with the addition of the groups of non-IWB users.

Presented in Chapter Five are the conclusions and implications of these findings. Recommendations for further research associated with these findings are also detailed.

Chapter 5

Conclusions and Implications

Integration of technology for instruction has become a requirement, however, teachers may have already formed perceptions about technology which may have influenced their decisions to integrate technology into instruction. Expectations imposed on others has not led to sudden or harmonious implementation, as those who were expected to implement an idea may not have been in agreement. Hennessy, Ruthven and Brindley (2005) raised the point that “imposed policy decisions and mechanical change models often appear unresponsive to teachers’ perspectives and their workplace constraints” (p. 157). If technology were to be integrated into instruction, teachers must recognize the “educational value” and be convinced of the “transformative potential of the technology” before it becomes an accepted means for delivering instruction (p. 185).

Interactive whiteboards (IWBs) have been examples of technology which may be presently found in schools. Although research suggested that IWBs are positive classroom assets (Levy, 2002; Smith, Higgins, Wall & Miller, 2005), there was no guarantee that all teachers shared this perception or used IWBs for instruction even if they had IWB access. Teachers may have already formed perceptions pertaining to IWBs whether or not they have used them for instruction. These perceptions could have impacted teachers’ decisions to take advantage of IWB access or purposefully make no

attempt to use IWBs for instruction. If teachers did not believe that IWBs had educational value, nor believed that IWBs had potential to enhance instruction, then little effort may have been given towards using IWBs for instruction. Alternatively, if teachers did believe that IWBs had educational value and had the potential to enhance instruction, a willingness to integrate IWBs into instruction may exist. This study aimed to investigate if there was a relationship between Ohio foreign language teachers' perceptions of IWBs and their IWB instructional use.

The first section of this chapter presents conclusions drawn from the analysis of the data gathered with the Interactive Whiteboard Survey. The summary of the findings is detailed according to research question and variable. The second section pertains to the implications for the teaching profession and for those responsible for making decisions that impact the presence of IWBs in classrooms. The final section of this chapter presents recommendations for future research.

5.1 Research Question One

Research Question One asked if there was a relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching. Based on the conclusions drawn by previous studies pertaining to IWBs and instructional effects of IWBs on teaching (Glover & Miller, 2001; Levy, 2002; Gray et al., 2006; Türel & Johnson, 2012), it was hypothesized that there would be a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching. The ANOVA results from this investigation suggested that there would be a positive relationship between self-reported

IWB instructional use and perceptions of the instructional effects of IWBs on teaching which supported findings from previous research. Thus it could be concluded that the more frequently IWBs are used for instruction, the more positively the instructional effects of IWBs on teaching are perceived.

The results generated from the Tukey-Kramer HSD post hoc test reinforced which groups were significantly different in their perceptions of the instructional effects of IWBs on teaching. The two groups which indicated to not use IWBs for instruction may be significantly different from the groups that indicated their use "sometimes" or "daily" due to lack of experience of IWB instructional use because the two groups which indicated not to use IWBs for instruction had to base their perceptions of the instructional effects of IWBs on teaching on speculation rather than actual IWB instructional use. The perceptions of those who reported using an IWB "sometimes" may have been lacking the skills to employ maximal IWB features (Glover & Miller, 2001) and may have experienced different instructional effects of IWBs on teaching in comparison to the groups which used IWBs "frequently" or "daily" for instruction. Additional reasons, such as a deficit in IWB "technical competency" (Somyürek, Atasoy & Özdemir, 2009), lack of professional development opportunities (Armstrong et al., 2005; Smith et al., 2005), failure of IWBs to function properly during a lesson (Levy, 2002, p. 16) or inconsistent or inconvenient IWB access (Levy, 2002) may also be preventing teachers who had access but only sometimes to an IWB from realizing a higher potential of the impact on instructional effects of teaching. Although a group of participants indicated to use IWBs "frequently" for instruction, the group which indicated to use IWBs for instruction "daily" may have had the opportunity develop more advanced IWB skills to employ maximal

IWB features (Glover & Miller, 2001) and may have experienced different instructional effects of IWBs on teaching, thus resulting in the groups' perceptions of the instructional effects of IWBs on teaching being significantly different. The group which reported to use IWBs "frequently" as opposed to "daily" may also not quite have developed the IWB "technical competency" (Somyürek, Atasoy & Özdemir, 2009) or have experienced the same amount of professional development opportunities as the group which used IWBs "daily" for instruction. This difference in frequency of IWB use may have prevented the group of frequent IWB users from realizing the potential of IWBs that the group of daily IWB-users may have experienced to impact the instructional effects of IWBs on teaching.

5.2 Research Question Two

Research Question Two sought to determine if there was relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on student learning. Consistent with previous studies (Beeland, 2002; Levy, 2002; BECTA, 2005; Türel & Johnson, 2012), it was hypothesized for Research Question Two that there would be a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on student learning. The ANOVA results suggested that there was a positive relationship between self-reported IWB instructional use and perceptions of the instructional effects of IWBs on student learning, which supported the research hypothesis. Thus it could be concluded that the more frequently IWBs are used for instruction, the more positively the instructional effects of IWBs on student learning are perceived.

The results generated from the Tukey-Kramer HSD post hoc test revealed that while not all groups were significantly different when compared in pairs, they reinforced which groups were significantly different in their perceptions of the instructional effects of IWBs on student learning. The perceptions of the group which indicated to not have access to IWBs of the instructional effects of IWBs on student learning may have been significantly different from the perceptions of the group which indicated to use IWBs daily. The group of daily IWB users may have recalled how its students learned before an IWB was incorporated into instruction and was able to make a comparison of how students learned once IWBs were used during instruction, whereas the group without IWB access only had experience observing students learn without IWBs and thereby speculated how IWB instructional use could impact student learning. Additionally, the perceptions of the group that reported to use IWBs for instruction sometimes of the instructional effects of IWBs on student learning may be significantly different from the perceptions of the group of daily IWB users. The latter group was comprised of more experienced IWB users and it may have developed more advanced IWB skills and may have been better able to use IWBs as tools to impact student learning differently. For example, daily IWB users may have become more efficient and skilled at developing IWB-based lessons due greater frequency of IWB use (Levy, 2002) and may have developed advanced IWB “technical competency” (Somyürek, Atasoy & Özdemir, 2009), whereas the group which used IWBs sometimes for instruction may have had to grapple with inconsistent or inconvenient IWB access (Levy, 2002). Lack of professional development opportunities (Armstrong et al., 2005; Smith et al., 2005) and failure of IWBs to function properly during a lesson (Levy, 2002, p. 16) may also have prevented

the group that indicated to use IWBs "sometimes" from realizing a higher potential of IWBs to impact the instructional effects of IWBs on student learning.

5.3 Research Question Three

Research Question Three investigated if there was a relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the motivational effects of IWBs on teachers. Based on previous studies pertaining to the instructional effects of IWBs on student learning (Glover, Miller & Averis, 2004; BECTA 2005, Türel & Johnson, 2012), it was hypothesized that there would be a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the motivational effects of IWBs on teachers. The ANOVA results suggested that there was a positive relationship between self-reported IWB instructional use and perceptions of the motivational effects of IWBs on teachers, which supported the research hypothesis. Thus it could be concluded that the more frequently IWBs are used for instruction, the more positively the motivational effects of IWBs on teachers are perceived.

The results generated from the Tukey-Kramer HSD post hoc test revealed that not all of the five groups of teachers significantly different when compared in pairs, they reinforced which groups were significantly different in their perceptions of the motivational effects of IWBs on teachers. The perceptions of the groups which indicated to not use IWBs of the motivational effects of IWBs on teachers may be significantly different from the perceptions of the group which indicated to use IWBs daily for instruction because the two groups of non-users never had the opportunity to experience potential motivation associated with IWB use for instruction and speculated how such

motivation might impact feelings towards IWB instructional use. Participants which indicated to have IWB access, yet never used IWBs had the opportunity to use IWBs for instruction, did not appear to be motivated enough to actually use them. Inconvenient location of IWBs or the initial time investment necessary to develop IWB-based lessons may have compounded feelings of disinterest (Levy, 2002). A mindset of “technological ineptitude” (Glover & Miller, 2001, p. 268) or having a deficit in IWB “technical competency,” (Somyürek, Atasoy & Özdemir, 2009) may have also have impacted the group of participants which declined to use IWBs despite access unmotivated to use IWBs for instruction. Lack of professional development opportunities (Armstrong et al., 2005; Smith et al., 2005) and failure of IWBs to function properly during a lesson (Levy, 2002, p. 16) may have also hindered this group from feeling motivated enough to use IWBs. The perceptions of the group which indicated to use IWBs "sometimes" of the motivational effects of IWBs on teachers may have been significantly different from the perceptions of the groups which indicted to use IWBs "frequently" or "daily" because other factors may have hindered this group from being more motivated to use IWBs more often, such as a deficit in IWB “technical competency” (Somyürek, Atasoy & Özdemir, 2009), lack of professional development opportunities (Armstrong et al., 2005; Smith et al., 2005), failure of IWBs to function properly during a lesson (Levy, 2002, p. 16) or inconsistent or inconvenient IWB access (Levy, 2002). Lastly, the perceptions of the group which indicated to use IWBs "frequently" for instruction of the motivational effects of IWBs on teachers may be significantly different from the perceptions of the group which indicated to use IWBs "daily" for instruction because the group of frequent IWB-users may not be as motivated to use IWBs for due to unequal opportunities to

become more efficient and skilled at using IWBs (Levy, 2002). The group which indicated to use IWBs "frequently" may also not quite have developed the IWB "technical competency" (Somyürek, Atasoy & Özdemir, 2009) or experienced the same amount of professional development opportunities as the group which uses IWBs daily (Armstrong et al., 2005; Smith et al., 2005).

5.4 Research Question Four

Research Question Four examined if there was a relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the effects of IWBs on student engagement. Previous studies pertaining to the instructional effects of IWBs on student learning (Glover & Miller, 2001; Beeland, 2002; Levy, 2002; BECTA, 2005) supported the hypothesis of a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the effects of IWBs on student engagement. The ANOVA results suggested that there was a positive relationship existing between self-reported IWB instructional use and perceptions of the effects of IWBs on student engagement, which supported the research hypothesis. Thus it could be concluded that the more frequently IWBs are used for instruction, the more positively the effects of IWBs on student engagement are perceived.

The results generated from the Tukey-Kramer HSD post hoc test revealed that while not all of the five teacher groupings were significantly different when compared in pairs, they reinforced which groups were significantly different in their perceptions of the effects of IWBs on student engagement. The perceptions of the groups which indicated use of IWBs "sometimes" or "frequently" of the effects of IWBs on student engagement

may be significantly different from the perceptions of the group which indicated to use IWBs "daily." Although all of these groups indicated to use IWBs for instruction, teachers who indicated to use IWBs "daily" may have become more efficient and skilled at developing IWB-based lessons which encouraged student engagement (Levy, 2002). A deficit in IWB "technical competency" (Somyürek, Atasoy & Özdemir, 2009), lack of professional development opportunities (Armstrong et al., 2005; Smith et al., 2005), failure of IWBs to function properly during a lesson (Levy, 2002, p. 16) or inconsistent or inconvenient IWB access (Levy, 2002) may have prevented the groups of IWB-users which are not associated with "daily" IWB use from developing the skills which could potentially increase student engagement in IWB-based lessons. The group which indicated to use IWBs "frequently" may not have had a similar opportunity to become as efficient and skilled at incorporating IWBs to enhance student engagement as the group which indicated to use IWBs "daily" (Levy, 2002). Additionally, the group which indicated to use IWBs "frequently" may also not quite have developed the IWB "technical competency" (Somyürek, Atasoy & Özdemir, 2009) or experienced similar professional development opportunities as the group of "daily" users (Armstrong et al., 2005; Smith et al., 2005).

5.5 Relationships between the Five Groups

Of the teacher participant groups, the group which reported to use IWBs daily for instruction stood out as having the most favorable perceptions of the instructional effects of IWBs on teaching, the instructional effects of IWBs on student learning, the motivational effects of IWBs on teachers and the effects of IWBs on student engagement. This group of daily IWB-users was followed by the group which indicated to use IWBs

"frequently" for instruction. The group which reported to use IWBs "sometimes" for instruction had the least favorable perceptions of all four continuous dependent variables. It was surprising that the group which used IWBs "sometimes" had the least favorable perceptions, because this group was comprised of participants who reported actually using IWBs for instruction "sometimes."

When considering the groups of non-IWB users, the group which reported a lack of IWB access had more favorable perceptions of the instructional effects of IWBs on student learning, the effect of IWBs on teacher motivation, as well as the effects of IWBs on student engagement than the group which indicated to have IWB access, yet did not use IWBs for instruction. The group which declined to use IWBs for instruction despite access had more favorable perceptions than the group without IWB access towards the instructional effects of IWBs on teaching. The responses of the group with IWB access but lack of IWB instructional use illustrated the possibility of teachers choosing not to use IWBs for instruction for reasons other than disagreement that IWBs could potentially enhance instruction, learning, motivate teachers or contribute to student engagement. It was worth noting that 9 out of 14 participants in the group which deliberately did not use IWBs for instruction were between 41 years of age and 61+ years of age. This may have played a role among other factors as to why participants in this group declined to use IWBs for instruction, despite access. It was possible that these participants could have been considered "digital immigrants" (Prensky, 2001).

When only the three groups which reported to use IWBs for instruction were considered, as frequency of IWB instructional use increased, group perceptions of IWBs became more favorable. However, when the self-reported frequencies of IWB

instructional use of the groups which reported to not use IWBs for instruction were included, the pattern of increasing IWB instructional use correlating with increasingly more favorable perceptions decreased in strength. Although overall there was a positive relationship between self-reported IWB instructional use and perceptions of the instructional effects of IWBs on teaching, the instructional effects of IWBs on student learning, the motivational effects of IWBs on teachers and the effects of IWBs on student engagement, self-reported IWB instructional use and perceptions of IWBs do not share a cause-effect relationship (see Figure 5.1).

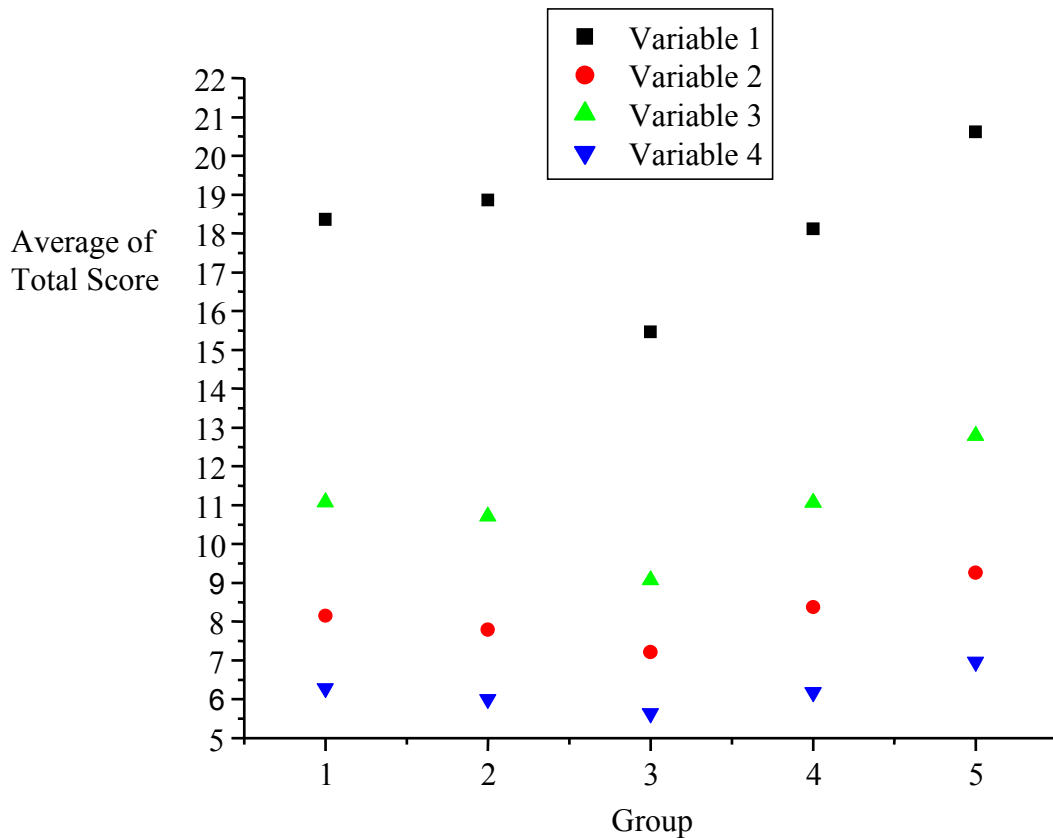


Figure 5.1 Group averages of total scores per variable.

5.6 Implications for Practice

The findings in this study had implications for foreign language teachers and those who make decisions regarding the presence of IWBs in schools. The majority of participants (222 participants, 94%) in this study reported to have access to and use IWBs for instruction either sometimes, frequently or daily. Only the fourteen participants (6%) reported not to use IWBs for instruction despite access, yet reported more favorable perceptions of IWBs than the group which used IWBs "sometimes" for instruction. Other foreign language teachers (Group 1) also reported to have favorable perceptions of the effects of IWBs, even though they did not have IWB access and could not use IWBs for instruction.

This investigation revealed that among high school foreign language teachers who do use IWBs, the more frequently IWBs were used for instruction, the more positive their perceptions were regarding the effects of IWBs. If how positive teachers' perceptions of IWBs are depends on the frequency of IWB instructional use, then as teachers use IWBs more and more, the more positive their perception of the effects of IWBs should become, therefore if perceptions are going to increase, teachers must be given opportunities to use IWBs. To encourage IWB instructional use, those responsible for making decisions pertaining to technology must coordinate efficient access to IWBs. Access may include the installation of IWBs in classrooms or, to accommodate a limited budget, designating easily accessible rooms where teachers reserve class periods for IWB use.

Comprehensive professional development and collaborative training with peer mentors would also support IWB use. Novice IWB-users would benefit from opportunities to learn from IWB users possessing advanced skills. Additionally, all IWB users should have access to reliable and comprehensive platforms to share ideas and strategies with

colleagues. An online standards-based platform supported by the Ohio Foreign Language Association would be one such example of a resource for all Ohio foreign language teachers. Until adequate IWB access and support can be achieved, potential enhancement of instruction, student learning and engagement and teacher motivation will remain untapped.

5.7 Recommendations for Further Research

The findings of this study established that indeed there was a positive relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching, the instructional effects of IWBs on student learning, the motivational effects of IWBs on teachers and the effects of IWBs on student engagement. However, further studies pertaining to IWB access and instructional use in foreign language classrooms must take place.

Based on the findings pertaining to Research Question One, it is recommended that the following studies should be conducted:

- A qualitative study conducted by a researcher present in a classroom to document how foreign language teachers are actually using IWBs to meet instructional objectives in their lessons
- A qualitative study conducted by a researcher present in a classroom to document if and how effectiveness of instruction has changed after an IWB has been incorporated into the classroom

Based on the findings pertaining to Research Question Two, it is recommended that the following studies should be conducted:

- Either a qualitative or quantitative study to document how students perceive themselves to be learning after an IWB has been incorporated into instruction
- Either a qualitative or quantitative study to investigate how student learning has been affected after an IWB has been incorporated into instruction

Based on the findings pertaining to Research Question Three, it is recommended that the following studies should be conducted:

- Either a qualitative or quantitative study to document teacher motivation to use an IWB for instruction before and after teachers have participated in professional development and peer collaboration sessions and effective technical support has been established.

Based on the findings pertaining to Research Question Four, it is recommended that the following studies should be conducted:

- Either a qualitative or quantitative study to document how students perceive themselves to be engaged in lessons after an IWB has been incorporated into instruction
- Either a qualitative or quantitative study to investigate how student engagement has been affected after an IWB has been incorporated into instruction

Foreign language teachers and those responsible for making decisions regarding IWBs in classrooms must establish a clear picture of current IWB instructional use to acknowledge and affirm teachers' perceptions of IWBs. Only then can teacher-supported solutions be found to conquer obstacles surrounding IWB use in high school foreign language classrooms.

References

- Abel, R. (2010). A new generation of learning technology standards. *Technology, Instruction, Cognition & Learning*, 7, 205-224.
- American Council on the Teaching of Foreign Languages. (1996). *Standards for foreign language learning: Executive summary*. Retrieved from <http://www.actfl.org/i4a/pages/index.cfm?pageid=3324>
- American Council on the Teaching of Foreign Languages. (2002). *Program standards for the preparation of foreign language teachers*. Retrieved from <http://www.actfl.org/files/public/ACTFLNCATEStandardsRevised713.pdf>
- American Council on the Teaching of Foreign Languages. (2012). Home page for the american council on the teaching of foreign languages. Retrieved from <http://www.actfl.org/i4a/pages/index.cfm?pageid=1>
- Armstrong, V., Barnes, S., Sutherland, R., Curran, S., Mills, S., & Thompson, I. (2005). Collaborative research methodology for investigating teaching and learning: the use of interactive whiteboard technology. *Educational Review*, 57(4), 455-469.
- Arnold, N. (2007). Technology-mediated learning 10 years later: Emphasizing pedagogical or utilitarian applications? *Foreign Language Annals*, 40(1), 161-181.
- Association for Educational Communications and Technology. (2004). The definition of educational technology. Advance online publication. Retrieved from http://www.indiana.edu/~molpage/Definition%20of%20ET_classS05.pdf
- Banks, T. (2000). Teaching-learning process: assess, plan, implement, evaluate, document. Retrieved from <http://www.ncdhhs.gov/dhsr/hcpr/pdf/PrinciplesofAdultLearning2007.pdf>

- Beeland, W. (2002). Student engagement, visual learning, and technology: Can interactive whiteboards help? Retrieved from http://downloads01.smarttech.com/media/research/international_research/usa/beeland_am.pdf
- British Educational Communications and Technology Agency. (2005). *How can the use of an interactive whiteboard enhance the nature of teaching and learning in secondary mathematics and modern foreign languages?* Retrieved from <https://content.ncetm.org.uk/itt/sec/KeelePGCEMaths2006/InteractiveWhiteboard&DataProj/Research/BectaReportMiller&co.pdf>
- British Educational Communications and Technology Agency. (2007a). *Evaluation of the primary schools whiteboard expansion project - summary report*. Retrieved from http://downloads01.smarttech.com/media/research/international_research/uk/becta_executive_expansion_summary.pdf
- British Educational Communications and Technology Agency. (2007b). *Harnessing technology schools survey 2007*. Retrieved from http://dera.ioe.ac.uk/1554/1/becta_2007_htssfindings_report.pdf
- Council of Chief State School Officers. (2010, July). Interstate teacher assessment and support consortium (InTASC) *Model core teaching standards: A resource for state dialogue (Draft for Public Comment)*. Washington, DC: Author.
- Creswell, J. W. (2012). *Educational research: planning, conducting, and evaluating qualitative and quantitative research*. (4th ed.). Boston, MA: Pearson Education, Inc.
- Cuban, L. (1986). Introduction. In *Teachers and machines: The classroom use of technology since 1920*. (pp. 1-7). New York: Teachers College Press.
- Darhower, M. (2006). Where's the community? Bilingual internet chat and the "fifth c" of the national standards. *Hispania*, 89(1), 84-98. Retrieved from <http://www.jstor.org/pss/20063254>
- Forlin, C. (1998). *Teachers' perceptions of the stress associated with inclusive education and their methods of coping*. Retrieved from <http://www.eric.ed.gov/PDFS/ED425582.pdf>

- Gall, M.D., Gall, J.P., & Borg, W.R. (2003). *Educational research: An introduction*. Boston, MA: Allyn and Bacon.
- George, P. (2005). A rationale for differentiating instruction in the regular classroom. *Theory into Practice, 44*(3), 185-193.
- Glover, D., & Miller, D. (2001). Running with technology: The pedagogic impact of the large-scale introduction of interactive whiteboards in one secondary school, *Journal of Information Technology for Teacher Education, 10*(3), 257-278.
- Gow, G. (1995). What is technology?. *Tech directions, 55*(2), 48.
- Gray, C., Hagger-Vaughan, L., Pilkington, R., & Tomkins, S. (2005). The pros and cons of interactive whiteboards in relation to the key stage 3 strategy and framework. *Language Learning Journal, 32*, 38-44.
- Gray, L., Thomas, N., & Lewis, L. (2010). *Teachers' Use of Educational Technology in U.S. Public Schools: 2009* (NCES 2010-040). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.
- Green, J. D. (2006). The impact of teacher self efficacy and attitudes toward classroom computers(s) on the use of classroom technology. Retrieved from ETD Collection for Wayne State University. (AAI3218278).
- Gregory, S. K. (2009). Lived experience of primary teachers using interactive whiteboards in their classroom. Retrieved from <http://dc.library.okstate.edu/utills/getfile/collection/theses/id/2925/filename/2926.pdf>
- Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: commitment, constraints, caution, and change. *J. Curriculum Studies, 37*(2), 155-192.

- ISTE. (2007). The ISTE NETS and performance indicators for students (NETS•S). Retrieved from <http://www.iste.org/standards/nets-for-students/nets-student-standards-2007.aspx>
- ISTE. (2008). The ISTE NETS and performance indicators for teachers (NETS•T). Retrieved from http://www.iste.org/Libraries/PDFs/NETS_for_Teachers_2008_EN.sflb.ashx
- ISTE. (2011). Iste nets. Retrieved from <http://www.iste.org/standards.aspx>
- Jones, P., Kervin, L., & McIntosh, S. (2011). The interactive whiteboard: Tool and/or agent of semiotic mediation. *Australian Journal of Language and Literacy*, 34(1), 38-60.
- King, K. A., Bernard, A.I., & Pealer, L.N. (2001). Increasing response rates to mail questionnaires; a review of inducement strategies. *American Journal of Health Education*, 32(1), 4-15.
- Levy, P. (2002). Interactive Whiteboards in learning and teaching in two sheffield schools: A developmental study. Retrieved from <http://dis.shef.ac.uk/eirg/projects/wboards.htm>
- Liu, C., & Kao, L. (2007). Do handheld devices facilitate face-to-face collaboration? Handheld devices with large shared display groupware to facilitate group interactions. *Journal of Computer Assisted Learning* 23, 285-299. doi: 10.1111/j.1365-2729.2007.00234.x
- Mangione, T.W. (1995). *Mail surveys. Improving the quality*. Thousand Oaks, CA: Sage.
- McIntyre-Brown, C. (2011). *Understanding the next wave of technology innovation in education: UK*. Retrieved from [http://www.futuresourceconsulting.com/pdfs/2011-0_FuturesourceUK_UnderstandingNext %20Wave Technology.pdf](http://www.futuresourceconsulting.com/pdfs/2011-0_FuturesourceUK_UnderstandingNext%20Wave%20Technology.pdf)
- Miller, D., Glover, D., & Averis, D. (2004). Motivation: The contribution of interactive whiteboards to teaching and learning in mathematics. Retrieved from http://rcsdk8.edlioschool.com/pdf/technology_committees/iwb/IWB_Motivation.pdf

- Morgan, G.L. (2008). *Improving student engagement: Use of the interactive whiteboard as an instructional tool to improve engagement and behavior in the junior high school classroom*. (Doctoral dissertation). Retrieved from <http://digitalcommons.Liberty.edu/cgi/viewcontent.cgi?article=1140&context=doctoral>
- Multimedia. (2012). In *Merriam-Webster, Incorporated*. Retrieved from <http://www.merriam-webster.com/>
- Ohio Department of Education. (2002). Foreign language academic content standards. Retrieved from <http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1701&ContentID=1494&Content=110454>
- Ohio Department of Education. (2010). Timeline for world languages standards revision. Retrieved from <http://education.ohio.gov/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1701&ContentID=105009&Content=128280>
- Ohio Department of Education. (2012a). *Revised standards document*. Manuscript in preparation. Retrieved from <http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1701&ContentID=105009&Content=123568>
- Ohio Department of Education. (2012b). *Revised standards introduction document*. Manuscript in preparation. Retrieved from <http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1701&ContentID=105009&Content=123568>
- Ohio Department of Education. (2012c). Foreign languages. Retrieved from <http://education.ohio.gov/GD/Templates/Pages/ODE/ODEPrimary.aspx?page=2&TopicRelationID=1701>
- Ohio Foreign Language Association. (2012). Ohio Foreign Language Association. Retrieved from <http://www.ofla-online.org/>
- Partnership for 21st Century Skills. (2009). P21 framework definitions. Retrieved from <http://p21.org/>

Peled, Y., Medvin, M., Domanski, L. (2012). Five years of interactive whiteboards in schools: Is it worth it? Factors related to use in four western pa k-12 school districts. Retrieved from www.ace.org/conf/site/submission/.../paper_3049_35092.doc

Phillips, J.K. (2008). Foreign language standards and the contexts of communication. *Language Teaching*, 41(1), 93-102. doi: 10.1017/S0261444807004752

Phillips, J.K., & Abbott, M. (2011). *A decade of foreign language standards* (Report of Grant Project P017A080037). Retrieved from <http://www.actfl.org/files/public/national-standards-2011.pdf>

Prensky, M. (2001). Digital natives, digital immigrants. Retrieved from <http://www.marcprensky.com/writing/prensky%20%20digital%20natives,%20digital%20immigrants%20-%20part1.pdf>

Royer, R. & Richards, P. (June, 2011) The Boards are interactive: What about the teaching? Paper presented at International Society for Technology in Education Conference, ISTE 2011. Philadelphia, PA

Sieloff Magnan, S. (2008). Reexamining the priorities of the national standards for foreign language education. *Language Teaching*, 41(3), 349–366. doi:10.1017/S0261444808005041

SMART Technologies. (2006). *Interactive Whiteboards and learning: Improving student learning outcomes and streamlining lesson planning* [White paper]. Retrieved from http://downloads01.smarttech.com/media/research/whitepapers/int_whiteboard_research_whitepaper_update.pdf

SMART Technologies. (2007). *The truth about interactive whiteboards, pens and fingers: Separating myths from facts* [White paper]. Retrieved from <http://downloads01.smarttech.com/media/research/whitepapers/truthaboutiwbpensandfingersdec2007.pdf>

SMART Technologies. (2008). *Interactive whiteboards in 1:1 learning environments* [White paper]. Retrieved from <http://downloads01.smarttech.com/media/research/whitepapers/onetoonelearningandiwb.pdf>

- SMART Technologies. (2009a). *Creating classrooms for everyone: How interactive whiteboards support universal design for learning* [White paper]. Retrieved from <http://downloads01.smarttech.com/media/research/whitepapers/interactivewhiteboardsanduniversaldesignforlearningjan20.pdf>
- SMART Technologies. (2009b). *Reducing stress in the classroom* [White paper]. Retrieved from http://downloads01.smarttech.com/media/research/whitepapers/reducing_stress_wp.pdf
- SMART Technologies. (2010). *The truth about interactive whiteboard resolution: Why higher resolution does not always mean greater accuracy* [White paper]. Retrieved from http://downloads01.smarttech.com/media/research/whitepapers/truth_about_iwb_res.pdf
- SMART Technologies. (2012). SMART notebook enhancements increase accessibility and ease-of-use of industry-leading software. Retrieved from <http://smarttech.com/About+SMART/About+SMART/Newsroom/Media+releases/English+US/Releases+by+year/2012+media+releases/2012/SMART+Notebook+Enhancements+Increase+Accessibility+and+Ease-of-Use+of+Industry+Leading+Software>
- Smith, H., Higgins, S., Wall, K., & Miller, J. (2005). Interactive whiteboards: boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning*, 21(2), 91–101. doi: 10.1111/j.1365-2729.2005.00117.x
- Somyürek, S., Atasoy, B., & Özdemir, S. (2009). Board's iq: What makes a board smart? *Computers & Education*, 53(2), 368-374.
- Stewart, K. L., & Felicetti, L. A. (1992). Learning styles of marketing majors. *Educational Research Quarterly*, 15(2), 15-23.
- Target language. (2012). In *Merriam-Webster, Incorporated*. Retrieved from <http://www.merriam-webster.com/>
- Teclhaimanot, B. & DeMedio, D. (2010). What Types of Technology are Really Used by Middle School Teachers?. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2010* (pp. 4123-4131). Chesapeake, VA: AACE. Retrieved from <http://www.editlib.org/p/34028>

Türel, Y. K., & Johnson, T. E. (2012) Teachers' belief and use of interactive whiteboards for teaching and learning. *Educational Technology & Society*, 15 (1), 318 – 394. Retrieved from http://www.ifets.info/journals/15_1/32.pdf

U.S. Department of Education, Office of Educational Technology. (2010). *Transforming american education: Learning powered by technology*. Retrieved from <http://www.ed.gov/sites/default/files/>

Warwick, P., & Kershner, R. (2008). Primary teachers' understanding of the interactive whiteboard as a tool for children's collaborative learning and knowledge building. *Learning, Media and Technology* 33(4), 269 – 28.

Appendix A

Electronic Letter of Permission to Adapt Instrument

Re: Approval of Julie's New IWB Instrument and Research Questions
Yalin Kilic Turel [yturel@gmail.com]
Sent: Tuesday, November 20, 2012 1:22 AM
To: Langan De Perez, Julie Anne

Hi Dear Julie,

You can freely use any part of my instrument in your PhD dissertation. I will be happy to hear the results of your study and to compare them with Turkey context as well. So, after finishing your dissertation, please let me know to start the comparison study :)
It is also good to hear that you already have been in Turkey and liked here. Hope we can have you as our guest some day.
Good luck on your studies!

Best,
Yalin

Appendix B

Electronic Letter of Permission from P21

Re: Request to Use Information from the Framework for 21st Century Learning Requests, P21 [requests@p21.org]
Sent: Tuesday, January 24, 2012 11:56 AM
To: Langan De Perez, Julie Anne

Hi Julie,

Thank you very much for your request. P21's Framework for 21st Century Learning and other materials are free and available to use for educational purposes. We would be very glad to have you include our materials as part of your work. Please do cite Partnership for 21st Century Skills, and see our website for the latest in 21st Century Skills-related resources. We would of course love to see how our materials are utilized, so if there is anything you could share with us as far as final product, publication or web links, we'd greatly appreciate it. We also encourage you to share with us feedback on the use of our materials and Framework. Please let us know more about your ongoing efforts and stay in touch.

All the best,
Partnership for 21st Century Skills
1 Massachusetts Avenue NW
Suite 700
Washington, DC 20001
www.P21.org

Appendix C

Electronic Letter of Permission from the Ohio Foreign Language Association

The Ohio Foreign Language Association



Roslyn M. Terek, President

pres@ofla-online.org

French Teacher

Poland Seminary High School

3199 Dobbins Road

Poland, Ohio 44514

Phone 330.757.7018 Ext. 37343

Julie Langan-Perez
University of Toledo
2801 W. Bancroft
Toledo, OH 43606-3390

September 17, 2012

Dear Julie,

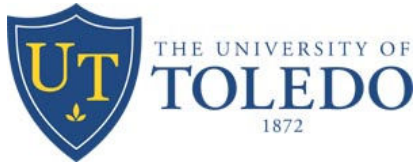
Thank you for expressing an interest in using the OFLA Listserv to collect data for your PhD research. My understanding is that you will send out a request for OFLA members to take a survey via our Listserv. Since this is your method to collect data, you have my permission to use the OFLA Listserv and its 1,536 participants for this purpose only.

Sincerely,

Roslyn M. Terek
OFLA, President

Appendix D

Electronic Letter of Consent



Curriculum and Instruction
3100 Gillham Hall, MS 914
Toledo, Ohio 43614
419-530-2495, Phone
419.530.7248, Fax

ADULT RESEARCH SUBJECT - INFORMED CONSENT FORM

An Investigation of the Effects of Interactive Whiteboards as Perceived by High School Foreign Language Teachers

Principal Investigator: Dr. Berhane Teclehaimanot, Professor, 419-530-7979
Julie Langan-Perez, Doctoral Candidate, 419-270-2575

Purpose: Ohio high school foreign language teachers are invited to participate in the research project entitled, An Investigation of the Effects of Interactive Whiteboards as Perceived by Ohio High School Foreign Language Teachers, which is being conducted at the University of Toledo under the direction of Dr. Berhane Teclehaimanot, Principal Investigator, and Julie Langan-Perez. The purpose of this study is to investigate the relationship between Ohio high school foreign language teachers' self-reported IWB instructional use and their perceptions of the instructional effects of IWBs on teaching and student learning, their perceptions of motivational effects of IWBs on teachers and their perceptions of effects IWBs on student engagement. Specifically this study will seek to survey high school foreign language teachers who are members of the Ohio Foreign Language Association (OFLA). THIS STUDY PERTAINS ONLY TO OHIO HIGH SCHOOL FOREIGN LANGUAGE TEACHERS.

Description of Procedures: This research study will take place in the state of Ohio at the location you choose. You will need a computer or other electronic device with Internet access to complete an online survey. Your participation will take approximately ten to fifteen minutes. If you are a HIGH SCHOOL foreign language teacher, you will be asked to provide some demographic information about yourself, as well as respond to items inquiring about your instructional use of IWBs and your perceptions of IWBs.

After you have completed and submitted the survey and the data has been analyzed, you may submit a personal request to the research team to debrief you about the data, theory

and research area under study and answer any questions you may have about the research. The research team may be contacted at 419-530-7979 or Julie.langandeperez@rockets.utoledo.edu.

Potential Risks: There are minimal risks to participation in this study, including loss of confidentiality and the right to stop participation at any point. If providing answers to the survey makes you feel upset or anxious at any time, you may stop at any time without fear of penalty. Your participation in this research is strictly voluntary. Please keep in mind that your insight is a valuable contribution to the field of education regarding perceptions of IWBs and instructional use of IWBs and will add to future decision-making and educational practices.

Potential Benefits: The only direct benefit to you if you participate in this research may be that you will learn about how studies in the realm of education are conducted and may learn more about foreign language teachers' perceptions of IWBs and their instructional use of IWBs. Others may benefit by learning about the results of this research.

Confidentiality The researchers will make every effort to prevent anyone who is not on the research team from knowing that you provided this information, or what that information is. Data will be stored in a Microsoft Excel spreadsheet. Only the researchers will have access to this data. Although we will make every effort to protect your confidentiality, there is a low risk that this might be breached. Participants will be assigned identification numbers and will not be kept track of by name or email address.

Voluntary Participation: Your refusal to participate in this study will involve no penalty or loss of benefits to which you are otherwise entitled and will not affect your relationship with The University of Toledo. In addition, you may discontinue participation at any time without any penalty or loss of benefits. As you begin the survey, you will read a statement about consent to participate. If you continue with the survey and submit it to the research team, you are thereby giving your consent to participate.

Contact Information: Before you decide to accept this invitation to take part in this study, you may ask any questions that you might have. If you have any questions at any time before, during or after your participation you should contact a member of the research team. Dr. Teclehaimanot can be reached at 419-530-7979. Julie Langan-Perez can be reached at Julie.langandeperez@rockets.utoledo.edu or 419-270-2575.

If you have questions beyond those answered by the research team or your rights as a research subject or research-related injuries, the Chairperson of the SBE Institutional Review Board may be contacted through the Office of Research on the main campus at (419) 530-2844.

Before you consent to participate in the study, please ask any questions on any aspect of this study that is unclear to you. You may take the necessary time to think it over, but please be aware that there is a deadline to submit a completed survey.

By clicking on to the link below or copying and pasting the link in your browser and beginning the survey, you are stating that you have read and accept the information above, are giving your consent to participate in this research and are a HIGH SCHOOL FOREIGN LANGUAGE TEACHER.

<https://www.surveymonkey.com/s/CRMHKQJ>

Appendix E

Instrument

Welcome to the Interactive Whiteboard Survey!

THIS SURVEY IS FOR HIGH SCHOOL TEACHERS ONLY!

By clicking on “NEXT” you will be taken to the next page to begin the survey. As you click "NEXT," you are stating that you have read and accept the information stated in the consent form and are giving your consent to participate in this research AND THAT YOU ARE A HIGH SCHOOL TEACHER.

I. General Demographic Information

Please answer the following questions about yourself. Please consider your current place of employment when you answer all questions. Select applicable response(s) provided after each question.

1. My gender is: male female
2. My age group is: 18-25 26-30 31-35 36-40 41-45
 46-50 51-60 61+
3. Years of experience teaching a foreign language:
 <1-5 6-10 11-15 16-20 21-25 26-30 30+
4. Current school system where employed: Public High School Private High School
5. Grade level(s) taught: (Select all that apply)
 9th 10th 11th 12th Other
6. What language(s) do you currently teach? (Select all that apply)
Arabic Chinese French German Italian Japanese
Latin Russian Spanish Other(s) _____
7. Please indicate the highest level of education you have completed:
 Bachelor’s degree, Master’s degree, Ph.D. or Ed.D.

II. Interactive Whiteboard (IWB) Access and Instructional Use

Please answer the following question pertaining to IWB access. Select one response provided after the question.

8. Do you have access to an IWB for teaching in your classroom, in another classroom or on a portable cart? yes no

Please answer the following question pertaining to IWB instructional use. Select one response provided after the question.

IWB instructional use includes at least one of the following or a combination of the following during a lesson: interactive pedagogy; teacher to student, student to student, and student to teacher interactions; creative use of IWB and non-IWB tools; use of images and digital resources to support instruction; pacing that efficiently moves the lesson forward; wait time that allows students to react, interact, and determine the flow of the lesson; use of the IWB to support instruction not provide it; higher order questioning, inquiry, and discussion; differentiation [and] opportunities for all students to respond to lesson activities and investigations (Royer & Richards, 2011, p. 8) *IWB instructional use* also includes times when students have used the IWB under your supervision.

9. How frequently have you used an IWB for instruction in the last academic year?

Please include time students have used an IWB under your supervision.

- I never used it
- I used it sometimes
- I used it frequently (though not daily)
- I used it daily

III. Teachers' Perceptions of IWBs

Please read the following statements pertaining to perceptions of instructional effects of IWBs on teaching. Select **STRONGLY DISAGREE**, **SOMEWHAT DISAGREE**, **SOMEWHAT AGREE** or **STRONGLY AGREE** for each statement.

10. An IWB helps me to manage instructional time effectively.
11. I think lessons become more effective with an IWB.
12. An IWB facilitates classroom management for me.
13. An IWB helps my lessons to be more interactive.
14. An IWB facilitates discussions on the content in class.
15. An IWB provides advantages to me to make course content more visual.
16. The way I give instruction has been changed since I began to use an IWB.

17. I use an IWB to integrate technology into instruction.

Please read the following statements pertaining to instructional effects of IWBs on student learning. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

18. I believe using an IWB helps my students' learning.

19. Using an IWB makes it easier for my students to remember what they learned in class.

20. My students learn faster when I teach with an IWB.

21. Using an IWB helps my students to learn concepts easier.

Please read the following statements pertaining to motivational effects of IWBs on teachers. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

22. I enjoy teaching with an IWB.

23. Because of using an IWB, I feel myself more prepared for instruction.

24. I notice my IWB skills are improving day by day.

25. Learning how to use an IWB is essential to me.

26. An IWB makes my courses more enjoyable.

Please read the following statements pertaining to effects of IWBs on student engagement. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

27. Using an IWB increases my students' interest in class.

28. My students focus on my lessons more when I use an IWB.

29. An IWB increases my students' engagement in lessons.

You have now completed the survey. Please click "Done" to submit the survey. Thank you for your participation!

HYPOTHETICAL QUESTIONS

**“NO” FOR QUESTION 8 AND “I never used it” FOR QUESTION 9
OR
“YES” FOR QUESTION 8 AND “NO” FOR QUESTION 9**

III. Teachers’ Perceptions of IWBs

Please read the following statements pertaining to perceptions of instructional effects of IWBs on teaching. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

10. An IWB could help a teacher to manage instructional time effectively.
11. Lessons could become more effective with an IWB.
12. An IWB could help a teacher to facilitate classroom management.
13. An IWB could help a lesson to be more interactive.
14. An IWB could help facilitate discussions on the content in class.
15. An IWB could provide advantages to make course content more visual.
16. The way a teacher could give instruction could be changed with the use of an IWB.
17. An IWB could be used to integrate technology into instruction.

Please read the following statements pertaining to instructional effects of IWBs on student learning. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

18. Using an IWB could help students’ learning.
19. Using an IWB could make it easier for students to remember what they learned in class.
20. Students could learn faster if a teacher would teach with an IWB.
21. Using an IWB could help students to learn concepts easier.

Please read the following statements pertaining to motivational effects of IWBs on teachers. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

- 22. A teacher could enjoy teaching with an IWB.
- 23. Because of using an IWB, a teacher could feel more prepared for instruction.
- 24. A teacher's IWB skills could improve day by day.
- 25. Learning how to use an IWB could be essential to teachers.
- 26. An IWB could make courses more enjoyable.

Please read the following statements pertaining to effects of IWBs on student engagement. Select STRONGLY DISAGREE, SOMEWHAT DISAGREE, SOMEWHAT AGREE or STRONGLY AGREE for each statement.

- 27. Using an IWB could increase students' interest in class.
- 28. Students could focus on lessons more if an IWB were to be used.
- 29. An IWB could increase my students' engagement in lessons.

You have now completed the survey. Please click "Done" to submit the survey.

Thank you for your participation.