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AN EVALUATION STUDY OF THE IMPLEMENTATION OF WEBCAM PROCTORING
FOR SECURE TESTING IN A K-12 VIRTUAL SCHOOL

by

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A dissertation in practice submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the Department of Instructional Technology
in the College of Education and Human Performance
at the University of Central Florida
Orlando, Florida

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2016

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ABSTRACT

The purpose of this evaluative study was to review the implementation of a Webcam Test-Proctoring Program (WTPP) implemented in a Kindergarten through 12th grade public virtual school. Results of the evaluative study will be used to determine if the secure Webcam proctoring method would be a viable solution to a problem of practice—requiring full time virtual school students to participate in the multitude of required state and Florida school district assessments. At the core of virtual education lies the appeal of flexibility in each student’s individual learning path. The rigid nature of secure assessments conflict with the intentions of a K-12 virtual school. Natale and Cook (2012) identified this as a problem of practice as well, stating, “Digital learning de-standardizes and decentralizes educational delivery, so it presents challenges in applying quality control systems and metrics that were developed for more traditional school structures” (p. 541).

A formal evaluation included an electronic survey and one-on-one phone interviews. The sample population for this study included 6th-12th grade students ($n = 27$) who were enrolled in Hurricane County Virtual School during the 2014-2015 school year. The HCVS population was 165 at the beginning of the 2014-2015 school year, therefore the population for this study was $N=165$. The WTPP evaluated for this study took place over two test sessions, the first in October of 2014 and the second in January 2015. Students were asked to complete the electronic survey and to volunteer to complete phone interviews to provide feedback about their experience completing their benchmark assessments.

In this mixed-methods study, an electronic survey created by the evaluator and research chair gathered quantitative data that were analyzed using descriptive and inferential statistics. In

order to determine if there was any relationship between specific demographic sub-groups and their experiences and preferences regarding Webcam proctoring, the researcher used the Kruskal-Walis and Mann-Whitney inferential statistics.

Additionally, qualitative data were collected through one-on-one phone interviews with six students who participated in the WTPP. Data from these interviews yielded supporting statements for the quantitative data analyzed. Results yielded from this study indicated that the majority of students who participated in the WTPP were satisfied or very satisfied with this method of proctoring for secure testing overall. Future studies should further evaluate the effectiveness of Webcam proctoring for secure testing and determine the impact of allowing students more flexibility (which Webcam proctoring inherently does) while testing has on their test scores.

This dissertation is dedicated to Louis Algarin, my poppy, who emphasized education above all else as a key to success. Also, this work is dedicated to my parents who emphasized family and hard work as the keys to success and my husband, daughter, and baby #2 who complete me and allow me to feel whole—success has been obtained.

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“The big secret in life is that there is no big secret. Whatever your goal, you can get there if you're willing to work.” Oprah Winfrey

There are many people I would like to thank for their support and encouragement as I worked to complete this Ed.D. journey. I could not have accomplished this on my own.

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hours while Chris and I worked hard to achieve that doctor title over the years—and as he continues to do so. It must also be said that during my period of great indecision to continue working toward this Ed.D.-- my dad would not take “no” for an answer. For that I am forever grateful.

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LIST OF ABBREVIATIONS/ACRONYMS

ALN	Asynchronous Learning Network
CoI	Community of Inquiry
DOE	Department of Education
F2F	Face-to-Face
FLDOE	Florida Department of Education
HCPS	Hurricane County Public Schools
HCVS	Hurricane County Virtual School
NCLB	No Child Left Behind
UCF	University of Central Florida
WTPP	Webcam Test-Proctoring Program

CHAPTER 1 THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction and Background

The American education system is diverse and complex. The Constitution of the United States of America empowers individual states to manage their own education systems; states are eligible to receive financial aid from the federal government if they meet certain federal educational requirements (U.S. Const. amend. X). The No Child Left Behind Act (NCLB) was put into law in 2002 under former President George W. Bush (NCLB Act of 2001, 2008). No Child Left Behind was an update of the 1965 Elementary and Secondary Education Act. The intent of NCLB was to ensure inclusion, equality, fairness, and to aid in closing the achievement gap between advantaged and disadvantaged or underserved students (NCLB Act, 2001, 2008). Subgroups of students, such as English language learners, students from low-income families, and special needs students are all entitled to additional support in academics under this act.

In order to show academic gains and proof of this additional academic support, all students must complete achievement tests in grades 3-8 and once in high school, in both reading and math, in order for schools to be eligible for NCLB (2001) funding. Currently, schools in Florida are using standardized assessments such as Florida Comprehensive Assessment Test (FCAT) and the Florida Standards Assessment (FSA), with implementation plans intended primarily for students in brick-and-mortar settings.

In 2015, hundreds of thousands of students completed their education in a fully online education program (Gemin, Pape, Vashaw, & Watson, 2015). According to Natale and Cook (2012), “Digital learning de-standardizes and decentralizes educational delivery, so it presents

challenges in applying quality control systems and metrics that were developed for more traditional school structures” (p. 514). Unfortunately, there is an issue regarding accessibility to mandatory standardized assessments for students enrolled in district virtual schools. The Florida Department of Education [FLDOE] Website reads, “The district may choose to have those [students] enrolled in a full time district virtual program report to the school in their attendance zone, to another school in the district or to another location established by the district” (Florida Department of Education [FLDOE], n.d., Assessment and Accountability section, Para. 4) for the purpose of taking standardized assessments.

Florida district virtual schools often include several virtual program offerings from different providers (also called suppliers or vendors). A virtual provider can be defined as, “Entities that deliver online courses, instruction, technology tools and/or services to support online learning. Providers or suppliers may be for-profit vendors, education organizations or agencies (i.e. state virtual schools, regional services agencies), or nonprofit organizations” (Gemin et al., 2015, p. 7). These virtual schools are run by each Florida school district, using curriculum purchased by one of the state approved vendors. Not surprisingly, these schools struggled with how to implement proper progress monitoring systems that were created as summative assessments for use in a face-to-face (F2F) proctored setting. Face-to-face proctoring occurs when students go to a physical location, such as a classroom or office space, and a teacher supervises them during testing. Many online programs at K-12 institutions and institutions of higher education alike have struggled with ways to test students. An additional challenge related to the state of Florida’s one-size-fits-all approach to assessment included requiring all students to report to a testing site, resulting in barriers for students who cannot attend onsite testing (HCVS

parents and students, personal communications, 2013-2015). As a solution, many schools and institutions of higher learning have been considering Webcam proctoring. Webcam proctoring provides a viable testing option for Florida public virtual schools (“Watchful Eyes,” 2013). Exam proctoring via Webcam involves a student using a computer with an internal or external Webcam device. Once the device is activated, students log in to an Internet-based portal that is set up by the school. Upon logging in, students can be placed in a secure testing lockdown mode where they are unable to access any websites outside of their assessment screen. The Webcam begins to record when the student enters the secure website and receives instructions on how to provide a 360-degree scan of the room, including the desk or table at which they are seated. Once these set up steps are completed, the student can then begin the assessment activity (“Watchful Eyes,” 2013). Use of Webcam proctoring software may allow K-12 virtual students to more readily participate in district and state required assessments. This research study explored the opportunities and challenges that Webcam proctoring can bring to K-12 students in virtual instruction programs.

Problem of Practice

In 2010, a large urban public school district located in Hurricane County¹, Florida that serves approximately 185,000 students, founded its first virtual school in accordance with s. 1002.45 of the Florida Statutes. This virtual school, the Hurricane County Virtual School (HCVS), was designed to provide students with high quality, full-time instruction in an online environment. During the 2014-2015 school year, students attending HCVS completed district-

¹ Hurricane County is a pseudonym used in this study.

created benchmark assessments through the use of secure Webcam proctoring software provided by a third party company called, Secure View (a pseudonym). The problem addressed in this unique formative evaluation study is the lack of flexibility in implementation of traditional K-12 assessments.

Testing in a central location requires the scheduling of multiple staff members and building space, transportation for students and staff, as well as make-up dates. Unfortunately, a central location does not always mean a convenient location; potential hardships in terms of transportation and scheduling involved in on-campus testing may discourage parents and students who were attracted to the convenience of a full-time virtual school program.

The FLDOE and the Hurricane County Public Schools (HCPS) testing procedures were designed for students in traditional brick-and-mortar schools and presented challenges when implemented in the virtual school environment. These challenges included thwarting the goals of parents/guardians and students who chose the virtual school option for a variety of reasons including, but not limited to, the following:

- Flexibility in terms of scheduling,
- Avoidance of possibly unfavorable influences of public school culture (i.e., bullying situations, testing for home education students),
- Access to electives and other accelerated options for college-bound students,
- Health issues (of the student or close family member), and
- Religious preferences.

Purpose and Objective

The purpose of this study was to determine if a secure Webcam Test-Proctoring Program (WTPP) offered a realistic and effective alternative testing option for students who are unable to complete tests at central brick-and-mortar locations. There are many benefits associated with allowing students to test from home, including the following:

- Accessibility (allowing virtual students to complete tests created in a Web-based software from home via a Web-based software proctoring company),
- Flexibility (in terms of scheduling), and
- Enhanced comfort (easing test anxiety by eliminating the distraction of an unfamiliar testing location).

Ultimately, upon receiving constructive stakeholder feedback, the goal was to continually improve upon, and eventually expand, the use of Webcam proctoring for secure testing to all schools throughout the HCPS. If the results of the WTPP evaluation support the expansion of Webcam proctoring, the district will consider implementing secure software Webcam proctoring for additional tests and for testing beyond the HCVS. Additionally, the results of the WTPP evaluation are important to not only testing within the HCPS but also for the Florida Virtual School (FLVS), as HCPS is a franchise of FLVS. The FLVS served 200,844 students during the 2014-2015 school year (Gemin et al., 2015) and is the largest K-12 virtual education provider in the nation. The FLVS is also looking for approval of similar remote proctoring options for their students who take the same statewide assessments and who are located across the entire state of Florida.

Evaluation Questions

The evaluation questions for this study fall into two areas of focus: (a) intended outcomes and (b) implementation. The evaluator developed Guiding Questions to gather feedback regarding student experiences related to testing outside of a typical F2F proctored environment. Implementation questions were designed to determine areas of improvement for the study-related technologies, more specifically, the Webcam proctoring software as tied to the Web-based assessments.

Guiding Questions

1. In what ways did the Webcam Test-Proctoring Program facilitate student experiences and satisfaction?
2. What opportunities and challenges evolved from the Webcam Test-Proctoring Program?
3. What factors facilitated/inhibited participation in the Webcam Test-Proctoring Program?

Implementation Question

1. How did internal and external factors impact the Webcam Test-Proctoring Program?

Organizational Context

Serving 165 students in its full-time program (grades 6-12), the HCVS is a School of Choice, meaning that parents are involved in selecting the school their child attends rather than being assigned to a zone school based on home address. Located within the HCPS District, the HCVS was established in 2010; administrators, faculty, and staff initially worked from the central district office and their own personal home offices. There is a variety of virtual school curricula made available to HCVS students, but only students enrolled in the full-time program are required to complete the mandatory district and state assessments as part of HCVS's school grade (HCVS Principal, personal communication, 2010). During the first two years after its establishment, HCVS operated without a proper center for testing and students were required to go back to their zoned school for state assessments, as per guidelines from the FLDOE. In 2013, the HCVS acquired its own physical school location, centrally located within the county. At that point, all HCVS students were required to attend testing in this setting.

Design of the Study

The purpose of this formative evaluative study was to review the implementation of a WTPP implemented in a Kindergarten through 12th grade public virtual school. Results of the evaluative study will be used to determine if the secure Webcam proctoring method would be a viable solution to a problem of practice—requiring full-time virtual school students to participate in the multitude of required state and school district assessments in a face-to-face setting.

As a potential solution to the problem of practice, HCVS implemented the use of Webcam proctoring software while making district benchmark assessments available to students

during a one-week test window (for two distinct test sessions during October and January of 2014-2015 school year). The process was referred to as the secure Webcam Test-Proctoring Program or (WTPP). The WTPP allowed students to remain in their usual learning environments to complete the district-mandated secure benchmark tests.

History

In 2013, the HCVS established a physical campus where students could meet for testing and tutoring purposes. Historically, a solution to the issue of providing proctored testing involved virtual school students testing in a physical location using the same standardized procedures as students in brick-and-mortar school settings (Rovai, 2000). The new HCVS campus was an old office building with many small offices, conference rooms, and three classrooms that served as an onsite-testing center for students. The building was designed as a central office for all of the public school district administration and support departments. At the time of the study, the building was being used as a testing/tutoring center which created many challenges surrounding scheduling of all face-to-face meetings and assessments for students. Also, assignment of students to specific classrooms according to their grade, subject being assessed, and any special accommodations they may receive during testing is very important. There are rigid, mandatory guidelines set by the district and state surrounding the proper implementation of assessments for all students in grades K-12, both general education students and those with special needs.

During its first two years, the HCVS was unable to provide its students with one brick-and-mortar location designated just for virtual school students; therefore, students were sent back

to their zoned schools to complete their state assessments. Not surprisingly, this decentralized approach to testing HCVS students generated problems; data would regularly go missing due to the ambiguity of the coding process as well as the heavy demands placed on testing coordinators at the zone schools. The capacity of zoned schools to accommodate all of their students for testing emerged as a challenge; some high schools in the HCPS had more than 2000 students and clearly felt the strain of finding testing space for even more students. Various virtual school programs, including the Virtual Instruction Program (VIP), FLVS, and HCVS, as well as Home Schooled Education students, required students to receive testing services at their zoned schools. In addition, a number of students did not know the correct virtual school name for which they were currently enrolled in and provided the wrong virtual school name to the zone school testing coordinator. Zone school coordinators were restricted to view only students enrolled in their school in the district wide information system and, therefore, had no way to verify the correct school of enrollment for students from these programs.

Conceptualization

A theoretical framework developed by Bolman and Deal (2008) describes four key frames through which an organization can be viewed and understood: (a) structural, (b) political, (c) human resources, and (d) symbolic. Structurally and logistically, creating a district virtual school presents enormous challenges. The following excerpt from Bolman and Deal's framework sheds light on these challenges:

The right structure depends on prevailing circumstances and considers an organization's goals, strategies, technology, people and environment. Understanding the complexity and variety of design possibilities can help create

formal prototypes that work for, rather than against both people and collective purposes. (p. 69)

This framework can be used to review the history and conceptualization of HCVS. For example, the FLDOE, the State Virtual School, the HCPS District, and the HCVS constitute a hierarchy of different organizations working together (Figure 1). A Florida district virtual school is listed as a School of Choice in public school districts throughout the state of Florida. As such, they are governed under the rule of the specific school district first and also must simultaneously meet the guidelines of the state virtual school in terms of implementing curriculum as purchased and providing training through the state virtual school vendor. Ultimately, state virtual schools and public school districts are all governed by the FLDOE. As mentioned above, some autonomy is given though when it comes to how to implement testing to best accommodate district virtual school students. This is where the WTPP study came to fruition.

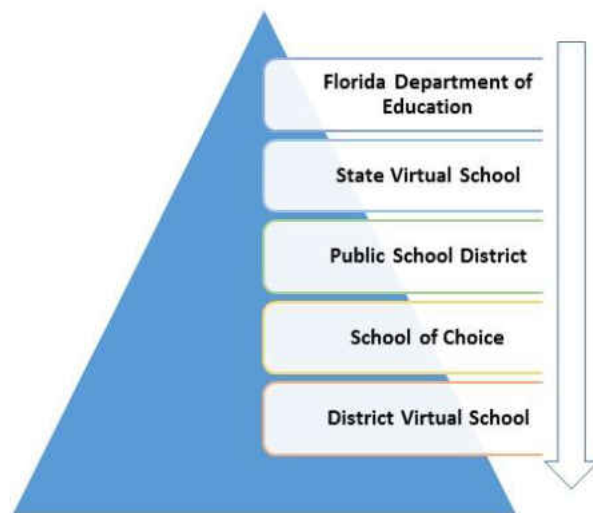


Figure 1. Geiser Hogan’s Model of the Hierarchy of a District Virtual School in Florida Model. Copyright 2015 E. Geiser Hogan.

Student enrollment numbers and accountability are key factors tied directly to funding (FLDOE, 2016a). All Florida public school students are required to sit for their state exam each spring, but what are the repercussions if they are unable to complete this requirement? In some cases, students may be retained in their current grade level, but this is not the case for all students in all grade levels. In addition, fiscal rewards are tied to students passing state exams and constitute another reason there is such an intense push for all students to be prepared and present for all testing. According to the FLDOE (2016a):

Each school is assigned a letter grade of A, B, C, D, or F annually, if it has sufficient data for at least one school grading component (achievement, learning gains, middle school acceleration, tested at least 95 percent of eligible students).
(p. 3)

Bolman and Deal's (2008) political frame corresponds to budget-related imperatives such as growing student enrollment numbers and accountability. These elements are what forced the HCVS to meet the demands and challenges of implementing state and district assessments.

Viewing the problem of practice from a human resources (HR) lens, the need for restructuring of the testing process within this hierarchy is also evident (Bolman & Deal, 2008). In the case of the HCPS, the testing coordinators in each zone school, who often wear many hats within their individual schools, were burdened by an impractical number of demands. Although most of Bolman and Deal's (2008) Basic Human Resource Strategies are followed by HCPS, there is a lack of support in the investing and empowering stages when a test coordinator is overloaded with excessive levels of responsibility along with unreasonably high expectations.

- Build and implement an HR strategy,
- Hire the right people,

- Keep them,
- Invest in them,
- Empower them, and
- Promote diversity.

Although professionals within HCPS, and throughout the state of Florida, may be attempting to follow this model, the problem of practice suggests that there are flaws within the HR frame.

Symbolically, the HCVS was created with the idea of providing high-quality virtual education to students anytime, anywhere. Theoretically, students can travel around the globe while completing lessons and submitting coursework in a timely manner. Students can work at all hours of the night and work at their own pace—either working faster than the scope and sequence timeline implemented in traditional brick-and-mortar schools might offer or taking more time to complete lessons. The concept of being able to work anytime, anywhere is what attracted most students to enroll in the full-time virtual program (HCVS parents and students, personal communications, 2013-2015); however, mandatory testing procedures mirroring that of the traditional brick-and-mortar schools quickly became a problem of practice for this organization.

Assumptions

The following assumptions shaped the investigation of this study's research questions:

1. Study participants were demographically representative of all students within HCVS and thus a representative population of HCPS;

2. Participants in the study responded honestly to the survey items and did seek the help of another person;
3. Participants' answers were based on their own perceptions and beliefs; and
4. Participants had access to the Internet and the online questionnaire.

Organization of the Study

This dissertation contains five chapters. Chapter 1 provides introductory and background information surrounding the organization and the problem of practice. Chapter 2 is the literature review, which provides a look at the scope of research done in the areas related to distance and virtual education as well as academic integrity in such learning environments. Chapter 3 provides an in depth look at the methodology, providing information regarding the data collection and analysis processes. Chapter 4 further analyzes the data results as they relate to the research questions. Chapter 5 consists of concluding thoughts, limitations, and suggestions, as well as implications for policy and practice and suggestions for future research. The appendices include the survey instrument, interview protocol and transcripts, the IRB approval letters, and addenda. The final section includes references.

Operational Definitions

Brick-and-Mortar School: A traditional school setting located in a physical school building.

Benchmark Assessments: School district-created assessments based on the Florida state benchmarks that teachers need to follow to guide their curriculum.

Face-to-Face Course (F2F): A course in which a live instructor delivers 100% of the instruction to students in a physical location and at a scheduled time (Allen & Seaman, 2011).

Florida Comprehensive Assessment Test: Florida's statewide assessment implemented in 1998 to improve overall student achievement and set higher standards (FLDOE, 2016a).

Florida Standards Assessment (FSA): Required state assessment given to students in all public schools grades 3-11 in Writing, Reading, and Math (through grade 8 only).

Florida Virtual School (FLVS): Established in 1997 as the first Internet based public high school in the United States. Florida Virtual School is now an online public school and its own school district with over 150 courses taught to students in grades K-12 by certified teachers. Courses are accessible to students anytime, anywhere. However, if students wish to earn a standard diploma from the state of Florida they are required to complete the state assessments. Students are not required to be Florida residents.

Florida District Virtual School: Throughout this study, the term Florida District Virtual School is referencing the full time school of choice which allows students to complete all of their course work online, anywhere and anytime and earn a standard diploma as long as all standard requirements for graduation have been met.

Full-Time Online Students: Students who take their entire course load online (Gemin et al., 2015)

State End of Course Exams (State EOCs): State End of Course Exams in the State of Florida included Algebra I, Algebra II, Geometry, U.S. History, Civics, and Biology during the 2014-2015 school year.

School of Choice (School Choice): The mission of School Choice, as defined by the Florida Department of Education, is to “support quality public and private educational choice programs by providing information and assistance to promote successful outcomes for students, families, institutions and communities” (FLDOE, 2016b, Para. 1).

Virtual Provider or Supplier: “Entities that deliver online courses, instruction, technology tools and/or services to support online learning. Providers or suppliers may be for-profit vendors, education organizations or agencies (i.e. state virtual schools, regional services agencies), or nonprofit organizations” (Gemin et al., 2015, p. 7).

Virtual Schools: Full-time online schools, which do not serve students at a physical facility. Teachers and students are geographically remote from one another, and all or most of the instruction is provided online. Online schools typically are responsible for ensuring their students take state assessments, and for their students’ scores on those assessments (Gemin et al., 2015).

CHAPTER 2 LITERATURE REVIEW

Introduction

According to Dipietro (2010), the rapid rise of virtual education has led some to suggest that online learning represents a true revolution in K-12 education. Assessment is the evidence sought by school administrators, state legislators, and parents to verify the progress of their students. Students enrolled in K-12 virtual public school programs across the state of Florida are required to participate in the annual state assessments. “Traditional assessments are considered reliable and support the current standards-based reform movement” (Trenholm, 2006, p. 286). However, traditional assessments often include only a traditional proctoring implementation that includes students testing in a physical setting with teachers observing students to ensure academic integrity is upheld. “Traditional tests usually require that all learners in a class be tested through the same standardized procedure at the same controlled location” (Rovai, 2000, p. 142). A problem of practice in the K-12 virtual school setting is that numerous students cannot meet the demands of the intensive face-to-face (F2F) assessment schedule designed for traditional classrooms. Thus, the implementation of the Webcam Test-Proctoring Program (WTPP) at Hurricane County Virtual School (HCVS) as evaluated in this study is a likely solution to offering virtual school students the flexibility they need to complete these required assessments in their own time and location, while providing the secure environment required by the state and district offices in Florida.

Research supporting the use of Webcam proctoring in the K-12 education arena is limited, but the challenge of proctoring assessments in the context of distance education has

emerged as a focus of educational researchers, driven by increasing numbers of students and parents who choose online learning options. “Currently, little is known as to whether or not remote proctoring (1) is effective at decreasing cheating, (2) affects test performance, (3) influences applicants’ reactions to the test or selection process, or (4) interacts with individual differences” (Karim, Kaminsky, & Behrend, 2014, p. 556). This evaluative study, like Karim et al.’s (2014) study, was created with this gap in current research in mind. As the demand for virtual education continues to grow, students have come to expect a secure, yet flexible, testing environment. This chapter addresses exam proctoring, summative assessments in distance education, and participation in distance education assessments.

The problems associated with assessments of virtual school students is complex and the scholarly literature related to exam proctoring in professional and higher education settings is used in this review to inform this problem on numerous levels. First, the current state of exam proctoring within traditional and virtual school settings is addressed. Literature from the history of exam proctoring in distance education settings is reviewed in order to retrieve foundational benchmarks from past processes (e.g., Howell, Sorensen and Tippets’ 2009 study, “The New (and Old) News about Cheating for Distance Education”). Then, further studies, such as Hylton, Levy and Dringus’ 2016 study, “Utilizing Webcam-Based Proctoring to Deter Misconduct in Online Exams,” include current suggestions for solutions related to the issue of academic misconduct in virtual school settings and suggesting pros and cons to using proctoring alternatives, such as Webcams. Additionally, formative and summative assessments are defined, and then participation at a distance for both types of assessments is discussed with the goal of further informing this study. Other studies have attempted alternative resolutions to maintain

academic integrity within distance education assessments and reported their successes and challenges, which also informs potential solutions at HCVS.

Participation in Distance Education

Although paper and pencil exams seem to be misplaced when discussing cheating in virtual classrooms, state mandated tests are often required of all students in a public school district, including virtual school programs. Despite advances in technology, paper-and-pencil exams remain in common practice in K-12 virtual schools (Attendees of the FLDVIPN Conference, personal communication, 2013). Procedures related to where virtual school students should go to take their tests cause confusion at school sites across the district. In Florida, for example, virtual school students often must report to their zoned brick-and-mortar school, another school in the district or another location determined by the district to complete state-mandated summative assessments (Florida Department of Education [FLDOE], n.d., Assessment and Accountability section, Para. 4).

Once a virtual student arrives at a mandated testing site, the testing coordinator determines which virtual program code to assign to this student's scores. In Florida, there are several virtual program options for students: Florida Virtual School, Florida District Franchises of Florida Virtual School and Virtual Instruction Programs for grades K-5 and 6-12 respectively (FLDOE, 2015a). Returning the student's test results to his/her specific virtual school (i.e., where he/she is actually enrolled) is especially important for numerous reasons, including student progression, school funding, teacher raises, etc. Unfortunately, if a student does not know the exact name or school number of their specific virtual program, confusion arises when

coding assessments, resulting in improper coding and lost test scores. Amongst students, parents, and brick-and mortar-school staff in Hurricane County Public Schools (HCPS), mixed messages regarding the correct virtual program title or even ignorance of the program title was cited as contributing to inaccurate coding of assessments during the 2010-2013 school years (Principal, HCVS, personal communications, 2014). Thus, these lackluster experiences led to the implementation of Webcam proctoring and this study's evaluation of students' experiences. Jung and Yeom (2009) noted:

Online education has expanded rapidly. Even so, the off-line test is usually chosen as the evaluation method for traditional brick and mortar classroom and virtual classrooms alike. The security of online examinations remains a problem. In some cases, the person writing the exam on a networked computer is monitored by a proctor at a predetermined location. But, the requirement for an exam location goes against accessibility, the major attraction of e-learning or distance learning. The requirement may also negate the cost savings generated by e-learning or pose obstacles for remote students. (p. 340)

In addition to the benefits mentioned above, virtual school students prefer to take tests in a comfortable environment of their choosing rather than a site that has been selected for them (based on their mailing address) and may be unfamiliar to them (Personal communication, 2013-2015). Testing in an uncomfortable or unfamiliar environment may negatively impact a student's test scores; this relationship between testing environment and testing outcomes is one of the strongest reasons why Webcam proctoring should be a primary option for testing virtual students (Stowell & Bennett's, 2010). For example, the students in Stowell and Bennett's 2010 study were asked to complete a two-part questionnaire, including 25 questions pertaining to their emotional state before the exam and 27 questions immediately following the exam measuring the same emotions. After surveying their students, 76% of the students in this study stated that they preferred synchronous online testing to paper and pencil testing. More important than personal

preference, this study focused on matching the pedagogical requirements with the best assessment approach (Chao, Hung, & Chen, 2012). Different assessment methods (such as testing virtually via Webcam proctor) correlate with various learning content (delivered virtually, both synchronous and asynchronously) more strongly than assessing virtual students using traditional assessment methods, such as paper and pencil tests and are, therefore, more effective.

Exam Proctoring

Traditional Exam Proctoring in K-12 Education

The traditional approach to monitoring the progress of student learning often includes assessments, such as exams. In order to ensure academic integrity, an authority figure such as a teacher or professor proctors, or oversees the administering of the assessments. Rovai (2000) stated, “An historical solution to the issue of providing proctored testing included learners in a class testing through the same standardized procedure at the same controlled location” (p. 142). This type of solution has been applied to professional, post-secondary, and K-12 distance education programs alike. According to Lorenzetti (2006), the benefits of in-person proctored exams are clear:

Traditional in-class testing provides face-to-face contact between student and instructor to allow for clarification of test instructions, direct supervision of students, and feedback on performance, however, often, feedback and its value to learning are delayed because of the time required to grade tests and distribute results. (p. 6)

Flesch and Ostler's (2011) studies support the value of proctored exam environments. Specifically, Flesch and Ostler took students from four sections of Math 1310 (Intermediate Algebra Online) and randomly assigned students to one of two exam groups: (a) proctored and (b) non-proctored. Overall, Flesch and Ostler found that the average course grade of the non-proctored group was significantly higher than the proctored group: "We could not find many studies that provided good research on how important proctoring is in an online class where there is no way to know who is doing the work, what outside sources they may be using, and how it affected the final learning outcomes" (p. 11).

After replicating this study over two quarters, Flesch and Ostler (2011) reported results that were consistent with their initial study. Hoping to address the issue of academic rigor and exam proctoring in online education, Prince, Fulton, and Garsombske (2009) compared the average test scores between tests taken online without a proctor as compared to those administered using a live or remote proctor:

To increase the academic rigor of online classes and to enhance the comparability of online education to traditional teaching, the researchers have convincingly brought evidence to show that students who take proctored tests will perform statistically lower on their tests as compared to students who are given non-proctored test. (p. 60)

The outcome of this study supports Flesch and Ostler's (2011) findings: the proctored group demonstrated significantly lower test scores on average when compared to the non-proctored group.

The approach to proctoring assessments is also important. Schyles (2002) identified standard proctoring procedures, including students removing extraneous materials from their desks or workspace before tests are distributed. States also may develop guidelines for the

administration of assessments; guidelines for the state of Florida—Florida Standards Assessment—include specific directions for students to turn off all electronic devices and place them in a safe location away from their reach. Students may not use electronic devices even if those devices do not pertain to the test, including breaks. Schyles (2002) goes on to stress the importance of monitoring the testing area for the duration of exams, and the proctor should have a clear view of all examinees. In the state of Florida, proctors for state assessments must be certified teachers, which may include any administrative staff (Florida Standards Assessment, n.d.). Proctors for state tests in Florida are also prohibited from use of non-approved electronic devices during testing. Finally, proctoring procedures are standardized across the entire state in order to provide consistent testing environments for students. Testing measures vary from state to state in the K-12 public school arena. However, the overall intent includes the common goal of combatting academic misconduct. “Cheating is more prevalent than most realize, especially parents (97%) who do not realize their own children may be part of the one-third who use cell phones to cheat” (Howell et al., 2009, p. 2). Cheating is not limited to K-12 students taking assessments, however, misconduct occurs in a multitude of assessment settings and among a variety of demographics.

Howell et al. (2009) provide specific instances in four settings (K-12, higher education, business, and government) where misconduct involving cheating lead to serious repercussions. Cheating took place in all types of testing environments, including methods such as:

- Using mobile phones and iPods: these electronic devices are frequently used by students to text test questions to another student and take pictures of exams.

- Braindumps: Websites offering platforms for students to post memorized test questions, homework solutions to textbook assignments, graded essays etc.
- Organized cheating: Hiring someone else to complete coursework for you. Any such illegal arrangement including bribery and robbery is considered organized cheating.
- Wireless earpieces and high-tech radio transmitters: students wearing Bluetooth earpiece technology with any assistance coming through the speaker is considered a breach of academic integrity.
- Traditional methods: Referencing unpermitted notes while testing, looking at another student's work, and writing answers on arms, hands, desks or sticky notes to be used during the examination etc. are all considered traditional methods of cheating.
- High tech (HT) cheat sites: Popular Websites such as YouTube, Facebook and Twitter provide students with easy access to resources on how to cheat on tests.

The next question to be asked is this: what is the best solution to the issue of providing proctoring for K-12 students in virtual programs?

Exam Proctoring in Distance Education

Misconduct during testing is by no means a new phenomenon; however, with the advancement of technologies, issues continue to increase, especially in online education (Hylton et al., 2015). “Computer-based testing has been around for more than 60 years. Compared with the traditional paper-and-pencil testing method, computerized testing offers many advantages:

enhanced reliability, fast delivery, immediate scoring and feedback for both students and instructors, and reduced human errors” (Tao, 2009, p. 27). Lorenzetti (2006) feels the delivery of online assessments is one of the largest issues in distance learning, especially when considering how to implement proctoring. The majority of studies on testing environments and proctoring favor physical proctoring locations over Webcam proctoring due to technology requirements, including implementation costs (Rovai, 2000; Schyles, 2002). In addition, assessment industry facilities struggle with maintaining test security, as proctors are underpaid (or volunteers), unmotivated, and often part-time employees (Foster, 2006). Other issues regarding testing distance education students in a physical location include:

- Test centers require scheduling multiple staff members,
- Physical building spaces require reservations to secure space,
- Students require transportation to all of the initial testing dates, and
- Students require transportation to all of the aforementioned for additional make-up dates.

Furthermore, a central location does not always mean convenience, which is a major reason parents and students choose to enroll in a full-time K-12 virtual school program (Parents, personal communications, 2013).

Web Proctoring Technologies

Considering all the concerns related to testing virtual school students in a physical location, Webcam proctoring has emerged as a viable solution. Cost of high tech misconduct prevention, has been cited as a concern or disadvantage (Tao, 2009). With the rapid growth of

virtual school enrollments, and increase in use of technology in our day-to-day lives, technologies such as Webcams and microphones have become much more mainstream and less expensive over the past decade. In addition to increased affordability, Internet-based testing software offers robust security protections (i.e., password protections, thermography, voice recognition, and retinal scans, along with hand geometry and fingerprint scans; Rovai, 2000). Such security protections were at their infancy during Rovai's (2000) study and are now becoming commonplace.

Virtual proctoring via Webcam have become an affordable and necessary option for testing students in virtual school programs as virtual learning for higher education and K-12 institutions are at an all-time high ("Speaking Personally," 2010). "Webcam proctoring will likely cost organizations less as well as not disrupting their students' day with travel to a testing center, bringing with it all of those attendant costs" (Foster, 2010, p. 231). Testing via Web-based proctoring technologies offers multiple benefits, including cost savings for schools. Chao et al. (2012) noted the following:

Online assessment can overcome the confining barriers of time and space for those who are not present at the one time in one geographical location. It has the advantages of providing time saving, immediate feedback with better resources, the possibility of recording activities for future reference and greater convenience for both instructors and learners. (p. 380)

Assessments in Distance Education

Formative Assessment

Assessments vary across all educational settings; depending on what an instructor is measuring, he or she can use formative or summative assessment to determine a student's level

of understanding. Cross and Palese (2015) define formative assessment as part of the teaching cycle, a process by which instructors use methodical checks to prepare instruction for future practices. Furthermore, Cross and Palese note:

In short, formative assessments are different from summative assessments in that they are intended to inform the teacher and the student of their current progress as well as the best teaching practices that may help the student move toward understanding. (p. 98)

There are many forms of formative assessment in online learning that can be similar to F2F. An example of a formative assessment check in a virtual classroom can be an online instructor asking students to click a smiley face button if they understand a concept just discussed in a virtual classroom. This technique is similar to a teacher in a brick-and-mortar environment asking students for a “thumbs up” if they are ready to move forward after taking notes. Cross and Palese’s 2015 study supports the use of Classroom Assessment Techniques, a specific type of formative assessment, within online courses. They go on to discuss how the implementation of this technique can transform a standard discussion posting, which could include limited synchronous interaction into an environment which is much more hands on. An online discussion posting where the students interact with one another, as well as the instructor all while applying the class content (Cross & Palese, 2015).

Formative assessments are not intended to provide evidence for grading students. Rovai’s (2000) compared and contrasted traditional and online assessments. Rovai began by reviewing general assessment theory, including a review of the difference between summative (high stakes) assessments and formative assessments commonly provided by teachers to determine students’ strengths and areas needing improvement. Rovai goes on to discuss the importance of online instructors using frequent and diverse assessments, such as proctored

testing, plagiarism detection software, and online discussions assessed via a rubric. Studies have continued to explore the importance of formative assessment in online learning in the years since Rovai (2000); for example, Bergquist and Holbeck (2014) discuss how traditional online courses were originally designed with only summative assessments in place (e.g., weekly assignments, quizzes, and exams). They go on to state, “However, formative assessments are also necessary to check for student understanding in the online classroom prior to the summative assessment” (Bergquist & Holbeck, 2014, p. 3).

Summative Assessment

Unlike formative assessment that provides snapshots of student learning throughout the process of gaining skills, summative assessment is defined as a summary of the achievement of a student (De Kleijn, Boumeester, Ritzen, Raemaekers, & Van Rijen, 2013). State and district created tests, as well as unit tests and end-of-course exams, typically fall under this more recognized assessment category. As mentioned above, summative assessments are ordinarily administered in a physical testing center in order to maintain academic integrity, to ensure the security of the testing materials, and to verify student identity. Vital questions to be asked when considering requiring virtual students to attend physical test centers for the purpose of assessment include:

- How do students enrolled in a virtual course feel about having to go to a physical testing location?
- Are students comfortable testing in a place that may be unfamiliar?
- Will students’ possible discomfort impact test results?

Tao (2009) sought constructive feedback in his formative evaluation study of the implementation of a WTPP, much like the study of HCVS's WTPP. The key difference is that Tao's (2009) study was the location of the testing. For this study, nursing students were asked to complete their exams via computer in order to prepare them for their computerized certification test. Students ($n = 166$) were required to come in to their classroom building to complete their assessments on secure laptops. Although the study yielded positive results in terms of students performing higher when taking their preparatory exams via computer versus paper-pencil, the feedback of the secure Webcam program addressed concerns mostly of the campus's Internet connection as well as the quality of laptops provided.

Stowell and Bennett (2010) conducted an experiment hypothesizing that online testing would result in lower levels of anxiety for students than testing in a traditional classroom setting. In their study, Stowell and Bennett split a class of students into two groups; one group was given a window of time in which they could complete an assigned online exam while the other group was asked to complete the same exam in their physical classroom using a pencil and Scantron answer sheet. The researchers did not specify whether the students taking the exam online were proctored in any way. Stowell and Bennet showed that "students reported comparable levels of test anxiety and performed equally well under both exam conditions; however, 54% of students reported a preference for taking the exam online compared to 46% favoring the classroom setting" (p. 168). There was a significant difference between levels of test anxiety with women reporting higher levels than men. Stowell and Bennett's study also denotes that those who indicated a preference for online testing reported a higher level of anxiety when testing in a classroom setting.

Another study supporting online assessment includes Foster's 2006 study that explored the idea that students are more comfortable and less distracted when testing online versus testing in a central testing location. Foster (2006) cites a recent study by Western Governors University that reports that 92% of students preferred testing in their own homes and 76% of this group reported feeling more confident in their performance. Yates and Beaudrie's (2009) study honed in on the impact of online assessment on overall course grades and analyzed a total of 850 grades from a variety of math courses at the community college level. Although no significant difference was found between end-of-course grades, there is much to be said for the benefits of offering these math courses online, including the possibility of student completion. Consider a student who otherwise may not have been able to attend this course in person due to location, disability, or scheduling conflicts (Yates & Beaudrie, 2009).

Academic and Assessment Integrity

Cheating and Institutional Responses

Critics may note that there are more opportunities for cheating to occur in a virtual school environment than in a traditional brick-and-mortar setting. Howell et al. (2009) reported, "Those in distance education are faced with a formidable challenge to ensure the identity of test takers and integrity of exam results, especially since students are physically removed from the classroom and distributed across the globe" (p. 1). There are, however, responses to these challenges in the academic literature. For example, Schyles (2002) discussed three key stages that attempt to preserve academic integrity in a distance learning setting: (a) the prevention stage,

(b) the detection stage, and the (c) intervention stage. According to Howell et al., there are nine very current propositions for preserving academic integrity including:

- The “honor” system,
- Banning/controlling electronic devices,
- Photo and/or government identification,
- Fingerprinting and palm vein scanning,
- Commercial security systems,
- Cheat-resistant laptops,
- Lawsuits,
- Computer-adaptive testing,
- Randomized testing, and
- Statistical analysis.

These measures can be considered part of Schyles’ prevention stage. Ultimately, any legitimate, accredited distance learning program or virtual school would have a solid academic integrity, detection, and intervention plan on par with their brick-and-mortar counterparts. Cheating is not going to disappear in this new digital learning environment but neither should one assume that cheating is going to increase simply due to the lack of face-to-face contact.

Researching academic dishonesty in an online versus brick-and-mortar setting, Watson and Sottile (2010) administered a multiple choice survey consisting of 44 multiple-choice (yes/no) questions organized into four parts: (a) demographics; (b) academic dishonesty; (c) cheating, specifically in online environments; and (d) perception/opinion confirmations. Interestingly, the highest percentage of students (33.2%) responded “yes” to the statement “I

have received answers to quiz or test from someone who has already taken it” in the context of a live classroom versus 20.3% of students responding “yes” to the same statement in an online setting. The next highest response was nearly even, with 32.1% of students answering “yes” in the context of a live classroom setting versus 32.7% in an online class in response to the statement "I have cheated on an assignment, quiz, or test." Watson and Sottile’s study shows that academic dishonesty is not necessarily more prevalent in distance education, however contrary to their study’s results the other studies in this literature review did not match with these findings. According to Trenholm (2006), “If point A is the formation of the intention to cheat and point B is the actual act of cheating, the Web environment allows a student to cheat much more easily, quickly and efficiently" (p. 278).

Processes to Ensure Assessment Integrity

As instructors implement the simple measures to determine if a student is indeed understanding a lesson, there is also the need for this measurement to confirm that the student’s acquisition of content being measured is indeed the student who registered for, and is regularly participating in, the course. In distance education, there is still doubt concerning the integrity of the education process especially due to the large amount of academic misconduct during proctored online assessments (Hylton et al., 2015). Howell et al. (2009) observed that Congress reauthorized the Higher Education Act with the following provision: “An institution that offers distance education to have processes through which the institution establishes that the student who registers in a distance education course or program *is the same student* who participates in and completes the program and receives the academic credit” (p. 1).

As a result of the Higher Education Act, additional formative assessment processes were created, requiring students to complete discussion-based assessments consisting of a live one-on-one discussion with a teacher (via phone or video based software). Another process used to prevent cheating in online classrooms involves the use of online discussion rubrics. Florida Virtual School includes rubrics in all of their courses in order to streamline expectations for students and teachers.

Currently, K-12 schools and higher education programs are requiring additional mastery level deliverables like ePortfolios to make sure students can demonstrate understanding. Additionally, students must submit written assignments and portfolio-type work as part of an online course. The purpose of building portfolios and demonstrating mastery of concepts through project based assessments is to support the movement of authentic, meaningful assessments (Jonassen, Howland, Marra, & Crismond, 2008). Additionally, these practices are commonplace in order to encourage student engagement and interaction with the instructor, a key element discussed by the International Association for Online Learning (iNACOL) in their 2011 *National Standards for Quality Online Teaching*. In order to verify the authenticity of these types of assignments, plagiarism identification software such as Turnitin.com is utilized as an internal part of certain Florida Virtual School courses. Rovai (2000) also suggests identifying plagiarized student work through the use of similar Internet-based services, which closely aligns with current practices used in virtual courses in higher education and K-12 classrooms alike. The use of such tools have become staples in learning management systems today.

The question of confirming student identity in online learning environments presents a challenge for both institutions of higher learning and K-12 institutions. Fletcher and Ostler

(2011) developed a course design that ensures that students demonstrate their understanding of course concepts in a foolproof manner. Specifically, the design of the developmental math courses at their institution (Metropolitan Community College) included writing and problem-solving activities that require students to demonstrate their understanding of the content through explanation.

Assessment Software and Academic Integrity

Massive growth in virtual course enrollments has led to discussions regarding academic rigor and integrity of online coursework. Due to this high demand for virtual courses in K-12 and higher education, as well as training and certification in professional organizations, there is a plethora of assessment software that exists to safeguard academic integrity. INTEGRITY Software is an online application created to analyze multiple-choice tests and detect academic integrity breaches while test taking. Wetzel (2006) stated:

INTEGRITY is an item analysis and statistical collusion detection (answer copying) online application. The reports, created by INTEGRITY, would be useful in the elementary, secondary and post-secondary levels toward guiding analysis of the quality of test questions, the performance of students and to determine the likelihood that the students have copied answers from one another. (p. 319)

INTEGRITY may be of use in terms of analyzing test taker responses, but it would ultimately be most efficacious as a tool for online assessment security if paired with an identity authentication tool, such as a Webcam. Wetzel (2006) repeatedly emphasizes that the software is user-friendly and, as an online software package, offers easy installment and is available at a competitive price. Affordability of this software was a suggested reason why online proctoring assessment software could not be implemented (during the time of the study—2016).

Collaborative Cyber Community (3C platform) offers educators and students a synchronous cyber classroom for learning and assessment; the 3C virtual classroom includes access to learning tools such as instant text communications and a whiteboard with 'electronic' stationary tools such as a pointer, highlighter, and eraser (Chao et al., 2012). Web browsing, desktop sharing, and functions for uploading documents, and pictures are also available in this platform (Chao et al., 2012). While providing a comprehensive virtual learning environment, the 3C platform did not explicitly provide for summative assessments.

Another example of secure testing software for online assessments is SeCOnE (Jung & Yeom, 2009) that works through a complex system that can be simplified in five methods to prevent and detect cheating:

- Identification of entities verified by Webcam,
- Continuous recording of audio and video of exam and examinee,
- Screenshots made to track test-taker's activities throughout exam,
- Disabling of all non-test-related communications, and
- Deactivation of all outside software programs through control of inputs by examinee.

SeCOnE is implemented along with the use of Webcam and microphones, offering one of the most secure and budget-conscious testing scenarios for present-day online assessments.

SeCOnE's five-step process is very similar to the Secure View Webcam monitoring company's procedures procured by HCVS to proctor their benchmark exams (Jung & Yeom, 2009).

Another Webcam proctoring service, Kryterian, is quite similar to Secure View, the remote proctoring company that HCVS employed as a third party to provide Webcam Proctoring

services for the WTPP evaluated. Created in 2006, Kryterian is a secure software company that provides online proctoring services. Some of the features of Kryterian's technologies include keystroke pattern measurements and facial recognition capabilities (Foster, 2010). Kryterian also happens to be one of the Webcam proctoring companies the researcher interviewed as a potential service provider during the implementation process of HCVS's use of Webcam proctoring; however, at the time of implementation (2014-2015), the company did not offer the services needed for virtual students in grades 6-12.

Summary

Literature has become increasingly more available, though it is still limited when specific search parameters including Webcam Test-Proctoring in K-12 are set. The broader topics of assessments in distance education were also reviewed where the definition of both formative and summative assessments were included. Studies most closely linked to the formative evaluation of HCVS's WTPP include Karim et al.'s (2014) in which results of the implementation of a Webcam proctored test showed decreased cheating occurred. Tao's (2009) study also evaluated the implementation of a WTPP in which results yielded positive results of students scoring higher on their nursing certification exam as a result of testing via a secure computerized assessment. Overall, results to the studies reviewed support the concern for misconduct during assessments, specifically in virtual classroom environments. The response to this concern has begun to include more studies attempting to implement alternative proctoring options, such as Webcam proctoring, but despite the demand for flexibility, impacted test participation rates and preference from student F2F proctoring seems to remain the standard procedure.

CHAPTER 3 METHODOLOGY

Introduction

This chapter describes the research design and procedures used to evaluate the implementation of a Webcam Test-Proctoring Program (WTPP) in a K-12 virtual school. This chapter discusses the study design and procedures used to evaluate the implementation of the WTPP in Hurricane County Virtual School (HCVS), as outlined in Chapter 1. In addition, this chapter presents the evaluation questions and clarifies the study design, study population, instrumentation, data collection, and data analysis.

Evaluation Questions

The evaluation questions for this study fall into two areas of focus: (a) intended outcomes and (b) implementation. The evaluator developed Guiding Questions to gather feedback regarding student experiences related to testing outside of a typical F2F proctored environment. The implementation question was designed to determine areas of improvement for the study-related technologies, more specifically, the Webcam proctoring software as tied to the Web-based assessments.

Guiding Questions

1. In what ways did the Webcam Test-Proctoring Program facilitate student experiences and satisfaction?
2. What opportunities and challenges evolved from the Webcam Test-Proctoring Program?

3. What factors facilitated/inhibited participation in the Webcam Test-Proctoring Program?

Implementation Question

1. How did internal and external factors impact the program?

Design of the Study

This study was a formative evaluation design that utilized mixed-methods analysis. The descriptive analysis of qualitative and quantitative research approach consisted of an online survey and personal interviews. The descriptive analysis allowed the researcher to collect data without changing an environment. This study incorporated a formative evaluation process through which stakeholder feedback was gathered, analyzed, and implemented, ultimately allowing future evaluators the opportunity to add their contributions to this line of research. Scriven (1991) defines evaluation as “. . . the process of determining the merit, worth and value of things” (p. 1). The intended outcomes of this study include, an explanation of the relationship between student interest, experience, and level of satisfaction.

Context of the Study

The purpose of this formative evaluative study was to review the implementation of a WTPP implemented in a Kindergarten through 12th grade public virtual school. Results of the evaluative study will be used to determine if the secure Webcam proctoring method would be a viable solution to a problem of practice—requiring full time virtual school students participate in

the multitude of required state and school district assessments. At the core of virtual education lies the appeal of flexibility in each student's individual learning path. The current, rigid nature of secure assessments by nature conflicts with the intentions of a K-12 virtual school. Natale and Cook (2012) identified this as a problem of practice as well, stating, "Digital learning de-standardizes and decentralizes educational delivery, so it presents challenges in applying quality control systems and metrics that were developed for more traditional school structures" (p. 541).

As a potential solution to the problem of practice, HCVS implemented the use of Webcam proctoring software while making assessments available to students during a one-week test window (for two distinct test sessions during October and January of 2014-2015 school year). The process was referred to as the secure Webcam Test-Proctoring Program (WTPP). The WTPP allowed students to remain in their usual learning environments to complete the district mandated secure benchmark tests. Students enrolled in English Language Arts (grades 6-11), Math (grades 6-8), Algebra I, Algebra II, Geometry, U.S. History, Civics, and Biology took tests created by the Hurricane County Public School (HCPS) that were designed to gather data on student performance tied to the new Florida Standards and to provide students with a practical experience similar to their upcoming Florida Standards Assessments (FSAs). These FSA scores appear on official student records, and select courses/tests necessitate a passing score as requirement for students' graduation or promotion to the next grade.

Secure View is an online exam proctoring company that offers cloud-based remote exam proctoring services. Secure View was the company selected by HCVS to proctor students via Webcam for their benchmark assessments. A representative from Secure View worked closely with the HCVS testing coordinator to ensure the implementation of the WTPP was efficient. A

step-by-step set-up process was created for HCVS students to be able to easily set up their Webcam, access the proctoring software and take their assessments. The first step during the set-up process included a digital signature (from parent or guardian) on the agreement form located on the first page upon entering the Website provided. This parental consent, or agreement form, was required for students to access and activate Webcam proctoring and, therefore also required to access their tests. The step-by-step instructional guide explained how to set up and access the Webcam proctoring system via an Internet based software. The step-by-step guide further explained how to log in to benchmark assessments and submit the test once completed. Appendix A contains the Students User Guide, a 5-step set of instructions for setting up their Webcam and accessing benchmark assessments through the secure software. Students who were enrolled in English Language Arts (grades 6-11), Math (grades 6-8), Algebra I, Algebra II, Geometry, U.S. History, Civics, and Biology received an email containing the user guide to help them access their test(s) through the secure Webcam proctoring system.

During the testing session, students' actions were recorded via Webcam, including all students' movements and audio communications. Trained professionals employed by Secure View reviewed the post-testing recordings, scanning the recordings for any behaviors considered a breach of academic integrity. All recordings received one of the following labels: (a) Red-Serious breach, (b) Yellow-Minor breach, or (c) Green-No breach. The recordings were then forwarded to the HCVS test coordinator for further review. Upon receipt, necessary administrative actions were taken where applicable.

Setting

Hurricane County Virtual School (HCVS) is a franchise of Florida Virtual School (FLVS) and as such is associated with the FLVS in the following ways:

- Hurricane County Virtual School purchases their curriculum from FLVS;
- Teachers at HCVS may participate in professional development provided by FLVS; and
- Florida Virtual School provides guidelines to faculty, staff and students at Florida public school district franchises, including HCVS.

Additionally, HCVS is operated by HCPS. Therefore, during the 2014-2105 school year it was required that a student resides within the HCPS' District in order to enroll in HCVS. Table 1 illustrates the demographic make-up of HCVS over a two-year period (2012-2014) as compared to the demographic makeup of HCPS District, as well as the entire state of Florida. The information in Table 1 is provided to show that the HCVS population, from which the sample was taken, connects to larger populations in terms of diversity. For example, the percentage of female students is almost identical from school to district to state showing 48.5%, 48.8%, and 48.7%, respectively, for the 2013-2014 school year. Additionally, other significant information includes similar trend growth among racial or ethnic groups within HCVS, HCPS, and the State of Florida, as shown below (i.e., decrease in Caucasian population and an increase in Black or African American populations).

Table 1

Florida Department of Education Hurricane County Virtual School: Student Enrollment Information

Racial/Ethnic/Minority/Gender Group	Number of Students Enrolled		School (%)		District (%)		State (%)	
	in October		2013-2014	2012-2013	2013-2014	2012-2013	2013-2014	2012-2013
	Female	Male						
White	36	44	47.6	48.5	29.7	30.5	40.9	41.6
Black or African American	11	11	13.1	18.2	27.3	27.4	22.9	23.0
Hispanic/Latino	28	23	30.4	25.3	35.6	34.7	3.0	29.3
Asian	*	*	*	*	4.5	4.5	2.6	2.6
Native Hawaiian or Other Pacific Islander					.02		0.1	0.1
American Indian or Alaska Native					.03	0.4	0.3	0.4
Two or More Races	*	*	*	*	2.3	2.4	3.2	3.1
Disabled	*	*	*	*	11.1	11.4	12.9	12.9
Economically Disadvantaged	33	22	32.7	19.2	61.1	62.2	58.4	58.6
ELL	*	*	*	*	19.7	20.0	12.4	12.1
Migrant					0.1	0.1	0.6	0.5
Female	82		48.8	51.5	48.5	48.6	48.7	48.7
Male		86	51.2	48.5	51.5	51.4	51.4	51.4

Note. Adapted from “Assessment and Accountability,” Florida Department of Education, n.d. Retrieved from <http://www.fldoe.org/core/fileparse.php/7509/urlt/Assesment-and-Accountability.pdf>

Population and Sample

This study targeted a subset of the HCPS District's population of 6th through 12th grade students enrolled full-time in HCVS. Within this group of grade 6-12 students, only those students enrolled in English Language Arts (grades 6-11), Math (grades 6-8), Algebra I, Algebra II, Geometry, U.S. History, Civics, and/or Biology were identified as eligible to complete their benchmark assessment (s) via WTPP.

The population included in this evaluation includes students who may have been enrolled in one or more of these assessment courses based on their individual progression plans but were unable to complete one or both of their benchmark assessments via the WTPP. During the October 2014 testing window, 165 students were enrolled in HCVS. The population included in this evaluation includes students who may have been enrolled in one or more of these assessment courses based on their individual progression plans but were unable to complete one or both of their benchmark assessments via the WTPP. During the October 2014 testing window, 165 students were enrolled in HCVS. During the January 2015 testing window, 166 students were enrolled in HCVS. Many of these students were enrolled in HCVS for the entire school year and therefore the total numbers per semester are provided to show a potential of students who may have been enrolled in only one semester and who were only eligible to participate in the WTPP for one test session. Demographic data collected from the HCVS was based on Fall 2014 enrollment. Thus the population for this study is $N=165$. Out of the 165 student population 27 students submitted responses on electronic survey for this study and all data collected was analyzed. As a result, the sample size for this study consisted of 27 HCVS students.

The study sample consisted of an ethnically diverse group of students as detailed in Table 2; the majority of students, however, were Caucasian (44%). Other ethnicities included Hispanic (33%), African American (11%), and Asian (4%). The remaining 26% of the students reported ‘Other’ for ethnicity.

Table 2

Descriptive Statistics for HCVS Population by Ethnicity

Ethnicity	Enrolled	%
African American	27	16
Asian	4	2
Caucasian	81	49
Hispanic	44	27
Other	9	6
Total	165	100

During the 2014- 2015 school year, HCVS’s student population consisted of 48% males and 52% females. The grade level distribution of secondary students in both middle and high school grades shows higher enrollments in the upper grades including 20% of the entire schools’ population in 11th grade (Table 3).

Table 3

Descriptive Statistics for Grade-Level Distribution

Grade	Enrolled	%
6th	13	8
7th	19	11
8th	17	10
9th	26	16
10th	28	17
11th	33	20
12th	29	18
Total	165	100

Participant Recruitment

In order to set the tone of this study, the evaluator worked directly with HCVS's principal to send out the initial email requesting participation from the target population in this evaluation study. Students' and parents' email addresses that were obtained from the school's guidance office, as directed from the principal. The initial email went out to eligible students (165 students) and their parents on January 25, 2016, and remained open for one week (until February 1, 2016). This initial email informed recipients about the study and invited students to participate in an electronic survey. The survey asked questions regarding their experience while participating in the WTPP during the prior (2014-2015) school year. Then, the evaluator sent a friendly reminder email to participants on January 27 and February 1, 2016, to reinforce the importance of the survey to those students who read the initial email. The content of these follow-up emails duplicated the initial email, except the survey link appeared at the top of the email. This series of emails was intended to show students that there is an important survey to complete without their having to scroll down the entire length of the email to access the survey.

The evaluator also requested that the principal of HCVS forward an email to all current students to participate in one-on-one phone interviews. This email included a clear description of eligibility for volunteers to be selected for interviews: (a) student must have been enrolled at HCVS full-time during the 2014-2015 school year, and (b) the student must have participated in one or both of the Webcam test proctor sessions during the 2014-2015 school year. Targeted student information was included in the email sent out requesting volunteers in order to differentiate between the population ($N_1 = 165$) and the sample ($n = 27$). By specifically requesting that only students who were enrolled in HCVS full-time during the 2014-2015 school

year as well as only those who completed at least one or both benchmark assessment sessions via WTPP, this eliminated any students who did not complete at least one benchmark test via Webcam proctor.

After the sample was identified, an email was sent out which requested volunteers for one-on-one phone interviews. Volunteers would then be selected to participate in the interview phase of the study if they met the following eligibility: (a) full-time enrollment at HCVS in 2014-2015, and (b) participation in one or both of the Webcam test proctor sessions. Next, available interview times were determined. The researcher reached out to confirm these selected students were available during the time outlined for students to contact the evaluator. The timeline for interviews was sent via email and began on January 27, 2016, and concluded on February 3, 2016. Students who were not available during this time frame were not selected and received an email thanking them for volunteering.

Due to the lack of respondents in the first interview window, an alternative plan to recruit participants included following the same steps and opening the survey for an additional number of weeks, as needed, in order to meet a targeted participation goal (minimum 5-10% participation for interviews and 25% for electronic surveys). To increase participation in both the electronic survey and interview data collection processes the researcher requested from the HCVS principal permission to offer incentives to students (e.g., extra credit). Once permission was granted as an addendum to the study via the University of Central Florida's Internal Review Board, interviews were conducted until six students were interviewed (22% participation). An accurate group size for a population of 165 students, as seen in this study, falls between 5-10%. Therefore, the

timeline for interviews concluded after meeting this standard. A total of 27 students began the online survey with at least some data reported (16% participation).

Interview Participants

The interview protocol included an open-ended question that asked all six participants if they would like to share any additional information with the evaluator. Some students were more receptive to talking about themselves and their experiences in the WTPP as well as in virtual school than others. Interviewee 1 shared that he is 15 years old and will graduate with the class of 2015. Interviewee 1 also shared that he enjoys virtual school because he enjoys learning at his own pace, thus allowing him to complete coursework from grades 10 through 12 within one calendar year. Interviewee 5 had challenges with the initial time frame the evaluator offered to schedule interviews due to her intense swim practice schedule. Both students' stories supported a reason that virtual schooling's flexible nature works for them, thus also supporting the need for flexibility in the multitude of assessments given throughout the school year as well. Additional information about student interviewees can be reviewed in Table 4.

Table 4

Student Interviewee Demographics

Interviewees	Gender	Grade (During WTPP)	Additional Information
Interviewee 1	Male	10	15 years old Final course with HCVS Last year he was listed as a grade 10 student
Interviewee 2	Male	10	N/A
Interviewee 3	Male	9	N/A
Interviewee 4	Male	7	N/A
Interviewee 5	Female	7	Avid swimmer with an intense swim schedule
Interviewee 6	Male	7	N/A

Additional Data Sources

Records from the implementation of the WTPP were acquired from HCVS with permission from the school’s principal. These data sources included the following:

- Parent consent was from required for students to participate in the WTPP,
- Step-by-step instructions that were emailed to WTPP students explaining how to set-up their Webcam and proctoring sessions and access their benchmark assessments,
- Academic integrity evaluation results from Secure View, and
- Lists of email addresses input by the students and parents in order to consent and initiate the set-up of the Webcam proctoring software.

Instrumentation

Instrumentation consisted of both an electronic survey (Appendix B) and an interview protocol (Appendix C). The anonymous electronic survey was used to collect both qualitative and quantitative data; this survey consists of demographic, multiple choice, and Likert-scale questions. The interview protocol was designed to enrich the data collected from survey results. This study called for a need to correlate the data from surveys and interviews. Cohen and Crabtree (2006) suggest qualitative researchers use triangulation as a method to ensure the account is rich, robust, comprehensive, and well developed. Triangulation is the process of correlating data from at least two different data sets to increase validity.

Survey

Table 5 was created to support the triangulation process during analysis of results from the electronic Survey Questions. The evaluator organized a chart (Table 5) correlating Survey Questions with the study's three Guiding Questions. If a question consisted of multiple parts (i.e., Question 10), each part of the question was correlated to the most relevant Guiding Question(s).

Table 5

Survey-Question Correlation to Guiding Evaluation Questions

Electronic Survey Question	Guiding Evaluation Question
Q5: Please select the Webcam proctoring session(s) you completed for the HCPS benchmark tests during the 2014-2015 school year (please select all that apply):	GQ 3
Q6: Please select the method used to complete your benchmark tests during the 2014-2015 school year:	GQ 2
Q7: Please rate each method of proctoring use the 0-5 scale. 0 equals your least preferred method and 5 equals your most preferred method. Method: Webcam Proctoring	GQ1, GQ2
Q8: Please rate each method of proctoring use the 0-5 scale. 0 equals your least preferred method and 5 equals your most preferred method. Method: Face to Face at HCVS Campus	Q3
Q9: Please rate each method of proctoring use the 0-5 scale. 0 equals your least preferred method and 5 equals your most preferred method. Method: Face to Face at Zoned School	Q3
Q10: Please use the 5 point scale below to rank your feelings about the topics listed to the left. How do you feel about mandatory testing methods becoming more flexible for full time virtual students?	GQ1, GQ3
b) How do you feel about the use of Webcam proctoring?	GQ1, GQ2, GQ3
c) How would you feel about the opportunity to take more secure tests via Webcam proctor instead of having to go to a physical school location?	GQ1, GQ2, GQ3
Q11: Please rate your overall experience during the Webcam proctoring pilot during the 2014-2015 school year.	GQ1, GQ2, GQ3
a) Ease of use during the Webcam proctoring set up	GQ1, GQ2, GQ3
b) Assistance from the testing coordinator	GQ1, GQ2, GQ3
c) Technology assistance from Secure View (using the 1-800 number on the instruction sheet	GQ1, GQ2, GQ3
d) Overall organization	GQ1, GQ2, GQ3
Q12: If you did not complete both benchmark testing sessions (October 2014 and January 2015) via Webcam proctor while enrolled with HCVS, please select the reason below.	GQ1, GQ2, GQ3

The anonymous electronic survey began by asking two consent questions. The parent had to first consent to their minor child participating in this study and next the child himself must have consented to participate selecting Yes or No, respectively. Without consent from both parties, the survey then directed the potential participant to a final screen explaining that participation in the survey is not permitted without consent from both parties. After this explanation, students were given the option to go back and revise their selection or exit the survey.

Next, demographic data were gathered: (a) gender, (b) age, (c) ethnicity, and (d) grade or classification (freshman, sophomore, junior, senior). The following two questions were composite questions and created to increase internal validity. Survey Question 5 of the student survey asks students to select which assessment session they completed using Webcam proctoring. This is an exclusionary question, as the evaluator gathered and grouped students into one of three groups:

1. Completed one test via Webcam proctor,
2. Completed two tests via Webcam proctor, or
3. Completed no tests via Webcam proctor.

Those students, who did not participate in at least one of the WTPP sessions, were excluded from the interview due to pre-determined criteria. The population of students enrolled in HCVS was 165 ($N = 165$). A total of 27 students submitted the survey making 27 the sample ($n = 27$).

The researcher created Survey Question 6 (SQ6) to strengthen internal validity; data gathered from this question informed the evaluator as to whether a student indicated that they did

not complete their tests via Webcam proctor, or took their tests in the face-to-face setting or not at all.

Survey Questions 9, 10, and 11 were constructed using the Likert scale in order to help categorize data in a meaningful and valid format during analysis. According to Allen, Seaman, and Garrett (2007), Likert and other researchers recommend that it is best to use as wide a scale as possible, as you can always collapse responses into condensed categories during the data analysis process. Survey Question 9 asks students to use a scale rating system from zero to five (six points) to rate each of the three proctoring methods listed: (a) Webcam, (b) face-to-face at their centralized HCVS campus, or (c) face-to-face at their zoned school. A neutral answer for each of the three options would provide unusable data to the evaluator. Therefore, the use of an even number of points (six) on this Likert scale was intentional on the part of the evaluator as the use of a truncated scale eliminates the neutral option and forces a preference to be selected; this is also known as a “forced choice” scale (Allen, Seaman, & Garrett, 2007).

In Survey Questions 10 and 11, students were asked to report their feelings and opinions. Neutrality in these questions would be useful to the evaluator; therefore, a neutral or midpoint was included because it would be inaccurate to force a preference as in Survey Question 9. Survey Questions 10 and 11 (SQs 10 and 11) were qualitative in nature, yet yielded quantitative results. Survey Questions 10 and 11 asked each participant about their feelings (rating using levels of importance) and to rate their overall experiences using a five-point satisfaction scale. Question 10 asked students to use the 5-point scale to rank their feelings about the topics listed: (a) student opinions on the importance of flexibility in proctoring options, (b) taking tests using a Webcam as a proctor and (c) being able to use the Webcam proctoring option for other tests in

the future (as an alternative to the only option, which is currently face-to-face at the HCVS campus). Question 11 used a 5-point scale to allow students to rate their level of satisfaction regarding specific elements of the WTPP: (a) ease of use, (b) assistance from both the testing coordinator and the Webcam proctoring companies, respectively, and (c) the overall organization of the implementation of this program.

Survey Question 12 asked participants to identify a reason why they did not complete their assessments via Webcam test proctor. Four specific options were provided for students to select their reason: Technology Issues, Not Enrolled, No Parental Consent, and Other. The Other option, also allowed students to further explain in a small text box provided below the option. This information was useful to further validate and explain the response from students who selected that they did not participate in either WTPP session. The final question asked students to select why Webcam proctoring is preferable to them as full-time virtual school students. This question allows for more than one selection and provided insight to student opinions while supporting the need for Webcam proctoring.

Questions in the electronic survey were designed by the evaluator to allow student participants to feel at ease while answering questions that are most closely aligned with their level of understanding (designed for grade 6-12 students). The evaluator created the survey using Qualtrics, an online survey builder, in order to allow the survey to be accessible via a survey link delivered via email.

Interviews

Six HCVS individual student interviews were conducted over the phone to supplement data collected from the electronic survey. The interview protocol was planned to last approximately 20 minutes. The evaluator kept the names of the interviewees confidential; only the evaluator and the teachers who would award enrichment activity credit to participants knew the names of interviewees. Email accounts of both the evaluator and the HCVS teachers are password protected. The evaluator emailed the appropriate teacher of each student's participation, but did not discuss enrichment credit activity beyond that student's participation. All six participants interviewed as part of this study were minors, and, therefore, parent consent to participate was required prior to the scheduled interview. Four of the six surveys were audio recorded with permission from the interviewee. Immediately following the session, the evaluator transcribed each response in order to make sure the information was current in the mind of the reviewer. Two of the interviews were not recorded due to recorder malfunction; thus, the evaluator transcribed those responses directly. Five out of six interviewees were male. Grade levels of the interviewees ranged from 7th grade to 10th grade based on the grade level they were enrolled in during their participation in the WTPP.

Upon analysis of the data, the evaluator recognized that categorization of transcript data and field notes is subjective. Therefore, to validate this process, results were triangulated. First, the evaluator organized a chart (Table 6) correlating Survey Questions with the study's three Guiding Questions. Next, the interview questions were correlated to the survey questions they supported.

Table 6

Interview Question Correlation to Guiding Evaluation and Survey Questions

Interview Question	Guiding Evaluation Question	Correlating Survey Question
iQ1: How well was the pilot program implemented? Please elaborate on why you feel that way.	GQ1, GQ2	SQ9, SQ10, SQ11, SQ13
iQ2: Was the program run smoothly and easy to access in your opinion? Why or why not?	GQ1, GQ2	SQ9, SQ11, SQ12
iQ3: Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the Webcam and logged into Performance Matters)?	GQ1, GQ2	Q11, Q12
iQ4: Did you have any difficulty gaining access to a Webcam? Or setting up the Webcam on your computer?	GQ3	SQ10, SQ11, SQ12
iQ5: Did you receive any feedback from Secure View (Webcam proctoring company) or HCVS administration regarding academic integrity breeches? Do you feel this assessment was accurate?	GQ1, GQ2	SQ10
iQ6: As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?	GQ2	SQ9, SQ13

Next, the Interview Questions were correlated to the Survey Questions they supported. Once the chart organized by likeness of survey, interview and Guiding Questions was complete, results from both tools were analyzed.

Data Collection

This research study recruited students enrolled in HCVS’s full time program during the 2014-2015 school year.

Initially, the evaluator reached out to the HCVS principal to obtain the student email addresses. After this preliminary attempt at data collection yielded limited participant response,

the evaluator contacted the school principal to solicit ideas concerning raising the response rate to the survey.

The principal recommended four teachers who might be willing to offer an incentive for students to participate in the study. The evaluator contacted the four teachers suggested by the principal. Those four teachers then coordinated enrichment credit incentive into their curriculum in exchange for those students who completed both the survey and then contacted the evaluator to schedule an interview. Once students emailed the evaluator to schedule an appointment his or her name was then sent back to the appropriate teacher to ensure the enrichment credit was issued. Students who did not complete the survey were allowed to complete an alternative activity to earn enrichment credit.

Once enrichment credit was approved the evaluator altered the email invitation to reflect the incentive. The email invitation was sent to all students enrolled at HCVS during the 2014-2015 school year. Initially, the list of email addresses provided by the HCVS guidance counselor included 66 addresses, which did not include even half of the student population as there were 165 students enrolled overall. Upon contacting the school counselor for a second time, the counselor replied that the 66 email addresses constituted the only information she had on file for last year's students. The principal allowed the evaluator to review achieved files to find additional email addresses. The evaluator discovered the former testing coordinator's email list that included 113 email addresses, specifically input by participants of the WTPP during the set up stages. The former testing coordinator's email address list was then used (in addition to the original 66 the counselor had provided) during the second round of recruitment, along with the incentives and teacher email support.

In addition to emailing students during this second attempt at data collection, the evaluator asked the four teachers offering enrichment credit to send the email invitation (drafted by the evaluator) to all of their currently enrolled students. The email sent by the teachers specifically invited students who had participated in the 2014-2015 WTPP to participate. The purpose of asking the teachers to email in addition to using the list from the prior year was to ensure the highest number of participants as possible. The underlying assumption was that teachers emailing currently enrolled students would have their most up-to-date contact information.

Survey

Step 1: The evaluator drafted the invitation e-mails mentioned above; these emails were submitted to, and approved by, the University of Central Florida's Institutional Review Board (IRB; Appendix D) as well as HCPS's Research, Accountability and Assessment's Research Board (Appendix E). The evaluator sent out the e-mail invitations and reminders in January and February of the 2015-2016 school year, the school year immediately following the WTPP implementation. Each e-mail invitation provided a link to the online survey. The first question of this survey was a parental consent question. The second question was a student assent question.

Step 2: Once parents and students completed the consent and assent process, the online survey was made available to the student.

Step 3: Study participants completed the online survey, with data captured electronically on a secure server (Qualtrics Software). Participants who took the survey were informed of the

additional opportunity to complete a one-on-one phone interview with the evaluator, during which time further data would be collected and recorded.

Step 4: Approximately five days after the initial invitation e-mail was sent, the evaluator sent an email to study participants and potential participants that included a thank you to those who completed the survey and a reminder for those who had yet to complete the survey. A single email addressing both parties was necessary because the survey was completely anonymous, and the evaluator could not differentiate between active participants in the study and those who had yet to participate.

Step 5: Approximately eight days after the initial e-mail invitation was sent to students in the study sample, the survey link was removed so they could no longer access the online surveys. However, the link was reactivated during the second and third trials in order to collect more data and increase participation rates.

Step 6: Step 6: The data were downloaded from the Qualtrics Software and imported into a Microsoft Excel spreadsheet. According to Qualtrics Software, data was collected from 27 surveys which were started and that had 90% of the survey questions answered. Therefore, each question will be analyzed using the total number of responses for individual questions. Including 165 as the population and 27 as the total number of respondents or sample size, the survey has an overall response rate of 16%.

Step 7: The Survey Questions were coded with matching Guiding Questions then triangulated with interview questions (also matched with correlating Guiding Questions) allowing for stronger and categorized analysis of results.

Interviews

Students in the sample population ($n = 27$) were emailed requesting that they volunteer to share their experiences participating in the WTPP. Volunteers were required to meet the following criteria:

- Must have participated in WTPP
- Must have completed the electronic survey, and
- Must have been full-time HCVS students.

Additionally, the students must provide a completed parental consent form to be selected. Digital consent would also be accepted from a parent's email account if they were unable to print and sign the consent form. The results of this process created a randomly selected subset consisting of interviewed students ($n_{\text{int.}} = 6$). Seven students contacted the evaluator to schedule an interview, and six of the seven phone calls for the interviews were scheduled based on the availability and convenience of the minor student, parent/guardian, and evaluator. The seventh student's schedule was not compatible with the evaluator's schedule. Therefore, six student interviews ($n_{\text{int.}} = 6$) were scheduled and successfully conducted.

Upon completion of the interview, participants were required to email the evaluator the teacher's name that recruited them. The evaluator then forwarded that email to the participant's teacher to confirm that the student earned enrichment activity credit. As noted previously, students who did not participate in this activity were offered an alternative activity for enrichment credit. Prior to sending the second round of emails (to the eligible population) that offered students an incentive (enrichment credit) to participate in the study, only one student volunteered to complete an interview. After receiving the second recruitment email containing

the offer of an incentive, the one student who had already agreed to participate in the interview process contacted the evaluator after receiving the revised email and was also issued enrichment credit.

Data Analysis

This study used formative evaluation design and applied mixed-methods of analysis. Descriptive Statistics and Non-Parametric analysis (likely due to small sample size) was used to analyze the quantitative data retrieved from Likert scale questions in the electronic survey.

Using Likert-type items, can be treated as interval-level data (if the distribution of responses is relatively normal). However, data can only be treated as interval-level data if the evaluator is using a scale (several items all measuring the same construct). This study uses single items during analysis, so it makes more sense to treat results as ordinal-level data.

Inferential statistics were used to correlate demographic data with Likert scale opinion questions. The Mann-Whitney (*U*) test and Kruskal-Wallis (*H*) tests were run on the corresponding Likert scale Survey Question items testing for ranking or distribution of rank. In order to organize Survey Questions to the correlating Guiding Question(s), Table 5 was created.

GQ1: In what ways did the WTPP facilitate student experiences and satisfaction?

GQ2: What opportunities and challenges evolved from the WTPP?

GQ3: What factors facilitated/inhibited participation in the WTPP?

Qualitative data were organized with their correlating Guiding Question. Then, further parallels between the Survey and Interview Questions were identified in the third column of

Table 6. Data from both sources were reviewed and conclusions were drawn from triangulation of the data from both the electronic survey and phone interview results.

Authorization to Conduct the Study

This study posed minimal to no risk to human participants. Despite limited risk to the human participants, approval from the University of Central Florida's (UCF) Institutional Review Board (IRB; Appendix D) was obtained. Additionally, since the electronic survey requested information from children, approval from HCPS was also obtained prior to any communication with HCVS (Appendix E). Permission from the IRB of UCF to extend the timeframe of the study was obtained (Appendix F) as well as IRB approval to interview only students and not parents/guardians for a total of five interview participants (Appendix G) and to offer extra enrichment activity credit to students who participated in the survey and interview (Appendix H).

Summary

This formative evaluative study explored the effect of Webcam proctoring on students taking summative assessments in a K-12 virtual school environment using the three Guiding Evaluation Questions created by the evaluator. Data were collected through an electronic survey and one-on-one phone interviews. Demographic data were gathered from both the survey instrument and the school's records. The electronic survey was the initial data point. The survey was provided online, and data were collected and stored on a secure server. Phone interviews were used as supporting data and recorded both through use of an audio recorder and through

transcription during the interview (due to malfunctioning of the audio recorder) by the evaluator and stored in a secure location.

The sample for this study consisted of 27 students who participated in the WTPP in the fall and spring semesters of the 2014-2015 school year at HCVS.

This study used formative evaluation design and applied mixed-methods of analysis. Descriptive Statistics were used to analyze demographic data and multiple-choice experience related questions. Non-Parametric analysis was used to analyze the quantitative data retrieved from Likert scale questions in the electronic survey. Qualitative data were reviewed and correlated to Guiding Questions as well as related Survey Questions.

CHAPTER 4 ANALYSIS AND RESULTS

The purpose of this study was to evaluate the implementation of a Webcam Test-Proctoring Program (WTTP), within a K-12 virtual school setting, to determine the effectiveness of this alternative assessment implementation process. This chapter reports descriptive, quantitative, and qualitative findings of the data collected from the electronic survey and interviews respectively. Data were organized using the study's evaluation questions. The Evaluation Questions drove this study and have two main components: intended outcomes of students' experience in the WTTP and the impact of the internal and external factors during the implementation process. The evaluation questions consisted of three Guiding Questions and one Implementation Question. Data retrieved and discussed in Chapter 4 refers to the Implementation Question innately within each Guiding Question.

Guiding Questions

1. In what ways did the Webcam Test-Proctoring Program facilitate student experiences and satisfaction?
2. What opportunities and challenges evolved from the Webcam Test-Proctoring Program?
3. What factors facilitated/inhibited participation in the Webcam Test-Proctoring Program?

Implementation Question

1. How did internal and external factors impact the program?

There are three Evaluation Questions labeled as Guiding Questions and one Implementation Question. The Implementation Question considers factors impacting the implementation of the WTTP—in which responses to each question are relative. Therefore, the Evaluation Implementation Question is not used as a specific subheading within the discussion of the data results; however, reflections of internal and external factors impacting the program can be found in quantitative and qualitative responses under each of the three Guiding Questions. The Evaluation Questions drove this study and have two main components: intended outcomes of students' experience in the WTTP and the impact of the internal and external factors during the implementation process. These key areas constituted a problem of practice to solve within a K-12 virtual school, HCVS.

Demographic Data

Upon analyzing the results of the electronic survey, it is important to note 27 began the survey, and 23 completed the full survey. Therefore, the sample for this study was 27 students. All analyses were run using any surveys that were started – missing responses were automatically left out of each analysis. Demographic questions gathered specific information about HCVS students' age, grade (during the implementation of the WTTP), and gender. Fifteen male students and 12 female students responded to the question asking their gender in the electronic survey (Table 7).

Table 7

*Descriptive Statistics for Gender of Students
Completing Electronic Survey*

Gender	<i>n</i>	%
Male	15	55.6
Female	12	44.4

Students' ages varied between ages 13 to 19 years (Table 8). The mode (18.5%) of the largest populations completing the survey was students who were 13 and 15 years old at the time he or she completed the survey. A total of 27 students completed this question on the electronic survey.

Table 8

*Descriptive Statistics for Age of Students
Completing Electronic Survey*

Age	<i>n</i>	%
13	5	18.5
14	4	14.8
15	5	18.5
16	4	14.8
17	4	14.8
18	3	11.1
19	2	7.4

The demographic make-up of the sample ($n = 27$), in terms of ethnicity, mirrors that of the school's enrollment of Caucasian and Hispanic populations during the 2014-2105 academic year (Table 9). Demographic information about the school's enrollment was sent to the

researcher directly from HCVS. In the spreadsheet received from HCVS, Arab was not an optional category and, therefore, data was not available.

Table 9

Descriptive Statistics by Ethnicity

Ethnicity	% of Total Enrollment	% Completed Survey
African American	16	3.8
Caucasian	48	44.4
Hispanic	27	22.2
Arab	N/A	7.4
Multi-Racial	9	18.5

The final demographic question asked students to report their grade level during the 2014-2015 school year. Table 10 provides a visual representation of the makeup of the sample population by grade, which is representative of the school’s total enrollment make up in the fall of 2014. The smallest percentage in both HCVS’s total enrollment and survey participation were the sixth-graders (8% to 4%). Other percentage makeup of HCVS’s total enrollment is included here:

Table 10

Descriptive Statistics by Grade

Grade	Percentage of Total Enrollment	Percentage of Test Takers by Grade
6	8%	4%
7	11%	7%
8	10%	26%
9	15%	19%
10	16%	19%
11	19%	11%
12	16%	15%

Quantitative Data Analysis

Quantitative data were analyzed using descriptive and non-parametric inferential statistics. Most descriptive statistics collected demographic and participation type data. The inferential statistics were used to analyze Survey Questions 11, 13, 6, and 12 respectively and will be broken down in tables as discussed under each correlating Guiding Question section.

Qualitative Data Analysis

The evaluator was interested in gathering more detailed accounts of student experiences during the WTPP, so she conducted six student interviews to gather qualitative results to help clarify and elaborate upon student responses from the electronic survey (Appendix I). Responses from Interviewee 1, 2, and 3 will show as quotations, as these interviews were recorded and transcribed. Responses from Interviewees 4, 5, and 6 will show as paraphrased due to technical difficulties with recording during the time of each interview. All direct responses provided are intended to support the results of the quantitative analysis and ultimately help the evaluator respond to each Guiding Question.

Guiding Question 1

Results from the electronic survey that yielded the most pertinent data were Survey Question 11, a Likert scale question including four sub-sections and Interview Responses from Questions 1 and 2. Data from Survey Question 11 (SQ11), as correlated to pertinent demographic information is also provided. The subheadings in this section are used to organize and help answer Guiding Question 1 (GQ). The sub-headings are based on the key topic of each sub-question in SQ 11: Ease of Use, Assistance from the Test Coordinator, Assistance for Secure

View and Overall Organization. Qualitative data are organized under each sub question category as pertinent to answering GQ1.

SQ 11_1 Ease of Use during the Webcam Proctoring Set Up

Students were satisfied overall with the ease of use during the Webcam proctoring set up process according to the findings from question SQ11_1. Table 11 shows that the mean and mode response, on a 5-point scale, was a 4, or “Satisfied.”

Table 11

Results for Survey Question 11_1: Webcam Set Up

Items	<i>N</i>	Minimum (Very dissatisfied)	Maximum (Very Satisfied)	Mean	Median	Mode
SQ11_1: Ease of use during the Webcam proctoring set up	22	1	5	3.55*	4	4

**Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)*

A Mann-Whitney *U* test was performed to determine whether differences in satisfaction levels for ease of use during the Webcam proctoring set up existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for males (mean rank = 13.15) and females (mean rank = 10.50) were not different to a statistically significant degree, $U = 50.000$, $z = -.963$, $p = .376$, using an exact sampling distribution for *U*.

A Kruskal-Wallis *H* test was performed to determine whether differences in satisfaction levels for ease of use during the Webcam proctoring set up existed among age groups or among grade levels. No statistically significant differences among age groups existed on this measure,

$H(6) = 5.031, p = .540$. No statistically significant differences among grade levels existed on this measure, $H(6) = 4.740, p = .578$.

A Kruskal-Wallis H test was also performed to determine whether differences in satisfaction levels for ease of use during the Webcam proctoring set up existed among ethnic groups: African American ($n = 1$), Caucasian ($n = 12$), Hispanic ($n = 6$), Arab ($n = 2$), and multi-racial ($n = 5$). Out of the 27 students began the survey, nine students did not submit a response to this question in the electronic survey. A visual inspection of the boxplot revealed that distributions of self-reported satisfaction levels on this item were not similar among all groups. A statistically significant difference in satisfaction levels for ease of use existed among ethnic groups on this measure, $H(4) = 10.796, p = .029$ (Table 12).

Table 12

Results for Survey Question 11_1: Ease of Use for Webcam Set Up by Ethnicity

Ethnicity	n	H	df	p
African American	1			
Caucasian	12			
Hispanic	6	10.796	4	.029
Arab	2			
Multi-Racial	5			

Pairwise comparisons with adjusted p -values showed that there were no significant differences in perception of ease of use between African-American and multi-racial respondents ($p = 1.000$), African-American and Hispanic respondents ($p = 1.000$), African-American and Caucasian respondents ($p = 1.000$), African-American and Arab respondents ($p = .380$), multi-racial and Hispanic respondents ($p = .639$), multi-racial and Caucasian respondents ($p = .216$), Hispanic and Caucasian respondents ($p = 1.000$), Hispanic and Arab respondents ($p = 1.000$), or

Caucasian and Arab respondents ($p = 1.000$). However, satisfaction levels related to ease of use were significantly different between multi-racial and Arab respondents, however ($p = .042$).

Results from student interviews show that the majority of students felt the setup process was easy to follow and they were, therefore, satisfied. Interview Questions (IQ) 1 and 2 were innately based on students’ feelings about the WTPP’s implementation. These questions help support the findings from the electronic survey, particularly in SQ11_1. When asked IQ1, “How well was the pilot program implemented? Please elaborate on why you feel that way.” Interviewee 4 felt it was a really efficient way of testing. He liked that students can test from home and feel more comfortable. Students were then asked in IQ2, “Was the program run smoothly and easy to access in your opinion? Why or why not?” Interviewee 1 stated: “Yes, the program was very smooth, you would just open it up and the tests were right there for you. It did take a little bit of time in the beginning to set up, but afterward, it was very smooth.”

SQ 11_2 Assistance from Testing Coordinator

The majority of students were satisfied or very satisfied with the assistance they received from the test coordinator according to the findings from question SQ11_2. Table 13 shows the mode response, on a 5-point scale, was a 5, or “Very Satisfied.”

Table 13

Results for Survey Question 11_2: Coordinator Assistance

Items	N	Minimum (Very dissatisfied)	Maximum (Very Satisfied)	Mean	Median	Mode
SQ11_2: Assistance from the testing coordinator	22	1	5	3.86*	4	5

**Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)*

A Mann-Whitney U test was performed to determine whether differences in satisfaction levels for assistance from the testing coordinator existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for males (mean rank = 12.50) and females (mean rank = 11.35) were not different to a statistically significant degree, $U = 58.500$, $z = -.422$, $p = .693$, using an exact sampling distribution for U .

A Kruskal-Wallis H test was performed to determine whether differences in satisfaction levels for assistance from the testing coordinator existed among age groups or among grade levels. No statistically significant differences among age groups existed on this measure, $H(6) = 9.066$, $p = .170$. No statistically significant differences among grade levels existed on this measure, $H(6) = 8.702$, $p = .191$.

An additional Kruskal-Wallis H test was performed to determine whether differences in satisfaction levels for ease of use during the Webcam proctoring set up existed among ethnic groups: African American ($n = 1$), Caucasian ($n = 12$), Hispanic ($n = 6$), Arab ($n = 2$), and multi-racial ($n = 5$). A visual inspection of the boxplot revealed that distributions of self-reported satisfaction levels on this item were not similar among all groups. A statistically significant difference in satisfaction levels for ease of use existed among ethnic groups existed on this measure, $H(4) = 10.374$, $p = .035$ (Table 14).

Table 14

Results for Survey Question 11_2: Coordinator Assistance by Ethnicity

Ethnicity	<i>n</i>	<i>H</i>	<i>df</i>	<i>p</i>
African American	1			
Caucasian	12			
Hispanic	6	10.374	4	.035
Arab	2			
Multi-Racial	5			

Pairwise comparisons with adjusted *p*-values showed that there were no significant differences in satisfaction for assistance from the testing coordinator among any pairs of groups, including: between African-American and multi-racial respondents ($p = 1.000$), African-American and Hispanic respondents ($p = 1.000$), African-American and Caucasian respondents ($p = .740$), African-American and Arab respondents ($p = .354$), multi-racial and Hispanic respondents ($p = 1.000$), multi-racial and Caucasian respondents ($p = .334$), multi-racial and Arab respondents ($p = .242$), Hispanic and Caucasian respondents ($p = 1.000$), Hispanic and Arab respondents ($p = .567$), or Caucasian and Arab respondents ($p = 1.000$). The lack of a statistically significant pairwise difference despite the statistically significant difference overall indicates that there are differences between groups that exist and affect the overall result but the origin of the difference cannot be determined.

Results from student interviews showed limited support for whether students were satisfied or dissatisfied with their assistance from their experience receiving assistance from the test coordinator. Most students did not provide any specific feedback about an interaction with the test coordinator, with the exception of Interviewee 2, who had the most severe technology issues of all interviewees. Interviewee 2 stated:

“It (WTPP) was easy to use, although even though, every time I had to open it to use it I did have to go through so many steps. The testing was giving me problems. I remember one time when I couldn’t take any tests because it was all blank. So I called technical support (Secure View), I can’t recall, but I don’t think the problem was ever solved. Then, I was contacted (by the test coordinator) to take the test in the physical school building because the other exams did not show up.”

This student was only able to complete one assessment via WTPP due to his technology issues. He was required to complete his remaining tests in a F2F test proctored room with other students who had similar issues or who did not receive consent to participate in the WTPP.

Despite his technology issues, when asked at the end of the interview if he would like to add any additional comments he mentioned, “Yes, I would say that I may have sounded like I did not like it, I did like it better than F2F.”

SQ 11_3 Technology Assistance from Secure View

Students were satisfied overall with the ease of use during the Webcam proctoring set up process according to the findings from question SQ11_3. Table 15 shows that the mean and mode response, on a 5-point scale, was a 3.5 and 4, respectively, or “Satisfied.”

Table 15

Results for Survey Question 11_3: Technology Support Assistance

Items	<i>N</i>	Minimum (Very dissatisfied)	Maximum (Very Satisfied)	Mean	Median	Mode
SQ11_3: Technology assistance from Secure View (using the 1-800 number on the instruction sheet)	22	1	5	3.32*	3.50	4

**Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)*

A Mann-Whitney U test was performed to determine whether differences in satisfaction levels for technology assistance from Secure View existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for males (mean rank = 12.81) and females (mean rank = 10.95) were not different to a statistically significant degree, $U = 54.500$, $z = -.672$, $p = .522$, using an exact sampling distribution for U .

A Kruskal-Wallis H test was performed to determine whether differences in satisfaction levels for technology assistance from Secure View existed among age groups, grade levels, and ethnic groups. No statistically significant differences among age groups existed on this measure, $H(6) = 6.978$, $p = .323$. No statistically significant differences among grade levels existed on this measure, $H(6) = 5.242$, $p = .513$. Nor were there statistically significant differences among ethnic groups existed on this measure, $H(4) = 2.699$, $p = .609$.

Interview Question 5 (IQ5) is a two-part question that helps support the findings from the electronic survey, particularly in SQ11_3. Results from student interviews show that the majority of students were satisfied with their assistance from Secure View. Interview Question 5 was created with intent to learn about any technology issues which may have impacted overall student experiences; however, the majority of feedback was positive with only Interviewee 1 and 2 citing any technology issues.

When asked IQ5, “Did you receive any feedback from Secure View (Webcam proctoring company) or HCVS administration regarding academic integrity breeches? Do you feel this assessment was accurate?” Three specific student responses included details regarding the feedback they received based on their recorded assessment session:

- Interviewee 2: Disappeared from the camera view for a few seconds and was placed under review by Secure View.
- Interviewee 4: “There was a knocking on the window behind me and I turned around to check what it was. The Webcam monitor said that I went out of view of the camera.”
- Interviewee 5’s statement, paraphrased: Feedback received from Secure View included the fact that a piece of paper was used even though the paper was shown to the Webcam. There were no hints or cheats on the paper before starting the assessment.

Interviewee 5 felt that Secure View’s review of her recorded assessment session was accurate because there could have been shadows that made it look like the paper had wording, therefore she stated that it was good that HCVS administration contacted her. Based on her experience, with detailed feedback from Secure View and the HCVS test coordinator, Interviewee 5 felt the use of a Webcam as a proctor reported accurate findings, and it was good that this behavior was noted and addressed, even though it was an actual breach of integrity.

SQ 11_4 Overall Organization of the WTPP

Students were satisfied overall with the organization of the Webcam proctoring set up process according to the findings from question SQ11_4. Table 16 shows that the mean and mode response, on a 5-point scale, was a 4, or “Satisfied.”

Table 16

Results for Survey Question 11_4: Overall Organization

Items	<i>N</i>	Minimum (Very dissatisfied)	Maximum (Very Satisfied)	Mean	Median	Mode
SQ11_4: Overall organization	22	1	5	3.77*	4	4

*Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)

A Mann-Whitney *U* test was performed to determine whether differences in satisfaction levels for overall organization existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for males (mean rank = 12.85) and females (mean rank = 9.56) were not different to a statistically significant degree, $U = 41.000$, $z = -1.243$, $p = .262$, using an exact sampling distribution for *U*.

A Kruskal-Wallis *H* test was performed to determine whether differences in satisfaction levels for overall organization existed among age groups and among grade levels. No statistically significant differences among age groups existed on this measure, $H(6) = 7.752$, $p = .257$. No statistically significant differences among grade levels existed on this measure, $H(6) = 4.558$, $p = .602$.

Another Kruskal-Wallis *H* test was performed to determine whether differences in satisfaction levels for overall organization during the Webcam proctoring set up existed among ethnic groups: African American ($n = 1$), Caucasian ($n = 12$), Hispanic ($n = 6$), Arab ($n = 2$), and multi-racial ($n = 5$). A visual inspection of the boxplot revealed that distributions of self-reported satisfaction levels on this item were not similar among all groups. A statistically

significant difference in satisfaction levels for ease of use among ethnic groups existed on this measure, $H(4) = 9.830, p = .043$ (Table 17).

Table 17

Results for Survey Question 11_4: Overall Organization by Ethnicity

Ethnicity	<i>n</i>	<i>H</i>	<i>df</i>	<i>p</i>
African American	1			
Caucasian	12			
Hispanic	6	9.830	4	.043
Arab	2			
Multi-Racial	5			

Interview Questions 1, 2, 3, and 5 all contributed to gathering results that support the student’s perception of the organization of the WTPP. As related to the GQ1, the factors that made the WTPP overall successful implementations were as follows: IQ1 asks, “How well was the pilot program implemented? Please elaborate on why you feel that way. Responses to this question remained consistent, with the majority of students responding with “rather well” or “pretty well.” When tabulating responses, three categories were created for this question, including similar response terms such as “pretty well or good,” “very well” or “really well,” and “not well.” Only Interviewee 6 responded negatively due to issues locating a Webcam that was compatible with his home computer.

Guiding Question 2

The WTPP provided a flexible and secure option for student testing which aligned directly with the program’s intentions. Results from the electronic survey that yielded the most pertinent data supporting this claim were SQ 10, a Likert scale question including three sub-sections, Survey Question 13, and Question 6.

Data from SQ10, as correlated to pertinent demographic information is also provided using inferential statistics. The subheadings in this section are used to organize and help answer Guiding Question 2 (GQ). The sub-headings are based on the key topic of each sub-question in SQ10: Webcam Proctoring Flexibility, Use of Webcam Proctoring, and Opportunity for Additional Webcam Proctored Tests.

Qualitative data are organized under each sub-question category as pertinent to supporting GQ2.

SQ10_1: Webcam Proctoring Testing Flexibility

Results from SQ 10_1 show that students felt that flexibility in testing for full time students was “Very Important.” Table 18 shows the mean and mode response, on a 5-point scale, was 4.48 and 5, respectively, or “Important” and “Very Important.”

Table 18

Results for Survey Question 10_1: Flexibility in Test Methods

Items	N	Minimum (Neutral)	Maximum (Very important)	Mean	Median	Mode (Very important)
SQ10_1: How do you feel about mandatory testing methods becoming more flexible for full-time virtual students?	23	3	5	4.48*	5	5

**Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)*

A Mann-Whitney *U* test was performed to determine whether differences in perceived importance of Webcam testing flexibility existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for

males (mean rank = 12.73) and females (mean rank = 11.05) were not different to a statistically significant degree, $U = 55.500$, $z = -.678$, $p = .563$, using an exact sampling distribution for U .

A Kruskal-Wallis H test was performed to determine whether differences in perceived importance of Webcam testing flexibility existed among age groups, as well as ethnic groups and finally among grade levels. No statistically significant differences among age groups existed on this measure, $H(6) = 6.057$, $p = .417$. No statistically significant differences among ethnic groups existed on this measure, $H(4) = 8.443$, $p = .077$. No statistically significant differences among grade levels existed on this measure, $H(6) = 5.761$, $p = .450$.

SQ10_2: Use of Webcam Proctoring

Results from SQ 10_2 show that students felt the use of Webcam proctoring as an alternative to face-to-face proctoring was “Somewhat Important.” Table 19 shows that the mean and mode response, on a 5-point scale, was 4, or “Somewhat Important.”

Table 19

Results for Survey Question 2: Webcam Proctoring

Items	<i>N</i>	Minimum (Not important)	Maximum (Very important)	Mean	Median	Mode (Somewhat important)
Q10_2: How do you feel about the use of Webcam proctoring?	23	2	5	3.70*	4.00	4

**Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)*

A Mann-Whitney U test was performed to determine whether differences in perceived importance of Webcam test-proctoring existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for males

(mean rank = 11.23) and females (mean rank = 13.00) were not different to a statistically significant degree, $U = 75.000$, $z = .650$, $p = .563$, using an exact sampling distribution for U .

A Kruskal-Wallis H test was performed to determine whether differences in perceived importance of Webcam test-proctoring existed among age groups. No statistically significant differences among age groups, among ethnic groups or among grade levels existed on this measure, $H(6) = 1.915$, $p = .927$. No statistically significant differences among ethnic groups existed on this measure, $H(4) = 1.560$, $p = .816$. No statistically significant differences among grade levels existed on this measure, $H(4) = 2.579$, $p = .860$.

SQ10_3: Opportunity for Additional Webcam-Proctored Tests

Results from SQ 10_3 show that students felt the use of Webcam proctoring as an alternative to traveling to a physical school location for F2F proctoring for additional mandatory assessments throughout the school year was “Somewhat Important.” Table 20 shows the mean and mode response, on a 5-point scale, was 4, or “Somewhat Important.”

Table 20

Results for Survey Question 10_3: Future Webcam Proctoring

Items	<i>N</i>	Minimum (Very unimportant)	Maximum (Very important)	Mean	Median	Mode (Somewhat important)
Q10_3: How would you feel about the opportunity to take more secure tests via Webcam proctor instead of having to go to a physical school location?	23	1	5	3.78*	4.00	4

**Use with caution based on scale being ordinal in nature rather than truly interval/ratio (continuous)*

A Mann-Whitney U test was performed to determine whether differences in the importance of additional opportunities for Webcam test proctoring existed between males and females. The distribution of responses among males and females on this item were similar. Responses on this item for males (mean rank = 12.96) and females (mean rank = 10.75) were not different to a statistically significant degree, $U = 53.500$, $z = -.814$, $p = .446$, using an exact sampling distribution for U .

A Kruskal-Wallis H test was performed to determine whether differences in the importance of additional opportunities for Webcam test proctoring existed among age groups, among ethnic groups or among student grade levels. No statistically significant differences among age groups existed on this measure, $H(6) = 3.307$, $p = .769$. No statistically significant differences among ethnic groups existed on this measure, $H(4) = 3.699$, $p = .448$. No statistically significant differences among grade levels existed on this measure, $H(4) = 1.242$, $p = .975$.

SQ13: Webcam Proctoring as a Preference

Findings from Survey Question 13 (Table 21) also support GQ2. The majority of students (63%) cited reduced travel time as a reason for preferring Webcam proctoring to F2F testing (30% to 25%, respectively) according to results from Survey Questions 7 and 8, which asked students to rate their preferred method of proctoring on a scale using 0 to 5 from least to most preferred. Students were able to select more than one response for this question; therefore, it is important to note that the next highest percentages were equal. The next highest points highlight the importance of flexibility for a virtual student, with 44.4% of students selecting flexibility in their schedule and testing from home as their preferences. Guiding Question 2 asks,

“What opportunities and challenges evolved from the WTPP?” which includes providing students flexibility while securing the setting for their assessments. Survey Question 13 shows the flexible nature of the WTPP that is afforded to students in both setting and scheduling.

Table 21

Results of Survey Question 13: Importance of Webcam Proctoring for Mandatory Testing

Items	<i>n</i>	%
It reduces my travel time (time spent driving to and from campus)	17	63.0
I do not have transportation readily available	6	22.2
My schedule requires flexibility	12	44.4
I feel more comfortable testing on my own computer	11	40.7
I feel more comfortable testing at home	12	44.4

Guiding Question 2 infers that the WTPP was intended to provide a secure setting for students to complete their assessments in addition to flexibility. Therefore, Interview Question 6 (IQ6) asks, “As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face-to-face proctoring? Why?” The evaluator did have to clarify part of the question for each student, as “secure” testing was not a readily familiar term.

Interviewees seemed to hesitate slightly in the interviews about responding on the topic of whether Webcam proctoring was as secure as F2F proctoring. Interviewee 1 noted the following:

“As for secure, I am not sure, because students were passing around rumors about how you could write down notes or use them during the test, or open programs on a virtual computer and the program won’t notice it. I don’t cheat personally, but it seems that could be easily fixed by having someone sitting and watching the Webcam.”

Interviewee 1 felt it was necessary to clarify that he does not cheat but could have cheated more easily with a Webcam versus in a F2F setting due to lack of physical presence of a person.

Interviewee 4 offered a similar observation (paraphrased): With the Webcam there is the possibility of cheating if you hang a picture of an answer sheet behind the camera, but with a teacher in room I feel it would be way harder because the teacher is walking up and down the class watching everything that you are doing. Interviewee 1 also suggested how to reduce the likelihood of this issue: have a live person watching the Webcam. Overall, those students who felt Webcam proctoring was less secure than traditional F2F testing also mentioned they felt that having a person watching over the testing environment limits opportunities to cheat.

In the first part of IQ 6, students are asked about convenience, another intention of the WTPP. Interviewees 3 and 5 cited schedule flexibility as a perk and a reason for their preference, while interviewees 1, 2, and 6 specifically mentioned the issue of travel in their responses and how this was an issue for them, thus validating the problem of practice.

For example, Interviewee 1 noted: “I find it way more convenient of course because my family lives way out in the middle of nowhere. Much more convenient than driving into the campus.”

Interviewee 6 also supported the travel concern in his response that has been paraphrased by the evaluator: I find it more convenient because now I don’t have to drive all the way to these proctoring places. We had to drive way away before this option and we got lost for almost an hour then we almost didn’t make it in time for the test so it is more convenient to have a Webcam in my opinion.

Guiding Question 3

What factors facilitated/inhibited participation in the WTPP?

Guiding Question 3 sought quantitative responses of specific numbers of students who participated in the WTPP. These data can be found by analyzing the descriptive statistics from Survey Questions 5, 6 and 12, and comparing the first to second session in order to show improvement or decline in overall participation.

Quantitative Analysis

Upon analyzing SQ5, it is clear that participation was higher during the October or Fall session with 52% of respondents participating as compared to 16% participating in the January or Spring session (Table 22). There were only 20% of all participants who completed this survey who participated in both of the WTPP test sessions.

Table 22

Results for Survey Question 5: Proctoring Session Participation

Session	<i>n</i>	%
October 27 – October 31	13	52.0
January 26 – January 30	4	16.0
Both	5	20.0
Neither	3	12.0

Survey Question 6 asks students to show the method they used to complete the benchmark assessments during the 2014-2015 school year. The majority (80%) of students who completed this electronic Survey Question selected WTPP (Table 23). The remaining students who answered this electronic Survey Question either completed their assessments at the HCVS

campus using F2F proctoring (11.5%) or they did not complete the benchmark assessments at all (7.7%).

Table 23

Results for Survey Question 6: 2014-2015 Benchmark Methods

Items	<i>n</i>	%
Webcam Proctoring	21	80.8
Face to face Proctoring (at the HCVS campus)	3	11.5
Did not complete any HCVS benchmark tests during 2014-2015 school year	2	7.7

To further determine a reason for students not participating in both WTPP sessions, SQ 12 asked students to select or provide a reason or explanation. Table 24 shows the Other option as 100% of the response rates. Along with this option, there was a comment box that was intended for students to supply their alternative reasoning; however, only 2 of the 4 students who selected this option provided a response. The first responses stated, "I did all of the benchmark tests via Webcam proctor." Therefore, this student should not have responded to SQ 12 at all. The second response stated, "Do not remember if I completed the January testing." The next most significant number of responses was in the areas of technology issues and lack of parental consent, both at 25%.

Table 24

Results for Survey Question 12: Reasons for Not Completing the 2014-2015 Benchmark Methods

Items	<i>n</i>	%
Technology issues	3	25.0
I was only enrolled with HCVS during only one (October 2014 or January 2015) testing window	2	16.7
Parent/guardian did not elect for me to participate	3	25.0
Other	4	100.0

Qualitative Analysis

Similar to Guiding Question 2, upon analyzing results to determine if GQ3 can be answered, IQs 3 and 4 yielded results regarding student technology issues that could lead to the explanation of why student improvement in the WTPP declined from Session 1 to Session 2.

Three of the six students interviewed cited technology issues.

IQ3: Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the Webcam and logged into Performance Matters)?

Interviewee 1: “The minor issue where the task manager thought I was cheating. It said I had something open, but I did not. That took me a little while to fix, but after that everything ran really nicely, really smoothly, no problems afterward.”

Evaluator: Who said you were cheating? Feedback from Secure View?

Interviewee 1: “No, not exactly, the program stopped and states you cannot continue unless you close this program meaning outside Web source. But again that only took a little bit to fix so that was no problem.”

Evaluator: So even though you had nothing open what was your solution?

Interviewee 1: “The solution was I contacted support and they told me to restart the program, then afterward it ran smooth.”

Interviewee 2: “Once logged in to the page to see the tests was where I had the problems.”

IQ 4: Did you have any difficulty gaining access to a Webcam? Or setting up the Webcam on your computer?

Interviewee 6 (paraphrased): Yes, it was hard to find one that would work with my computer so I had to order it off of eBay before the exam started. I contacted IT once because it locked me out of my test, but not for the setup of the Webcam.

Summary

This study was conducted during the fall and spring semester of the 2014-2015 school year at HCVS, and the study consisted of 27 students who completed their benchmark assessments via participation in the WTPP. The purpose of this formative evaluation was to examine the implementation of the WTPP in this K-12 virtual school setting. An electronic survey created by the evaluator and research chair gathered quantitative data that was analyzed using descriptive and inferential statistics. The Kruskal-Wallis and Mann-Whitney inferential statistics approaches were run in order to determine relationships between specific demographic groups and their experiences and preferences regarding Webcam proctoring.

Additionally, qualitative data were collected through one-on-one phone interviews with six students who participated in the WTPP. Data from these interviews yielded supporting statements for the quantitative data analyzed. Chapter 5 provides an interpretation of the results of the statistical analyses and recommends further research.

Data retrieved and discussed from both the electronic survey and interviews were organized according to the study's evaluation questions. The evaluation questions for this study fall into two areas of focus: (a) intended outcomes and (b) implementation. The evaluator developed Guiding Questions to gather feedback regarding student experiences related to testing outside of a typical F2F proctored environment. The implementation question was designed to

determine areas of improvement for the study-related technologies, more specifically, the Webcam proctoring software as tied to the Web-based assessments.

Results for the Implementation Question are discussed within each of the three Guiding Questions. Chapter 5 provides an interpretation of the results of the statistical analyses and recommends further research.

CHAPTER 5 DISCUSSION AND CONCLUSION

Introduction

Chapter 5 presents a discussion of the results of the data analysis presented in Chapter 4, and recommendations for future research are provided. The purpose of this formative evaluation research study was to determine the effectiveness of the first-time implementation of a Webcam Test-Proctoring Program (WTPP) in a K-12 virtual school. There were three Guiding Questions and one Implementation Question that looked at internal and external factors affecting the WTPP. Data retrieved and discussed in Chapter 4 refers to the Implementation Question innately within each of the Guiding Questions. The evaluation's three Guiding Questions will be used as an organizational structure for this discussion. Following discussions, are the practical implications, limitations, conclusions and recommendations for future research.

The questions that guided this formative evaluation study were:

1. In what ways did the Webcam Test-Proctoring Program facilitate student experiences and satisfaction?
2. What opportunities and challenges evolved from the Webcam Test-Proctoring Program?
3. What factors facilitated/inhibited participation in the Webcam Test-Proctoring Program?

Overview of the Evaluative Study

The intent of this formative evaluation study was to gather feedback based on students' experiences during the implementation of the WTPP. This feedback will be used to determine if Webcam proctoring is a viable option for proctoring secure assessments to future 6th-12th grade virtual students. The implementation of this WTPP was in response to an identified problem of practice within a K-12 virtual school—Hurricane County Virtual School (HCVS).

The problem of practice was a lack of participation in the multitude of mandatory assessments, which were created for students in traditional classrooms, thus being proctored in F2F settings. The purpose of this study was to determine if overall test participation would increase overall in virtual schools if Webcam proctoring was implemented in virtual schools. Participation in Hurricane County Public School's (HCPS) benchmark assessments was lacking due to access limitations by a subset of the student population who had difficulty with the lack of flexibility in the testing setting. Consider a student who otherwise may not have been able to attend this assessment in person due to location, disability, or scheduling conflicts (Yates & Beaudrie, 2009).

Ultimately, participation in HCPS's benchmark assessments was required in order to allow for schools to build portfolios showing student progress throughout the school year. Thus, prior to taking the required Florida Standards Assessment (FSA), teachers and administrators would be able to identify areas where students would need additional academic support. Per No Child Left Behind (NCLB) Act and the Elementary and Secondary Education Act (ESEA), student improvement and passing scores on the FSA are the measurements for school districts to receive federal funding (NCLB Act, 2001, 2008).

Guiding Question 1: Discussion

In what ways did the Webcam Test-Proctoring Program facilitate student experiences and satisfaction?

As an evaluation of a first-time program implementation of the Webcam Test-Proctoring Program, it was expected that feedback would yield suggestions for improvement. Responses to survey and Interview Questions correlated to Guiding Question 1 provided data showing that the overall setup process could be further simplified for future implementation; however, the process used for implementation was ranked easy to use by the majority (34.8%) of students surveyed (Table 25). The number of students who were Dissatisfied was the same as those who were Very Satisfied (21.7%). Although most students responded with a positive overall response, it is important to address those who may have had a poor experience to learn how future implementations of the WTPP could be more successful.

Table 25

Results for Survey Question 11_1: Ease of Use during Webcam Proctoring Set Up

Response	<i>n</i>	%
Very dissatisfied	1	4.3
Dissatisfied	5	21.7
Neutral	4	17.4
Satisfied	8	34.8
Very satisfied	5	21.7

To make the WTPP possible, there was a collaboration of Webcam proctoring software and student assessment release software powered by Secure View and Performance Matters Software respectively. The release of assessments was facilitated by the HCVS testing

coordinator, but the entry of student data including course enrollment was entered by the school registrar and linked to the school districts electronic internal databank. For participants, both student and/or parents alike, software collaboration would not have been evident. In the unlikely event of technical difficulty, this information had to be diagnosed by all stakeholders involved.

The results from the electronic survey revealed that the majority of participants were pleased with assistance offered by the HCVS coordinator (70% Satisfied or Very Satisfied with their service). While the assistance they received from Secure View was also ranked well (48% satisfied or very satisfied), it also yielded the highest number of "Dissatisfied" responses (26%). This is possibly due to the lack of control Secure View had over the assessment release software: in these cases, students then referred to the test coordinator for further technical assistance or to be scheduled for a F2F exam in the case that there was not a technical solution available. Although this number represents a minority, it highlights the importance of a strong technical support team. Technical assistance would be an area in which improvement of processes would be sought prior to future implementation, as it played a large role in the overall satisfaction of implementation of the WTPP, thus answering Guiding Question 1.

The majority (68%) of students felt the overall organization (Table 26) of the WTPP was successful (satisfied or very satisfied) which provides strong evidence in answering GQ1. Furthermore, evidence supporting that HCVS students felt the implementation of the WTPP was successful is based on results from 74% of students stating they felt the use of Webcams for future assessments was important or somewhat important—thus implying they felt the implementation of this WTPP was a success.

Table 26
Results for Survey Question 11_4: Overall Organization

Response	<i>n</i>	%
Very dissatisfied	1	4.5
Dissatisfied	1	4.5
Neutral	5	22.7
Satisfied	10	45.5
Very satisfied	5	22.7

Results from SQ11 were relevant to GQ11 as they provide feedback on student satisfaction levels regarding each topic surrounding the implementation of the WTPP: Ease of Use, Assistance from the Test Coordinator, Assistance for Secure View and Overall Organization. Inferential statistics tests were used on each individual question in this Likert Scale in an attempt to find correlations between the following: (a) topic and student gender, (b) the topic and student age, (c) the topic and student ethnic group, and (d) the topic and student grade level. There was a statistical significance in the area of ethnicity. Results suggest that there was statistical significance which may have been due to the large difference in the Caucasian variable as compared to the response number to all other student ethnicities that completed this Survey Question. All other areas tested resulted in no statistical significance. Thus, there was little correlation between demographic information and student satisfaction of the implementation of the WTPP.

Student demographics could become a focus of future studies in order to specify if Webcam proctoring is beneficial to certain racial/ethnic groups and/or gender. More specifically, future studies are recommended to encompass the accepted national demographic

sub-groups, as defined in the Elementary and Secondary Education Act, and their willingness to participate. Evaluative studies in this area could also include qualitative questions, asking students why they feel more comfortable testing from an environment of their choosing. See Implications and Suggestions for Future Research sections at the end of this chapter for more detail.

Guiding Question 2: Discussion

What opportunities and challenges evolved from the Webcam Test-Proctoring Program?

Students felt that the WTPP provided a flexible and secure option for testing, which aligns directly with the purpose and intentions of the implementation of the program's. Sixty-three percent of students felt reduced travel time was an important factor in leading to their preference of Webcam proctoring. Additional evidence, reveals that 44.4% of students prefer Webcam proctoring because they felt more comfortable testing from home. Foster (2006) cites a recent study by Western Governors University that reported that 92% of students preferred testing in their own homes and 76% of this group reported feeling more confident in their performance. HCVS students also preferred Webcam proctoring due to their schedule requiring the flexibility (44.4%).

The first part of IQ6 asked students if Webcam proctoring was more or less convenient when compared to F2F proctoring. All six interviewees responded that Webcam proctoring was more convenient than F2F proctoring. This data also supported GQ2, indicating that providing flexibility to a rigid assessment schedule was key to solving the problem of practice. Students and parents of virtual students seek out school choice programs to solve issues and problems that

they are having with their traditional school setting. According to HCVS climate surveys and personal discussions with parents and students (2010-2015), incentives to enroll in virtual schools include the flexibility in time and location as well as removing students from hostile or high stress environments. Although testing can be considered high-stress to some students, testing cannot be avoided in a public school. Allowing students to test from home using a secure WTPP seemingly was the next best option. Suggestions for future studies include research in the area of student perceptions based on testing from home as well as measuring test results and comparing WTPP's to scores of students required to test in a F2F setting.

Results from this study indicate that future studies could yield additional positive results of the same number of students, or perhaps an increase number. This formative evaluation design study provided guidelines and suggestions for future implementations that would allow a researcher to avoid mishaps. Refer to Implications and Suggestions for Future Research sections near the end of Chapter 5 for details.

When considering the second part of Interview Question 6, student comparisons of Webcam proctoring to F2F proctoring in terms of security, students' feelings were divided (3/6). Fifty percent of students interviewed provided examples of how it would be easier to cheat in a Webcam proctoring environment.

Interviewee 3 stated, "I think it would be easier to cheat because it (the cheating assistance) can be outside a webcam range. But in F2F you never know how they (students) are going to be with each, they could be helping each other out and helping each other cheat."

Interviewee 4 shared (paraphrased): Well, with the webcam there is the possibility of cheating if you hang a picture of an answer sheet behind the camera, but with a teacher in room I feel it would be way harder because the teacher is walking up and down the class watching everything that you are doing.

From the information above, students feel it is easier to cheat in a virtual environment with only a webcam watching; however, Interviewees 1 and 5 mentioned if there was a live person watching the webcam that would help minimize cheating attempts. Interviewee 6 felt that webcam proctoring was more secure than F2F because his friend was contacted about a possible cheating attempt.

Interview Question 5 asked each interviewee if they were contacted about possible academic integrity breaches of their own, based on the Webcam recording, to which half (3) of students replied “yes.” Upon analysis, only two of those students who responded that they felt Webcam proctoring did not provide a more secure test proctoring option when compared to F2F, were not contacted by Secure View of HCVS administration regarding their test sessions being in breach of some sort of academic integrity violation. The researcher believes this is an opportunity for further exploration to determine how use of Webcam proctoring would affect student test scores. If students are allowed to test in an environment and timeframe that is preferred, will this positively impact their test scores? Further opportunities to explore these results are suggested in Recommendations for Future Improvement; however, with unanimous results based on 100% of students feeling the WTPP did provide the flexibility sought and half (3) supporting that Webcam Proctoring is a secure method, overall Guiding Question 2 has been answered positively by the majority of participants.

Inferential statistical results from SQ10, relevant to answering GQ2, provided data on student feelings regarding the importance of Webcam proctoring. The Kruskal-Wallis and Mann-Whitney tests were run on each individual question in this Likert Scale in an attempt to find correlations between the topic and student gender; the topic and student age; the topic and student ethnic group; the topic and student grade level. Overall, there were no statistically significant differences found in any listed category. Perhaps, the findings were not significant due to the small sample size ($n = 27$) or timing of survey release. Future studies should replicate with larger sample sizes, target specific demographics, and perhaps set comparison groups between students who use Webcam versus traditional proctoring. Additionally, this survey was sent out a little over a year after the WTPP implementation. With such a large amount of time passing between the implementation and request for evaluation of the program, results could have been skewed and participation lower.

Guiding Question 3: Discussion

What factors facilitated/inhibited participation in the Webcam Test-Proctoring Program?

Guiding Question 3 seems quantitative in nature, but the validity of results comes from analysis of the explanation of participation. In what way did participation improve or decline? This question is followed up with the sub-question: What percentage of the target audience participated in testing using the secure Webcam option? As mentioned above, Survey Question 3 results directly to this Guiding Question as it shows 52% of students participated in WTPP in Session 1. Fifteen percent of students participated in Session 2 of the WTPP, 12% participated in neither, and 20% in both WTPP sessions. Approximately 69.2% of students (completed their

benchmark assessments via WTPP in Session 2 when compared with Session 1. Seeing such a drastic drop in participation rates from Session 1 to 2, it could be implied there was a great disapproval of this program from student participants; however, results from the satisfaction questions addressed above provide data supporting the contrary. A small number of students (16% based on students interviewed) had technical difficulties were able to use the WTPP for one test but perhaps not their remaining tests (even into the next testing session). Technical issues were prevalent in both test sessions, as one third (2 out of 6) of the students did mention technical issues.

Also important to report is the small sample size ($n = 27$), which includes only those students who responded to the electronic survey and is neither necessarily representative of the entire population of students at HCVS ($N_2 = 165$) nor generalizable to other populations. Replication of this study in the future would allow for results to show if participation rates continued to decline in the second session of testing or if this was just a result of the students who completed the survey and this Survey Question in particular.

In certain instances, there were students who were unable to test due to internal and external factors. When attempting to use their Webcam (even after multiple attempts to set it up following the step-by-step instructions) and calling for technical assistance, there was a considerable population (25% of those who completed the survey) who could not test using the WTPP. In these instances, those students would have had to go to the HCVS campus to complete their benchmark tests(s). Due to the complicated nature of the WTPP's program set-up, students may have had issues with the Webcam set-up, the assessment software, Performance Matters, or both. Unfortunately, there was not a formal assistance hotline set up for students

with technical difficulties only related to the area of Performance Matters, and it was at this point when the HCVS testing coordinator was contacted. If the issue went beyond the test coordinator's control and could only be corrected at an internal level at the district office, that student was then likely required to go to the HCVS campus for testing due to the time sensitivity of the testing materials being delivered through the online platform. In rare instances, students with these access issues to Performance Matters were given tests via paper and pencil, as their access to the online platform was completely denied.

Furthermore, it is important to note that students who had difficulties with the internal assessment release system, Performance Matters, could not be helped by calling Secure View nor the HCVS test coordinator for technical assistance. The results indicated that students may have been confused by the complicated process of two software programs being seemingly linked on their end and thus frustrated when a Secure View employee referred them to the HCVS test coordinator for further assistance. Thus implying future implementations need to have a stronger, and more coordinated technology assistance team in place.

Based on results from SQ6, students who completed the electronic survey for this evaluation study and did not participate in the WTPP included: one student whose parent did not elect for him to participate, another student identified that she did not participate in the WTPP nor any benchmark assessments—further explanation was not provided. This student was in 12th grade at the time of implementation; therefore, it can be inferred that this student was not enrolled in any of the assessed courses, as the courses most commonly assessed include students who are traditionally enrolled in grades 6-11.

Implications

Implementation Question: How did internal and external factors impact the program?

Overall, the findings of this evaluative study support Webcam proctoring as a practical solution to the problem of practice within a K-12 virtual school. Hurricane County Virtual School is in one of the largest public school districts in Florida and represents a variety of demographics. This formative evaluative study was based on the first-time implementation of a WTPP at HCVS. Although no significant difference was found between Implementation Guiding Questions and gender, age, and grade level, there is much to be said for the benefits of offering these assessments online and using a Webcam proctor, including student completion rates. Consider a student who otherwise may not have been able to attend the F2F proctoring in person due to location, disability, or scheduling conflicts (Yates & Beaudrie, 2009).

Limitations and suggestions for improvement should be considered prior to conducting future evaluative studies. Future studies should complete a test run through with a small sample yielding constructive feedback before releasing to the entire school population. A test run through will allow schools to identify and correct any technical errors within their test release software, as well as with the Webcam set-up and use processes prior to releasing to the entire school. Technical issues that may have been corrected in the WTPP implementation if a test run were implemented include:

- Identifying students not having access to their assessments in the Performance Matters system (due to internal data processing issues);

- Students having troubles accessing Webcams to match their devices (in the instance an internal Webcam was not present as with Interview 6 in this study) could be provided with more sufficient guides to find and set up;
- Providing more efficient technical help services (i.e. a team in numbers and not just the test coordinator, as well as more cohesion between the Webcam Service Provider and the school's technical assistance departments)
- Protocols of how to test using a Webcam proctor need to be reviewed with students prior to testing:
 - What is considered cheating during a Webcam proctored exam?
 - What steps should I take (as a student) if I run into a technical malfunction?
 - Who is my best contact for my technical issue?
 - Is my technical issue with my Webcam or with the assessment software?

Implementation of future studies should also include varying grade levels, regular use of the Webcam proctoring for multiple assessments, evaluation of capricious elements including flexibility in time and setting, effects on student test scores, and psychological effects on students using Webcam proctoring in their own chosen test settings. Another implication of this research is the idea of changing the way students are tested to include more meaningful ways of assessment, such as practical applications of learned knowledge rather than standardized testing including portfolio and project-based learning (Jonassen et al., 2008). Practices such as the lock-down of systems and the taking away of resources for students to use to help them in their testing of their knowledge, inhibits students from building their

knowledge of how to find solutions to questions they do not know an answer to. While the practice of lock down forces the idea of students having to memorize and regurgitate information. Future studies could include a comparison of students who have locked down and non-lock down features while testing from home via Webcam proctor. Limitations of this study and suggestions for improvement, as well as further suggestions for future research are discussed in the Limitations of Study section.

Conclusions

This problem of practice within HCVS, to attempt to resolve the issue of low numbers of participants during required HCPS benchmark assessments, resulted in the implementation of the WTPP. Upon evaluation of the implementation of the WTPP, results yielded affirmatively in favor of the WTPP as a potential solution to this issue. Thus, the WTPP was perceived to be implemented successfully through the overall organization and provided solid technical support systems. Future use of Webcams for test- proctoring will be helpful to provide secure and flexible testing environments.

Student participants provided responses supporting the demand for flexibility in the assessment process and the majority (60.9%) was Very Satisfied with Webcam proctoring. Interview results also paralleled the survey responses with specific feedback providing the evaluator with favorable results overall, with the notable exception of the area of student perception of the security without a physical person watching them test. Considering testing environments secure was an area that needed clarification during interviews; thus, one half of the

students interviewed (3 out of 6) agreed that Webcams are a secure means of testing, while the other half did not feel the same.

Overall participation in the WTPP included the greater majority (80.8%) of students who completed the electronic survey and all (6) students who were interviewed. Thus, student participation in the WTPP, as well as students who reported technical issues but did complete their benchmark assessments via F2F proctor, shows that 81% of students completed their benchmark assessments overall. These results provide evidence supporting that the WTPP is a viable option for improving student participation in assessments, especially in cases where students require flexibility.

Limitations of the Study

Bias

Based on this type of Webcam proctoring never being implemented or tested prior to this study, the initial study design intended to collect participant responses within a one-week to one-month time frame based on implementation. Unfortunately, data collection was pushed back to just over a year after the implementation of the WTPP, making recall bias a cause for concern. Due to duration of time between participation in the WTPP and data collection it is possible that students did not recall their experiences in detail, were no longer enrolled in HCVS and, therefore, would not have been included in the incentive offer of credit from select teachers for participation, or did not.

Demographics

The majority of students who completed this electronic survey were in 8th grade. This is important to consider when analyzing because there could have been biased information provided if the student was being assisted by a parent or in the case of misunderstanding a question. Unfortunately, the possibility of a student not taking the time to read each question carefully and respond truthfully for fear of someone tracing their responses could also lead to inaccuracies in the data or bias responses.

Survey Question Limitations: Questions 7, 8, and 9

These questions asked, “Please rate each method of proctoring using the 0-5 scale. 0 equals your least preferred method and 5 equals your most preferred method.” This scale indicates one action, but the question stem implies another. The question was intended to ask students to rank order the three proctoring methods, however, giving them a 0-5 scale with only two clearly defined scale points (least preferred and most preferred) could have led to confusion. So, if respondents selected 0 or 5, they truly meant least or most, respectively, but everything in between 0 and 5 is muddled—the evaluator can’t readily infer what they meant by a rating of 1, 2, 3, or 4. When asking for ranking, there should be as many ranking choices (three) as there are methods (three). This scale has six ranks/ratings for three methods, which poses an issue. As it stands, the inaccuracy of the scale makes it difficult to conduct inferential statistics and if run, would likely cause inaccurate inferences about the data due to the faulty scale and question.

Future revisions to this Survey Question should include question rewording to more clearly state, “Rank these three proctoring methods according to your personal preference.” The

question should then require respondents only rank the three methods according to a ranking of 1, 2, or 3 and also allow them to use each ranking of 1, 2, and 3 only once, known as forced ranking.

Alternatively, if future evaluators do not want respondents to rank and rate the items using a Likert-scale, then a clearly defined Likert scale where each scale point has a clear definition or “value” is necessary.

Survey Question Limitations: Question 10

This question asked, “Please use the 5-point scale below to rank your feelings about the topics listed to the left.” Upon analyzing the descriptive statistics, there were several people who seemed to default to the Neutral choice, which doesn’t provide any real feedback about how the student felt about the topics listed. This Neutral option also invalidates any potential use of the mean. Means should be used for continuous data only, but people will often treat true Likert-scales as continuous data so long as they have clear and symmetric scale points. Here, the neutral is the center and the mean of the scale, but tells nothing about importance. Revisions to this question for future use should force respondents to specify their opinion as important or not important.

Additionally, wording needs to be clarified in the question prompt. The question asks the respondent to rate their feelings, but the scale is an importance scale. Either the question prompt needs clarification to indicate the respondent needs to respond based on how important each sub-question/item is to her personally or the scale needs to be changed. Nothing in the sub-questions (how do you feel about mandatory testing methods, etc.) or question prompt indicates that the

student needs to think of how important each item is. Asking students in the prompt to rate their “feelings” should have more accurately included a happy/unhappy type Likert-scale.

Survey Question Limitations: Question 11

This question asked, “Please rate your overall experience during the Webcam proctoring pilot during the 2014-2015 school year. This scale allowed for a neutral option. Several students seemed to default to the “neutral” choice, which provided specific feedback on how the student felt about this particular process. The neutral option also invalidates any potential use of the mean. As in Questions 7, 8, and 9 where the neutral option was eliminated forcing students to respond on satisfaction, not neutrality. In this case, students may have been somewhat satisfied or dissatisfied, but because there was nothing between satisfied and neutral and dissatisfied and neutral on the scale, they likely just selected the midpoint by default. For future evaluations a better scale would be: satisfied (4), somewhat satisfied (3), somewhat dissatisfied (2), dissatisfied (1). This scale excludes the middle-point and makes the respondent decide on their level of satisfaction instead of just selecting neutral.

One student responded to question 11 asking specifically about his experience in the WTPP, but this student did not take any assessments via Webcam due to lack of parental consent. In future studies, students who select the option of not participating in the WTPP should not have access to this question, as the overall results can be skewed with inaccurate feedback from a student who may have been confused or intentionally responding to a question that did not apply to them.

Survey Question Limitations: Question 12

Question 12 asked, “If you did not complete both benchmark testing sessions (October 2014 and January 2015) via Webcam proctor while enrolled with HCVS, please select the reason below.” This question should have employed “display logic” and been displayed only if the respondent did not select “Both” October 27-October 31 and January 26-January 30 in Question 5 (Please select the Webcam proctoring session(s) you completed for the HCVS benchmark tests during the 2014-2015 school year). There were respondents who selected “Other” because they may have felt they were required to answer Q12 even though they did complete both benchmark testing sessions via Webcam proctor.

One-on-one phone interviews were open to HCVS students in grades 6 through 12. The level of student vocabulary, thus level of understanding of the questions asked could have been a cause for skewed responses. During each interview, the student was asked to let the evaluator know if he or she needed clarification or rewording of a question in order to allow for the most accurate and detailed responses. There were also instances where students eluded to a specific scenario that needed further clarification, so additional questions were asked to prompt the interviewee to provide a thorough response.

Suggestions for Future Research

1. Further research should be conducted to investigate if students had participated in any Webcam proctoring experiences prior to this study. This would have eliminated the possibility to be a coexisting element. Additionally, the results would have been stronger had a follow-up question asked about students’ prior experiences using Webcams to

ensure clarification of student feelings about Webcam proctoring are tied only to the student's experience in the program being evaluated (WTPP).

2. Additional research is suggested to determine if HCVS's small population (which likely led to the non-parametric outcome) of students compared to the larger state virtual school would be similar. If a similar Webcam testing program was to be set up within this larger entity and evaluated, it could yield more specific results, as the sample size would inherently be much larger and review more about the Webcam proctoring system experiences.
3. Additional research is suggested to extend this study to additional school districts within Florida. HCVS is located in a large urban county in Florida. Evaluating varying areas throughout the state would yield feedback that is specific to the needs of each county's families in virtual schools, thus determining the need for Webcam proctoring during additional assessments as well.
4. Further research is recommended to include additional or alternate assessments that provide more consistency and exposure to the Webcam proctoring set up process. This study evaluated the implementation of Webcam proctoring of one specific assessment, the HCPS's benchmark assessment, which was given two times throughout the 2014-2015 school year. Should HCVS offer Webcam proctoring as an option for additional assessments, results could vary based upon the Webcam set up process becoming more familiar to students.
5. Further research is recommended to refine the familiarity of the Webcam proctoring process, which could also lead future studies to evaluate additional factors, such as

student test scores using Webcam proctors versus F2F proctors, student comfort level when testing from a home environment, the effectiveness of security for assessments using various software release programs (i.e., Performance Matters), etc.

6. Additional research is suggested to focus on the psychology behind allowing more flexibility during assessment implementation through the use of a Webcam proctor (i.e., choosing of time and location for testing). This could also have an impact on student scores and is recommended for future studies.
7. Further research is recommended for use of a Webcam proctoring system established for virtual assignments, in addition to tests. Virtual instruction places a large amount of trust in the hands of the parents/guardians of K-12 virtual students, thus a study to suggest Webcam proctoring can allow for a more conducive learning environment in distance education is needed.
8. Additional research is also recommended for the rapidly growing area of education known as blended learning. Blended learning is defined by the Clayton Christensen Institute for Disruptive Innovation (Gemin et al., 2015, p. 7) as “a formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace; at least in part in a supervised brick-and-mortar location away from home; and the modalities along each student’s learning path within a course or subject are connected to provide an integrated learning experience.” Where do blended students complete assessments? If at home, how does the use of a Webcam proctor compare with fully online learners (in terms of test results, evaluation of satisfaction of the WTPP use, etc.)?

9. Additional research is suggested to measure the level of security offered in a WTPP. A state education department such as the FLDOE will demand full security if they were to permit Webcam proctoring for statewide assessments due to the high-stakes nature such assessments (student graduation, school funding, teacher raises, etc.).
10. Future studies are recommended to encompass the accepted national demographic sub-groups, as defined in the Elementary and Secondary Education Act, and their willingness to participate.

APPENDIX A
STUDENT USER GUIDE

Students User Guide

STEP

1

Have your parent/guardian sign the electronic consent form:
<http://remoteproctor.com/parentalconsentv2/register.aspx?org=cps>

2

Access the Remote Proctor NOW System

- Go to remoteproctor.com
- Start System Check** – Follow the on-screen prompts to confirm your computer meets the requirements to use the Remote Proctor system
- Click on the **Windows** or **MAC** icon to download the required software
- Run the application by selecting **Run** – In the “Application Warning” window, select **Run** then wait for the application to finish downloading (once installed, the software will then launch automatically)

3

Select your Test

- Complete the online form
- Select [Performance Matters](#)
 - Select District Required Test
 - Select Benchmark Test
 - Enter your contact information – your email **MUST** match the email registered by your parent when they signed the parental consent form.
 - If you are getting a message that you are unauthorized to take this exam please email Elena.GeiserHogan@remoteproctor.com

4

Verify your Identity

- Follow the on-screen prompts to verify your identity
- Take a clear picture of your valid government issued or student ID
 - Scan your testing area using your webcam
 - Take a clear picture of yourself

5

Complete your Test

- You will now see the Performance Matters Login Screen
- Enter your [Performance Matters](#) student ID as your login and YYYY/MM/DD of your birthday as your password.
- Select the exam you want to complete from the list
- Once the exam is completed and submitted you can close the Remote Proctor browser.

Getting Support

Please review the following to be sure you choose the right path for support.

- Contact your Institution if:

1. Unable to login to Performance Matters
2. Unable to access the exam in Performance Matters
3. Exam cannot be found, or the exam is no longer available

- Contact Software support if:

1. You need help navigating through the Remote Proctor website
2. You need help (or receive errors) when attempting to take your pictures.

If you need to contact Software support, use the following options:

- By Phone: **1-855-436-2039**
- Online Support: <http://clientportal>.
- 📄 **Browse** the FAQs and common technical issues
- 📄 **Submit** a ticket by registering online
- 📄 **Chat** with Support

Technical support is open 24/7

APPENDIX B
WEBCAM PILOT EVALUATION

Webcam Pilot Evaluation

Q14 Parental Consent: Are you willing to allow your child to participate in this study?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To You have selected NO and will not be...

Q16 Student Assent: Your participation in this study is entirely voluntary. Are you willing to complete this survey?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To You have selected NO and will not be...

Q15 You have selected NO and will not be able to continue on into the survey without both the parental consent and student assent questions marked as YES. If this was selected in error, please select YES below. If this is the correct selection, thank you for your time. You may now exit the survey.

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Q1 Please select your gender:

- Male (1)
- Female (2)

Q2 Please provide your age in the space below:

Q3 Please select your ethnicity (you may select more than one):

- African American (1)
- Asian (2)
- Caucasian (3)
- Hispanic (4)
- Native American (5)
- Other (6) _____

Q4 Please provide the grade level you were in during the 2014-2015 school year:

- 6th grade (1)
- 7th grade (2)
- 8th grade (3)
- 9th grade, Freshman (4)
- 10th grade, Sophomore (5)
- 11th grade, Junior (6)
- 12th grade, Senior (7)

Q5 Please select the webcam proctoring session(s) you completed for the [redacted] benchmark tests during the 2014-2015 school year (please select all that apply):

- October 27- October 31 (1)
- January 26-January 30 (2)
- I did not complete any of my benchmark tests via webcam proctor (3)

Q6 Please select the method used to complete your benchmark tests during the 2014-2015 school year:

- Webcam Proctoring (1)
- Face to face proctoring (at the [redacted] Campus) (2)
- Did not complete any [redacted] benchmark tests during 2014-2015 school year (3)

Q9 Please rate each method of proctoring use the 0-5 scale. 0 equals your least preferred method and 5 equals your most preferred method.

- _____ Webcam Proctoring (1)
- _____ Face to Face Proctoring at [redacted] campus (2)
- _____ Face to Face Proctoring at your zoned school (3)

Q10 Please use the 5 point scale below to rank your feelings about the topics listed to the left.

	Very Unimportant (1)	Not Important (2)	Neutral (3)	Somewhat Important (4)	Very Important (5)
How do you feel about mandatory testing methods becoming more flexible for full time virtual students? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How do you feel about the use of webcam proctoring? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel about the opportunity to take more secure tests via webcam proctor instead of having to go to a physical school location? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 Please rate your overall experience during the webcam proctoring pilot during the 2014-2015 school year.

	Very Dissatisfied (1)	Dissatisfied (2)	Neutral (3)	Satisfied (4)	Very Satisfied (5)
Ease of use during the webcam proctoring set up (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assistance from the testing coordinator (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology assistance from ██████████ the 1-800 number on the instruction sheet) (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall organization (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12 If you did not complete both benchmark testing sessions (October 2014 and January 2015) via webcam proctor while enrolled with ██████████, please select the reason below:

- Technology issues (1)
- I was only enrolled with ██████████ during only one (October 2014 or January 2015) testing window (2)
- Parent/guardian did not elect for me to participate (3)
- Other (4) _____

Q13 Webcam proctoring is preferable for me because...(Select all that apply)

- It reduces my travel time (time spent driving to and from campus) (1)
- I do not have transportation readily available (2)
- My schedule requires flexibility (3)
- I feel more comfortable testing on my own computer (4)
- I feel more comfortable testing at home (5)

APPENDIX C
INTERVIEW PROTOCOL

Interview Protocol for One on One Phone Interviews

Prior to recording:

Explain to student that this interview will be recorded and transcribed. Inform him or her that any questions they do not understand can be repeated or reworded upon request. If they would like to provide any additional information they will be offered the opportunity at the end of the interview.

Gather Student Demographic information: Name, Grade (at time of testing), Gender, and Age

QUESTIONS FOR STUDENTS:

- 1) How well was the pilot program implemented? Please elaborate on why you feel that way.
 - 2) Was the program run smoothly and easy to access in your opinion? Why or why not?
 - 3) Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)?
 - 4) Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?
 - 5) Did you receive any feedback from [redacted] (webcam proctoring company) or [redacted] administration regarding academic integrity breeches? Do you feel this assessment was accurate?
 - 6) As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?
- Is there any additional information you would like to share about your experience?

APPENDIX D
INSTITUTIONAL REVIEW BOARD LETTER



University of Central Florida Institutional Review Board
 Office of Research & Commercialization
 12201 Research Parkway, Suite 501
 Orlando, Florida 32826-3246
 Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: UCF Institutional Review Board #1
 FWA00000351, IRB00001138

To: Elena M. Geiser Hogan

Date: October 26, 2015

Dear Researcher:

On 10/26/2015, the IRB approved the following minor modifications to human participant research until 05/21/2016 inclusive:

Type of Review:	IRB Addendum and Modification Request Form
Modification Type:	The study design has been changed and now (in the interview portion of the study) only students will be interviewed and not parent/ guardians for a total of 5 interview participants. The research instrument has been updated and this Qualtrics survey has been uploaded in iRIS, along with a revised protocol. A revised Informed Consent document has been approved for use.
Project Title:	AN EVALUATION STUDY OF IMPLEMENTATION OF WEBCAM PROCTORING FOR SECURE TESTING IN A K-12 VIRTUAL SCHOOL
Investigator:	Elena M. Geiser Hogan
IRB Number:	SBE-15-11324
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form cannot be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 05/21/2016, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

A handwritten signature in black ink that reads "Joanne Muratori". The signature is written in a cursive style with a large, stylized initial "J".

Signature applied by Joanne Muratori on 10/26/2015 12:01:41 PM EDT

IRB Manager

APPENDIX E
RESEARCH APPLICATION LETTER

From: XXXXXX <XXXXXX@XXXX.net>
Sent: Tuesday, December 22, 2015 12:23 PM
To: Elena Geiser
Cc: Research; 'glenda.gunter@ucf.edu'
Subject: XXXX Research Application Approval

Good afternoon,

Congratulations! Your application to conduct research was accepted. Please save the attached Notice of Approval in a safe location. Do not initiate any communication or other research activity with XXXXXXXXXXXXXXX staff, students, or families until the Research office has sent clearance for you to do so. After you have received this clearance to communicate, you will need to attach the Notice of Approval to all initial communication with any XXXX staff and have it available at all times while conducting research activities.

As described on the application, please be aware that a Notice of Approval does not obligate any person associated with XXXX to participate in this research project. Any person, including but not limited to students, parents, teachers and administrators, can refuse participation at any point in the research process. School and district administrators may make the decision to refuse participation for their entire school or for a group of schools.

The following must be emailed to Research@xxxx.net:

- 1) If your study involves compensation of any kind, a request for permission to compensate.
- 2) If you completed Section 4 and your data request is large (requiring more than 6 hours to fulfill), email a draft plan for reimbursement.
- 3) If you completed Section 5, email a list of all names, employers, and titles for research team members who will be in personal contact with any XXXX staff, student, or family member. These members will require Level 2 security clearance and XXXX badges.
- 4) Email information about your situation if any of the following cases

apply to you:

- a. You or other members on your research team are currently employed by XXXX;
- b. You have been background checked and fingerprinted by XXXX but are not currently employed by XXXX;
- c. You were background checked by XXXX but not fingerprinted;
- d. You have been fingerprinted by another school district and have received a blue, statewide badge that will expire one year or more after the completion of all research activities; or
- e. You have an XXXX badge that will expire during the course of your research activities.

If you have any questions, please email us at Research@xxxx.net.

Thank you,
XXXX

APPENDIX F
INSTITUTIONAL REVIEW BOARD: EXTENSION LETTER



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138
To: Elena M. Geiser Hogan
Date: May 18, 2016

Dear Researcher:

On 05/18/2016, the IRB approved the following human participant research until 05/17/2017 inclusive:

Type of Review: IRB Continuing Review Application Form
Expedited Review
Project Title: AN EVALUATION STUDY OF IMPLEMENTATION OF
WEBCAM PROCTORING FOR SECURE TESTING IN A K-
12 VIRTUAL SCHOOL
Investigator: Elena M. Geiser Hogan
IRB Number: SBE-15-11324
Funding Agency:
Grant Title:
Research ID: N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 05/17/2017, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in IRIS so that IRB records will be accurate.

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 05/18/2016 10:21:38 AM EDT

APPENDIX G
INSTITUTIONAL REVIEW BOARD: ADDENDUM TO UPDATE STUDY PARTICIPANTS



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Elena M. Geiser Hogan

Date: October 26, 2015

Dear Researcher:

On 10/26/2015, the IRB approved the following minor modifications to human participant research until 05/21/2016 inclusive:

Type of Review:	IRB Addendum and Modification Request Form
Modification Type:	The study design has been changed and now (in the interview portion of the study) only students will be interviewed and not parent/ guardians for a total of 5 interview participants. The research instrument has been updated and this Qualtrics survey has been uploaded in iRIS, along with a revised protocol. A revised Informed Consent document has been approved for use.
Project Title:	AN EVALUATION STUDY OF IMPLEMENTATION OF WEBCAM PROCTORING FOR SECURE TESTING IN A K-12 VIRTUAL SCHOOL
Investigator:	Elena M. Geiser Hogan
IRB Number:	SBE-15-11324
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 05/21/2016, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

A handwritten signature in black ink that reads "Joanne Muratori". The signature is written in a cursive style with a large initial "J" and "M".

Signature applied by Joanne Muratori on 10/26/2015 12:01:41 PM EDT

IRB Manager

APPENDIX H
INSTITUTIONAL REVIEW BOARD: ADDENDUM TO OFFER ENRICHMENT CREDIT
TO PARTICIPANTS



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Elena M. Geiser Hogan

Date: May 03, 2016

Dear Researcher:

On 05/03/2016, the IRB approved the following minor modification to human participant research until 05/21/2016 inclusive:

Type of Review: IRB Addendum and Modification Request Form
Modification Type: To assist in recruitment of study participants, teachers may (at their discretion) offer extra enrichment activity credit to students who participate in the survey and who reach out to the researcher to be interviewed (via phone) about their experience in the webcam proctoring pilot program during the 2014-2015 school year.
Project Title: AN EVALUATION STUDY OF IMPLEMENTATION OF WEBCAM PROCTORING FOR SECURE TESTING IN A K-12 VIRTUAL SCHOOL
Investigator: Elena M. Geiser Hogan
IRB Number: SBE-15-11324
Funding Agency:
Grant Title:
Research ID: N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form cannot be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 05/21/2016, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

A handwritten signature in black ink that reads "Joanne Muratori". The signature is written in a cursive style with a large initial "J".

Signature applied by Joanne Muratori on 05/03/2016 03:09:19 PM EDT

IRB Manager

APPENDIX I
INTERVIEW TRANSCRIPTS

Interview Protocol for One on One Phone Interviews

Prior to recording:

Explain to student that this interview will be recorded and transcribed. Inform him or her that any questions they do not understand can be repeated or reworded upon request. If they would like to provide any additional information they will be offered the opportunity at the end of the interview.

Gather Student Demographic information: Name, Gender and Grade (at time of testing)

*Name has been excluded from final document for confidentiality

Transcription

INTERVIEW #1 Feb 2, 2016

Interview 12/12 on recorder

Student: Male/ Grade 12

QUESTIONS FOR STUDENTS:

How well was the pilot program implemented? Please elaborate on why you feel that way.

It was programmed pretty well. The only problem I ran into was a bit of technical issue, only once or twice, where the program would think you are cheating and it would close itself and make you restart the test.

Was the program run smoothly and easy to access in your opinion? Why or why not?

Yes, the program was very smooth, you would just open it up and the tests were right there for you. It did take a little bit of time in the beginning to set up, but afterward it was very smooth.

Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)?

The minor issue where the task manager thought I was cheating. It said I had something open, but I did not. That took me a little while to fix, but after that everything ran really nicely, really smoothly, no problems afterwards.

SIDE BAR: Who said you were cheating? Feedback from XXXXXXXXXX?

No, not exactly, the program stopped and states you cannot continue unless you close this "program" meaning outside web source. But again that only took a little bit to fix so that was no problem.

SIDE BAR: So even though you had nothing open what was your solution?

The solution was I contacted support and they told me to restart the program, then afterwards it ran smooth.

Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?

No, none at all. Set up, steps 1-4 whenever it started the program, it all went smoothly and there were no issues.

Did you receive any feedback from XXXXXX (webcam proctoring company) or XXXXXX administration regarding academic integrity breeches? Do you feel this assessment was accurate? Based on memory, I did not get any feedback stating I was cheating. I did get emails warning of cheating, but none telling me I had breached academic integrity.

As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?

I find it way more convenient of course because my family lives way out in the middle of nowhere. Much more convenient than driving into the campus. So, very convenient for sure. As for secure, I am not sure because I students were passing around rumors about how you could write down notes or use them during the test, or open programs on a virtual computer and the program won't notice it.

I don't cheat personally, but it seems that could be easily fixed by having someone sitting and watching the webcam.

Additional Information:

Personally, [Webcam proctoring was] my favorite way of testing so far and I've done many ways including mail it, sit in front of a principal, normal testing where everyone is in the room together, I like this way of testing the best because I am a person who enjoys studying.

Evaluator Note: Student discussed that he was in 10th grade at the time of participation (2014-2015) in the WTPP and is currently on track to graduate this school year (2015).

INTERVIEW #2

Feb. 19, 2016

Interview 13/13 recorded

Student: Male/ Grade 12

QUESTIONS FOR STUDENTS:

How well was the pilot program implemented? Please elaborate on why you feel that way. I think it was implemented well. Pretty simple to use to webcam. It was simple.

Was the program run smoothly and easy to access in your opinion? Why or why not?

It was easy to use, although even though, every time I had to open it to use it I did have to go through so many steps. The testing was giving me problems.

I remember one time when I couldn't take any tests because it was all blank.

So I called technical support, I can't recall, but I don't think the problem was ever solved.

Contacted to take the test in the physical school building because the other exams did not show up (only 1 via webcam proctor)

Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)?

Once logged in to the page to see the tests was where I had the problems

Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?

No, not at all

Did you receive any feedback from XXXXXX (webcam proctoring company) or XXXXXX administration regarding academic integrity breeches? Do you feel this assessment was accurate?

I think I did receive one once, I think they told me I disappeared from the camera view for a few seconds and they said that was placed under review, but I never heard about that again.

As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?

Well, even though it did give a little bit of problems, it was pretty much convenient in every way. In terms of transportation because I usually do not have one.

More comfortable because I do not have to wake up early.

If improved technologies it will be great for the future.

I'd have to admit it be more secure to test F2F, well maybe if you were testing via webcam proctoring whereas if you are F2F there is no way.

Additional Information:

Yes, I would say that I may have sounded like I did not like it, I did like it better than F2F.

INTERVIEW #3

Feb. 19, 2016

Interview 14/14

Student: Male/ Grade 9

QUESTIONS FOR STUDENTS:

How well was the pilot program implemented? Please elaborate on why you feel that way.

I believe it was implemented rather well, at the same time it can be inconvenient for those with integrated webcam because they asked me to turn it around 360 degrees.

Was the program run smoothly and easy to access in your opinion? Why or why not?

Yes, it was easy to access because it was able to run on a lower process computer with ease. I believe it ran perfectly.

Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)?

No technology issues

Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?

No

Did you receive any feedback from XXXXXX (webcam proctoring company) or XXXXXX administration regarding academic integrity breeches? Do you feel this assessment was accurate?
No

As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?

More secure because for one thing it allows you to monitor ppl to allow them from cheating. It can be very convenient not depending on the software. Since they are in Virtual School or High School they can set their schedules so they likely need the flexible schedule that the webcam proctoring provides.

I think it would be easier to cheat because it can be outside a webcam range. But in F2F you never know how they are going to be with each, they could be helping each other out and helping each other cheat.

Additional Information: No

INTERVIEW #4

Feb. 23, 2016

Interview – Not recorded due to technical difficulties with recorder

Student: Male/ Grade 7

QUESTIONS FOR STUDENTS:

How well was the pilot program implemented? Please elaborate on why you feel that way.

I think it was a really good, efficient way of doing it. So the kids that have to take the test can be more comfortable so they can stay at home while taking the test.

Was the program run smoothly and easy to access in your opinion? Why or why not?

It was, I personally I didn't know how to do it because I am not good at computers, but my dad is really good a computers. So I asked him if he thought this was an easy process so he said yes it was really smooth easy way to test and he wished he had this option to test when he was a kid.

Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)?

Not by what I could tell. For me there were no issues at all. It all ran perfectly. There were no issues and everything was good.

Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?

No troubles getting a webcam, both of my computers have built in webcams. The set up was easy to complete on my computers.

Did you receive any feedback from XXXXXX (webcam proctoring company) or XXXXXX administration regarding academic integrity breeches? Do you feel this assessment was accurate? Actually yes, by XXXXXX campus administration. There was a knocking on the window behind me and I turned around to check what it was the webcam monitor said that I went out of view of the camera.

As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?

I found it more convenient because of the way it was set up. You don't have to go to a physical building because you can stay home, and feel more relaxed and focused.

Well with the webcam there is the possibility of cheating if you hang a picture of an answer sheet behind the camera, but with a teacher in room I feel it would be way harder because the teacher is walking up and down the class watching everything that you are doing.

Additional Information: I think it was a great way of testing all around. The set up process was simple, liked that you can stay at home.

INTERVIEW #5:

Feb. 25, 2016

Interview not recorded due to technical difficulties with recorder

Student: Female/ Grade 7

QUESTIONS FOR STUDENTS:

How well was the pilot program implemented? Please elaborate on why you feel that way. The webcam process was easy to use and I did not have any technical problems or anything like that.

Was the program run smoothly and easy to access in your opinion? Why or why not? Everything went really smoothly. It went quickly and there weren't any technical problems.

Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)? No technical issues.

Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?

Well my computer doesn't have a built in webcam, but I was able to get one really easily.

Did you receive any feedback from XXXXXX (webcam proctoring company) or XXXXXX administration regarding academic integrity breeches? Do you feel this assessment was accurate?

I think they said I used a piece of paper even though I showed the webcam that I did not have any hints or cheats on the paper before I started. Yes, it could have been accurate because there could have been shadows that made it look like wording so it was good that they contacted me.

Sidebar: Why did you have the paper there?

It was scratch paper for math which was pre-approved.

As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?

I think it is more convenient because you can take the test from home and you can take it at your convenience within your timeframe that you are available to take the test. I think it may be a little less secure to have webcam proctoring because you don't have a physical person looking over you as you take the test, but it is still a secure way to take the test.

Additional Information: Not really—everything went really well.

Evaluator Notes: Had to go back and forth when attempting to schedule interview due to student's intense swim schedule. She and her sister are in virtual school so they are able to commit a large amount of time to this sport.

INTERVIEW #6:

Feb. 25, 2016

Interview not recorded due to technical difficulties

Student: Male/ Grade8

QUESTIONS FOR STUDENTS:

How well was the pilot program implemented? Please elaborate on why you feel that way.

I would say not very because I had to go out and buy a web cam in order to take the exam.

Did you have further issues once you purchased the webcam: Just a few sign-in issues but other than that nothing much.

It was implemented somewhat well.

Was the program run smoothly and easy to access in your opinion? Why or why not?

I think it ran smoothly, but not easy to access because I had to set up a long complicated thing in order to get the webcam to be set up on my desktop

Were there any issues with the internal technology programs (once you completed steps 1-4 of setting up the webcam and logged into Performance Matters)?

No

Did you have any difficulty gaining access to a webcam? Or setting up the webcam on your computer?

I think I have given that answer- Yes, it was hard to purchase one that would work with my computer so I had to order it off of eBay before the exam started.

I contacted IT once because it locked me out of my test. But not for the setup of the webcam

Did you receive any feedback from XXXXXX (webcam proctoring company) or XXXX administration regarding academic integrity breeches? Do you feel this assessment was accurate?
No- feedback from either

I feel it was somewhat accurate because you are going to move a little during an exam, the camera does pick up sounds

As a student, do you find this method of proctoring to be more or less convenient? More or less secure than face to face proctoring? Why?

I find it more convenient because now I don't have to drive all the way to these proctoring places. We had to drive way away before this option and we got lost for almost an hour then we almost didn't make it in time for the test so it is more convenient to have a webcam in my opinion.

I would say it is secure because one of my friends got an email that had a page open that he didn't even use, so I think it is very secure if it can detect something as miniscule as that.

Additional Information: No

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