MASTER'S PROJECT

INDIVIDUALIZED LEARNING: IS VIRTUAL LEARNING THE KEY TO IMPROVING STUDENT ACHIEVEMENT?

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TABLE OF CONTENTS

APPROVAL PAGE ii

CHAPTER

I. INTRODUCTION 5

Statement of the Problem or Research Question

Statement of the Purpose

Definition of Important Terms

General Hypothesis

II. REVIEW OF THE LITERATURE 13

Introduction

Summary and Analyses of Sources

Conclusion of Literature Review

III. METHODOLOGY AND PROCEDURES 45

Type of Design

Participants

Apparatus

Procedure

Data Analysis

IV. RESULTS 52

V. DISCUSSION 66

Conclusions

Implications

Recommendations

REFERENCES 74

APPENDICIES 77

Appendix A: Approval Letter

Appendix B: Expert Judge Letter and Rubric

Appendix C: Student Survey

Appendix D:

Appendix E:

Appendix F:

Add appendices as necessary

Individualized Learning: Is Virtual Learning the Key to Improving Student Achievement?

Chapter 1

Introduction

Statement Research Question

As a result of the events that occurred in the Spring of 2020 through the current school year of 2023-2024, the United States and many other nations have been struggling to return to some semblance of normal life. The COVID-19 health pandemic uprooted and changed all traditional understanding of daily life, and the field of education was no exception. Overnight, educators were forced to change the way information was shared, assignments were returned, and grading was completed. Everything was thrust into the digital world, creating both positive and negative possibilities in the space of education. The effects are still being felt to this day as many parents, teachers, and school administrators comment on questionable student behaviors and the strain and burnout currently being experienced by educators and students alike.

However, these drastic changes have brought forth possibilities in the educational space that were thought to be nearly impossible 20 years ago--the idea of individualized learning. Post-pandemic education has seen clusters of students excelling and developing the ability to work in remote and hybridized environments. While this is exciting to see, this also brings forth an important question: Does this new educational approach fit the needs of all students or just some?

Statement of Purpose

The purpose of this applied research project is to determine if the remote or hybridized environment is better suited for high school students in this digital age. This will be observed by examining and comparing data points for high school students who are currently in 11th and 12th grade. Students selected for this study will be current online learners, with past participation of at least one semester in a virtual learning environment. The selected students' grades and attendance will be compared to their in-person counterparts. Schools in the selection group will use the same online learning academy, which provides the same curriculum to all users. The sample population will be high school students who started high school in either the 2020-2021 or 2021- 2022 school year in Jefferson County, Ohio.

Information generated by this project will be shared with the online learning academy, as well as school administrators to see the differences in scoring and attendance averages. Hopefully, the trends revealed in this study will help to better tailor curriculum and learning for students who participate in online education.

Definition of Important Terms

Achievement Tests: Achievement Tests are summative assessments which help determine a student's understanding of academic content and standards. These achievement tests are aligned to standards set forth by the state of Ohio to ensure students are learning all content necessary during the school year. Achievement tests are used to track a student's progression of learning throughout the school year.

Asynchronous learning: Asynchronous learning is an online academic content program that allows students to complete assignments and work at their own pace within

a set period of time, such as a week. Students can access information whenever they are ready within the timeframe of their class. There is no immediate feedback with asynchronous learning.

Bias: Bias refers to different qualities of the individuals participating in the study or testing. When examining Ohio test bias, the following is defined, "Construct-irrelevant components that results in systematically lower or higher scores for identifiable groups of examinees. A test item is unbiased if all individuals having the same underlying ability have equal probability of getting the item correct, regardless of subgroup membership" (ODEW, 2005, p. 1).

Blended Learning: Blended Learning is an educational program where students are required to spend at least 50% of their class time in a traditional brick and mortar school setting. The remaining required class time is spent either working online or attending synchronous learning sessions with educators.

Calibration: Calibration determines guidelines and restrictions of examination in terms of difficulty and rigor.

Construct: Constructs are used to define a variable that may affect some aspect of a test being conducted.

Constructed Response Items: Constructed Response Items are questions used on examinations that involve complex answers and an explanation of reasoning for answers.

Content Knowledge: Content Knowledge is an understanding of the knowledge, skills, and abilities possessed by an individual.

Diagnostic Tests: Diagnostic tests are assessments used to determine the academic strengths and weaknesses of a student. These tests are used by educators to ascertain

ways to better aid a student in an area of weakness. Diagnostic tests often cover small samples of information in order to directly pinpoint areas of academic difficulties for individual students.

Differential Items Functioning (DIF): For Ohio achievement tests, Differential Items Functioning (DIF) is defined as follows, " a statistical property of a test item in which different groups of test takers who have the same total test score have different average item scores or, in some cases, different rates of choosing various item options" (ODEW, 2005, p. 2).

Electronic Learning: Electronic Learning, or E-Learning, is learning that is conducted through an electronic device or medium. A primary example of this style of learning is online learning. There are several different companies that host online E-Learning such as Blackboard, Google Classroom, and Canva.

Error of Measurement: Error of Measurement, often referred to as Observational Error, is the discrepancy between observed data and the true data being collected.

Fairness: Fairness, in terms of assessments, means that every individual participating in the assessment will be examined at the same level as every other participant

Field Test: For Ohio achievement tests, Field tests are defined as "tests in which the item (questions) are tested with an appropriate group of examinees and item parameters are established" (ODEW, 2005, p. 2).

Formative Assessment: Formative Assessments are used to provide feedback to educators that can help modify and improve educational practices.

Hybrid Learning: Hybrid Learning occurs when students are primarily in the traditional school setting and only attend school virtually for snow or sick days. This allows for the student to participate with their peers in a synchronous manner.

Individualized Learning: Individualized Learning is an educational practice in which curriculum, instruction, and learning speed are based on individual student's needs. Individualized Learning often is associated with Individualized Learning Plans. Individualized learning plans are developed to meet the unique needs of the learner.

Item Analysis: Item Analysis is an in-depth study of student responses to individual questions. Item Analysis is used to study the intention of questions, as well as the question's relationship to the whole of the examination.

Learning Management System (LMS): A Learning Management System (LMS) is a website or software with the purpose to create, supervise, and assess the learning of the user. An LMS is used to help facilitate online learning at all levels of education, including elementary, middle, high school, and college. There are many different marketed LMS systems such as Blackboard, Canvas, and Google Classroom. An LMS is an important part of the Online or E-Learning environment.

Offline Time: Offline Time is characterized as the completion of academic activities that do not require a computer or the internet.

Online Learning: Online Learning refers to an education provided electronically. The curriculum provided with online learning can be accessed remotely and completed anywhere, away from a Traditional School Environment. Depending on the program, online learning can synchronous or asynchronous. This style of learning is provided over

the world wide web by education-based platforms such as Blackboard, Canvas, Online Learning Academy, or E-School.

Performance Assessment: Performance Assessments aim to examine students' behavior and application of knowledge or skills to a problem. The assessments can be completed a number of ways, including through open-ended essays, labs, or portfolios of students work. Performance Assessments are often based on real world problems or circumstances that require specific skills and knowledge.

Process: A Process is a string of actions that create a procedure. This procedure can be applied in applicable settings or problems.

Proficiency Test: Proficiency tests are used to determine if a student has sufficient knowledge to be considered proficient in the content areas of their particular grade level. These tests are generally completed at the end of school year.

Remote Learning Environment: Remote Learners attend class in a virtual, online classroom, where an educator delivers lessons and information. Remote Learning is known as Distance Learning, as students are physically distanced from their instructor. In most cases, students attend lectures at their homes. Remote Learning is a synchronous style of learning as the course is directed by the educator.

Scale Score: Scale Score is the conversion of a raw score into a weighted score based on the difficulty level of the question.

Scaling: Scaling is the process of creating a scale or scale score in order to interpret the results of an examination. Scaling can be different depending on the form of assessment or the interpretations of the examination.

Seat Time: Seat Time is a measure used by online learning academics to determine how long a student worked on a unit or lesson. Seat Time in the online learning environment serves as a measure of instructional time for students.

Summative Assessment: Summative Assessments are used to determine how effective the teaching methods were during instructional time. These forms of assessments are conducted at the end of instruction and can be used to measure the performance of educators and students alike.

Synchronous Learning: Synchronous Learning is when both the educator and the students gather at the same time, whether virtual or physically, to learn. During Synchronous Learning, students are able to interact with the educator in real-time and receive feedback instantly.

Test Accommodations: Test Accommodations are a change in the formatting of an assessment in order to aid a particular student. Test Accommodations are granted to students who have Individualized Education Plans (IEP) or suffer from a disability that makes the normal testing environment difficult. These accommodations *do not change* what the assessment is measuring.

Test Blueprint (Specifications): Test Blueprints are detailed descriptions of examination's key elements, curriculum that will be covered, and point allocations for each section of the examination. Test Blueprints are used to show the participant what information will be covered and how scoring will be accomplished.

Test Modification: Test Modifications change the conditions of the test for those students who are not able to operate under normal test taking conditions. Test Modifications *do modify* what the assessment is measuring.

Traditional School Environment: Traditional School Environment refers to a conventional brick and mortar school building that houses classrooms for a range of grades. These Traditional Schools are based on the original one room schoolhouse, in which the educator leads students of varying ages through curriculum. The Traditional School setting is one of the more common forms of schooling throughout the United States.

General Hypothesis

The researcher hypothesizes that if students are placed in an online learning environment, they will perform better on academic testing then their brick-and-mortar counterparts due to the individualized nature of the curriculum. Furthermore, students in the online environment will show marked improvement in attendance from previous years as a result of the convenience and accessibility to their curriculum.

Chapter 2

Review of the Literature

Introduction

This review of the literature will examine studies, articles, and meta-analyses related to online education. The sources used throughout this review of literature will show the importance and progression of online education prior to and after the COVID-19 health pandemic. The review of literature will be organized into 2 main sections *Online Learning Studies* and *Digital Tools/Learning Management System Studies.* The 2 sections show a full scope of the online learning environment and its use throughout the world of education.

Summary and Analyses of Sources

Online Learning Studies

Published in December of 2023, *Navigating Online Learning Through "Technological Frames": A Qualitative Examination,* was a large critical discourse analysis (CDA) that set out to determine how technology enhances learning environments. The study was conducted by Merve Basdogan of Texas Tech University and Curtis J. Bonk of Indiana University. The CDA used the principles of "Carl Mitcham's typology of technological frames, which categorizes technology into four groups: (1) object, (2) knowledge, (3) activity, and (4) volition" (Basdogan & Bonk, 2023). The CDA used 9 educators from Turkey who specialize in the field of technology for this study as professional experience was found to be more important than race or gender.

The authors of the CDA used Mitcham's technology frames as an interview guide when working with 9 educators. During the course of these interviews, it was discovered that volition was the most emphasized ideal out of the 4. In relation to the study, the term volition refers to educators' engagement or willingness to use technology in the field of education. The scholars remarked throughout the interview process that in order for one to use technology appropriately, they must first understand how to use that technology. The least noted principle of the technology frames was knowledge.

The CDA concludes there are two main points that are worth noting for this thesis. The first is how the field of education views the premise of technology. Technology can be used as an aid for improving educational programs that use technology. These programs could include, but are not limited to, Learning Management Systems (LMS) and synchronous Blended Learning. The second point made is the reconfirming of Carl Mitcham's technological frames. These four principles (object, knowledge, activity, and volition) are all vital aspects of the online education movement. These principles help establish a successful baseline framework that can allow for academic successes. Basdogan and Bonk propose a fifth aspect of the framework, space. The authors reference space as "… [the] online space affects learning, cognitive engagement, motivation, and the overall educational experience" (Basdogan & Bonk, 2023). The authors use space as a way to highlight the importance of understanding technology in education.

Basdogen and Bonk worked with educators from Turkey for this study. Due to this fact, the educators may not be familiar with certain educational practices in the United States. However, since the educators' specialties are in the field of technology, the

article is still applicable to online education in the United States. The authors of this article used an educational framework to prove that technology in education is possible as well as useful when used correctly. This framework is one of the main examples that can be used to help schools transition educational practices online.

Dr. Bryan Drost was given the daunting task of transitioning his Ohio school to digital learning at the beginning of the COVID-19 health pandemic. Once the difficult times of the pandemic subsided, he was left with a difficult question: Did the pandemic cause irreversible learning loss? Drost defines Learning Loss as "the general loss of knowledge or skill, often due to a gap or discontinuity in a student's educational experience" (Drost, 2023). The author believed there would be a clear trend of learning loss across all schools around the nation. Drost spoke with 14 school districts across the Midwest portion of the United States of America and it became clear; however, that not all schools experienced learning loss. Drost discovered "that districts that thrived during the pandemic focused learning on pedagogy first and technology integration second…" [to] avoid learning loss (Drost, 2023). Once this thesis statement was discovered, Drost was able to pinpoint four elements that helped schools not only succeed during the pandemic, but also gain student achievement.

The author defines these four elements as "(1) having an instructional framework… (2) determining a clear pedagogical function… (3) connecting technology to the pedagogical function… [and] (4) capitalizing on the formative assessment cycle" (Drost, 2023). The instructional framework is a lesson plan which identifies a strategy that an educator would use to achieve a specific learning goal. Instructional frameworks ensure that all necessary learning goals are achieved in the classroom. The second

element, determining the pedagogical function, is establishing how educators want their students to learn the material associated with the learning standard. This pedagogical function could be completed through peer collaboration, practice with materials, or self-assessments. Once the first two elements are established within the lesson plans, the educator can choose the technological tool best suited to carry out the function. This element can use any technological tool that is applicable, available, and district approved. If an educator chooses the pedagogical function of assessment, one may consider using an interactive online quiz software to engage all students simultaneously. The final element Drost discusses is the use of formative assessments. The author notes that it is critical to "monitor…student learning and provid[ed] feedback and…make instructional adjustments along the way" (Drost, 2023). This feedback provided by students helps educators better tailor lessons and frameworks to the needs of the students in the class. The author of this article provides insight into ways to improve online education for all schools, both synchronous and asynchronous.

This article written by Drost shows there is a way to successfully educate students in an online learning environment. In some cases, online education was shown to be more effective for some schools then traditional face-to-face instruction. Drost provides an excellent framework for educators exploring online learning for students who may struggle in the traditional learning environment.

Published in February of 2022, *Investigation of the Effectiveness of Hybrid Learning on Academic Achievement: A Meta-Analysis Study*, was a meta-analysis study of online and hybridized learning studies from 2010 to 2020. Meta-analysis is a statistical technique that implements the combination of findings from multiple independent studies

on a particular topic. Meta-analysis offers a full scope analysis of an overall effect or result from various studies. In this case, the meta-analysis was completed as a response to the COVID-19 health pandemic. Since hybridized learning was thrust into the forefront of education, researchers began examining the effects of distance learning seen in the ten years prior to the pandemic.

This particular meta-analysis was conducted by İbrahim Yaşar Kazu and Cemre Kurtoğlu Yalçın. Kazu and Yalçın sought to research the effect of hybrid learning on academic achievement, as well as the instructor's effect on the students' academic achievement. In order to keep the validity of the meta-analysis, the authors took type of publications, education level, disciplines, and length of the study into consideration. Once the meta-analysis study was completed, there was an emphasis on the increasing importance of technology in the field of education. The data from the 45 studies used showed the positive effectiveness of hybrid learning among students. The authors also determined that hybrid learning has the most effectiveness in the STEM (science, technology, engineering, and mathematics) fields. It was also determined that the publication type (article or research paper) did not have significant influence on the effects of the study. Factors such as the author's education level and length of the study only had an average effect on the results.

The authors of this article reviewed a wide scope of data which allowed for ample information to be provided. The authors of the meta-analysis reviewed over 1,326 studies which were narrowed down to 200 studies. These studies were required to meet the following criteria: completed between 2010 to 2020, published in a national or international refereed journal or a master's/ doctoral thesis, was written in Turkish or

English, along with 5 other criteria (Kazu and Yalçın, 2022). Due to this fact, it allows for many opinions and research points to be recognized from all areas of education. Many of the studies included in the meta-analysis are useful to this thesis. The studies included in the meta-analysis place online learning in a positive light which this thesis seeks to discover. The article was a culmination of research that has been conducted over the past ten years. The research done over the past ten years shows the stability and improvement online education can offer students. The study did, however, include research on the international community as a whole; thus, potentially skewing some data points due to the different socioeconomic standings of the countries.

The advent of the COVID-19 pandemic required all fields of education to utilize online distance learning, and colleges and universities were no exception. The University of Urbino in Italy was one of the many universities tasked with merging in person education to online learning. The article, *Teaching and Learning Centers and Coordinated Technologies for an Effective Transition at COVID-19 Pandemic Time to Massive Distance Learning and Online Exams*, written by Marco Bernardo and Edoardo Bontà, explains how the university was able to quickly transition into an online university.

There were two main points of emphasis that allowed for the university to have a successful adaptation to online learning, including the reliance upon a teaching and learning center and designation of technological tools. Teaching and learning centers (T&LCs) can be described as resources that help improve education quality, enhance students' learning experience, and integrate technology into education. These T&LCs became crucial to the university as they provided much needed support to both students

and educators alike. This support was provided through technology trainings, tutoring resources, and educational framework strategies. The second point that helped ensure the university's success was the use of designated technological tools. These tools included the use of Learning Management Systems, as well as meeting tools such as Google Meets and Blackboard Collaborate. Technological tools helped the students and educators stay connected and on track with the learning curriculum. In the last few paragraphs prior to the conclusion, the authors discussed how the students took exams at the end of the semester. The university opted to still conduct written examinations that were proctored live and online examinations taken in lockdown browsers. These lockdown browsers allow for only one app to be functioning on a device at a time and students computer screens, as well as monitoring body language to ensure cheating did not occur.

The authors conclude the article by discussing the positive effects that T&LCs and technology had on the university during the pandemic. The article notes that while technology is a helpful tool to possess, it needs to be accepted by those who are using it. However, the authors also note that the current generation of students is better equipped to understand and accept the use of technology in the classroom compared to previous generations.

This article has great insight into how universities around the world were able to transition to online quickly during the COVID-19 pandemic. It also highlights how technology can be used to help students further their education. Although this article focuses on the effects the pandemic had on Italian college students, the article still provides helpful ideas of how to develop the best way to conduct online learning.

The COVID-19 health pandemic affected every country's educational system during 2020. Edgar Allen G. Castro, a professor at De La Salle Lipa in the Philippines, set out to determine how students felt about the online education offered during the pandemic and as a way to deliver education. He conducted and published his findings in 2023 with a paper titled, *Predictors of Success and Preference for Full Online Distance Education: Insights Moving Forward the New Normal in Education.*

Castro focused on several different factors when surveying 2,703 students in the Philippines. These factors included student satisfaction, intention to re-enroll, intentions to recommend the school, and preference for online learning. When the data was received and analyzed, it was determined, "…the paper presents evidence that the success of an online learning program largely depends on the delivery of learning, including course design, the commitment of teachers, and their readiness to deliver the learning as designed" (Castro, 2023, pg.193). This implies in order for a student to be successful in an online learning environment, there must be an educational framework in place, as well as faculty willing to put forth effort in the curriculum. The data also revealed that learning outcomes, academic support, and student services provided solely online did not succeed. Students indicated a preference for in-person engagement for collaboration-based activities.

The study highlights the importance of efficient content delivery and the need for continuous improvements to online education. The author makes a strong point that successful implementation of online learning requires investment into technology and an emphasis on the importance of student satisfaction, as well as educational achievement. The author of this paper has a clear understanding of how online learning can be a force

for good in the field of education. Castro recognizes that some educational programs were not ready for a transition to online learning. He notes in his conclusion, "…Learning during the pandemic was challenging for most schools because they needed more time to prepare for an online learning setup, especially for those…not familiar with digital learning or interested in incorporating technology in education" (Castro, 2023, pg. 194). This statement reflects back to the data. The students who enjoyed online learning were working with educators who were familiar with technology and had a desire to make the online experience fruitful.

Many studies that look at the effect of technology on students tend to examine older age groups such as high school and college students. However, there is another age demographic that is the subject of debate in regard to the use of technology, young children. For many years, there has been a common belief that children ages 3 and under should not use screens as it can affect their cognitive functioning in a negative manner. Researchers, Maria Hatzigianni and Ioannis Kalaitzidis, began looking into whether or not this ideology is still held and how early childhood educators feel about young children using screens. The authors published *Early childhood educators' attitudes and beliefs around the use of touchscreen technologies by children under three years of age* in 2018. The study reflects the opinions of early childhood educators in Australia.

The study revealed that Early Childhood Education (ECE) teachers' attitudes and beliefs about technology have shifted to greater acceptance of using technology with young children. The article states, "…[the study] reveals a changing trend in views on the use and integration of technology from a very young age" (Hatzigianni & Kalaitzidis, 2018, pg. 892). Educators demonstrated a great confidence in their own personal use of

technology, which allowed for more opportunities to implement technology into their field. Hatzigianni and Kalaitzidis commented that "…there is a definite link between educators' views regarding children and their personal use of technology" (Hatzigianni & Kalaitzidis, 2018, pg. 892). Those interviewed for this study saw benefits in presenting young children with technology, such as greater opportunity for exploration and creativity. The authors remark about how there is still a divide among educators about what technology to provide young students. The authors state: "Given that this is a critical age for all aspects of development and that technology is an undeniable part of everyday life for these children and will be even more eminent as they grow up, educators are concerned about how to establish a 'positive start' in using technology" (Hatzigianni & Kalaitzidis, 2018, pg. 892). The ECE educators simply want the students to be prepared for a successful life in the future with the technology saturated world.

This article gives good insight into a study about young children and technology. Nevertheless, the study did not have a clear and concise standing on whether or not technology is harmful for students. Rather, it expressed the viewpoints of the educators in that field who believe that it will be beneficial to the students. This article leaves the reader wondering how young children will be affected down the road. Since this study was conducted only 5 years prior to 2024, the field of education is still only beginning to understand the effects of technology on young children and students.

The COVID-19 health pandemic affected all nations' educational practices. Many developed nations were fortunate to already have loose infrastructures in place that aided with the transition to online learning. However, there were developing nations that found themselves struggling due to a lack of resources and experience with the concept of

online learning. Two researchers, Debolina Adhya and Santosh Panda, located at the Indira Gandhi National Open University in New Delhi, India, began researching how educators in India coped with the COVID-19 pandemic.

The researchers studied the technology-enabled learning (TEL) that replaced in-person classes. The research showed technology integrations does improve teaching and learning experiences to some degree. Adhya and Panda recognized an educator's attitude towards technology plays a crucial role in the success of online learning. The studies purpose was to "…investigate…educators' attitude towards adoption of TEL…by examining the factors that encourage a successful TEL integrated curriculum during and post-Covid-19 period" (Adhya and Panda, 2022, pg. 135). The researchers wanted to determine whether or not TEL was more desirable to educators after the pandemic. The researchers polled 112 teachers in West Bengal, India.

Once all of the data was collected and reviewed, four topics were presented on: the attitude toward TEL during the pandemic, influence of age, position, and gender, attitude towards face-to-face vs. distance learning, and the attitude towards continuation of TEL post-pandemic. Adhya and Panda determined that educators generally viewed TEL as exceedingly beneficial during the pandemic. There was a clear shift in attitude before and during the pandemic about how applicable TEL could be for education. The position and gender of individuals did not show significant signs of influence on the educators surveyed. Although the age of educators influenced some of the results, as educators older than 56 were more favorable toward TEL due to health concerns. The attitudes of distance learning educators demonstrated a more positive response to the TEL. These educators did have prior experiences with distance learning and were more

equipped to handle the transition during the pandemic. Finally, the attitudes toward the continuation of TEL post-pandemic were favorable among most of the educators surveyed. The researchers found a greater recognition of TEL's potential to enhance education.

This article was a good reflection of a developing nation's use of online education and how it can affect change in the education system. The educators who worked on the project were able to change their opinions for the better due to the COVID-19 health pandemic. The authors also bring to light the importance of further research into TELs and the potential positive impact on India's field of education.

Before the COVID-19 health pandemic forced technology into the classroom, some educators were exploring the possibilities of technology integrations into the classroom. Erik Kormos began researching the opinions of educators about the integration of technology into the classroom. His research was published in an article titled *An Exploration of Educators' Technology Integration in the Middle Grades*. This research sought to discover the opinions about technology integration into the middle school environment.

The study aimed to understand middle school teachers' perspectives on technology used in education. Kormos' study was designed to understand the uses, perceptions, acquisition, and barriers surrounding technology integration. The author gathered his data by surveying middle school teachers in a Mid-Atlantic state public school during the 2017 to 2018 school year. The survey was comprised of 20 questions related to technology integration. After the surveys were completed, Kormos received

796 responses from female teacher, with an averaging age of 43 with 14 years of teaching experience.

The data collected by Kormos identified 5 points of note: the identification of barriers, mitigating barriers, acquisition of technology skills, perceptions of effectiveness, and addressing teacher disparities. There were 2 main barriers identified by the educators: the cost of technology and students' knowledge of technology. In order for integration to be successful in a middle school classroom, these two barriers must be addressed. In order to mitigate barriers, the study suggests using free or low-cost educational technologies. This would help students who are from low socioeconomic standings.

Another issue addressed by the survey was the acquisition of technology skills. Many of the responders noted that peer interaction was the primary source for acquiring new technology skills amongst the teachers. The article suggests that educators try to meet during shared planning periods and online forums to promote peer-to-peer interactions. Perceptions of effectiveness was another data point to come forth from the survey. The responders indicated that the best use of technology was training students on programs in commonly used technologies. These skills included document creation, class websites, and assessment technologies. The final point made in the study was addressing teacher disparities. These disparities could occur if the educator does not cover a wide range of learning styles and levels. The study supports the integration of various educational technologies in order to address the needs of a diverse student population.

This article presented relevant information about educator's feelings toward technology integration before the pandemic. As shown in other studies, the opinions of educators shifted towards a more positive light after the COVID-19 pandemic. This study

shows there was already a positive inclination towards the use of technology prior to the pandemic.

COVID-19 had an immense impact on the way that online education was used. The pandemic thrust the world of online learning into the spotlight as it was the primary means to deliver educational content during that difficult and unprecedented time.. Yet, the use of online learning and the recognition of its benefits have been studied for many years. In 2010, an article titled *Study looks at Online Learning vs. Traditional Instruction* was released by Roanne Angiello. The article examined the efficacy of online learning compared to traditional instruction by looking at a U.S Department of Education study. This study titled *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies.*

The study used meta-analysis to look at the outcomes of online and traditional learning. It was discovered that students who participated in total or part-time online did better than students in traditional learning environments. The study also examined the use of blended learning in schools and how the practice affected student achievement. Blended learning was shown to also increase student achievement compared to the traditional learning environment. The meta-analysis study attributes these better achievement rates to the broad scope of learning styles online learning can cover. Online learning also allows for students to spend more time on task.

The author of this article does, however, caution readers when reviewing the results of this meta-analysis study. Anigello notes “If online learners spend more time than their face-to- face counterparts, the time spent, rather than the online medium itself, might account for some or all of the result” (Anigello, 2010, pg. 58). She later discusses

other factors that have direct effects on the way that students learn such as curriculum, pedagogical techniques used, and extent of online materials.

The study examines the addition of media elements into any learning environment. Based on the results, the introduction of media elements does not necessarily correlate with better achievement. Instead, using activities that prompt reflection and control over interactions with media were found to be more effective. The article concludes by stating further research needs to be completed in order to determine the true effectiveness of online learning.

This article provides great insight into the history of online learning. The ideas and practices associated with online learning have been around for many years. However, many believe that online learning is a new addition to the world of education because of COVID-19. This article shows the opposite to be true.

Released in December of 2023, *Culturally and Linguistically Responsive Online Teacher Learning and Professional Development* is a study that examined teachers online learning and professional development in connection with cultural and linguistic responsiveness. There were several professors from various universities who were contributing authors to this paper: Faridah Pawan, Belle Li, Meika Billings Dopwell, Suliya Nijiati, Alyse Harris, and Tiana Iruoje. The study also explores the impact of technology in preparing teachers for cultural and linguistic responses in the classroom setting.

While conducting this study, three different types of research studies were viewed in order to create a large data pool: qualitative, mixed method, and quantitative. The authors used mainly qualitative research studies which were used to gain insight into

individual and group perspectives of teachers. The quantitative research studies were used to see how asynchronous tools such as social networks affected the culture of the classroom.

Once all of the collected research studies were analyzed, the authors were able to determine some key finding. The findings highlighted how technology is used in the online environment to foster responsiveness, inclusivity and engagement in professional development. Technology was shown to facilitate the creation of online communities which allowed for learners to share and interact with different cultures and views. The study explained how social media platforms such as WhatsApp and Instagram, can provide asynchronous learners the ability to enhance their learning experience through communication. Technologies, like Slack, Google, and Docs were shown to bridge barriers between geographical, linguistic, and cultural barriers. These tools were employed through a cross-cultural framework, which allowed all student populations to connect, share experiences, and conduct conversations. Technology helped educators as it promoted engagement and advanced learning. Teachers received supportive learning and professional development, focusing on culturally relevant issues students may be facing. The online platforms reviewed in this study enabled educators to participate in personal coaching, self-reflection, and professional learning communities. All of the information presented in this study shows the possibilities that technology tools have to offer educators who might be struggling with cultural issues in the classroom.

This article showed a unique perspective about how technology can be used by educators. There are many who view technology as only a tool for their students or a way to make learning more engaging for the classroom. However, it is important for educators

to understand that there are resources available to them which can help learn and adapt to an ever-changing society.

All nations around the world are working to create productive learning environments for students, especially in the area of online education. Published in August 2023, *Conceptualizing the future of e-Learning: examining students' readiness, satisfaction, and intention to continue employing remote learning in higher education landscape* investigates higher education students perception of online education in the United Arab Emirates (UAE).

The author of the study began working as a response to the COVID-19 health pandemic. The UAE's Ministry of Education made efforts to establish a robust e-learning infrastructure. The group worked hard to create both synchronous and asynchronous online learning which would cater to the needs of UAE students. These implementations were seen as a positive by many in the educational field in UAE, which resulted in further research being conducted on the effectiveness.

The study surveyed 476 students with diverse majors and backgrounds in the UAE. The results of the study showed students' readiness, satisfaction, and personal intentions in relation to online education. The students exhibited a medium to high self-efficiency level when using online education. The UAE students showed a high readiness to operate and understand the online curriculum. The students reported high satisfaction levels towards online education. Based on the satisfaction score received, there is a positive outlook towards online learning. Students also exhibited a strong intention to continue pursuing online education. This intention shows that students are ready and more willing to accept the integration of online learning into their education.

This study demonstrates that students who are age 18 to 24 and younger are digital natives who desire technology to be implemented into their learning. As the current generation of students continue to grow in society, technology will only grow increasingly more prevalent. This prevalence encourages the field of education to continue to grow and change with technology and its advances.

There has been a debate for many years over whether face-to-face learning or online learning prompts higher achievement scores among students. Published in January 2024, *Comparison of Knowledge Gained in a Face-to-Face Versus an Online College-Level Nutrition Course,* written by Deborah S. Fetter examined this question through a college nutrition course. The study was conducted via an introductory college-level nutrition course, Nutrition 10. The online version of Nutrition 10 was created in 2017, and the pilot of the course was launched in winter of 2018. This study sought to compare students' performance both online and in person during the fall of 2019 and winter of 2020.

The study was conducted with a 27-item nutrition knowledge questionnaire to determine learning outcomes before and after course participation, as well as provide clear and quantitative measures of student learning. The results of the study indicated that while both sets of students - in person and online, had had significant improvement in nutrition knowledge, the students in the face-to-face setting performed better. Overall, both course formats effectively conveyed the course information and allowed for improved nutrition knowledge. The results of this study agree with other studies conducted in which students achieved better in the face-to-face setting. However, there

are still other studies that show students in online education achieve better than those in the face-to-face environment.

This study is an important reference point for this paper, as the hypothesis of the paper suggests students in the online environment will perform better. The study provides good insight into the achievement of students in the 2019-2020 school year. This research paper will produce data from a different grade level and generation of students.

Digital Tools/Learning Management System Studies

In the current field of education, students are not the only individuals who need to possess knowledge of online education, educators do as well. In the article, *Teacher Educators' Attitudes Towards Using Digital Technologies for Learning and Teaching: The Case of Slovenia*, Sonja Čotar Konrad and Tina Štemberger examine Slovenia teachers' ability and attitudes to use technology in their classrooms. The study was conducted with 61 participants who completed a questionnaire on attitudes towards digital technology used in the classroom. The study found the teachers surveyed have a basic understanding of technology; however, that knowledge decreases when the technological tools become more advanced.

In Slovenia, teachers' education is regulated by the government, and a general framework for digital competence is required. Teachers hired by Slovenia schools are expected to possess digital competence skills. However, even though this is the case, there are still discrepancies between teachers' skill levels. "The study showed that teacher educators are inclined to use [Digital Technology] DT for teaching and, even more so, for personalized learning and teaching" (Konrad and Štemberger, 2023, pg. 52). This study

exhibits educators' willingness to implement technology into their lecturing. However, the study's data also showed, "the teacher educators were disinclined to use DT to support assessment and critical thinking in educational processes" (Konrad and Štemberger, 2023, pg. 52). Teachers still have hesitation to use technology for testing or critical thinking, activities that have students using the full scope of knowledge and application.

This article is a prime example of the slow acceptance of technology into the classroom and curriculum. Most educators in the field, see the digital technology as a tool that can be used on occasion rather than in totality.

Many online learning providers use Learning Management Systems (LMS) to centralize and streamline the educational process. These LMSs are used by other facets of education, including libraries and learning centers. In the article, *Meeting Them Where They Are: Designing a New Self-Paced Library Orientation Program for Students in the Learning Management System*, Russell Michalak and Monica D.T. Rysavy explain the ways that they are helping students better understand library resources through an LMS.

Michalak and Rysavy decided to transition their library system to two different LMSs to aid in streamlining the library. The transition to the Teachable to Campus Web & CourseARC began in 2015 and was fully launched in January of 2023. The migration to an online library software was driven by a desire to streamline services, reduce costs, and eliminate redundancies. The project plan for developing an online library orientation for new students, which utilizes technology tools, addresses past method challenges, establishes objectives, and designs modules for learning. The goal of the online library orientation system is to provide students the opportunity to learn and understand

resources that are available to them through library systems. The authors note that many students are unaware of the resources that are available to them within the school library system. The goal of the LMS is to help new students understand what the library has to offer to them.

This article demonstrates the possibilities of an LMS system as well as how they can be utilized in all areas of the field of education. The authors of this article indicate a clear and direct plan for implementation. The plan is direct in helping the reader understand the need for improvements to the system along with the importance of the change. LMS is a key part of success in the world of online learning.

Published in 2023, the article *Evaluation of usability in Moodle Learning Management System through Analytics Graphs: University of Applied Sciences Teacher's perspective in Finland*, researches how students at a Finnish university respond to the use of a Learning Management System, in particular the program Moodle. The study was conducted by four university professors: Sunday Olaleye, Richard Agjei, Biliaminu Jimoh, and Prince Adoma. The study took place at the University of Applied Sciences in Finland with a focus on students in a marketing course. The study followed the marketing course's five-month duration.

The authors set out to demonstrate the usability of Moodle in the classroom setting and how educators can adapt and maximize the potential of the LMS. These objectives were completed through a quantitative approach by review system log data throughout the course. During the course, twenty-six students participated in various assignments, presentations, and examinations. All data produced from these courses was logged in the Moodle LMS. The authors comment, "This paper presented the application

of the Analytics graph, which has a high potential to serve as an analytics tool for monitoring and evaluating student performance and behaviour when using Moodle in LMS" (Olaleye, Agjei, Jimoh, and Adoma, 2023, pg.101). Moodle shows it was able to track student's performance, activity patterns, and submission behaviors. These findings were illustrated through Moodle's analytics graphs which allows the teacher insight into students' behaviors, performances, and course engagement.

The article is an excellent representation of how LMSs can provide insight into student behaviors and performances. The study also highlights the potential benefits that LMSs offer educators and online learning institutions for enhancing the educational experience of its students. However, the study does show that further updates can be made to LMSs. The article does show the positive potentially of Moodle and other LMS systems in the field of education.

Throughout the field of education, Learning Management Systems (LMS) are considered to be the main form of content delivery to online students. In 2023, four Australian professors, Julie Willems, Henk Huijser, Iain Doherty, and Alan Soong, set out to determine *Whither the LMS: Is the LMS Still Fit for Purpose?* This article examines the ongoing debate around the effectiveness of the LMSs made more prevalent by the COVID-19 health pandemic.

The study underscores the importance of reevaluating teaching technology tools and how the tools are being used. One of main points of this reevaluation is the pedagogical standards and technological environment that is best used for conveying curriculum to students. In the conclusion of the study, the authors found that many educators view LMS primarily as a means to distribute content without concerns for the

pedagogical framework. Therefore, making the LMSs used by these educators unsuccessful with students. The LMS is criticized for only acting as a content distributor instead of a program fostering interactivity and engagement with lessons. The data of this study also showed more preference toward social based messaging such as Microsoft Teams and Slack, rather than LMSs traditional blog post style.

This paper truly shows the argument amongst educators about the effectiveness of online learning environments. The argument is reflected in the following factors: quality of teachers, social interaction, learning frameworks, relevant learner activities, and formative feedback. While LMSs can support some of these aspects, there are current limits to the capabilities of LMSs. This article sheds important light on the opposition side to the use of online LMSs and the limitations that are present in the systems. However, the article does mention the small sample size used by the researchers and impact of the COVID-19 on research timelines. This article only shows the view of a few who have had limited success with LMS. The study does address several important points about the need for changing and updating technological tools in the field of education.

One important aspect of online learning is the use of tools that can help improve students' learning experiences. Many of these different online tools are growing and changing to suit the needs of students all over the world. In the article, *Utilizing Mobile Devices to Enrich the Learning Style of Students* written by Enda McGovern, Cuauhtemoc Luna-Nevarez, and Arne Baruca, the authors examine the importance of technology tools and student perception of these tools.

The research study was conducted at a private university in the United States. The study used two technology tools, Flipboard and Stitcher, applications that were integrated into students' coursework. The goal of the apps was to enhance the coursework for 160 business students participating in the study. Flipboard provided relevant reading material related to the courses and Stitcher provided business-related podcasts.

The two applications were used over the course of a semester and upon its conclusion, 27 students were selected for focus groups. Within these focus groups, a preference for Flipboard became apparent. Students found that Flipboard was more useful for finding relevant information that aided in class discussions. Whereas Stitcher was less efficient in providing information due to the length of the content. There were 4 main themes that emerged from this study: engagement, enjoyment, linking theory to practice, and integration. Students found it easier to engage with format and content on Flipboard. This allowed the students to feel more confident when participating in class. Students found enjoyment while reading the stories on Flipboard; they found the content to be relatable and pleasant to read. Flipboard helped aid students in connecting theoretical concepts from their textbooks to real-world applications. This improved interaction with the content. The final theme found in this study was integration. Students found that the mobile nature of Flipboard allowed them to work on coursework more flexibly. These features allowed for easier integration into the flow of the students' daily lives.

There were a minority of students who enjoyed using Stitcher, as it allowed for multitasking. The divide in preference does show the need for diversity of learning materials, as all students learn differently in the classroom. The study concludes by

addressing how educators should consider integrating apps that align with students' digital habits and preferences, in order to see successful use.

This article is important, as it addresses and lays a foundational understanding of what students need in learning today. There are many learning apps that can be used in the classroom, which can often lead to overwhelmed educators. This study provides a framework, or rubric educators can use in order to successfully integrate digital learning tools into the classroom.

In the article, *Faculty pedagogical developers as enablers of technology enhanced learning* written by Olga Viberg, Olle Bälter, Björn Hedin, Emma Riese, and Anna Mavroudi, the authors study and discuss a shift to bottom to top technology integration. The bottom to top model has teachers implement new ideas and the administration supports the change. Traditionally most schools operate with the top to bottom model, where the administrator implements new ideas, and the teachers support the change. The Faculty Pedagogical Developer Initiative (FDPI) at the KTH Royal Institute of Technology in Sweden conducted a study in 2017 with the goal to support faculty members as designers of Technology Enhanced Learning (TEL). These TELs were specific to a school who saw a need for technology integration in the classroom.

The study interviewed, "three directors of education and six faculty pedagogical developers (FPDs) at different schools" (Viberg & ect, 2019, para 18). These interviews were conducted in order to create an understanding of how to implement bottom to top and TELs creations. The schools involved in the study were looking for ways to integrate more technology into the classroom with teacher created TELs. The interviewees were

selected due to their understanding of educational practices and how these practices can be applied to technological frameworks.

At the beginning of the study, members of the FDPI found it difficult to start improving school's technology resources as there were no clearly defined roles. Due to this fact, the members had to spend time creating job frameworks which would later become beneficial to the process. The study found the participants who experienced the best results were schools whose directors and higher up faculty trusted the educators' decision-making skills and creative abilities. Technology was integrated faster when the educators had full control over the process rather than the directors. Also, the schools who experienced the most success were those whose faculty were accepting of the change, as well as possessed a knowledge of pedagogical teaching practices. These schools were able to not only have a successful integration of technology but also see positive results from students. Finally, due to the creation of the job frameworks within the FDPI, the group was able to better assist schools and help with professional development.

The article was well written and shows promise when looking to establish TELs in schools. The ideas presented are in line with other studies that have been conducted since 2019. However, the study itself was small and only interviewed 10 participants from 2 different schools. This may suggest that not a large enough sample size was taken in order to show whether or not the idea of bottom to top implementation is viable.

Despite the support that online education has received since COVID-19, there are still some that make negative assumptions. In the article, *Assumptions and Distance*

Education, writer Michael Simonson addresses some of the notable assumptions of instructional designers which are made about creating online education.

This article addresses 7 main issues that instructional designers must consider with online learning, such as its learners, structure, and technology. Simonson states that instructional designers should not take assumptions about learners for granted. In this case, the assumptions about the learner using the program will help instructional designers create a product that's usable for all. The structure of the course is the first part of the project, "…Structure decisions are usually decisions without evidence (e.g., assumptions)" (Simonson, 2023, pg. 40). The structure of the coursework is often difficult for instructional designers as there are time constraints and the application of learning theories. These difficulties require instructional designers to make assumptions about what is best suited for the online class and content.

Another assumption discussed in this article is technology and its delivery to those using the course work. Simonson notes "…one immediate assumption is that online course design and delivery must be instructional technology-based" (Simonson, 2023, pg. 40). Therefore, instructional designers must have a base knowledge of educational technology in order to ensure the programming will work properly.

The article suggests that instructional designers may not recognize these assumptions openly; however, they are still imperative to the design process. Simonson also notes that ultimately assumptions without evidence are essentially standards without research. There needs to be a stronger understanding and underscoring of the need for evidence-based practices in online learning.

This article presents a different viewpoint then most others spoken about in this literature review. Simonson wrote this article for those who are tasked with creating the online curriculum rather than those who will be using the curriculum. This article shows what those responsible for the course creations need to accomplish instead how the information can be applied to the classroom.

Through the field of education, there is an uneven acceptance of technology and its application in different areas. There is a substantial amount of previous literature on this topic, but it is lacking in the area of the impact of academic, psychological, and experiential factors. Published in 2023, *Extending Technology Acceptance Model to Higher-Education Students' use of Digital Academic Reading Tools on Computers*, this study seeks to quantify the acceptance of digital reading tools and to determine if academic, psychological, and experiential factors make a significant impact. The authors, Yupeng Lin and Zhonggen Yu, then use this statistical analysis, along with previous literature, to create a hypothesis model to conceptually visualize the impacts these factors have on the acceptance of digital reading tools on education.

The study created 16 different hypotheses using previous literature ranging from positively predicting higher-education students' thoughts on the usefulness of digital tools to lecturers' positive predictions of students' attitudes toward digital tools. The hypotheses also discuss how digital tools affect academic achievement positively and how digital tools positively improve collaboration. After the study was conducted, the results showed that 10 out of the 16 hypotheses were supported during testing. The results also produced the top 8 advantages and disadvantages to using digital reading tools. Some of the advantages included "easy to use, easy access to resources, and easy to

take notes" (Lin & Yu, 2023, pg. 16). While some of the disadvantages included "eye-tiring, distracting, and hard to take digital notes" (Lin & Yu, 2023, pg. 16). The study showed that some variables which combined would negatively affect or render the variables almost unusable. This shows that certain digital tools should not be combined in order to avoid affecting the learning achievement of students.

This study was an interesting combination of previous research and a new research study. The study showed how digital tools have a high acceptance rate among students when properly paired with other digital tools. The authors show students in higher education are open and willing to use digital tools that are available to them.

One of the main issues with the implementation of digital tools in the classroom is a lack of understanding amongst educators and administration. Dmitriy V. Kornienko and Svetlana V. Mishina saw a need to improve the digital literacy of educators and students at all levels in the City of Yelets, Russia. The pair published their finding in September 2023 in an article entitled, *Implementation of Digital Education Tools in the Pedagogical Community.* The authors worked with over 350 administrators and teachers, as well as 4,000 students, who were actively participating in digital education practices.

The study utilized the organizational forms such as resource centers, local educational networks, pivotal schools, and the authors' schools to implement new digital educational practices. The authors utilized learning platforms, like the LECTA, and digital learning tools such as 3D modeling, digital video creation, and robotics.
The research results showed a deficiency in digital literacy among teachers mainly; however, they were able to successfully implement digital practices prior to the study. The program was able to increase teacher and student involvement with digital education

by providing examples of effective digital tools. The results of the study revealed a qualitative improvement in digital competencies among both teachers and students. The authors of the study, strongly underscore the importance of digital pedagogical practices, in order to create successful practices that improve digital literacy and technology use.

This study shows how many teachers struggle with digital literacy issues, which can result in the uneven spread of proper digital pedagogical practices. This study emphasized that with proper training and the communication of information, educators can begin to better understand technology practices. The authors provided a great blueprint for schools looking to improve their digital education and the use of digital tools.

Published in 2013, *The One-to-One Moment: Digital-Age Tools and the Challenge of Democratic Education in a Post-No Child Left Behind Era,* was an article written to explore the ideas of cloud computing, theoretical frameworks, and societal shifts revolving around technology and the No Child Left Behind act. The author, Baaiyr Rohney, examines how the one student per one piece of technology can be used by The National Educational Technology Plan (NETP) to match shifts in the US educational policy. NETP aims to create modern, technology-driven educational systems at all levels of education.

NETP promotes the use of technology to enhance learning opportunities and bridge achievement gaps among students. However, NETP recognizes there are tensions between standardized curriculum and democratic educational approaches. Due to these tensions, NETP provided a menu of options to states and districts which allows for the incorporation of cloud-drive technologies in educational systems.

Rohney discusses 4 ways that cloud-based learning can become more democratic in regard to student's use of technology. One of the topics discussed in the article is schooling for accountability and economy. This aspect focuses on how the No Child Left Behind Act and initiatives like Common Core standards emphasize the need to infuse 21st-century skills into curriculum. There needs to be standards which focus on skills like communication and critical thinking implemented. These skills will help prepare students for a global market economy.

The article concludes by discussing the potential of cloud-based technologies and can aid in creating engaging, relevant, and personalized learning experiences for all learning. Although, for cloud-based technologies to improve, educators must grapple with tough questions about the role of technology in education.

This article provided insight into technology and its perception in the field of education over 10 years ago. One is able to see how better digital tools and further acceptance of technology has changed in education. The COVID-19 pandemic helped with further acceptance of tools as there were little to no other choice in 2020. However, this article shows the desire to move and implement technology into education is not a recent idea.

Conclusion of Literature Review

The literature reviewed above is a culmination of 12 different studies relating to online education and 10 different studies relating to the tools used in online education. These two sections offer a robust viewpoint of how technology has affected the field of education for the better. Many of the studies used examined how countries were able to use online learning during the pandemic and how it improves perception of online

education. The studies revolving around digital tool show the application and advances in digital tools over the past serval years. These tools have become a pivotal asset to educators in the classroom today.

This literature review relates to this paper, as the research conducted aims to discover how online education has affected student achievement. Due to the nature of the schools to be studied, it is imperative that a prior understanding of the world of online education and its tools are discussed. This literature review covers a broad scope of knowledge for online education; thus, it provides the reader background information necessary to properly comprehend the data presented.

Chapter 3

Methodology and Procedures

Type of Design

The general research conducted during this thesis will be applied research. The category of research used is a case study of academic test scores and attendance percentages.

Participants

Content: There will be two local high schools examined in this study. Both schools have similar student bodies with similar disadvantages. High school students from both School A and School B whose data will be studied struggled in a traditional school setting. Thus, the students were enrolled in an online learning academy that works in partnership with the student's district. Each of the selected students has been enrolled in the virtual learning setting for longer than 6 months after being unsuccessful in the traditional school setting. The high school students will be in either grades 11 or 12 to ensure a robust data set. Out of the students who attended both high schools, nearly 62% are economically disadvantaged.

The data collected from the online students will be compared to students in the traditional school setting. The traditional students are from the same high schools and economic standing. However, only the class's achievement scores from the traditional students will be compared to the online students.

Units of analysis: There will be several components examined during this case study in order to see if there was marked improvement in student achievement and attendance when the students were transitioned to the online setting. Students who started

9th grade in either 2020 or 2021 will be examined in this study. These students were targeted as each will have between 3 to 4 years of data to examine. Each online student's average scores for core classes will be evaluated and compared to their peers in the traditional school setting. The online student's attendance and seat time will also be reviewed and compared.

Geographic extent: The students in this study reside in Jefferson County located in northeastern Ohio. In Jefferson County, approximately 18.1% of the residences fall below the poverty line, and 71% of the total students are economically disadvantaged.

Time of membership: High school students have been participating in the online learning setting for longer than 6 months but less then 4 years.

Sampling technique: The sampling technique used throughout the analysis will be purposeful sampling. The students selected have not only participated in the virtual learning environment longer than 6 months, but also participated in the traditional school setting during their high school career.

Ethics: This case study will be done with minimal risk. In order to ensure minimal risk, information evaluated and discovered will be shared with participants bi-weekly. Participants will be allowed to retract average academic percentage and attendance data at any time until May 1st of 2024. The final results of the case study will be shared with participants by May 3, 2024, in writing and at a scheduled debriefing.

Apparatus

This research will be conducted through three main forms of data collection: data from the traditional school setting, data from the online learning academy, and a student

conducted survey. These 2 main points of data collection will provide a robust lens of student achievement over their 3-to-4-year high school academic career. The first point of data collection is from the traditional school setting. The superintendent will be contacted via permission letter which is attached in the appendix. The names of individuals contacted will be removed for privacy purposes. The letter will ask for permission to access class attendance data and test scores. Since the comparison being made is individual students from the online learning academy to the whole class, there is not a need to request individual student data from the school.

The second point of data collection is the online learning academy. The online learning academy offers a more in-depth view of student achievement through data collecting software. The students who have been members of the online learning academy for longer than 6 months but less then 4 years will be used. Two different reports will be run on each of the students: an item analysis and a seat time report. The item analysis will detail students achievement while attending the online learning academy. The seat time report will act as the students' attendance report, as it measures how much time the student spent completing units in the courses.

Procedure

After preliminary research on the potential and validity of the study, I received permission from the director of the virtual learning academy to begin extracting data from the virtual learning academy's Learning Management System. As for the traditional brick-and-mortar school data, I was able to access the data by working with a gifted coordinator at an educational service center. The gifted coordinator was able to pull public reports about achievement data and attendance data from 2018-2023. The 2023-

2024 school year data can be accessed on the Ohio Department of Education and Workforce's (ODEW) website.

The brick-and-mortar data I compiled contains the district, grade, subject, subgroup of students, percentage achievement score, and school years attended. This data only shows the average grade for all students, not individual student averages. The attendance data includes grade level, chronic absenteeism rates, and the attendance rate. There is additional data shown on the report, such as race and gender, which will not be examined in the scope of this study.

In order to showcase the most accurate representation of student data from the virtual learning academy, a list of all students who have attended the virtual learning academy was created and placed in an excel document, organized by district. A data table was created showing student names, school district, grade, student license type, and start and end date of said license.

These students were then sorted by what year their respective license started with the virtual learning academy. Any students who were licensed before 2020 were removed from the list due to lack of data. All students who were sophomores and older in the 2020-2021 school year were also removed, as they are outside the scope of this study due to the changes made as a result of the COVID-19 pandemic. The remaining students' class schedules were reviewed to determine whether or not they participated in a full-time capacity either in the fall, spring, or both semesters. For a student to be considered full-time at the virtual learning academy, a student must take 4 or more classes. If the student did not participate full time, they were removed from the data pool. The 2020 freshman

class was selected to participate in the study, as these students will have 4 years worth of data to draw upon.

For the 2021-2022 school year, the student list was reexamined, and the parameters changed marginally. The students who were sophomores during the 2021-2022 school year remained in the data pool, as well as students who were freshman during the 2021-2022 school year. Both the graduating class of 2024 and 2025 will be examined in this study in order to increase the sample population. The students who were juniors and seniors are removed from the data at this time. Once the data pool is narrowed down to the freshman and sophomores of 2021-2022 school year, each student's class schedule will be examined again. All students who are not participating in a full-time capacity in either the fall, spring, or both semesters will be removed from the data.

The 2022-2023 school year will be placed under review. Students who were sophomores or juniors will be left in the data pool, freshman and seniors will be removed. Once the pool is narrowed down to sophomores and juniors, each student's class schedule will be reviewed. If the student is not participating in a full-time capacity in either the fall, spring, or both semesters, they will be removed from the data pool.

Finally, the 2023-2024 school year will be reviewed. Students who are juniors and seniors will be left in the data pool, freshman and sophomores will be removed. Once completed, the juniors and senior's schedules will be reviewed. If the student is not participating in a full-time capacity in either the fall, spring, or both semesters, they will be removed from the data.

Subsequently, information reports will be run on each of the students remaining in the data pool. For each semester the student participated, an achievement report and seat time report will be generated for the core 4 subjects: English, Math, Science, and History. The achievement report will show the grade received in the class, whereas the seat report will act as attendance data and will show how long the student spent on the course. These two reports will produce a percentage value which will be entered into a data table. This data table will have the student's name, grade, school year, fall average, spring average, and total average between the 2 semesters. Another 4 data tables for average seat time will be created following the same format as previously stated. There will be 20 data tables in total, which correlate with the 4 school years and core subjects reviewed.

Following the collection of the virtual learning academy data, all of the total student averages will be averaged into one main average per core subject. The main average will then be compared to the traditional brick and mortar class averages. The goal is to determine which group of students, in the same district, produced a better average during the selected school year.

Internal validity: This research project ensures internal validity, through a thorough literature review, detailed population overview, explicit definition of terms, and clearly defined parameters for data collection.

External validity: This research does not contain external validity, as all students used were selected from the same school district.

Data Analysis

Based on the literature review and the preliminary data review, the researcher believes online students will achieve 3 to 5% higher in achievement then students in the traditional school settings. The researcher also believes online students will have a 90% attendance rate, and in person students will have a lower attendance rate, around 80-85%. These higher testing scores will be attributed to online student's better attendance rate. These variances in scores between the two groups or populations will be found by comparing achievement and attendance percentages collected from the two styles of learning.

Chapter 4

Results

The results shown in this chapter were created under the following conditions for achievement and attendance.

Achievement

Online students from both schools must have been in their respective online environment for longer than 6 months, and the students must have been 9th graders in 2020-2021 or 2021-2022. Each student's scores were taken using their grades in each class. Students were included in the study regardless of whether or not they completed courses in all core 4 subjects. Once all students with eligible scores were collected, each student was assigned a number in alphabetical order. Students were then sorted into data tables via grade level. Second, the students' scores were averaged together to create a class average. This class average was then compared to in-person brick-and-mortar class averages. These averages were obtained through the Ohio Department of Education and Workforce's public testing records. The following pages contain achievement data for Schools A and B.

School A

Table 1

In-Person Student Achievement Scores from 2020-2023

School Year	Courses and Average Scores			
	Math	Science	English	History
2020-2021	<10%	<10%	<10%	<10%
2021-2022	18.33%	68.80%	49.70%	59.95%
2022-2023	31.57%	62.00%	49.30%	60.40%

School A

Table 2

Online Student Achievement Scores from 2020-2023

School Year	Courses and Average Scores			
	Math	Science	English	History
2020-2021	66.20%	92.20%	87.90%	88.30%
2021-2022	79.40%	78.70%	84.00%	78.80%
2022-2023	74.20%	86.10%	78.80%	76.40%

School A

Table 3

Comparison of In-Person Student & Online Student Achievement Scores from 2020-2023

School Year	Courses and Average Scores							
	Math		Science		English		History	
	In-Person	Online	In-Person	Online	In-Person	Online	In-Person	Online
2020-2021	<10%	66.20%	<10%	92.20%	<10%	87.90%	<10%	88.30%
2021-2022	18.33%	79.40%	68.80%	78.70%	49.70%	84%	59.95%	78.80%
2022-2023	31.57%	74.20%	62.00%	86.10%	49.30%	78.80%	60.40%	76.40%

School B

Table 1

In-Person Student Achievement Scores from 2020-2023

School Year	Courses and Average Scores			
	Math	Science	English	History
2020-2021	30.50%	55.60%	73.40%	59.10%
2021-2022	21.10%	68.30%	67.20%	62.15%
2022-2023	30.20%	53.10%	48.30%	64.05%

School B

Table 2

Online Student Achievement Scores from 2020-2023

School Year	Courses and Average Scores			
	Math	Science	English	History
2020-2021	76.80%	84.10%	77.30%	77.10%
2021-2022	80.50%	76.50%	75.90%	73.30%
2022-2023	76.20%	78.40%	75.00%	76.40%

School B

Table 3

Comparison of In-Person Student & Online Student Achievement Scores from 2020-2023

School Year	Courses and Average Scores							
	Math		Science		English		History	
	In-Person	Online	In-Person	Online	In-Person	Online	In-Person	Online
2020-2021	30.50%	76.80%	55.60%	84.10%	73.40%	77.30%	59.10%	77.10%
2021-2022	21.10%	80.50%	68.30%	76.50%	67.20%	75.90%	62.15%	73.30%
2022-2023	30.20%	76.20%	53.10%	78.40%	48.30%	75.00%	64.05%	76.40%

Attendance

In order to qualify for this study, online students from both schools must have been in their respective online environment for longer than 6 months, and the students must have been 9th graders in 2020-2021 or 2021-2022. In order to determine students' attendance online, a seat report was generated. This report shows the amount of time a student spends working on school related activities. All online students attending School B, receive an automatic 50% attendance rate due to activities assigned by their home school. Each student's course seat time was added together to determine a student's yearly attendance. To create the class average, each student's seat time was averaged together. This average was then compared to the attendance rate at each of the respective brick-and-mortar schools. In person students are scheduled to attend 910 hours of instruction. The following pages contain attendance data for Schools A and B.

School A

Table 4

In-Person Student Attendance Data from 2020-2023

School Year	Grade Level and Attendance Data		
	9th Grade	10th Grade	11th Grade
2020-2021	88.50%		
2021-2022	82.10%	84.00%	
2022-2023		87.30%	87.30%

School A

Table 5

Online Student Attendance Data from 2020-2023

School Year	Grade Level and Attendance Data		
	9th Grade	10th Grade	11th Grade
2020-2021	0.00%		
2021-2022	3.08%	7.00%	
2022-2023		26.44%	3.39%

School A

Table 6

Comparison of In-Person Student & Online Student Attendance Data from 2020-2023

School Year	Grade Level and Attendance Data					
	9th Grade		10th Grade		11th Grade	
	In-Person	Online	In-Person	Online	In-Person	Online
2020-2021	88.50%	0.00%				
2021-2022	82.10%	3.08%	84.00%	7.00%		
2022-2023			87.30%	26.44%	87.30%	3.39%

School B

Table 4

In-Person Student Attendance Data from 2020-2023

School Year	Grade Level and Attendance Data		
	9th Grade	10th Grade	11th Grade
2020-2021	93.00%		
2021-2022	88.90%	92.00%	
2022-2023		90.00%	90.20%

School B

Table 5

Online Student Attendance Data from 2020-2023

School Year	Grade Level and Attendance Data		
	9th Grade	10th Grade	11th Grade
2020-2021	58.93%		
2021-2022	53.19%	56.34%	
2022-2023		62.06%	54.94%

School B

Table 6

Comparison of In-Person Student & Online Student Attendance Data from 2020-2023

School Year	Grade Level and Attendance Data					
	9th Grade		10th Grade		11th Grade	
	In-Person	Online	In-Person	Online	In-Person	Online
2020-2021	93.00%	58.93%				
2021-2022	88.90%	53.19%	92.00%	56.34%		
2022-2023			90.00%	62.06%	90.20%	54.94%

Chapter 5

Discussion

Conclusion

Explanation of results: In order to create the data sets shown in Chapter 4, online students' individual transcripts were examined. Each core Math, Science, English, and History class was entered into a data table. The formula used to create the averages in Excel was =AVERAGE(#1, #2, #3…). Once all student data was tabulated, all students' achievement scores were averaged using the same formula. Once these averages were calculated, all of the resulting data points were transcribed into their respective graphs for visual comparison.

Based on the data collected and reviewed, the researcher found online students at School A tended to score between 9.99 and 82.20 percentage points higher than the traditional students, and School B's online students scored between 3.99 to 59.40 percentage points higher than their traditional counterparts. This supports the thesis' hypothesis of online students performing better overall than their in-person peers.

The in-person students attending School A struggled with their achievement scores as shown in **Table A1**. In **Table A3,** the 2020-2023 school year scores for both modes are listed to show an overview of the results. This data table shows the clear difference in achievement scores. The 2020-2021 school year, in particular, produced the largest difference in achievement scores. **Table A1** shows the achievement percentages, of the core 4 subjects from the traditional school setting were 10%. This could be in direct correlation with learning loss that occurred during the pandemic. Whereas the online students received higher scores in the 4 subjects: 66.20% in Math, 92.20% in

Science, 87.90% in English, and 88.30% in History. The scores indicate that online students at School A scored between 56.20-82.20 percentage points higher than their in-person counterparts.

During the 2021-2022 school year, School A was able to increase their in-person scores. However, with the improved scores, shown in **Table A1** and **Table A3,** the traditional students still received less then 50% in two of the core 4 courses: 18.33% in Math and 49.70% in English. These scores are 8.33 and 39.70 percentage points higher than the 2020-2021 scores. The in-person students were able to raise their Science to 68.80% and History score to 59.95%, meaning the in-person students were able to raise their scores by 58.80 and 49.95 percentage points. Although, these scores are still lower than the online students. The online students scored 79.40% in Math, 78.70% in Science, 84.00% in English, and a 78.80% in History. Thus, there was a difference of 9.99 to 61.07 percentage points between the 2 groups of students.

For the 2022-2023 school year, School A saw another year of improvement in their traditional students' test scores. The traditional students' scores and the online students' scores are shown in **Table A1, A2,** and **A3**. School A's traditional students were able to raise their test scores, but still performed under 50% in Math and English. Their scores are as follows: 31.57% in Math, 62.00% in Science, 49.30% in English, and 60.40% in History. However, the online students' achievement scores declined. Despite seeing a drop in the achievement average, no score dropped below 70%. The online students' scores were 74.20% in Math, 86.10% in Science, 78.80% in English, and 76.40% in History. The online students still performed better, with 24.10 to 42.63 percentage points greater achievement.

School B showed similar trends in achievement scores between the traditional and online students. During the 2020-2021 school year, as shown in **Table B1** and **Table B3,** only one of the core 4 subjects received below a 50%, Math. The in-person students scored 30.50% in Math, 55.60% in Science, 73.40% in English, and 59.10% in History. The online students scored 76.80% in Math, 84.10% in Science, 77.30% in English, and 77.10% in History. These scores resulted in an achievement difference of 3.90 to 46.30 percentage points.

In 2021-2022 school year, as shown in **Table B1** and **Table B3,** the only course that failed to score above a 50% was yet again Math. The in-person students' Math score dipped to 21.10%. The in-person students' other scores remained above 50%, scoring 68.30% in Science, 67.20% in English, and 62.15% in History. The online students' achievement scores in all 4 subjects remained above 70%, scoring an 80.50% in Math, a 76.50% in Science, a 75.90% in English and a 73.30% in History. Despite the slight drop in achievement scores, the online students still outperformed the in-person students by 8.20 to 59.40 percentage point difference in achievement.

The 2022-2023 school year continued to see an overall decrease in student achievement for both the online and in-person students. **Table B1** and **Table B3** confirms the in-person students failed to achieve a 50% in two courses, Math and English. The in-person students scored a 30.20% in Math, a 53.10% in Science, 48.30% in English, and 64.05% in History. The online students' achievement decreased but still remained above 70%: 76.20% in Math, a 78.40% in Science, a 75.00% in English, and 76.40% in History. With the decrease in achievement from the in-person students, the achievement gap

widens further between the two populations, resulting in a 12.35 to 46.00 percentage point difference in scores.

Once all of the achievement averages from both Schools A and B were compared, the results were found to be in direct correlation with the hypothesis in Chapter 1. The online students achieved higher than the in-person students; however, the researcher did not expect the achievement difference to be so large. Thus, the data analysis from Chapter 3 does not support the original hypothesis of the difference to be between 3% to 5% as the student achievement difference was between 9.99 and 82.20 percentage points higher for School A and between 3.99 to 59.40 percentage points higher for School B.

It is interesting to note the difference between achievement scores and attendance between the in-person and online students for both School A and B. Both School A and B's online students completed less instructional time but were able to complete their course work and achieve better scores. For example, in the most recent school year, 2022-2023, the online students in 11th grade at School A attended an average of 3.39%. Whereas the in-person students attended an average of 87.30%. The same trend can be observed with School B's 11th grade students who attended 54.94%. The in-person students attended 90.20% of their required instructional time.

The difference in attendance hours and percentages is not in line with either the hypothesis or data analysis previously listed in the paper. The hypothesis stated that online students would have more hours than the in-person students. This was originally believed as the online students would need more educational time to outperform their in-person peers. However, this was proven to be the opposite, as the online students performed better than their in-person counterparts with less educational time.

While some could argue that this could be due to the online students cheating, the LMS used to distribute the curriculum has several safeguards that prevent cheating. The educators who grade the assignments are also notified if cheating is suspected to have occurred. In most cases, students are required to re-do the assignments in their entirety if cheating is suspected.

References to Prior Research: From an achievement standpoint, this data supports previous literature with the online students performing at a higher level than the in-person brick and mortar students. Only one study (Castro, 2023, p.180-199) found that in-person students have higher achievement than online students. There was a surprising lack of previous research and literature reviews about attendance for online and in-person students.

Implications

The results of this case study may be of some value to the local and area schools. One of the main concerns within the field of education is how to help students perform at a higher achievement level. This study appears to indicate that students placed online within their district were able to improve their individualized achievement scores. The individual students' scores, show higher achievement scores than their in-person counterparts. These results may provide the ability to analyze and begin to work on closing the learning gap between the online and traditional students. The study also highlights the benefits that the virtual learning academy's Learning Management System is having on students.

This study suggests that students are able to achieve more when they are able to work at their own pace and encouraged to have a clear understanding of the content

presented to them. Individualized learning is a very viable option for the learning difficulties that are currently occurring in our educational system.

This study may also provide key stakeholders the opportunity to examine whether or not a curriculum change would be fruitful for students in the traditional learning environment. All students deserve the ability to learn and fully grasp concepts regardless of the educational or economic standings.

Recommendations for Future Research

The main recommendation for future research would be to do this same achievement study on a larger scale. This could be done by including every high school in a county or multiple counties. This would allow a large data pool to be created that can be compared to other counties in the same state or another state. By examining all high schools in a county, objective comparisons could be made that would be invaluable to improving and optimizing student performance. This could also help provide schools who may be considered under privileged, information to see if there are any practical steps for improvement.

The concept of this study should also be revisited 5 to 10 years from now. This would not only allow time for technology to continue to advance and change the way curriculum is distributed, but also allow for the effects of COVID-19 to be observed. Currently, the field of education is on the verge of technological renaissance which will drastically change the technology used in the field. Once the technology improves in the classroom, it will be interesting to see how the difference in achievement between online and in person learners changes. The COVID-19 pandemic affected the way many students started their learning journey, and by re-creating this study in the next 5 to 10

years, one would be able to get a better glimpse into how much the COVID-19 pandemic affected the learning of the younger generations of students.

One thought provoking concept that can be derived from this study is whether or not students should be required to attend school for 6-7 hours a day. The results of this study show that the online students who spent less educational time performed better than their peers. This could be attributed to online students' ability to work self-paced and at their leisure. This self-paced nature allows students to work with the curriculum until the information is fully grasped.

Another interesting idea is whether or not students should focus on one course a day or a few courses a semester. One liberty that the online students in this study have is the ability to work on one subject per day. This allows for the students to focus on each subject individually. With less variety of information placed on students per day, it appears that the students have better retention of the concepts.

One of the main errors that may have occurred in this study is human error. Students could have found a way around the cheating protocols or may not have applied themselves to their studies. This would affect the outcomes of the in-person students as their scores could be lower or higher than what was presented on their transcripts. Another place for human error could be within the averaging of the data sets. Even though the calculations were completed by the Excel program and were thoroughly reviewed, there is still a possibility that a formula could have been improperly written.

Despite the possibility of the errors, this study helps to shed light on the improvements that need to be made in the school systems. This issue has been discussed for many years and addressed by lawmakers and educators alike. This study highlights

the importance of online learning, and the impact that it can truly have on the field of education. The COVID-19 pandemic helped to push the use of technology forward, but there is more that can be done. Technology may be a key to improving student achievement, and the field of education needs to work together on finding better integration practices that will allow for all students to use and benefit from technology. Online learning has proven to be an effective solution for individualized learning gaps, as shown in this study and many others.

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Appendices

Appendix A: Approval Letter

Dear Superintendent_____,

As part of my final project to obtain my master's degree in education from Franciscan University, I am currently how students who transitioned to online learning compare to their classmates attending in person. I will be using the Jefferson County Virtual Learning Academy for my data concerning online learners. During my case study, I will be examining the class of 2024 and class of 2025. My class instructor is Dr._____, and _____, Director of the _____ Virtual Learning Academy, is assisting me with the project as well.

I am seeking your approval to have access to the class averages of your students attending school in person. I am seeking the class averages in core curriculum as well as attendance. I will use the class averages as a comparison point for the online students' averages. During study, I will review the class of 2024 and class of 2025 performance data over the last 3 to 4 years. I am only seeking the class averages and not individual student data.

If you have any questions about this research project, please feel free to contact me at _____, ewagner003@student.franciscan.edu, or ewagner@jcesc.org. Your cooperation with this project is greatly appreciated. Please respond before March 15th, 2024. This form can be mailed back to _____or email the form to either of the emails above. Thank you again for considering participating in this research.

Sincerely,
Elizabeth R. Nelson

_____ _____

Superintendent 's Signature_____ Date_____

Appendix B: Expert Judge Letter and Rubric

Dear Expert Judge,

Due to your expertise in the field of education, I am reaching out to you for assistance. I am currently working on completing my graduate degree in education from Franciscan University in Steubenville. As a curriculum requirement, I must complete a master's research project in which I explore an avenue of education.

I am asking you to be an expert judge and review my survey created for the master's research project. The project is comparing students who are in the traditional classroom setting with those who participate in an online learning environment. The study will compare the Jefferson County Virtual Learning Academy with a public school district in Jefferson County. I am working with Dr._____, the class advisor and _____, Head of the _____ County Virtual Learning Academy. Please consider reviewing my questions for their validity and reliability. Your feedback will ensure the questions yield the most accurate results from students.

The survey will be 16 questions, consisting mainly of multiple choice and fill-in-the-blank responses. These questions will address students' thoughts and perceptions about their education and how they feel the online setting has affected their education. The questionnaire and grading rubric are attached for you to review.

If you are unable to act as a judge at this time or have any questions, please feel free to contact me at ewagner003@student.franciscan.edu or waggs390@gmail.com. If your question is urgent, you may reach me at _____. Your input and responses are greatly appreciated. Thank you for your cooperation!

Sincerely,
Elizabeth Wagner

1. Please rate the survey in terms of reliability (1 is low, 5 is high).

1 2 3 4 5

Additional comments regarding reliability:

2. Please rate the survey in terms of validity (1 is low, 5 is high).

1 2 3 4 5

Additional comments regarding validity:

3. Please rate the survey's scaling (1 is low, 5 is high).

1 2 3 4 5

Additional comments regarding scale:

5. Please indicate suggestions on how to improve any of the questions.

6. Please indicate any additional questions that should be added.

7. Any additional comments can be listed below.

Appendix C: Student Survey

Student Survey

1. Age:_____
2. Gender:
    a. Male
    b. Female
    c. Prefer not to say
3. Grade Level:
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
4. Compared to in-person classes, how engaged do you feel in online classes?
    a. Much less engaged
    b. Less engaged
    c. Neither more or less engaged
    d. More engaged
    e. Much more engaged
5. I am satisfied with my online learning experience.
    a. Strongly Disagree
    b. Disagree
    c. Neither Agree or Disagree
    d. Agree
    e. Strongly Agree
6. I feel the Virtual Learning Academy fits my learning needs.
    a. Strongly Disagree
    b. Disagree
    c. Neither Agree or Disagree
    d. Agree
    e. Strongly Agree
7. I have gotten better grades in online school than my in-person school.
    a. Strongly Disagree
    b. Disagree
    c. Neither Agree or Disagree
    d. Agree
    e. Strongly Agree
8. I feel online classes prepare me for test and exams.
    a. Strongly Disagree
    b. Disagree
    c. Neither Agree or Disagree
    d. Agree
    e. Strongly Agree
9. I am motivated to do my online schoolwork.
    a. Strongly Disagree
    b. Disagree

c. Neither Agree or Disagree
d. Agree
e. Strongly Agree

10. How many hours per week do you typically dedicate to doing homework and studying? _____
11. Where do you usually do your schoolwork? (Check all that apply)
    a. Home
    b. Library
    c. Café
    d. Other:_____
12. If you have missed classes, what were the primary reasons? (Check all that apply)
    a. Health issues
    b. Lack of interest
    c. Work commitments
    d. Technical Difficulties
    e. Family Responsibilities
13. I do better with in-person classes.
    a. Strongly Disagree
    b. Disagree
    c. Neither Agree or Disagree
    d. Agree
    e. Strongly Agree
14. Compared to online classes, how engaged do you feel in in-person classes?
    a. Much less engaged
    b. Less engaged
    c. Neither more or less engaged
    d. More engaged
    e. Much more engaged
15. Based on your personal experience, what improvements, if any, would you suggest for the Virtual Learning Academy?
16. How do you think online or in-person attendance impacts your academic achievements, and why?

Thank you for participating in this survey!