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PRINCIPAL PERCEPTIONS ABOUT THE IMPLEMENTATION AND EFFECTIVENESS OF ONLINE LEARNING IN PUBLIC HIGH SCHOOLS IN INDIANA

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ABSTRACT

The purpose of this quantitative study was to determine the principal perceptions and demographic relationship of the implementation and effectiveness of online learning in non-charter Indiana public high schools. An analysis was prepared to determine whether demographic factors played a role in the principal's perceptions of the implementation and effectiveness of online learning. Factors examined included school location, school size, technology and support costs, principal's age, and principal's gender. Principal's perceptions were examined because the principal is considered to be the building level educational leader. As such, the principal has a responsibility to provide the students with a sound curriculum that meets their needs individually and collectively.

The research design involved a population of 343 non-charter public high school principals serving grades of at least 10 – 12. Principal beliefs in the implementation and effectiveness of online learning were collected using a 44-item survey. Statistical analysis of the data included descriptive statistics regarding the mean, standard deviation, and frequency of selected items. A Pearson product moment correlation and multivariate analysis of variance were used to test the null hypotheses. Significance was identified at the .05 level. In all, 241 principals of non-charter public high schools in Indiana responded to the survey instrument which questioned the perceived level of effectiveness and perceived level of implementation of 15 specific uses of online learning.

As a result of the analysis, significant findings were present in the overall perceptions of the implementation and effectiveness of online learning and also in the 15 individual uses of online learning. Significance was also found in one or more of the 15 uses of online learning in regards to the perceived implementation based upon gender, student enrollment, school locality, and the interactions based upon age and gender, and student enrollment and school locality. In addition, significance was found in one or more of the 15 uses of online learning in regards to the perceived effectiveness based upon student enrollment, school locality, and the interactions of enrollment and locality.

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CHAPTER 1

Introduction

The news about public school education in the United States (U.S.) has been less than impressive over the past 35 years. President Lyndon B. Johnson's landmark Elementary and Secondary Education Act (ESEA), which became President George W. Bush's No Child Left Behind Act of 2001 (NCLB), was intended to improve the education of poor and disadvantaged children. On January 8, 2002, when President Bush signed the NCLB into law at a ceremony at Hamilton High School in Ohio he stated "we know that every child can learn, now is the time to ensure that every child does learn" (Wright & Wright, 2002, ¶ 2). While the improvement of the education of poor and disadvantaged students is still being debated, what is known about the ESEA/NCLB is that after 35 years and more than $125 billion of federal aid, the poor and disadvantaged are still lagging behind (The Claremont Institute, 2000). Research data indicate students in public schools in the U.S. are not learning what they need to know in order to compete globally. In addition, public schools across the U.S. have been accused of failing to provide equal access to instructional materials, safe and decent school facilities, and qualified teachers.

Even though NCLB dramatically increased the role of the federal government in guaranteeing the quality of public education for all children in the U.S. by emphasizing increased funding for school districts serving economically disadvantaged students, higher

achievement for poor and minority students, and new measures to hold schools accountable for their students' progress, report after report indicate inner-city and rural schools serving mostly low-income and/or non-White students receive a lesser amount of the essentials, including highly qualified teachers. Inexperienced teachers and those with low academic skills are more likely to teach in high-poverty schools and schools with high concentrations of minority students (Henke 2000). The result of our inability to meet the needs of students in public high schools in the U.S. is reflected by the data revealing the following:

- Only 70% of all entering freshmen and barely half of students of color finish high school with a regular diploma four years later. Every school day, nearly 7,000 American high school students become dropouts.
- Only 30% of students entering high school read at grade level, so it is not surprising that only a third are prepared for college and work by the time they finish high school.
- Among developed nations, the U.S. ranks 18th in its high school graduation rate. American 15-year-olds rank 15th in reading scores; 24th in the math scores; and 24th in problem solving skills.
- An estimated 85% of current jobs and almost 90% of the fastest-growing and best-paying jobs now require some postsecondary education.
- Dropouts from the Class of 2007 cost the nation more than $329 billion in lost wages, taxes, and productivity over their lifetimes. (Alliance for Excellent Education, 2007, p. 1)

In 2001, when President Bush's proposal for an extension of ESEA was introduced, debated, amended, and ratified by Congress, very little attention was being paid by

policymakers, educators, or the public in general to the nation's high schools. President Bush's original proposal for ESEA reauthorization only mentioned the term "high school" twice (Alliance for Excellent Education, 2007, p. 9). Just as high schools throughout the U.S. are feeling the pressure to perform, at no time in history have public high schools in Indiana felt as much pressure as they do today to increase academic opportunities for students of all academic ability levels while at the same time being forced to operate with less money in their budgets. According to the Indiana Department of Education General Fund Summary of Expenditures, the total cost of operating Indiana's K-12 public schools during 2008 was $6,467,898,410.40 for 999,983 students equaling an average cost of $6,472 spent on each individual student (Indiana Department of Education, 2009a). While Indiana high schools varied in terms of operational costs, Hope Academy, an Indiana public charter high school sponsored by the Indianapolis mayor's office, earned the distinction of spending the most money per pupil in 2008 with an average of $13,610 being spent per student. The Lawrence Early College High School for Science and Technologies, another Indiana public charter high school sponsored by the Indianapolis mayor's office, earned the distinction of spending the least per pupil in 2008 by providing an education for students at an average cost of $4,702 per student. The general public in Indiana has become increasingly outspoken about the disparity of the amount of money schools are absorbing and the academic qualifications, or lack thereof, of the high school graduates. As an example of the disparity in finances vs. outcomes, in 2008 Hope Academy was costing Indiana residents the most amount of money of any public school ($13,610 per pupil), yet the Academy had a dismal graduation rate of 13%. The same can be shown in regards to the Lawrence Early College High School. Even though the school cost the least amount of money ($4,702 per pupil), only 50% of the Lawrence Early College High

School students met the Indiana Graduation Qualifying Exam requirements. These two schools are just a snapshot of Indiana as the state graduation rate for 2008 was approximately 78% overall. This translates to a publicly perceived 22% failure rate, or in economic terms, a waste of funds being spent on 22% of the 12th grade population.

As a result of the publicity of costs vs. academic achievement, residents of Indiana have applied pressure to state politicians in an effort to make a change in the public school system that will result in less money being spent and more students graduating. State politicians have responded by promising to produce a more equitable method of funding and to have a higher level of academic accountability.

Indiana Governor, Mitch Daniels, and Superintendent of Public Instruction Tony Bennett, are actively pursuing the goal of financial equity of public schools, loosely terming their objective *the money follows the student*, while at the same time expanding the academic accountability system in an attempt to increase school accountability far beyond Indiana's Public Law 221 accountability and the federal government's NCLB Annual Yearly Progress accountability. With a focus on increased academics, Governor Daniels and Superintendent Bennett have declared their objectives every time they have been given the opportunity, demanding all Indiana public high schools must have a 90% or higher graduation rate by the year 2012. The governor and superintendent also insist on public high schools giving individual students more academic opportunities including choices to boost the student's ability to advance to higher education.

In an attempt to gain public support of their initiatives, Governor Daniels and Superintendent Bennett invited former Florida Governor, Jeb Bush, and Executive Director of the Foundation for Excellence in Education, Patricia Levesque, to Indianapolis in early

September 2009 to increase public awareness about the issue of public school accountability in academics and finances. According to their website, the Foundation for Excellence in Education is a 501(c)3 not-for-profit charitable organization launched in 2007 by Jeb Bush, Governor of Florida from 1999 to 2007 (Foundation for Excellence in Education, 2007). During the discussion with Indiana's Educational Roundtable, the former governor and his foundation's executive director stressed the importance of grading schools much the same way as schools grade the students which is what was done in Florida while he was governor. Governor Daniels and Superintendent Bennett seized upon the opportunity to exploit public opinion by sharing data from former Governor Bush's Florida initiatives with the Indiana media personnel that were invited to attend the private meeting. The media in turn wrote articles claiming that former Governor Bush's initiatives were outstanding and just what Indiana needed to turn around the academically and financially bad organization of public schools (Berman, 2003).

Focusing attention on the massive costs associated with public education in Indiana, lawmakers have been targeting the funding resources and formulas used in the process of funding public schools. Since 1949, Indiana has used a foundation program as the funding formula used to calculate general fund revenue. In Indiana, general fund dollars are used to pay salaries, purchase supplies for instruction, and other classroom specific uses. Each local school corporation is given a specific per-pupil dollar amount based upon the average daily membership of students, the special education and vocational student count, the number of students eligible for free or reduced lunch, and the minimum dollar amount the Indiana General Assembly designates for each student.

One of the first changes to occur in the school funding formula for Indiana public schools was shifting general fund monies from being provided by property taxes to being provided by sales taxes, Public Law 146. Law makers changed sales tax from 6% to 7% as a way to make up the anticipated difference in revenues needed to support local government agencies. Another change to occur was to cap local property taxes. These so-called circuit breakers were put into effect in 2008 to limit the amount of financial responsibility for schools that local home and land owners were responsible for providing. These circuit breakers were set at 2% of a home's assessed value in 2008, 1.5% of the assessed value in 2009 and 1% in 2010. The two changes brought an overwhelming positive approval from home and land owners for the current lawmakers, but the realities were less revenue being available for schools and all public services.

As a result of the revenue shortfall, lawmakers have targeted public schools and the perceived lack of fiscal responsibility as the cause of much of the financial crisis occurring in the state. Many lawmakers have publicly stated that schools are antiquated, money-sucking organizations in need of a major overhaul. In response to public opinion and the slowed economy plaguing Indiana in 2009, Senator Luke Kenley stated the K-12 education spending is over $6 billion per year, so every 1% reduced for education would be a $60 million savings to the taxpayers in Indiana. Cutting 1% or 2% of the budget for education would go a long way toward reconciling the problem (Ruthart, 2009a). In October 2009, Governor Daniels acknowledged that cutting K-12 education funding, reducing university spending and laying off state employees are options Indiana would consider if state revenues continue to fall well short of projections (Ruthart, 2009a). In December 2009, Governor Daniels cut 6% of the state funding for higher education. Daniels' called for the emergency spending cuts after state

revenue for November 2009 fell $144 million short of projections, the 14th straight month Indiana state tax receipts missed fiscal forecasts (Ruthart, 2009b).

The looming budget crises bear the question: Can the use of online courses in public high schools in Indiana be the way to provide the best quality education and equalize the playing field for all students? The use of technology to bridge the educational gap of our underserved populations was on the mind of politicians as early as 1996 as evidenced in U.S. Education Secretary Richard Riley's *Report to the Nation on Technology and Education*. In the report, Secretary Riley stated that during the past decade, the use of technology in American life exploded. This explosion of technology characterizes what is inevitable in American education - computers and the Internet will play a vital role in classrooms (United States Department of Education, 1996a). In addition, recognizing both the growing use of technology in schools and the limited amount of applicable research and data collection, President Clinton's Committee of Advisors on Science and Technology identified an imperative need for extensive, federally sponsored research and evaluation on school technology (President's Committee of Advisors on Science & Technology, 1997).

Statement of the Problem

Online learning has a potential to provide flexible access to content and instruction and availability of learning experiences for all students including those who cannot or choose not to take traditional face-to-face courses. Online learning also offers the possibility to pull together and distribute instructional subject matter more cost-efficiently. Additionally, online learning has the potential to enable teachers to supervise additional students while maintaining learning outcome quality comparable to traditional instruction.

The availability of online learning has the potential to provide students with course choices and in some cases, the basic courses that should be part of every curriculum (Picciano & Seaman, 2009). Shortages of teachers in high-demand secondary school subject areas such as science, mathematics, and foreign languages have historically been a serious problem for rural school districts and are now becoming a problem for urban and suburban school districts. Rural school districts generally have the lowest per pupil expenditures compared to urban and suburban districts and need to use financial resources as wisely and effectively as possible (Picciano & Seaman, 2009). Online learning has the capability to provide affordable academic options for students in schools and districts where teacher shortages exist by making available a cost beneficial method of offering courses for students that otherwise would require the hiring of teachers who would not have enough students to justify their salaries.

The ability to provide sensible high quality educational alternatives to the traditional methodology via the online approach is an option school districts may wish to consider. Inner city urban districts, for instance, frequently have difficulty attracting and keeping secondary school teachers in science, mathematics, and foreign languages (Picciano & Seaman, 2009). One common approach to solving this problem has been to contract with colleges or universities in the community to offer courses either on the college campus or the high school campus. Though useful, this option can be more problematic than offering online courses. Online courses with some, if not all, of the content being taught by credentialed educators at the students' home school could be a more viable option. A blended course would be particularly appealing where an online teacher could work face-to-face with an instructional aide via the internet. The teacher and aide could work with and support each other - the teacher delivering specialized online content and the aide offering face-to-face instruction, tutoring, and hands-on

activities (Picciano & Seaman, 2007). Online learning provides options for all school districts to consider as they try to meet best the needs of each and every one of their students.

Purpose of the Study

The purpose of this quantitative study was to determine the principal perceptions and demographic relationship of the implementation and effectiveness of online courses in Indiana public high schools. An analysis was prepared to determine whether demographic factors played a role in the principal's perceptions of the implementation and effectiveness of online learning. Factors to be examined included school location, school size, grade configuration, technology costs, support costs, administrative costs, and existing technological infrastructure. Other factors including the principal's age, gender, number of years served as a principal, number of years served as a teacher, ability to control the school budget, and highest degree earned were also examined.

Research Questions

This quantitative study sought answers to five research questions:

1. What is the principal's perception of the level of implementation of online learning in Indiana public high schools?
2. What is the principal's perception of the effectiveness of online learning for Indiana public high schools?
3. Is there a relationship between the principal's perception of the level of implementation of online learning and principal perception of effectiveness of online learning in Indiana public high schools?
4. What are the barriers that impede the development of online learning in Indiana public high schools?

5. Are there differences in perceptions and implementation of online learning due to demographics of principals and high schools?

Null Hypotheses

$H_0$1. There is no relationship between the principal's overall perceptions of online learning and the overall implementation of online learning in Indiana public high schools.

$H_0$2. There is no relationship between principal perceptions of effectiveness and implementation of each of the fifteen items of online learning in Indiana public high schools.

$H_0$3. There is no significant difference across genders of the principal and the implementation of online learning in Indiana public high schools.

$H_0$4. There are no significant differences between age of the principal and the implementation of online learning in Indiana public high schools.

$H_0$5. There is no significant interaction between gender and age of the principal and the implementation of online learning in Indiana public high schools.

$H_0$6. There is no significant difference between genders of the principal and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$7. There are no significant differences between age of the principal and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$8. There is no significant interaction between gender and age of the principal and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$9. There are no significant differences between school enrollment and the implementation of online learning in Indiana public high schools.

$H_0$10. There are no significant differences between school locality and the implementation of online learning in Indiana public high schools.

$H_0$11. There is no significant interaction between school enrollment and school locality on the implementation of online learning in Indiana public high schools.

$H_0$12. There are no significant differences between school enrollment and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$13. There are no significant differences between school locality and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$14. There are no significant interactions between school enrollment and school locality on the perceived effectiveness of online learning in Indiana public high schools.

$H_0$15. There is no relationship between the principal's age, gender, enrollment, and local of school and the barriers of implementing online learning in Indiana public high schools.

Significance of the Study

Online learning has the potential to change the face of secondary education as we know it today. High school teachers are expected to ensure that each and every individual student in his/her class stays on track to graduate from high school on time, is prepared to pass high-stakes state exams, and is prepared to be successful in post-secondary education. It is a challenge for teachers to effectively meet the individual needs of each student in the classroom. It is due to this reason that schools are challenged to find new approaches to support success for all students. A possible approach to meet the needs of all students is the implementation of online learning.

Delimitations

This study contained the following limitations:

1. The survey was confined to non-charter public high schools in Indiana.
2. Only public high school principal perceptions were recorded.

Definitions

Several terms used in this investigation are defined in the interest of consistency.

At Risk Students are students exhibiting characteristics that they will exit from K-12 education before successfully completing it (Setzer & Greene, 2005).

Credit Recovery refers to a student passing, and receiving credit for, a course that the student previously attempted but was unsuccessful in earning academic credit towards graduation (Setzer & Greene, 2005).

High School, for the purpose of this study, a non-charter Indiana public high school will be defined with a grade configuration of 10 through 12, but can include grades K through 12.

Online Learning is an approach to teaching that relies on the Internet instead of a physical classroom to deliver educational information. Online learning has historically gone by various names such as e-learning and distance learning (Duff, 2004).

Principal is the administrative leader of the school.

Hybrid or Blended Course is a course using instruction provided via the internet and also face-to-face (Cavanaugh, 2009).

Virtual Schools are web-based distance education programs for K-12 students. These are also called cyber schools, cybercharters, electronic schools, and e-schools. Virtual schools offer full-time or supplemental programs, and in some cases both (Cavanaugh, 2009).

CHAPTER 2

Review of the Literature

The purpose of this study is to examine variables related to the implementation and effectiveness of online learning in public high schools. The literature pertaining to the topic of online learning in K-12 schools reflects the rapid pace of implementation since 2005. Even though in 2009 many high schools still operate under the assumption that one size will fit all when it comes to the education of students, research indicates that in order to meet the needs of every student, curricula must be customized to meet the individual needs of every student.

The advances in technology provide an easy way to personalize education for every single student. In addition, technology usage by schools allows students to enjoy the freedom of the constraints of location and time. Through the use of online courses, the education of individual students can be personally tailored to fit their individual needs and interests often resulting in increased interaction among students and teachers. Ikenberry (2000) stated "the knowledge explosion, the technology revolution, and our increased global interdependence are transforming virtually every segment of our societies" (p. 1). Ikenberry also emphasized the need for students to be successful in the conceptual era in which prosperity and well-being are defined less by traditional metrics, less by the ability to handle labor intensive positions, and more by educational levels, intellectual strength, creativity, and ingenuity.

The use of online courses to meet the needs of students who otherwise would not have the opportunities found in resource-rich schools is at the forefront of educational technological trends. Specifically as it relates to this review of the literature, the use of online learning has the potential to help secondary schools meet academic needs at minimal costs. In addition, public policy is supportive of choice as it relates to high school students having access to a wide range of courses at minimal expense. Aronson and Timms (2004) assert that:

> All secondary school students deserve access to a wide variety of high-quality courses, yet many schools, especially smaller, rural and resource-poor urban schools, can offer little more than a basic curriculum. For their students, these limited offerings can translate into a limited future. (p. 2)

Evidence indicating the United States Department of Education (USDOE) fully supports the use of resources available via the internet for educational purposes is seen in the USDOE Star Schools Program. Understanding that greater access to quality instruction in academics had become a reality, on August 6, 1996, U.S. Secretary of Education, Richard Riley announced the award of approximately nine million dollars in grants to schools whose goals were to increase literacy skills of their students by using distance learning as the means of instruction. At that time, United States President, Bill Clinton, stated the grants represented the wave of the future by enabling lifelong learning from all sites all over the country and increasing learning opportunities for students of all ages by benefitting from advanced technology and have access to the information super highway (United States Department of Education, 1996b).

As a recipient of one of the USDOE's Star Schools Grants, the University of Nebraska Independent Study High School set a goal of providing high school students and adults with

online curricula and courses that would meet the state requirements for a high school diploma. The university's project became known as Communications, Learning, and Assessment in a Student-Centered System (CLASS). The original grant proposal had the University of Nebraska Independent Study High School developing forty internet-based required courses and ten internet-based elective courses. Credit and diplomas would be issued by Independent Study High School with accreditation being granted by the North Central Association of Colleges and Schools (University of Nebraska, 2004).

Online learning holds tremendous potential for schools in the ability to provide for the needs of every student. Online technology enables students anywhere, poor inner cities, remote rural areas, even at home, to take any course they like, from the best instructors in the world, and to customize learning to their own needs, schedules, styles, interest, and academic growth (Moe & Chubb, 2009). While the research makes it evident post-secondary school administrators became aware of and acted upon the need to accommodate students by offering online courses at the dawn of the internet age, the same cannot be said about secondary school administrators. In March 2007, the Sloan Consortium published their fourth annual report on the extent of online learning in post-secondary schools. The data in the report indicated nationally nearly 3.2 million college students were taking at least one online course during the fall 2005 term. According to the consortium, this was a 35% increase in comparison to the 2004 data (Allen & Seaman, 2006). During this same time frame, K-12 school administrators were slow to take advantage of the unlimited opportunities that online learning promised to offer. According to Christensen, Horn, and Johnson (2008), the overall number of K-12 students engaged in online courses during the 2005-2006 school year was roughly 500,000. In 2007-2008, Christensen et al. estimated the number increased to nearly 1 million students

taking online courses. Even though this was a 100% increase in the number of K-12 students engaged in online learning, it still is only an estimated 30% of the total number of students taking online classes at the post-secondary level.

Computer Use in Schools

During the 1980s and 1990s public schools in Indiana were no different than schools throughout the United States in terms of wanting to embrace the new technology to increase student academic proficiencies. Many schools in Indiana bought computers, placed the computers in an existing classroom, sent a veteran teacher to computer training, and then had limited classes to educate students on the use and programming of the computers. Eventually the Indiana Department of Education (IDOE) created computer-based courses to be used as a requirement for graduation resulting in schools converting classrooms into computer labs where students would take required computer courses. These labs were also available to the general student population with the intent of giving the student the ability to access digital information. In addition to creating classrooms filled with computers, many schools located computer labs in or next to existing school libraries and changed the function of the library from a depository of written information to media centers containing books, information, and information technology operated not by a librarian but by media specialists.

In 2001, the IDOE made a formal commitment to increase technology use by high school students by developing a technology plan that would guarantee students in the public schools access to technology in Indiana classrooms. The IDOE termed this initiative *Indiana Access* (Affordable Classroom Computers for Every Secondary Student) or inACCESS. The IDOE tracked the grant recipients from 2006-2009 and released information indicating that

there were approximately 130 schools that took advantage of the inACCESS grant programs (D. Ryan, personal communication, November 8, 2009).

The premise of inACCESS was based on information indicating Indiana schools had purchased and installed a significant number of computers, but many students were receiving less than an hour a week using a computer. The IDOE developed what many considered an innovative approach to allow a computer for every student in every Language Arts classroom in every Indiana public high school. High schools were encouraged to apply for specific inACCESS grants from the IDOE which would allow the schools to purchase low-cost computers and monitors. As part of the grant requirements, each individual computer could not cost more than $199 and each individual monitor could not cost more than $99. In addition, the inACCESS grant plan included a requirement that each system only run open source software which is generally available for free or at low cost. The IDOE investigated the functionality of hardware and software, retraining issues, and viability in the classroom including acceptance on the part of students and teachers, comfort levels with application software, reliability and durability (IDOE, 2009b).

As a result of the IDOE commitment to technology, many Indiana public high school English classrooms have one computer per student. Traditional student desks that were once a mainstay in these classrooms have been replaced with tables containing recessed computers and monitors affording students complete access to software applications, internet connectivity, and online classroom integration tools that offer access in and out of the classroom. Even though the inACCESS program was phased out in January 2009, the program provided technology-rich high school English classrooms with commodity-priced hardware and open source software to improve English / Language Arts teaching and learning. As of January 2009, Indiana removed

the specific requirement for software or hardware purchases. In addition, the IDOE project proposals have been adjusted to include elementary schools as well as middle and high schools.

Online Learning

The body of research on the topic of online learning expands exponentially from 2000 to the current date, with the majority being extensively conducted during the past five years. Online learning tends to be a vague concept to individuals outside of the realm of education, and even within education's disciplines it has different meanings. A common definition of online learning is one in which it is referred to as the strategies used, through the application of the internet, to deliver training courses to faculty and staff. More specifically, in education, online learning is used to identify a specific method used by the faculty and staff to offer a course where the students rarely or never meet face-to-face or access on-campus educational facilities because they study online. Online learning is an approach to teaching that relies on the Internet instead of a physical classroom to deliver educational information. Online learning has historically gone by various names such as e-learning and distance learning (Duff, 2004).

According to Allen and Seaman (2006), by 2006 nearly 3.5 million students were participating in online learning at institutions of higher education in the United States. There has been an increase of around 12-14% per year on average in enrollments for fully online learning in the U.S. post-secondary educational institutions, compared with an average of approximately 2% increase per year in enrollments overall. Picciano and Seaman (2009) found that almost one-fourth of all students in post-secondary education were taking fully online courses in 2008, and a report by Ambient Insight Research (as cited in Adkins, 2009) suggests that in 2009, 44% of post-secondary students in the USA were taking some or all of their courses online, and projected that this figure would rise to 81% by 2014.

The technological advances of online learning are playing a critical role in the ability of schools to meet the needs of students who are disinclined or incapable of physically attending classes. As the technology for delivery of course content at an off-campus site increased from paper and pencil, to radio, to audio cassette, to television, to video cassette, to computer and now to web-based, so too have the number of available options for students. During the 1980s the technological changes in telecommunications with the introduction of the affordable personal computer and modems for transmitting data via existing telephone lines made it possible for distance education students to have similar experiences at remote locations as those students who were sitting in the traditional learning environment. It is important to note during the early to mid 1980s the Apple II personal computer was being sold for a relatively inexpensive price, and the Commodore 64 personal computer and modem, which included membership to an online network, was available to the public for the cost of approximately $250 (Morabito, 1997). This ability to communicate via the computer became the basis for many of the changes that occurred in the way schools delivered instruction within the building as well as how distance instruction was delivered and received. Research indicates that in 1981 there was one computer for every 125 students in schools. By 1991 there was one computer for every 18 students; and in 2000, there was one computer for every five students. Since 1990, schools have spent over 60 billion dollars on equipping schools with computers (Christensen et al., 2008).

In an effort to level the playing field for all students regardless of demographics, online learning classes and virtual schools are being created exponentially throughout the United States. According to the International Association for K-12 Online Learning (iNACOL), the association's mission is to ensure all students have access to world-class education and quality

online learning opportunities that prepare them for a lifetime of success. In addition, the iNACOL specifically addresses concerns associated with the implementation of online learning by targeting fictitious information which has not been supported by research. The iNACOL (2009) lists the following myths and counters with research-based information.

1. Myth: Virtual schools are a separate delivery system from traditional education.

   Truth: There are more than 500,000 enrollments in online courses across the U.S, in schools and districts, meeting rigorous state academic standards as virtual schools provide courses to students inside schools. Online courses are in all 50 states and make it possible to offer advanced courses or instruction that are otherwise not offered at the local level.

2. Myth: Online courses are for gifted and talented students only.

   Truth: Online courses have worked well with students of all kinds, including at-risk students, students in urban and rural areas, those with limited English proficiency, and those with special needs. Online learning has also been used successfully as part of systemic reforms to help students who are performing below grade level in large urban school districts.

3. Myth: Online courses lack interaction.

   Truth: Students typically have more one-on-one interactions with their teachers and fellow students in online courses, especially when team projects are assigned. Teachers report getting to know their students better, and students who are shy or do not think well "on their feet" tend to contribute more in online environments. Students are often actively interacting with both resources and others in online environments.

4. Myth: Online students are isolated and therefore will be socially disadvantaged.

   Truth: In fact, students often engage actively both online and off as they complete assignments and socialize with other students and adults in their schools, at home, and in the community. Online students typically take only one or two courses online, blending their learning opportunities with traditional instruction in brick-and-mortar schools.

5. Myth: Online teachers have easy jobs.

   Truth: Online teachers report that they work much harder and spend more hours online than in the classroom, but that they love it. They do not simply "move a class online" and 'put up what they teach.' Online instructional design, writing, management of instruction, and communicating with students can take considerable time and be quite different from what goes on inside a traditional classroom.

6. Myth: Online courses have to be developed from scratch.

   Truth: Many online courses already exist that meet state standards and are accredited by recognized organizations. These online resources have been developed by states, private business, and independent organizations. At least initially, collaborating and sharing these options may be more cost effective and practical for school systems than developing online instruction in-house.

7. Myth: Online course are easier for students than regular courses.

   Truth: Most online courses are not condensed or easier versions of regular courses. They are aligned to rigorous state standards. They require active participation and operate in settings under supervision of state-certified teachers, require students take

state assessment tests, have attendance policies, and have competency-based academic progress requirements in effect.

8. Myth: A student is more likely to cheat online.

   Truth: Cheating is no more prevalent online than in the classroom. In addition, there are many technological ways to deter it and track it. In many cases, the online venue and communication enables teachers to get to know their students' idiosyncrasies and skills much better. Teachers say that student writing has a voice and that it is often easier to spot work that is inconsistent or unlike earlier communication in online environments.

9. Myth: Virtual schools are about technology.

   Truth: Virtual schools are about curriculum and instruction for students. The "medium" is not the message because the student, instructor, content, and learning goals are key. Networks simply make it possible to provide communication, access to extended resources, and use of sound, graphics, video, text, interactivity, and other digital capabilities to strengthen instruction. Most schools have the basic technology, Web browsers, plug-in software, and access that are needed.

10. Myth: Online courses represent an 'add-on' to already burdened school systems and teachers.

    Truth: Online education does not represent an 'add-on.' It does represent an opportunity to take advantage of online resources, enable teachers to help students learn in ways that match students' needs and learning style, and transform schools. Online courses may or may not decrease costs, depending on how budgets are

> allocated and how online courses are integrated into instruction. Training and support of teachers is important. (iNACOL, 2009, pp. 1-2)

Whereas early online courses, such as those developed at the New Jersey Institute of Technology, relied heavily on instructor to student relationships, today's online education tends to fall in the realm of little to no instructor/student interaction (Hiltz, 1990). A major breakthrough in the ability to have learning take place in the absence of face-to-face instruction occurred when online asynchronous learning became available via the internet (Morabito, 1997). During the years 1995 until 2006, online learning was often focused on using the internet to replicate traditional classrooms where instructors led all activities and experiences within the classrooms. As in traditional classrooms, the content of the online learning classroom was typically intended to lead students through the content and finish with an assessment that indicated content mastery.

Since the establishment of the internet as a technological instrument to increase students' productivity in education, differing types or forms of online learning have emerged. Bates and Poole (2003) described the usage as a continuum beginning with (a) no online learning, i.e. no use of computers and/or the internet for teaching and learning, to (b) the use of online content for classroom aids, i.e. making classroom lectures available to students through a course web site or learning management system, to (c) laptop programs, i.e. students were required to bring laptops to class and use them as part of a face-to-face class, to (d) hybrid learning, i.e. classroom time is reduced but not eliminated, with more time devoted to online learning, to (e) fully asynchronous online learning, i.e. students are fully emerged in the usage of the computer with no real-time interaction with faculty. In the Bates and Poole's continuum, blended learning included classroom aids, laptops and hybrid learning, while distributed

learning incorporates either hybrid or fully online learning. The online usage classification describe by Bates and Poole is comparable to the description used in the Allen and Seaman (2006) report on the status of online learning, which refers to web enhanced, web supplemented and web dependent to reflect increasing intensity of technology use.

Online learning has been shown to provide major benefits for schools and students involved including: (a) Improved performance: A 12-year meta-analysis of research by the U.S. Department of Education found that higher education students in online learning generally performed better on standardized assessments than those in face-to-face courses (Means, Toyama, Murphy, & Jones, 2009); and (b) Increased access: Renown instructors can share their knowledge across borders, allowing students to attend courses across physical, political, and economic boundaries. Recognized experts have the opportunity of making information available internationally, to anyone interested at minimum costs. For example, the MIT Open Courseware program has made substantial portions of that university's curriculum and lectures available for free online (Massachusetts Institute of Technology, 2009); (c) Convenience and flexibility to learners: in many contexts, online learning is self-paced and the learning sessions are available anytime and anywhere. Learners are not bound to a specific day or time to physically attend classes. They can also pause learning sessions at their convenience; (d) To develop the skills and competencies needed in the 21st century, and in particular to ensure that learners have the digital literacy skills required in their discipline, profession or career. Bates and Poole (2003) state a major argument for online learning is it enables learners to develop essential skills by embedding the use of information and communications technologies within the curriculum. Bates and Poole (2003) also argue that using e-learning in this way has major implications for course design and the assessment of learners.

Implementing Online Courses

Can the use of online courses in public high schools be the way to provide the best quality education, or equalize the playing field, for all students while drastically cutting costs? Although many studies are currently in progress, those done to date suggest that students taking online and virtual classroom programs outperform their peers. In addition, the Allen and Seaman (2006) report, based on a poll of academic leaders, suggested that students generally appear to be at least as satisfied with their on-line classes as they are with traditional ones. The studies also suggest that once startup costs are covered, the courses cost less than traditional classes operated on site in schools. As cited by Watson (2007), the Ohio legislature studied the cost of its eCommunity Schools, which are online charter schools. The Legislative Committee on Education Oversight looked at five statewide online schools and found that they spent $5,382 per student, compared to $7,452 for students in *brick and mortar* charter schools, and $8,437 for students in traditional, non-charter schools. Technology costs made up 28% of the spending, followed by instructional costs at 23%, administrative costs at 16%, and curriculum costs at 9%.

Costs. According to the Indiana Department of Education General Fund Summary of Expenditures, the total cost of operating Indiana's K-12 public schools during 2008 was $6,467,898,410.40 for 999,983 students equaling an average cost of $6,472 spent on each individual student (IDOE, 2009a). The question to be answered is how much of this money was spent on traditional education and how much was spent on online learning?

Costs can be measured in various ways. Jung (2005) found cost effectiveness research results typically conclude that online learning is more cost effective than classroom teaching mainly due to the increased class load (i.e. increased number of students).

> In addition, these studies find several factors that affect the cost and/or effectiveness of online training. These factors include the technology infrastructure, the number of students in a course, the number of courses offered, the multimedia component in online courses, the amount of instructor-led interaction, the type of online training platforms, the choice of synchronous versus asynchronous online interaction and the completion rate. (Jung, 2005, p. 132)

The University of British Columbia's Department of Distance Education & Technology conducted a two year study which was federally funded by the Canadian TeleLearning Networks of Centres of Excellence (Zlomislic & Bates, 1999). In the study, Zlomislic & Bates (1999) investigated the possible cost benefits and limitations of incorporating online learning. The researchers divided the cost factors into three groups, capital and recurrent cost – computer equipment and support for the equipment, production and delivery costs - development and delivery of the course, and fixed and variable costs - those that either remain constant regardless of the number of participants or change with the number of participants. This and other research indicate the startup costs associated with the use of online learning is typically high, the costs then trail off making the use of online learning an economically sound undertaking for schools. To determine if it is economically sensible for public high schools to implement online learning, it is important to investigate the expenses associated with technology, support, administration, development or implementation of courses, and those expenditures associated with paying faculty/staff.

Technology costs. One of the most important cost considerations in deciding to offer online courses is the technology infrastructure, and the most costly part of the infrastructure is the cost of bandwidth. Higher bandwidth is required with the delivery of complex audio and

video in addition to common text and graphics. In order to successfully have online courses available to students, a school district must commit to building a proper information technology infrastructure to support online courses. Technology will add to a school's costs because of the equipment, support and time required to implement.

Another technological concern is the location from which the courses will be generated. Many online courses are available from vendors such as Advanced Academics who house their server at their location. If a school is planning on housing a dedicated server, then these costs must be taken into consideration. In his research on determining the costs associated with online learning, Morgan (2000) found:

> In terms of technology needs, an institution must explore the acquisition of a powerful server to house their online courses. Often, an institution will purchase packaged software to serve online courses. When purchasing a server, it should be configured so that it is compatible with this online course delivery software and provide room for future growth. For costing purposes, you should amortize the cost of a server over a three-year period (lifespan of many computer systems) and assume that an investment of 10% of the cost of the machine each year for new equipment will be necessary. (p. 4)

Support costs. The second most important financial consideration when implementing online courses is that associated with the cost of providing technological support. Technology specialists have been found to be a key component in the success of offering online courses to students. The technology specialist is responsible for providing faculty with instructional technology and design support, as well as key technical support for faculty and students. In addition, students will need technical support in order to help in the understanding of the technology or course materials. While researching the costs associated with developing a

virtual university, Turoff (1996) asserts proper support should be provided to students to ensure accurate answers. Even though many of these positions may already exist at a school, the costs for the portion of their time spent with online courses needs to be accounted for to properly cost out the endeavor.

Administrative costs. In attempting to determine the administrative costs involved with online learning it becomes evident that major complexities exist in determining the actual costs. To truly get an idea of what it will cost an institution, a comparison of the costs of different modes of delivery into a quantifiable number is necessary (Morgan, 2000). Bates attempts to answer the administrative question of why cost comparisons aren't just simple figures for traditional classes being compared with figures for online classes (Bates, 2000). In his analysis of costs, Bates indicates that there are incredible disparities between the costs for traditional courses as compared to the costs associated with technology-based teaching. Often, the actual cost associated with traditional classes is hidden because the cost of developing courses is not tracked within school budgets. Instructors typically prepare and deliver course material as conditions of employment without regard for the cost associated with the extra time and content used to develop the course. The difference in traditional administrative costs and online administrative costs is found in the fact that under the online model, the administrative cost associated with educational technology equipment and support costs have to be over-budgeted due to their importance, whereas under the traditional model, these costs can be under-budgeted due to a lack of demand. In the online model, it is a must that schools budget for the administrative cost associated with the technology equipment and support.

Implementation costs. Switching from teaching in a traditional face-to-face classroom to virtual delivery formats is considered to be one of the greatest challenges facing public

school faculty today. While the research is limited in addressing this challenge, evidence points to two primary approaches to managing virtual course development. Schools can develop and deliver courses on their own or schools can purchase pre-packaged courses that are delivered via the Internet. For the purposes of this review of the literature, the research will focus on pre-packaged courses.

Cost associated with pre-package courses, not including the cost of the technology infrastructure needed to run the software, support, and administration, vary in degrees according to the vendor. Vendors tend to sell the right to use their software to schools through a yearly license. Although licensing rights vary depending upon the vendor, one license typically allows one student at a time to take a virtual course or courses. Many vendors provide price breaks for schools as the number of licenses increase. For the purpose of this study, the following four vendors were examined to determine typical costs: Pearson Digital, PLATO Learning, Apex Learning, and the Indiana Virtual Academy.

Pearson Digital Learning licenses its online learning product, NovaNet, to high schools through a yearly subscription. By means of NovaNet, Pearson Digital Learning claims to provide "comprehensive online curriculum to extend individualized learning beyond the classroom and help every student reach graduation" (Pearson Digital learning, 2005, ¶ 6). Individual licenses are termed *ports* and can be used by only one student at a time 24 hours per day. Pearson charges between $1,000 and $1,600 per port depending upon the number of licenses purchased.

PLATO Learning operates in much the same fashion as Pearson Digital Learning. PLATO Learning makes the claim "PLATO Learning is the industry's foremost expert in secondary instructional technology, offering the most comprehensive library of rigorous,

interactive content and assessment" (PLATO Learning, 2010, ¶ 1). Software licensing costs are based on the number of computer workstations a school has, no matter how many students use a single workstation during the school day. Costs range from $90 per year per workstation for a single subject to $1,000 per year per workstation for a collection of subjects designed for multiple grade levels.

Apex Learning licenses its online learning product to high schools through a yearly subscription. Unlike NovaNET and PLATO, Apex licenses can be used by one student at a time until the student completes the course. In marketing its product to schools, Apex claims "from its inception, Apex Learning has sought to increase access to high quality educational alternatives for all students through online learning" (Apex Learning, 2010, ¶ 1). The cost of each Apex Learning license varies from $100 to $300 per license depending upon the number of licenses purchased, with a minimum number of licenses required based upon school size.

Having the goal of expanding access to more diverse curriculum and post-secondary education opportunities, the Indiana Virtual Academy offers online courses to high school students throughout Indiana. Unlike the licensing fees charged by the aforementioned vendors, the Indiana Virtual Academy charges a fee based upon the number of courses an individual student takes. Course fees are $275.00 per semester credit for Ripley County students and $295.00 for all students outside of Ripley County.

Faculty/staff costs. According to the IDOE (2009c), average teacher salaries ranged from $36,800 in the lowest paying district to $57,500 in the highest paying district, with the overall average teacher salary in Indiana being $49, 569. These figures do not include benefits which can easily add up to 50% in additional expenses for the school. The salary of non-certified individuals will vary depending upon the school district. For the purpose of this study

the researcher assumed the average salary of non-certified school employees in Indiana was $10.00 per hour with no benefits. This translated to $13,500 annually based upon a 7.5 hour workday for 180 school days.

Online learning provides at least two ways to reduce expenses being paid for faculty and staff. The first way online learning can be used to reduce faculty and staff costs is by increasing class sizes/reducing the number of course sections. The increase in the number of students in the class effectively reduces the number sections of courses offered, thus reducing the number of faculty members needed to teach the course content. The second way to reduce faculty and staff costs is to employ a non-certified individual as a monitor for online classes and allow a teacher or administrator to serve in the capacity of teacher-of-record. The teacher-of-record would monitor all progress and award the grade and credit for each student.

Based on the first scenario of increasing class sizes, school districts in Indiana could save on average $49,569 in salary alone for every day's worth of courses and students that could be covered by online learning instead of a teacher. Based on the second scenario, school districts in Indiana could save $36,069 in salary costs by employing a non-certified individual to monitor online learning (Average teacher cost = $49,569 minus average non-certified individual cost of $13,000 = $36,069). Cost savings would increase by an average of $49,569 per teacher reduced in this scenario if the school district employed only one non-certified individual instead of multiple individuals.

Effectiveness of Online Learning

Only online courses can give students access to the best teachers and most rigorous and relevant courses regardless of where the student lives or attends school. Many students, especially those students in poor urban or rural schools, throughout the U.S. have a limited

ability to meet the state guidelines for high school graduation due to a lack of courses being offered for a multitude of reasons. Online learning is being used as a valuable tool to meet state requirements and also increase student proficiency levels. An analysis of online learning by Means et al. (2009) drew national attention due to significant results in the area of effectiveness. The evaluation included more than 1,000 studies from 1996 to 2008 that compared online learning to traditional learning. The analysis investigated how the effectiveness of online learning compared with traditional instruction and whether supplementing traditional instruction with online teaching enhanced students' learning. The majority of the studies reviewed in the analysis focused on students in higher education, resulting in a concern about generalizing the report's findings to secondary school settings. Yet, the analysts note that K-12 findings were similar to those for higher education. As a result, the researchers recommended continuing online learning in public schools and call for more research on the impact of online courses for K-12 students (Means et al., 2009). Significant inferences in the report included:

- Online classes, whether completely online or hybrid, on average produce stronger student learning outcomes than those conducted solely in a traditional classroom environment (Means et al., 2009, p. 17).
- Online learning is more conducive to an expansion of learning time; therefore, students in online classes benefitted from more time-on-task Means et al., 2009, p. 18).
- Hybrid learning plus the expansion of time-on-task for online learners produced observed learning advantages (Means et al., 2009, p. 19).

Enhancing communication. Online learning provides numerous ways to increase the exchange of ideas between students and faculty, including discussion boards, chats, and e-mails. Researchers have found that adding these essential elements to an online course increases student motivation and participation in class discussions and projects. Kubala (1998) found that students were more willing to participate in online classes due to a measure of anonymity, which served as a motivator for students to get involved because the students felt more empowered. They are daring and confrontational regarding the expression of ideas (Kubala, 1998). Using the internet to attend class, research information and communicate with other students teaches skills in using technologies that are critical in the 21st century. In addition, online forums like the Blackboard™ or Moodle™ discussion boards or chat rooms provide areas for students to post and retrieve information. Each student can view other student's answers and learn through the exposure to different perspectives. This benefits students because they can combine new opinions with their own and develop a solid foundation for learning. Research supports that as learners become aware of the variations in interpretation and construction of meaning among a range of people they construct an individual meaning (Alexander, 1997).

Classroom equality. Another benefit to using web-based communication tools is to give all students a reinforced sense of equality. Equality cannot be separated from community. Bellah, Madsen, Sullivan, Swidler and Tipton (1985) define community as:

> A community is a group of people who are socially interdependent, who participate together in discussion and decision making, and who share certain practices that both define the community and are nurtured by it. Such a community is not quickly formed.

> It almost always has a history and so is also a community of memory, defined in part by its past and its memory of the past. (p. 333)

Online learning provides each individual the same opportunity to participate without the typical distractions such as seating arrangements, volume of student voices, and gender biases. Shy and anxious students can feel more comfortable expressing ideas online instead of being required to speak in front of the class. Research suggests online discussions provoke more confrontational and direct communication between students.

Some students claim they work best in the morning, some in the evening. Some students commute to campus and others take night classes. Scheduling time for homework and group projects can be difficult depending on each student's course, job, and personal responsibilities. Online learning offers course material to be accessible 24 hours a day, 7 days a week. Students have the ability to read and re-read lectures, discussions, explanations and comments. Often spoken material in the classroom passes students by due to a number of distractions, missed classes, tiredness or boredom. In addition online institutions often offer chat rooms for discussion between students increasing bonding and camaraderie amongst students.

Teacher accessibility. One of the main roles of the teacher in online learning environments is to be accessible consistently to provide support to the students. It is not uncommon for online schools to have requirements for how often the individual teachers must log in to their classes, and how quickly they must respond to students. Online course providers may also require and/or facilitate communication by telephone or online synchronous methods, such as online office hours. Interactions between the teacher and students have been found to affect the quality of student experiences and learning outcomes in distance education (Phipps &

Merisotis, 2000). Online communication benefits students by providing an additional layer of teacher accessibility. Teachers utilizing online methods must have strong written and oral skills to communicate with students. Students in online courses have the ability to submit inquiries via e-mail to teachers at any time. In return the teacher can work individually with students at anytime, anywhere. Additionally, students in courses that incorporate Moodle™ or Blackboard™ have the ability to submit inquiries, assignments, suggestions, etc. to teachers at anytime.

Student-centered teaching. Online learning enables student-centered teaching approaches. In online learning environments, instructional practices tend to shift from traditional teacher focused strategies to strategies that are student-centered, engaging learners through the consequential use of computers to enhance academic achievement. Research has shown that every student has their own way of learning. Some learning visually, while others do better kinesthetically. Online learning allows course materials to be learned in many formats to accommodate different types of learning styles. As an example, lecture notes and slides can be put online so that both visual and auditory learners benefit. Students who prefer to focus on listening and watching during lecture do not have to worry that they are missing important concepts while scrambling to take copious notes. They can focus on understanding the material and concepts as they are presented. Students with attention difficulties or those who get overwhelmed by organizational tasks also benefit, because materials provided show how the instructor has grouped and prepared materials in the handouts, and indicate what items are most important.

As previously stated, every student has a unique learning style. Some students are visual learners, some are auditory learners, while others are kinesthetic learners. In their study,

Cavanaugh et al. (2006) found that significant increases were observed related to the following student-centered strategies: student attention, interest and engagement; project-based learning; teachers acting as facilitators and coaches; cooperative/collaborative learning; independent inquiry/research; academically focused class time; computers used as a learning tool; and utilization of computers to support critical thinking skills. Online learning environments permit students to use a variety of resources in ways that work best for them. Additional benefits of online learning for kinesthetic learners is the ability to participate in online discussions, which allows students extra time in which they can pick up information from classmates and the instructor. Typically, students rehearse information when they study for exams or complete assignments. However, they also rehearse information when formulating thoughts into sentences and typing those thoughts into the computer. When instructors post discussion questions or short essay assignments in the online portion of a course, students must attend to and reflect on the subject matter before responding. This results in reflection and articulation of content, as the very process of reporting and writing about what they have learned engages students in an active learning experience.

Maximizing classroom experiences. When course content and activities are provided online, students no longer need to worry about accessing course materials. Students can complete assignments during their most productive times. Students can choose to download readings or take practice exams whenever it is most convenient. Continual access to course documents also guarantees students can obtain materials at any time. Online learning allows students to pursue learning in an individualized and self-paced way. Students can instantly query, express doubts, and provide feedback without any hesitation (authorGEN Technologies, 2010). Furthermore:

> In a virtual classroom content is primarily digitally-based and is delivered through chats, whiteboard and digital presentations such as the use of Powerpoint™. Also, links related to other resources and websites can be shared in an online session. Moreover, session recordings are readily available to students to revisit them as required. (authorGen Technologies, 2010, p. 6)

The online environment makes instructors more approachable. Students can talk openly with their teachers through online chats, email and in newsgroup discussions, without waiting for office hours that may not be convenient. This option for communication provides enhanced contact between instructors and students. In addition, students can access online libraries from their computers for research articles, electronic content and other material without worries that the material is already checked out.

The time saving elements introduced by web-based education tools like Blackboard™ and Moodle™ apply to both the instructor and the student. Students benefit because they have immediate access to course materials at any location, they do not have to spend time walking across to the teacher's office or searching for a materials in the library. Through the use of technological tools like Blackboard™ or Moodle™, students no longer have to spend valuable classroom time waiting for the instructor to hand out information. The time spent in traditional classrooms at the start or end of each class period distributing handouts, collecting assignments, and making announcements can be utilized for teaching when administrative tasks are managed through online tools. In addition, participating online is much less intimidating than in the classroom. The anonymity of the virtual classroom provides students a level playing field undisturbed by bias caused by seating arrangement, gender, race and age. Students are given the ability to think longer about what they want to say and add their comments when ready.

Instructors can also provide increased opportunity for student exploration and activity learning by putting related web sites into the Moodle™ or Blackboard™ external links feature. When instructors reference these types of web sites, content reinforcement is provided as students can see how course material is utilized in real world situations. In addition, because there are no geographic barriers to online learning, students can find course material that may not be available to them otherwise. This is especially true for students in remote rural areas that cannot support college or vocational training centers.

Use of online learning for advance classes. Due to the accountability measures addressed in No Child Left Behind, it has become common knowledge that secondary schools continue to have roughly 30% of the students to drop out of school instead of graduating within a four-year time span, with the percentage of dropouts being much higher for African-American, Hispanic, and Native-American students. Providing rigorous academic coursework has been shown to be at the top of the list in terms of how to increase student achievement. The implementation of online learning provides schools that would otherwise not be able to offer challenging courses the ability to do so. Many secondary administrators are confronted with the task of providing a broad array of rigorous courses to meet the challenges of the 21st century without adequate resources to do so. In 2007, the United States Secretary of Education, Margaret Spellings, sent prepared remarks in advance of the National Summit on America's Silent Epidemic in which she appealed for the expansion of Advanced Placement classes at the secondary level noting that rigorous coursework is one of the best ways to improve student achievement. Spellings (2007) stated that studies revealed taking one or two Advanced Placement courses increases a student's chance of going to college and the odds of graduating in four years. A major dilemma was that nearly 40% of our nation's high schools did not offer any

AP courses, and many of those schools serve low-income and minority students (Spellings, 2007).

Unfortunately secondary student access to advanced courses has not been universal throughout the United States. When the United States Department of Education's National Center for Education Statistics (NCES) (2005) analyzed the availability of advanced courses in English, world languages, math and science for high school students, the results painted a bleak picture. The NCES (2005) found more than 25% of the nation's high school students do not have advanced courses available in their home schools, with the majority of these schools being rural or with senior class populations consisting of less than 150 students. The analysis also found only 74% of high school students in the United States had access to at least one course, only 58% had access to at least two advanced courses, and less than 22% had access to at least four advanced courses in their home school.

Many times in smaller rural or low funded high schools problems arise with the scheduling of advanced courses. Typically in these schools advanced courses are single semester, one section, one credit courses that can only be offered during one specific time of the day. The main problem faced by students in schools with limited funding is when the advanced course is offered during the school day and during the school year. The state required courses and the co-curricular electives such as band tend to limit the availability for students to take the advanced course due to the advanced course only being offered at the same time as the required or co-curricular courses. The inability to offer the course more than one time per day increases the likelihood of the course filling to capacity and students in need being turned away. Prior to the advancements in online learning, administrators would be forced to shuffle the teaching schedules around of their faculty so that an advanced course could be taught by a marginally

qualified, if qualified at all, teacher. When shuffling the schedule didn't work out the administrators could contract with another school system or a local university to have an expert from the field teach a traditional classroom-based or synchronous video-conference via distant learning class period in order to provide an opportunity for students to take an upper-level course. This format still put the emphasis on school and teacher availability instead of student availability.

In 2009, virtually every required class needed for graduation was available online in an asynchronous format, allowing students to decide when and where they would attend class, and accredited online classes were available 24 hours per day, 7 days per week. Secondary schools use of online learning curriculum could result in a reduction or elimination of scheduling conflicts and teacher shortages. The advancements in technology allowing high schools to supplement their in-house curriculum with that of online learning is a way to meet the needs and ensure the academic success of the students. With online learning, individual schools are not limited to providing only the advanced courses that are popular based upon a predetermined number of students being interested. Instead, individual schools have the ability to offer any advanced course to any number of students at any time.

Use of online learning for at-risk students. According to Setzer and Greene (2005), the primary reason online courses are offered in school districts is to expand offerings to courses that would otherwise be unavailable, the second most commonly cited reason for offering online learning is to meet individual student needs. Additionally, Bridgeland, DiIulio, and Morison (2006) describe the challenges that face U.S. schools because of students becoming disengaged and dropping out of school. The well-published data from the report includes:

- Every 29 seconds another student gives up on school, resulting in more than one million American high school students who drop out every year.
- Nearly one-third of all public high school students—and nearly one half of all African Americans, Hispanics and Native Americans—fail to graduate from public high school with their class.
- Dropouts are more likely than high school graduates to be unemployed, in poor health, living in poverty, on public assistance, or single parents with children who drop out of high school.
- Dropouts are more than twice as likely as high school graduates to slip into poverty in a single year and three times more likely than college graduates to be unemployed.
- Dropouts are more than eight times as likely to be in jail or prison as high school graduates.
- Dropouts are four times less likely to volunteer than college graduates, twice less likely to vote or participate in community projects, and represent only 3% of actively engaged citizens in the U.S. today (Bridgeland et al., 2006).

Research indicates that there are no simple solutions to keeping at-risk students in school. At the same time, research indicates that online learning can provide the reinforcement within the academic environment to improve the chances of at-risk students staying in school. According to the Georgia Department of Education (2009), credit recovery programs are focused on helping students stay in school and graduate on time. Credit recovery is traditionally defined as a way to recover credit for a course that a student was previously unsuccessful in earning academic credit towards graduation. Credit recovery differs greatly

from credit accrual programs that allow students to earn first time credit in that students having already satisfied seat time requirements for a course in which they were unsuccessful can focus on earning credit based on competency of the content standards for the particular course.

Online learning programs can be designed to increase educational opportunities for students regardless of their demographic characteristics. As stated previously, according to Setzer and Greene (2005), the fundamental rationale for offering online courses in school districts is to increase the number and depth of courses that would otherwise be unavailable, and to meet individual student needs. Online curricula offer a plethora of courses and services to reach students from low to high ability.

National statistics on the use of online learning. A review of the literature indicated that statewide online learning curriculums provide courses primarily or exclusively to high school students, targeting a wide variety of student types. More often than not, statewide online learning was developed as a means for schools to meet the rigorous requirements of No Child Left Behind, by being intended for students whose needs were not being completely met by their local educational agency, such as students unable to take a physical school course due to lack of availability or a scheduling conflict. Also notable is that targeted student populations tended to be rural students, inner-city students, students from high-poverty districts, or students from low-performing schools.

The NCES released the first comprehensive report of online education in public schools in 2005 conveying that 36% of public school districts in the United States had students enrolled in courses via distance education (Setzer & Greene, 2005). According to the NCES report, data were collected via survey of a sample including 2,305 public school districts in the U.S. by the Department of Education during the 2002-2003 12-month academic year (Setzer & Greene,

2005). The survey was mailed to public school district superintendents, who were asked to review the questionnaire and determine the person in the district who was best suited to complete it. Suggested respondents were the director of curriculum, the technology coordinator, or the distance education coordinator. Respondents were provided with a definition and description of distance education courses. For this study, distance education courses were defined as credit-granting courses offered to elementary and secondary school students enrolled in the district in which the teacher and students were in different locations. Distance education courses could originate from the respondent's district or from other entities, such as a state virtual school or postsecondary institution. These courses could be delivered via audio, video, Internet or other computer technologies. Additionally, the distance education courses could include occasional face-to-face interactions between the teacher and the students. Although the study did not focus exclusively on online learning, the study did focus on a modality where the instructor and the students were in different locals while the classes were being taught. The NCES data was classified as follows: distance education for public education students; technologies used for delivering distance education sources; entities delivering distance education courses; reasons for having distance education courses; and future expansion of distance education courses. The NCES key findings included:

- A greater proportion of large districts than medium or small districts had students enrolled in distance education courses (50% vs. 32% and 37%, respectively). In addition, a greater proportion of districts located in rural areas than in suburban or urban areas indicated that they had students enrolled in distance education courses (46% compared with 28% and 23%, respectively).

- The percentage of schools with students enrolled in distance education courses varied substantially by the instructional level of the school. Overall, 38% of public high schools offered distance education courses, compared with 20% of combined or ungraded schools, 4% of middle or junior high schools, and fewer than 1% of elementary schools.
- In 2002–03, there were an estimated 328,000 enrollments in distance education courses among students regularly enrolled in public school districts. Students enrolled in multiple courses were counted for each course taken. Thus, enrollments may include duplicated counts of students.
- Of the total enrollments in distance education courses, 68% were in high schools, 29% were in combined or ungraded schools, 2% were in middle or junior high schools, and 1% were in elementary schools.
- There were an estimated 45,300 enrollments in Advanced Placement or college-level courses offered through distance education in 2002–03. This represents 14% of the total enrollments in distance education.
- The proportion of all distance education enrollments that are in Advanced Placement or college level distance education courses is greater in small districts compared to medium or large districts (24% vs. 10% and 7%, respectively).
- When asked which technology was used to deliver the greatest number of distance education courses, 49% of districts reported two-way interactive video, more than any other technology.
- Of those districts with students enrolled in distance education courses in 2002-2003, about half (48%) had students enrolled in distance education courses delivered by a

postsecondary institution. Thirty-four percent of districts had students enrolled in distance education courses delivered by another local school district, or schools in other districts, within their state.

- Seventy-two percent of districts with students enrolled in distance education courses planned to expand their distance education courses in the future.
- Thirty-six percent of districts that were planning to expand their distance education courses selected course development and/or purchasing costs as a major factor preventing their expansion. (Setzer & Greene, 2005, pp. 10-14)

As Watson (2005) points out, online learning developed explosively between the years 2000 - 2005. As of July 2005, 21 states had statewide online learning programs. The 21 statewide programs had many features in common. All were primarily or entirely supplemental; all of them operated primarily at the high school level; almost all of them relied, in whole or in part, on local schools or districts to provide support for the online students; and most were experiencing rapid growth. The extent of these common features suggested that a strong and largely successful educational model has emerged (Watson, 2005). The four common mechanisms for the formation of statewide programs were identified as: the state-wide online learning program was established by the state department of education or other state entity; the online learning program was founded by the state legislation; the online learning program was designed by a local education agency (LEA)—a school district or regional service agency, or a consortium of LEAs; the online learning program evolved out of distance-education programs that originally used channels other than the Internet.

Summary

The changes in Indiana's economy and the political emphasis in graduation rates over the past few years have greatly influenced the need to lower overall costs by utilizing new technologies to meet the needs of the students. Online learning at the secondary level has developed drastically over the past ten years in response to meeting the growing demand for learning opportunities in secondary schools. The findings from major online research studies presented within this review revealed that the research conducted by Setzer and Greene (2005) is the most influential work to date on utilization of online learning courses in public school districts in the United States. The research reveals that school administration and faculty have a tremendous opportunity to increase student academic achievement levels through effective and efficient implementation of online learning courses, curricula and programs.

CHAPTER 3

Methodology

This chapter discusses research methodology including the null hypotheses, data sources, the population of the study, the data collection process, and the instrument used. The purpose of this quantitative study was to determine the principal perceptions and demographic relationship of the implementation and effectiveness of online courses in Indiana public high schools. Overall, the design involved the following procedures:

1. Approximately 343 non-charter Indiana public high schools encompassing grades of at least 10 through 12 in the state of Indiana will be included in the population.
2. Principals' implementation and effectiveness data will be collected from each school that responds to the survey.

Research Questions

This quantitative study sought answers to five research questions:

1. What is the principal's perception of the level of implementation of online learning in Indiana public high schools?
2. What is the principal's perception of the effectiveness of online learning for Indiana public high schools?

3. Is there a relationship between the principal's perception of the level of implementation of online learning and principal perception of effectiveness of online learning in Indiana public high schools?
4. What are the barriers that impede the development of online learning in Indiana public high schools?
5. Are there differences in perceptions and implementation of online learning due to demographics of principals and high schools?

Null Hypotheses

$H_0$1. There is no relationship between the principal's overall perceptions of online learning and the overall implementation of online learning in Indiana public high schools.

$H_0$2. There is no relationship between principal perceptions of effectiveness and implementation of each of the fifteen items of online learning in Indiana public high schools.

$H_0$3. There is no significant difference across genders of the principal and the implementation of online learning in Indiana public high schools.

$H_0$4. There are no significant differences between age of the principal and the implementation of online learning in Indiana public high schools.

$H_0$5 There is no significant interaction between gender and age of the principal and the implementation of online learning in Indiana public high schools.

$H_0$6. There is no significant difference between genders of the principal and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$7. There are no significant differences between age of the principal and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$8. There is no significant interaction between gender and age of the principal and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$9. There are no significant differences between school enrollment and the implementation of online learning in Indiana public high schools.

$H_0$10. There are no significant differences between school locality and the implementation of online learning in Indiana public high schools.

$H_0$11. There is no significant interaction between school enrollment and school locality on the implementation of online learning in Indiana public high schools.

$H_0$12. There are no significant differences between school enrollment and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$13. There are no significant differences between school locality and the perceived effectiveness of online learning in Indiana public high schools.

$H_0$14. There are no significant interactions between school enrollment and school locality on the perceived effectiveness of online learning in Indiana public high schools.

$H_0$15. There is no relationship between the principal's age, gender, enrollment, and local of school and the barriers of implementing online learning in Indiana public high schools.

Data Sources

Population. For the purpose of this study, a non-charter Indiana public high school is defined with a grade configuration of 10 through 12, but can include grades K through 12. There were a total of 343 public high schools in Indiana with this grade configuration (Indiana Department of Education, 2009d). All 343 public high schools were selected for the study.

Data Collection Process

1. Three hundred forty-three public high schools in Indiana were selected.

2. A list of subjects was developed using the information provided by the Indiana Department of Education (IDOE) website (http://www.doe.state.in.us/). After contacting the IDOE, e-mail and mail addresses was obtained for every public school secondary principal. Principal e-mail and mail addresses were obtained by viewing the list available from the Indiana Department of Education and by visiting school websites. The names of the principals were confirmed by a phone call to each school to verify the current name(s), e-mail address and mail address of the secondary principal employed in the school.
3. To obtain a high rate of return, the researcher utilized two different modes of distribution by first e-mailing the survey using Qualtrics, and then followed up by mailing the survey. A letter explaining the purpose of this research project, directions for accessing the Principal Online Learning Survey, and explanation that the respondent's identity was blind to the researcher accompanied the survey (Appendix A). The principals were surveyed on implementation and effectiveness of online learning. Principals were asked to return their completed Principal Survey either online or via traditional mail.
4. Principals were provided a follow-up letter thanking them for their participation in the study or prompting them to respond to the survey.
5. Results were used to examine the differences between implementation levels of various online learning approaches; the effectiveness of various online learning approaches; the differences between online approaches and perception of effectiveness; and relationships of online learning and school demographics.

Instrumentation

Principal Survey. The Principal Online Learning Survey was used with school principals to determine the implementation and effectiveness of online learning. The Principal Online Learning Survey was developed after reviewing the current literature, establishing content validity. Practitioner's views and field-testing the instrument provided face validity. The instrument consisted of a 44-item survey instrument developed by the researcher to measure principals' perceptions of the implementation and beliefs of the effectiveness of online learning in Indiana high schools. The survey instrument was patterned after the questionnaire developed by Picciano and Seaman (2007), who developed their survey based upon a similar instrument used by Allen and Seaman (2006) to conduct national surveys of chief academic officers in American colleges and universities.

Picciano and Seaman are two pioneers in collecting data on and comparing fully online and blended learning in K-12 schools throughout the United States. Their study of online learning published in 2007 was considered a landmark study focusing on the following research questions: 1. What is the nature and extent of online and blended learning in K–12 schools in the United States? 2. What is the perceived importance of online and blended learning for K–12 school programs? 3. What are the issues and barriers that impede the development of online and blended learning in K–12 schools? 4. Who are the major providers of online and blended learning courses to K–12 schools? According to Picciano and Seaman (2007), "the purpose of this study was to explore the nature of online learning in K–12 schools and to establish base data for more extensive future studies".

Permission was granted by Dr. Picciano (Appendix E) to use any or all parts of the survey in creating a survey tailored to this research, Principal Perceptions About The

Implementation And Effectiveness Of Online Learning In Public High Schools In Indiana. Specifically, questions in regards to perceived importance, barriers to implementation, and demographics were taken directly from the Picciano survey. Other questions on the Principal Online Learning Survey were developed by the researcher through collaboration with his dissertation chair, Indiana State University professor, Dr. Todd Whitaker.

Face Validity

The degree to which this survey accurately assessed the concept of public high school principals' perceptions of the implementation and effectiveness of online learning was validated by sampling 15 K-12 school administrators in regards to the survey instrument clarity and organization.

Survey Reliability

Picciano and Seaman (2007) developed their survey instrument to gain insight into the use of online learning in American colleges and universities by surveying Academic officers. The parallel of the instrumentation provided consistency of measurement. In addition, reliability was tested via Cronbach's Alpha. The reliability analysis for each category was reported by statistically determining the scale mean, the scale variance for each item if deleted, the corrected item correlation, and the alpha when the item is deleted. All alphas had values of over .90 indicating excellent reliability.

Statistical Analysis

This study of the use of online learning in Indiana public high schools drew on descriptive analysis relying extensively on a survey instrument (Appendix C) patterned after a similar instrument used by Picciano and Seaman (2007). This survey was conducted for the 2010–2011 academic year.

$H_0$1, $H_0$2, and $H_0$15 were tested using a correlation. $H_0$1 analysis was determined by running a correlation of the overall combined score of the first fourteen survey items in regards to belief in effectiveness and the perceived level of implementation on the Principal Online Learning Survey. $H_0$2 analysis was determined by running a correlation for each of the following 14 individual items in regards to the principals belief in effectiveness and the perceived level of implementation: Providing methods for differentiating instruction; Addressing growing populations and limited space; Increasing the number of electives available for students; Offering courses not otherwise available at school; Offering Advanced Placement or college-level courses; Helping students recover credits; Reducing class sizes; Providing individualized instruction; Providing students who dislike school an opportunity to succeed; Providing courses where certified teachers are not available; Providing a cost effective way of offering courses where low enrollment numbers are typical; Meeting the needs of at-risk students; Reducing scheduling conflicts for students; Permitting students who failed a course to take it again; and Meeting the needs of students requiring enrichment. $H_0$15 analysis was determined by running a correlation of the principal's age, gender, enrollment, and local of school and the barriers of implementing online learning in Indiana public high schools.

For $H_0$3 - $H_0$14, significance of group differences and interactions was tested using a multivariate analysis of variance (MANOVA). $H_0$3, $H_0$4, and $H_0$5 was analyzed using the factors of gender and age of the principal in regards to the perceived level of implementation of online learning in public high school in Indiana. $H_0$6, $H_0$7, and $H_0$8 was analyzed using the factors of gender and age of the principal in regards to the perceived level of effectiveness of online learning in public high school in Indiana. $H_0$9, $H_0$10, and $H_0$11 was analyzed using the factors of school enrollment and school locality in regards to the perceived level of

implementation of online learning in public high school in Indiana. $H_0$12, $H_0$13, and $H_0$14 was analyzed using the factors of school enrollment and school locality in regards to the perceived level of effectiveness of online learning in public high school in Indiana.

Summary

In this chapter, the design components consisting of the hypotheses, the data source including the population, and the instrument to be used were presented and described. The main purpose of the study was to analyze the principal's perception of the implementation and effectiveness of online courses in Indiana public high schools.

CHAPTER 4

Analysis of Data

The purpose of this quantitative study was to determine the principal perceptions and demographic relationship of the implementation and effectiveness of online courses in Indiana public high schools. An analysis was prepared to determine whether demographic factors play a role in the principal's perceptions of the implementation and effectiveness of online learning. Factors examined were school location, school size, technology costs, support costs, administrative costs, and existing technological infrastructure. Other factors were the principal's age, gender, number of years served as a principal, number of years served as a teacher, ability to control the school budget, and highest degree earned. The overall descriptive charts indicating principal responses to individual items are located in Tables 1 – 13, and on the graphs in Appendix G.

The overall design of the study included the following procedures:

1. During the fall of 2010, 343 public non-charter high schools in Indiana with a grade configuration including grades 10 – 12 were selected.
2. A list of subjects was developed using the information provided by the Indiana Department of Education (IDOE) website (http://www.doe.state.in.us/). After contacting the IDOE, electronic mail and mail addresses were obtained for every public school secondary principal. Principal electronic mail and mail addresses

were obtained by viewing the list available from the Indiana Department of Education and by visiting school websites. The names of the principals were confirmed by a phone call to each school to verify the current name(s), electronic mail address and mail address of the secondary principal employed in the school.

3. To obtain a high rate of return, this researcher utilized two different modes of distribution by first electronically mailing the survey using Qualtrics, and then following up by mailing the survey. A letter explaining the purpose of the research project, directions for accessing the Principal Online Learning Survey, and an explanation that the respondent's identity would be blind to the researcher accompanied the survey (Appendix A). The principals were surveyed on implementation and effectiveness of online learning. Principals were asked to return their completed Principal Survey either online or via traditional mail.
4. Principals were provided a follow-up letter thanking them for their participation in the study or prompting them to respond to the survey.

Principals of public non-charter high schools with at least a population consisting of students in grades 10, 11 and 12 were invited to participate in this study. A total of 343 principals qualified and were offered the opportunity to participate in this study. Out of the 343 school principals invited to participate, 241 principals responded with completed surveys.

Statistical analysis of the data included descriptive analysis for selected items, means, and standard deviations. A Pearson product moment correlation was used to test the first two and 15th null hypotheses, while a multivariate analysis of variance (MANOVA) was used to test null hypotheses three through 14.

This chapter provides a description of the data and presents the results of the study. It is organized into the following sections: Descriptive Data, Findings and Analysis of the Hypotheses, and Summary of Findings.

Descriptive Data

The research focus of this study was public, non-charter high schools encompassing grades of at least 10 through 12 in the state of Indiana. A principals' perception survey was sent to all principals of the 343 schools in the state with this grade configuration to determine their perceptions about the implementation and effectiveness of online learning. The analysis data set contained 241 records (N = 241), representing 70% of all public, non-charter, high schools in the state of Indiana.

The major research questions that guided this study were:

1. What is the principal's perception of the level of implementation of online learning in Indiana public high schools?
2. What is the principal's perception of the effectiveness of online learning for Indiana public high schools?
3. Is there a relationship between the principal's perception of the level of implementation of online learning and principal's perception of effectiveness of online learning in Indiana public high schools?
4. What are the barriers that impede the development of online learning in Indiana public high schools?
5. Are there differences in perceptions and implementation of online learning due to demographics of principals and high schools?

Respondent characteristics. The population of high school principals that participated in this survey represented a cross section of Indiana non-charter public high schools encompassing grade levels of at least 10 through 12. Principals in 241 out of a total population of 343 public, non-charter schools in Indiana responded to this survey.

Respondents by sex/gender. Within the population of principals in non-charter public high schools in Indiana, there were 305 males (88.93%) and 38 females (11.07%) as reflected in Table 1. Respondents were representative of the population with male respondents making up 88.38% of the pool, while 11.62% of the respondents were female.

Table 1

Respondents by Gender

Gender	*N*	Percent
Male	213	88.38
Female	28	11.62
Total	241	100.00

Respondents by age. Respondents represented four out of five possible age categories: (1) 24 and younger; (2) 25 - 37; (3) 38 - 50; (4) 51 - 63; (5) 64 and older as presented in Table 2. No respondents were recorded as 24 and younger. Principals aged 25 – 37 made up 11.20% of the sample; principals aged 38 – 50 made up 48.13% of the sample; principals aged 51 – 63 made up 39.00% of the sample; and principals 64 and older made up 1.66% of the sample.

Table 2

Respondents by Age

Age	*N*	Percent
24 and younger	0	0.00
25 – 37	27	11.20
38 – 50	116	48.13
51 – 63	94	39.00
64 and older	4	1.66

***Respondents by ethnicity*.** Respondents represented four out of the following five possible ethnic categories: (1) Caucasian; (2) African American; (3) Hispanic; (4) Asian; (5) Other as shown in Table 3. No respondents were recorded as Asian. Principals classifying themselves as Caucasian made up 95.00% of the sample; principals classifying themselves as African American made up 4.17% of the sample; principals classifying themselves as Hispanic made up 0.42% of the sample; and principals classifying themselves as Other made up 0.42% of the sample.

Table 3

Respondents by Ethnicity

Ethnicity	*N*	Percent
Caucasian	228	95.00
African American	10	4.17
Hispanic	1	.42
Asian	0	0.00
Other	4	.42

***Respondents by school enrollment*.** Principals responding to the survey reported serving in the capacity of principal in schools ranging in size from less than 500 students to 2,001 or more students as presented in Table 4. Principals of 57 schools reported enrollments of 500 students or fewer; principals of 112 schools reported enrollments between 501 students and 1,000 students; principals 28 schools reported enrollments between 1,001 students and 1,500 students; principals of 26 schools reported enrollments between 1,501 students and 2,000 students; and principals of 19 schools reported enrollments of 2,001 students or greater.

Table 4

Respondents by School Enrollment

Enrollment	*N*	Percent
Less than 500	57	23.55
501 –1,000	112	46.28
1,001 – 1,500	28	11.57
1,501 – 2,000	26	10.74
2,001 or more	19	7.85

***Respondents by school grade level configuration*.** Principals of the surveyed schools reported the school they were serving, in the capacity of principal, had one of the following configurations: 6 – 12, 7 – 12, 9 – 12, 10 – 12, or other consisting of at least grade levels 10 – 12 as reflected in Table 5. Principals of 14 schools reported a grade configuration of 6 – 12, principals of 70 schools reported a grade configuration of 7 – 12, principals of 155 schools reported a grade configuration of 9 – 12, principals of two schools reported a grade configuration classified as other. No respondents reported a grade classification of 10 – 12.

Table 5

Respondents by Grade Configuration

Grade Configuration	*N*	Percent
6 - 12	14	5.81
7 - 12	70	29.85
9 - 12	155	64.32
10 - 12	0	0.00
Other	2	.83

***Respondents by school locale*.** The Institute of Education Sciences of the U.S. Department of Education, in the Common Core of Data, categorizes the location of schools based on their proximity to areas of particular population levels (NCES, 2010). Based on these community classifications, participating schools were located in a variety of contexts: urban, suburban, small town and rural. Of the fall 2010 participants, the schools in which they were the principal consisted of; 12.86% located in urban contexts, 19.50% in suburban contexts, 27.80% in small town contexts, and 39.83% in rural contexts as shown in Table 6. Definitions of these locales are based on The Institute of Education Sciences of the U.S. Department of Education (Appendix F).

Table 6

Respondents by School Locale

Locale	*N*	Percent
Urban	31	12.86
Suburban	47	19.50
Small Town	67	27.80
Rural	95	39.83

Respondents by years of principal service. Principals responding to the survey reported serving in the capacity of principal for a total of less than five years, to more than 25 years (Table 7). Principals of 59 schools reported serving in the capacity of principal for less than 5 years; principals of 128 schools reported serving in the capacity of principal for five to 15 years; principals of 37 schools reported serving in the capacity of principal for 16 to 25 years; and principals of 17 schools reported serving in the capacity of principal for more than 25 years.

Table 7

Respondents by Principal's Years of Service

Years of Service	*N*	Percent
Less than 5	59	24.48
5 - 15	128	53.11
16 - 25	37	15.35
More than 25	17	7.05

Respondents by years of teaching experience. Principals responding to the survey reported serving in the capacity of teacher prior to becoming a principal for a total of less than five years, to more than 25 years (Table 8). Principals of eight schools reported serving in the capacity of teacher for less than five years; principals of 172 schools reported serving in the capacity of teacher for five to 15 years; principals of 45 schools reported serving in the capacity of teacher for 16 to 25 years; and principals of 14 schools reported serving in the capacity of principal for more than 25 years.

Table 8

Respondents by Years of Teaching Experience

Locale	*N*	Percent
Less than 5	8	3.35
5 - 15	172	71.97
16 - 25	45	18.83
More than 25	14	5.86

Respondents by highest degree earned. Principals of the surveyed schools reported one of the following degrees as the highest they earned: Master's Degree, Master's Degree plus additional graduate work, Educational Specialist, Doctorate, or Other (Table 9). Principals of 27 schools reported their highest degree earned as a Master's Degree; principals of 147 schools reported their highest degree earned as a Master's Degree plus additional graduate work; principals of 57 schools reported their highest degree earned as an Educational Specialist Degree; principals of 10 schools reported their highest degree earned as a Doctoral Degree. No respondents reported a degree classification of other.

Table 9

Respondents by Highest Degree Earned

Degree	*N*	Percent
Master's	27	11.20
Master's plus	147	61.00
Educational Specialist	57	23.65
Doctorate	10	4.15
Other	0	0.00

Principal's belief in the effectiveness of online learning. The first section of the Principal's Perception of Online Learning survey dealt with the belief in effectiveness of online learning in meeting the needs of the students. With the use of a five - point Likert scale, all survey items were rated on a scale of 1 to 5 with 1 being the lowest level of effectiveness, 3 being neutral, and 5 being strongly effective. A total of 241 public, non-charter high school principals responded to the survey items. Respondents indicated recovering credits (M = 4.56, SD = .37), and retaking courses (M = 4.34, SD = .52) as two of the most effective aspects of online learning. Table 10 illustrates principal responses to the 15 questions on the survey regarding perceptions of effectiveness.

Table 10

Perception of Effectiveness of Online Learning

Item	*M*	*SD*	Strongly Ineffective (1)	Ineffective (2)	Neutral (3)	Effective (4)	Strongly Effective (5)
Differentiating Instruction	3.82	.90	5	19	33	137	44
Growing Populations	3.73	.89	6	16	49	130	36
Increasing Elective	3.96	.83	6	11	35	121	65
Offering Courses	3.98	.85	5	13	33	115	70
Offering AP Courses	3.71	1.17	12	19	54	93	59
Recovering Credits	4.56	.37	0	1	11	81	146
Reducing Class Size	3.31	1.21	20	25	84	75	32
Individualizing Instruction	3.68	.82	6	17	59	118	35
Increasing Opportunities	3.95	.87	5	11	47	104	71
Providing Courses w/out Teachers	3.50	1.20	18	17	71	90	41
Cost Effective Courses	3.78	.98	9	12	58	103	56
Meeting Needs of At-Risk	3.95	.92	6	12	43	104	74

Table 10 (continued)

Item	*M*	*SD*	Strongly Ineffective (1)	Ineffective (2)	Neutral (3)	Effective (4)	Strongly Effective (5)
Reducing Conflicts	3.90	.85	7	9	44	117	59
Retaking Courses	4.34	.52	2	2	16	109	105
Enrichment Needs	3.63	1.09	13	17	58	102	44

The second section of the Principal's Perception of Online Learning survey dealt with the principal's belief in the level of implementation of online learning in their respective high schools. By the use of a five - point Likert scale, all survey items were rated on a scale of 1 to 5 with 1 being not implemented, 3 being somewhat implemented, and 5 being fully implemented. A total of 241 public, non-charter high school principals responded to the survey items. Respondents indicated recovering credits (M = 4.20, SD = 1.03), and retaking courses (M = 3.86, SD = 1.20) as two factors with the highest level of implementation. Table 11 illustrates principal responses to the 15 questions on the survey regarding perceptions of level of implementation.

Table 11

Perception of Implementation Level of Online Learning

Item	*M*	*SD*	Not Implemented (1)	(2)	Partially Implemented (3)	(4)	Fully Implemented (5)
Differentiating Instruction	2.95	1.06	27	44	97	57	15
Growing Populations	2.84	1.25	50	39	69	63	19
Increasing Electives	2.94	1.27	44	41	67	61	27
Offering Courses	2.78	1.37	63	39	59	49	31
Offering AP Courses	2.65	1.48	84	33	42	48	34
Recovering Credits	4.20	1.03	9	4	42	62	124
Reducing Class Size	2.39	1.32	88	42	57	34	19
Individualizing Instruction	3.03	1.23	39	33	74	65	26
Increasing Opportunities	3.24	1.30	35	30	62	68	45
Providing Courses w/out Teachers	2.58	1.42	84	34	49	46	27
Cost Effective Courses	2.78	1.38	66	31	59	53	29
Meeting Needs of At-Risk	3.38	1.34	31	31	53	61	61

Table 11 (continued)

Item	*M*	*SD*	Not Implemented (1)	(2)	Partially Implemented (3)	(4)	Fully Implemented (5)
Reducing Conflicts	3.09	1.38	47	31	55	61	43
Retaking Courses	3.86	1.20	17	16	41	75	91
Enrichment Needs	2.78	1.30	57	40	59	60	21

Barriers to implementation. Principals returning surveys were asked to indicate on a five – point Likert scale the level of barrier each of seven factors played in the principal's school ability to offer online learning courses. As indicative in Table 12, course costs (M = 2.59, SD = 1.35) and course quality (M = 3.06, SD = 1.21) were most often indicated as the reason a school was not offering online learning as an alternative to the students. When looking at course costs, it should be noted that twice as many respondents reported it as very much a barrier (n = 60) as compared to respondents who felt it was not a barrier (n = 30).

Table 12

Barriers to Offering Online Learning

Characteristic	*M*	*SD*	Very much a barrier (1)	Between (2)	Neutral (3)	Between (4)	Not a barrier (5)
Course Costs	2.59	1.35	60	80	30	41	30
Infrastructure	3.56	1.43	31	36	26	61	86
Bandwidth	3.52	1.43	29	43	29	53	86
Course Quality	3.06	1.21	21	68	60	54	35
Master Contracts	3.42	1.31	22	43	55	52	68
Teacher Training	3.13	1.27	25	58	61	50	45
Replacing Teachers	3.14	1.24	23	61	56	60	40

Findings and Analysis of the Hypothesis

Reliability. To report the reliability of the categories, or scales, of effectiveness and implementation, a coefficient alpha or Cronbach's Alpha was used for each of the 30 categories of implementation and effectiveness by assessing each statement and establishing an item analysis. The reliability analysis for each category was reported by statistically determining the scale mean, the scale variance for each item if deleted, the corrected item correlation, and the alpha when the item is deleted. All alphas had values of over .90 indicating excellent reliability (Table 13).

Table 13

Reliability Analysis of Perception of Effectiveness and Implementation

Statistics for Implementation and Effectiveness	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected Item Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Effectiveness 1	99.74	301.037	.266	.492	.910
Effectiveness 2	99.80	297.662	.390	.493	.908
Effectiveness 3	99.58	298.777	.345	.732	.909
Effectiveness 4	99.54	296.760	.393	.647	.908
Effectiveness 5	99.83	293.493	.437	.643	.908
Effectiveness 6	98.98	301.802	.385	.510	.909
Effectiveness 7	100.17	295.820	.372	.620	.909
Effectiveness 8	99.85	301.000	.289	.577	.910
Effectiveness 9	99.58	299.360	.306	.543	.909
Effectiveness 10	99.99	295.021	.388	.666	.908
Effectiveness 11	99.71	295.197	.447	.626	.908
Effectiveness 12	99.61	296.999	.361	.607	.909
Effectiveness 13	99.60	294.961	.506	.667	.907
Effectiveness 14	99.15	298.774	.493	.580	.908
Effectiveness 15	99.91	296.258	.380	.637	.908
Implementation 1	100.54	289.937	.532	.595	.906
Implementation 2	100.65	284.624	.590	.660	.905
Implementation 3	100.51	282.782	.634	.784	.904
Implementation 4	100.67	282.096	.587	.771	.905

Table 13 (continued)

Statistics for Implementation and Effectiveness	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected Item Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Implementation 5	100.81	279.965	.585	.707	.905
Implementation 6	99.28	294.411	.459	.590	.907
Implementation 7	101.10	285.995	.519	.697	.906
Implementation 8	100.41	287.379	.533	.672	.906
Implementation 9	100.24	285.401	.533	.654	.906
Implementation 10	100.95	279.935	.604	.743	.905
Implementation 11	100.65	282.625	.578	.693	.905
Implementation 12	100.12	285.807	.506	.687	.907
Implementation 13	100.36	281.128	.593	.703	.905
Implementation 14	99.66	285.903	.573	.708	.905
Implementation 15	100.72	280.546	.645	.666	.904

Note. N = 30; Mean = 103.51; Variance = 310.501; SD = 17.621

Table 14

Reliability Coefficients

	Alpha	Standardized Item Alpha
Reliability Coefficients	.910	.909

Hypotheses Testing

Statistical analysis of the data included descriptive analysis for selected items, mean, and standard deviation. A Pearson product moment correlation and a multivariate analysis of variance (MANOVA) were used to test the null hypotheses at the .05 significance level.

Null hypothesis one. The first hypothesis was, "there is no relationship between the principal's perceptions of the effectiveness of online learning and the implementation of online learning in Indiana public high schools." This hypothesis was tested using the Pearson product moment correlation.

The possible range on the perception of effectiveness measures was 1 - 5, where higher scores indicated higher levels of belief in effectiveness. The obtained range was 1 - 5. The possible range on the perception of implementation level measure was 1 - 5, where higher scores indicated higher levels of belief of implementation. The obtained range was 1 - 5. There was a significant positive correlation between scores on the effectiveness measure and those on the implementation measure ($r = .372$, $p < .001$). Table 15 illustrates these correlations. In all cases, as the principal's beliefs in effectiveness increased, so did the level of implementation. Based upon the number of significant relationships that exist, $H_0 1$ is rejected.

Table 15

Correlation Between Overall Principal's Perception of Effectiveness and Implementation Level (n = 241)

Online Learning Characteristics	Effectiveness *M* (*SD*)	Implementation *M* (*SD*)	Correlation Coefficient of Effectiveness and Implementation
			Coefficient
Overall	2.85 (.55)	2.78 (.81)	.37**

Note. **$p < .001$ (2-tailed)

Null hypothesis two. The second hypothesis was, "there is no relationship between principal perceptions of effectiveness and implementation of each of the 15 items of online learning in Indiana public high schools." This hypothesis was tested using the Pearson product moment correlation.

Significant correlations existed at the .001 level between principals' perceptions of online learning and principals' perceptions of the implementation of online learning. Table 16 illustrates these correlations. In all cases, as the principal's beliefs in effectiveness increased, so did the level of implementation. Based upon the number of significant relationships that exist, $H_0$2 is rejected.

Table 16

Correlation Between Principal's Perception of Effectiveness and Implementation Level (n = 241)

Online Learning Characteristics	Effectiveness *M* (*SD*)	Implementation *M* (*SD*)	Correlation Coefficient of Effectiveness and Implementation Coefficient
Differentiating Instruction	3.82 (0.90)	2.95 (1.06)	.30**
Addressing Growing Populations	3.73 (0.88)	2.84 (1.25)	.35**
Increasing Electives	3.96 (0.83)	2.94 (1.27)	.40**
Offering Courses Not Available	3.98 (0.85)	2.78 (1.37)	.41**
Offering AP or College Courses	3.71 (1.17)	2.65 (1.48)	.46**
Recovering Credits	4.56 (0.37)	4.20 (1.03)	.44**
Reducing Class Size	3.31 (1.21)	2.39 (1.32)	.46**

Table 16 (continued)

Online Learning Characteristics	Effectiveness *M* (*SD*)	Implementation *M* (*SD*)	Correlation Coefficient of Effectiveness and Implementation
			Coefficient
Individualizing Instruction	3.68 (0.82)	3.03 (1.23)	.36**
Increasing Opportunities to Succeed	3.95 (0.87)	3.24 (1.30)	.37**
Providing Courses w/out Teachers	3.50 (1.20)	2.58 (1.42)	.39**
Providing Cost Effective Courses	3.78 (0.98)	2.58 (1.42)	.38**
Meeting Needs of At-Risk Students	3.95 (0.92)	3.38 (1.34)	.48**
Reducing Scheduling Conflicts	3.90 (0.85)	3.09 (1.38)	.53**
Retaking Courses	4.34 (0.52)	3.86 (1.20)	.44**
Meeting Enrichment Needs	3.63 (1.09)	2.78 (1.30)	.49**

Note. **$p < .001$ (2-tailed)

Null hypotheses three, four, and five. The third, fourth and fifth hypotheses were tested using a multivariate analysis of variance (MANOVA). Perceived implementation served as the dependent variables, gender and age of the principals served as the independent variables.

The assumptions within the MANOVA were examined to ensure validity of the results. The assumption regarding linearity was examined with a bivariate scatterplot and determined the assumption was not violated as it was elliptical in nature. Independence was met as all measured responses are independent of each other. The assumption of multivariate normality was violated due to having the following dependent variables outside of the +1 or –1 range for

normal kurtosis: Addressing Growing Populations (-1.062), Increasing Electives (-1.021), Offering Courses Not Available (-1.214), Offering AP or College Courses (-1.378), Recovering Credits (1.410), Providing Courses without Teachers (-1.286), Providing Cost Effective Courses (-1.260), Reducing Scheduling Conflicts (-1.176), and Meeting Enrichment Needs (-1.180). Even though this assumption was violated, MANOVA's are robust with regards to moderate violations of normality.

The assumption of homoscedasticity, or equal covariances, was also violated. A significant Box's test of equality of covariance matrices was determined, F (240, 13091) = 1.308, p = .001. The differences in group sizes resulted in equal variances not being assumed. Due to violating the assumption of homoscedasticity, the MANOVA was tested using the Pillai's Trace test instead of the standard Wilks' Lambda.

In hypothesis three, the means of the genders of the principals in regards to beliefs in the implementation levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample groups (Table 17). The MANOVA did not determine significant differences between the two groups through the use of the Pillai's Trace test with $F(15, 189) = .76$, $p = .73$.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. Gender differences was significant for providing cost effective courses, $F(1, 211) = 4.11$, $p = .044$, partial $\eta^2 = .020$ (2% of the variance within providing cost effective courses can be explained by the respondent's gender). In this characteristic, females rated the implementation significantly lower than males. Differences in the remaining 14 dependent variables were not significant (Table 17).

Table 17

Means, Standard Deviations, Mean Differences, F Values, and Significance for Males and Females in Regards to Perceived Level of Implementation of Online Learning

Level of Implementation	Male	*SD*	Female	*SD*	Difference Between Means	*F*	Sig.
Differentiating Instruction	2.96	1.09	2.73	1.00	.23	.806	.370
Addressing Growing Populations	2.89	1.24	2.62	1.17	.27	2.485	.117
Increasing Electives	2.98	1.26	2.77	1.11	.21	.382	.573
Offering Courses Not Available	2.82	1.38	2.50	1.27	.32	.527	.469
Offering AP or College Courses	2.62	1.45	2.73	1.43	.11	.033	.857
Recovering Credits	4.26	.99	3.81	1.06	.45	.158	.691
Reducing Class Size	2.49	1.29	1.85	1.19	.64	.660	.418
Individualizing Instruction	3.06	1.23	3.08	.94	.02	1.566	.212
Increasing Opportunities to Succeed	3.33	1.31	2.92	1.09	.41	.006	.940
Providing Courses w/out Teachers	2.61	1.38	2.27	1.56	.34	3.228	.074
Providing Cost Effective Courses	2.91	1.35	2.15	1.19	.76	4.107	.044*
Meeting Needs of At-Risk Students	3.44	1.33	3.00	1.36	.44	.580	.447
Reducing Scheduling Conflicts	3.19	1.36	2.65	1.44	.54	1.475	.226
Retaking Courses	3.90	1.19	3.62	1.17	.28	.603	.438
Meeting Enrichment Needs	2.58	1.17	2.79	1.31	.21	.201	.654

In hypothesis four, the means of the age of the principals in regards to beliefs in the implementation levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample groups. No significance in the model summary was determined through a Pillai's Trace test with $F(45, 573) = .98$, $p = .513$.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. The univariate tests examined the perception of the level of implementation of online learning characteristics with an alpha level of .05 and determined that none of the dependent variables were significantly different with regards to the age categories of the principals. Therefore, $H_0$4 was not rejected (Table 18).

Table 18

Multivariate Analysis of Variance for Perceived Level of Implementation of Online Learning Based on Age of the Principal

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	3.26	3	1.090	.93	.428
Addressing Growing Populations	4.63	3	1.550	1.02	.386
Increasing Electives	1.15	3	.382	.244	.865
Offering Courses Not Available	2.14	3	.714	.380	.768
Offering AP or College Courses	5.19	3	1.730	.816	.486
Recovering Credits	6.09	3	2.030	2.062	.106
Reducing Class Size	1.32	3	.441	.265	.850
Individualizing Instruction	.98	3	.325	.221	.882

Table 18 (continued)

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Increasing Opportunities to Succeed	10.52	3	3.505	2.150	.095
Providing Courses w/out Teachers	2.04	3	.679	.342	.795
Providing Cost Effective Courses	.37	3	.122	.068	.977
Meeting Needs of At-Risk Students	6.76	3	2.253	1.301	.275
Reducing Scheduling Conflicts	1.99	3	.662	.357	.784
Retaking Courses	3.71	3	1.234	.865	.460
Meeting Enrichment Needs	5.59	3	1.864	1.080	.359

Note. $*p < .05$

In hypothesis five, the interaction between gender and age of the principal on the implementation of online learning in Indiana public high schools was tested using a MANOVA. Perceived implementation served as the dependent variable and gender x age served as the independent variables. The MANOVA results, Pillai's Trace $F(45, 573) = .816$, $p = .798$, partial $\eta^2 = .060$, indicated that significance was not shown at the .05 level. As shown in Table 19, multivariate analysis of variance showed there is no significant interaction with the perceived implementation of online learning, $F(3, 185) = .750$, $p = .523$.

Table 19

Multivariate Analysis of Variance: Principals Perceptions of Implementation Level Based on the Interaction of Age and Gender

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Between Groups					
Gender	1.272	1	1.272	1.694	.195
Age	.142	3	.047	.063	.979
Gender x Age	1.691	3	.564	.750	.523
Within Groups	138.983	185	.751		
Corrected Table	143.885	192			

In order to determine if there were significant differences among the interactions of the individual characteristics, separate univariate tests were completed. In this case, the test revealed there were no significant interactions between the age and gender of the principal and the perception of the level of implementation of online learning (Table 20). Therefore, $H_0$5 was not rejected.

Table 20

Analysis of Variance for Interaction of Age and Gender on the Perceived Level of Implementation of Online Learning

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	.49	3	.162	.138	.937
Addressing Growing Populations	3.97	3	1.33	.873	.456
Increasing Electives	1.57	3	.523	.335	.800
Offering Courses Not Available	1.97	3	.655	.348	.791
Offering AP or College Courses	.07	3	.025	.012	.998
Recovering Credits	3.64	3	1.213	1.232	.299
Reducing Class Size	2.90	3	.968	.583	.627
Individualizing Instruction	4.05	3	1.349	.919	.433
Increasing Opportunities to Succeed	2.82	3	.941	.577	.631
Providing Courses w/out Teachers	7.38	3	2.460	1.240	.296
Providing Cost Effective Courses	3.03	3	1.009	.563	.640
Meeting Needs of At-Risk Students	12.29	3	4.096	2.366	.072
Reducing Scheduling Conflicts	2.68	3	.895	.482	.695
Retaking Courses	3.41	3	1.137	.796	.497
Meeting Enrichment Needs	2.48	3	.825	.478	.698

Note. *$p < .05$

Null hypothesis six, seven, and eight. The sixth, seventh, and eighth hypotheses were tested using a multivariate analysis of variance. Perceived effectiveness served as the dependent variables, gender and age of the principals served as the independent variables.

The assumptions within the MANOVA were examined to ensure validity of the results. The assumption regarding linearity was examined with a bivariate scatterplot and determined the assumption was not violated as it was elliptical in nature. The assumption of multivariate normality was violated due to kurtosis and skewness having dependent variables outside of the +1 or –1 range. The following dependent variables were outside of the normal range for kurtosis: Differentiating Instruction (1.161), Addressing Growing Populations (-1.060), Increasing Electives (1.489), Offering Courses Not Available (1.199), Reducing Scheduling Conflicts (1.359), and Retaking Courses (3.248). The following dependent variables were outside of the normal range for skewness: Differentiating Instruction (-1.025), Increasing Electives (-1.091), Offering Courses Not Available (-1.049), Recovering Credits (-1.139), Reducing Schedule Conflicts (-1.014), and Retaking Courses (3.248). Even though this assumption was violated, MANOVA's are robust with regards to moderate violations of normality.

The assumption of homoscedasticity, or equal covariances, was also violated as determined by a significant Box's test significance of equality of covariance matrices, F (240, 11668) = 1.519, p = .001. Due to violating the assumption of homoscedasticity, the MANOVA was tested using the Pillai's Trace test instead of the standard Wilks' Lambda.

In hypothesis six, the means of the genders of the principals in regards to beliefs in the effectiveness levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference. The MANOVA determined the

two groups were not significantly different, Pillai's Trace $F(15, 192) = .822$, $p = .652$. Significance was not shown at the .05 level, therefore $H_0$6 was not rejected.

To determine if there were significant differences among the individual characteristics, separate univariate tests were completed (Table 21). As presented in Table 21, in 10 out of 15 characteristics, females rated the effectiveness level higher than males, but there was not a significant difference. The univariate tests examined the online learning characteristics with an alpha level of .05 and determined they were not significantly different between male principals and female principals.

Table 21

Means, Standard Deviations, Mean Differences, F Values, and Significance for Males and Females in Regards to Perceived Level of Effectiveness of Online Learning

Level of Effectiveness	Male	*SD*	Female	*SD*	Difference Between Means	*F*	Sig.
Differentiating Instruction	3.79	.933	3.85	.784	.06	.078	.780
Addressing Growing Populations	3.71	.898	3.92	.744	.21	1.367	.244
Increasing Electives	3.97	.913	3.92	.891	.05	.056	.813
Offering Courses Not Available	3.96	.933	4.04	.958	.08	.149	.699
Offering AP or College Courses	3.68	1.067	3.77	1.142	.11	.154	.695
Recovering Credits	4.54	.588	4.58	.758	.04	.096	.756
Reducing Class Size	3.37	1.054	2.96	1.280	.41	3.202	.075
Individualizing Instruction	3.65	.094	3.77	.815	.12	.414	.521
Increasing Opportunities to Succeed	3.90	.949	4.23	.951	.33	2.704	.102

Table 21 (continued)

Level of Effectiveness	Male	*SD*	Female	*SD*	Difference Between Means	*F*	Sig.
Providing Courses w/out Teachers	3.49	1.082	3.73	1.151	.24	1.119	.291
Providing Cost Effective Courses	3.78	.977	3.92	.845	.14	.529	.468
Meeting Needs of At-Risk Students	3.91	.950	3.85	1.223	.06	.111	.739
Reducing Scheduling Conflicts	3.91	.864	3.88	.864	.03	.019	.890
Retaking Courses	4.34	.717	4.42	.578	.08	.316	.574
Meeting Enrichment Needs	3.59	1.038	3.81	1.021	.22	1.054	.306

In hypothesis seven, the means of the age of the principals in regards to beliefs in the effectiveness levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference. The MANOVA determined the groups were not significantly different, Pillai's Trace $F(45, 582) = .86$, $p = .73$.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. In this case, the test revealed that there was no significant difference between the age of the principal and the perception of the level of effectiveness of online learning (Table 22). The univariate tests examined the perception of the level of effectiveness of online learning characteristics with an alpha level of .05 and determined they were not significantly different between the age categories of the principals. Therefore, $H_0 7$ was not rejected.

Table 22

Multivariate Analysis of Variance for Perceived Level of Effectiveness of Online Learning Based on Age of the Principal

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	1.23	3	.410	.483	.694
Addressing Growing Populations	1.46	3	.488	.629	.597
Increasing Electives	2.04	3	.681	.811	.489
Offering Courses Not Available	.78	3	.261	.292	.831
Offering AP or College Courses	2.23	3	.743	.639	.591
Recovering Credits	1.08	3	.359	1.009	.390
Reducing Class Size	5.40	3	1.801	1.557	.201
Individualizing Instruction	4.80	3	1.600	.221	.882
Increasing Opportunities to Succeed	.37	3	.123	.136	.938
Providing Courses w/out Teachers	5.63	3	1.877	1.637	.182
Providing Cost Effective Courses	1.34	3	.445	.478	.698
Meeting Needs of At-Risk Students	2.88	3	.960	.996	.396
Reducing Scheduling Conflicts	1.40	3	.465	.621	.602
Retaking Courses	.91	3	.303	.608	.611
Meeting Enrichment Needs	3.13	3	1.044	.983	.402

Note. $*p < .05$

In hypothesis eight, the interaction between gender and age of the principal and the effectiveness of online learning in Indiana public high schools was tested using a MANOVA. Perceived effectiveness served as the dependent variable and gender and age served as the independent variables. The MANOVA results, Pillai's Trace $F(45, 582) = .232$, $p = .332$, partial $\eta^2 = .077$, indicated that significance was not shown at the .05 level. As shown in Table 23, multivariate analysis of variance showed there is no significant interaction with the perceived effectiveness of online learning, $F(3, 185) = 1.827$, $p = .144$.

Table 23

Multivariate Analysis of Variance: Principals Perceptions of Effectiveness Based on the Interaction of Age and Gender

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Between Groups					
Gender	.821	1	.821	2.814	.095
Age	.447	3	.149	.511	.675
Gender x Age	1.600	3	.533	1.827	.144
Within Groups	53.98	185	.292		
Corrected Total	56.041	192			

To determine if there were significant differences among the interactions of the individual characteristics, the test of between-subjects was examined. In this case, the test revealed there were significant interactions between the age and gender of the principal and the perception of effectiveness of online learning in two characteristics: Recovering Credits *F*(3,

206) =2 9272, $p = .035$, partial $\eta^2 = .041$, and Providing Courses without Teachers $F(3, 206) = 3.311$, $p = .021$, partial $\eta^2 = .046$, (Table 24).

Table 24

Analysis of Variance for Interaction of Age and Gender on the Perceived Effectiveness of Online Learning

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	.85	3	.162	.334	.801
Addressing Growing Populations	4.18	3	1.390	1.795	.149
Increasing Electives	2.26	3	.755	.899	.443
Offering Courses Not Available	.88	3	.294	.329	.805
Offering AP or College Gourses	3.11	3	1.236	.890	.447
Recovering Credits	3.13	3	1.043	2.927	.035*
Reducing Class Size	9.06	3	3.018	2.608	.053
Individualizing Instruction	3.83	3	1.275	1.609	.188
Increasing Opportunities to Succeed	3.58	3	1.195	1.325	.267
Providing Courses w/out Teachers	11.39	3	3.796	3.311	.021*
Providing Cost Effective Courses	2.10	3	.699	.750	.523
Meeting Needs of At-Risk Students	6.78	3	2.259	2.344	.074
Reducing Scheduling Conflicts	2.31	3	.770	1.029	.381
Retaking Courses	1.44	3	.479	.961	.412
Meeting Enrichment Needs	2.90	3	.965	.909	.438

Note. *$p < .05$

Null hypotheses nine, 10, and 11. The 9th, 10th, and 11th hypotheses were tested using a multivariate analysis of variance (MANOVA). Perceived implementation served as the dependent variables, enrollment and locale of the schools reported by the principals served as the independent variables.

The assumptions within the MANOVA were examined to ensure validity of the results. The assumption regarding linearity was examined with a bivariate scatterplot and determined the assumption was not violated as it was elliptical in nature. Independence was met as all measured responses are independent of each other. The assumption of multivariate normality was violated due to having the following dependent variables outside of the + 1 or – 1 range for normal kurtosis: Addressing Growing Populations (-1.062), Increasing Electives (-1.021), Offering Courses Not Available (-1.214), Offering AP or College Courses (-1.378), Recovering Credits (1.410), Providing Courses without Teachers (-1.286), Providing Cost Effective Courses (-1.260), Reducing Scheduling Conflicts (-1.176), and Meeting Enrichment Needs (-1.180). Even though this assumption was violated, MANOVA's are robust with regards to moderate violations of normality.

The assumption of homoscedasticity, or equal covariances, was also violated as determined by a significant Box's test of equality of covariance matrices, F (480, 13377) = 1.632, p <.001. The differences in group sizes resulted in equal variances not being assumed. Due to violating the assumption of homoscedasticity, the MANOVA was tested using the Pillai's Trace test instead of the standard Wilks' Lambda.

In hypothesis nine, the means of the enrollment of the schools reported by principals in regards to beliefs in the implementation levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between

the sample groups. Results revealed no significant differences among school enrollment categories on the dependent variables, Pillai's Trace $F(60, 732) = 1.26$, $p = .10$. Significance was not shown at the .05 level. Therefore, $H_0 9$ was not rejected.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed (Table 25). School Enrollment differences was significant for offering AP courses, $F(4, 194) = 5.00$, $p = .001$, partial $\eta^2 = .094$; reducing class size, $F(4, 194) = 2.47$, $p = .046$, partial $\eta^2 = .048$; cost effectiveness $F(4, 194) = 2.63$, $p = .036$, partial $\eta^2 = .051$; and reducing scheduling conflicts, $F(4, 194) = 3.89$, $p = .005$, partial $\eta^2 = .074$. Differences in the remaining 11 dependent variables were not significant.

Table 25

Analysis of Variance for Perceived Level of Implementation of Online Learning Based on School Enrollment

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*f* Ratio	Significance (*p*)
Differentiating Instruction	9.79	4	2.448	2.179	.073
Addressing Growing Populations	9.22	4	2.306	1.563	.186
Increasing Electives	9.69	4	2.421	1.607	.174
Offering Courses Not Available	16.41	4	4.102	2.245	.066
Offering AP or College Courses	38.39	9	4.102	5.004	.001**
Recovering Credits	4.57	4	1.142	1.127	.345
Reducing Class Size	15.81	4	3.951	2.470	.046*
Individualizing Instruction	5.54	4	1.385	.941	.442

Table 25 (continued)

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Increasing Opportunities to Succeed	11.70	4	2.924	1.778	.133
Providing Courses w/out Teachers	16.86	4	4.216	2.258	.064
Providing Cost Effective Courses	19.03	4	4.759	2.633	.036*
Meeting Needs of At-Risk Students	6.77	4	1.691	.952	.435
Reducing Scheduling Conflicts	28.60	4	7.149	3.889	.005**
Retaking Courses	.56	4	.140	.095	.984
Meeting Enrichment Needs	10.06	4	2.514	1.514	.200

*p< .05; **p< .01

In hypothesis 10, the means of the locality of the schools reported by principals in regards to beliefs in the implementation levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample groups. The MANOVA results revealed no significant differences among school locality categories on the dependent variables, Pillai's Trace $F(60, 732) = 1.26$, $p = .10$. Significance was not shown at the .05 level. Therefore, $H_0 10$ was not rejected.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. School Locale differences were significant for providing courses without teachers, $F(3, 194) = 4.64$, $p = .004$, partial $\eta^2 = .067$; and meeting enrichment needs, $F(3, 194) = 5.31$, $p = .002$, partial $\eta^2 = .076$. Differences in the remaining 13 dependent variables were not significant.

Table 26

Analysis of Variance for Perceived Level of Implementation of Online Learning Based on School Locale

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	1.44	3	.480	.427	.734
Addressing Growing Populations	3.02	3	1.007	.683	.564
Increasing Electives	2.65	3	.884	.587	.624
Offering Courses Not Available	5.47	3	1.823	.998	.395
Offering AP or College Courses	8.84	3	2.947	1.536	.206
Recovering Credits	1.93	3	.644	.636	.593
Reducing Class Size	4.34	3	1.448	.905	.440
Individualizing Instruction	9.50	3	3.166	2.150	.095
Increasing Opportunities to Succeed	9.06	3	3.019	1.846	.140
Providing Courses w/out Teachers	26.00	3	8.666	4.641	.004**
Providing Cost Effective Courses	3.77	3	1.257	.696	.556
Meeting Needs of At-Risk Students	8.16	3	1.257	2.720	.208
Reducing Scheduling Conflicts	7.58	3	2.728	1.375	.252
Retaking Courses	5.10	3	1.699	1.154	.328
Meeting Enrichment Needs	26.46	3	8.822	5.314	.002**

*$p < .05$; **$p < .01$

In hypothesis 11, perceived level of implementation served as the dependent variable and enrollment and locale served as the independent variables. MANOVA results revealed no significant interactions among the enrollment x locale categories on the dependent variables, Pillai's Trace $F(120, 1496) = 1.065$, $p = .306$, partial $\eta^2 = .079$.

As shown in Table 27, multivariate analysis of variance showed there is no significant interaction with the perceived implementation of online learning, $F(8, 176) = 1.669$, $p = .109$.

Table 27

Multivariate Analysis of Variance: Principals Perceptions of Level of Implementation Based on the Interaction of Enrollment and Locale

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Between Groups					
Enrollment	8.134	4	2.033	2.820	.027
Locale	5.011	3	1.670	2.317	.077
Enrollment x Locale	9.629	8	1.204	1.669	.109
Within Groups	126.897	176	.721		

In order to determine if there were significant differences among the interactions of the individual characteristics, the test of between-subjects was examined. In this case, the test revealed there were significant interactions between the enrollment and locale of the principal's school and the perception of implementation of online learning in one characteristic, Offering Advanced Placement Courses $F(8, 194) = 2.403$, $p = .017$, partial $\eta^2 = .090$ (Table 28).

Table 28

Analysis of Variance for Interaction of Enrollment and Locale on the Perceived Implementation of Online Learning

Level of Implementation	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	13.41	8	1.676	1.492	.162
Addressing Growing Populations	18.63	8	2.329	1.579	.133
Increasing Electives	22.48	8	2.810	1.866	.067
Offering Courses Not Available	26.84	8	3.355	1.836	.072
Offering AP or College Courses	36.87	8	4.609	2.403	.017*
Recovering Credits	3.80	8	.475	.469	.877
Reducing Credits	3.80	8	.475	.469	.877
Reducing Class Size	19.09	8	2.386	1.491	.162
Individualizing Instruction	6.99	8	.874	.593	.783
Increasing Opportunities to Succeed	17.37	8	2.171	1.327	.232
Providing Courses w/out Teachers	22.88	8	2.860	1.532	.148
Providing Cost Effective Courses	12.92	8	1.614	.893	.523
Meeting Needs of At-Risk Students	6.47	8	.809	.455	.886
Reducing Scheduling Conflicts	13.11	8	1.639	.892	.524
Meeting Enrichment Needs	9.81	8	1.227	.739	.657

*$p < .05$

Null Hypotheses 12, 13, and 14. The 12th, 13th, and 14th hypotheses were tested using a multivariate analysis of variance. Perceived effectiveness served as the dependent variable, enrollment and locale served as the independent variables.

The assumptions within the MANOVA were examined to ensure validity of the results. The assumption regarding linearity was examined with a bivariate scatterplot and determined the assumption was not violated as it was elliptical in nature. The assumption of multivariate normality was violated due to kurtosis and skewness having dependent variables outside of the +1 or –1 range. The following dependent variables were outside of the normal range for kurtosis: Differentiating Instruction (1.161), Addressing Growing Populations (-1.060), Increasing Electives (1.489), Offering Courses Not Available (1.199), Reducing Scheduling Conflicts (1.359), and Retaking Courses (3.248). The following dependent variables were outside of the normal range for skewness: Differentiating Instruction (-1.025), Increasing Electives (-1.091), Offering Courses Not Available (-1.049), Recovering Credits (-1.139), Reducing Schedule Conflicts (-1.014),and Retaking Courses (3.248). Even though this assumption was violated, MANOVA's are robust with regards to moderate violations of normality.

The assumption of homoscedasticity, or equal covariances, was also violated as determined by a significant Box's test significance of equality of covariance matrices, F (360, 11895) = 1.424, $p < .001$. Due to violating the assumption of homoscedasticity, the MANOVA was tested using the Pillai's Trace test instead of the standard Wilks' Lambda.

In hypothesis 12, the means of the enrollment of the schools reported by principals in regards to beliefs in the effectiveness of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample

groups. The MANOVA results revealed significant differences among school enrollment categories on the dependent variables, Pillai's Trace $F(60, 744) = 1.73$, $p = .001$. Significance was shown at the .01 level. Therefore, $H_0 12$ was rejected.

In order to determine the significant differences among the individual characteristics, separate univariate tests were completed (Table 29). School Enrollment differences were significant for Increasing Electives $F(4, 197) = 3.1664$, $p = .015$, partial $\eta^2 = .060$; Offering Courses Not Available, $F(4, 197) = 7.11$, $p < .001$, partial $\eta^2 = .126$; Offering AP Courses, $F(4, 197) = 3.29$, $p = .012$, partial $\eta^2 = .063$; Providing Cost Effective Courses, $F(4, 197) = 3.25$, $p = .013$, partial $\eta^2 = .062$; Reducing Scheduling Conflicts, $F(4, 197) = 4.26$, $p = .003$, partial $\eta^2 = .080$; and Meeting Enrichment Needs, $F(4, 197) = 2.64$, $p = .035$, partial $\eta^2 = .051$. Differences in the remaining nine dependent variables were not significant.

Table 29

Analysis of Variance for Perceived Level of Effectiveness of Online Learning Based on School Enrollment

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	2.88	4	.721	.880	.477
Addressing Growing Populations	4.46	4	1.114	1.466	.214
Increasing Electives	9.27	4	2.318	3.158	.015*
Offering Courses Not Available	20.20	4	5.050	7.109	.000***
Offering AP or College Courses	14.20	4	3.550	3.289	.012*
Recovering Credits	1.27	4	.317	.832	.506
Reducing Class Size	4.94	4	1.234	1.108	.354

Table 29 (continued)

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Individualizing Instruction	1.66	4	.414	.509	.729
Increasing Opportunities to Succeed	5.48	4	1.369	1.471	.212
Providing Courses w/out Teachers	10.30	4	2.575	2.404	.051
Providing Cost Effective Courses	11.61	4	2.903	3.251	.013*
Meeting Needs of At-Risk Students	8.60	4	2.149	2.376	.054
Reducing Scheduling Conflicts	11.49	4	2.872	4.256	.003**
Retaking Courses	2.50	4	.624	1.335	.258
Meeting Enrichment Needs	10.30	4	8.822	2.641	.035*

*$p < .05$; **$p < .01$; ***$p < .001$

In hypothesis 13, the means of the locality of the schools reported by principals in regards to beliefs in the effectiveness of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample groups. The MANOVA results revealed no significant differences among school locale categories on the dependent variables, Pillai's Trace $F(45, 555) = .896$, $p = .666$. Significance was not shown at the .05 level. Therefore, $H_0$13 was not rejected.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed (Table 30). School locale differences were significant for Providing Courses without Teachers $F(3, 197) = 3.69$, $p = .013$, partial $\eta^2 = .053$; Retaking Courses, $F(3, 197) = 2.80$, $p = .041$, partial $\eta^2 = .041$; and Meeting Enrichment

Needs, $F(3, 197) = 4.41$, $p = .005$, partial $\eta^2 = .063$. Differences in the remaining 12 dependent variables were not significant.

Table 30

Analysis of Variance for Perceived Level of Effectiveness of Online Learning Based on School Locale

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	1.02	3	.339	.414	.743
Addressing Growing Populations	.31	3	.103	.135	.939
Increasing Electives	1.65	3	.548	.747	.525
Offering Courses Not Available	2.59	3	.863	1.215	.306
Offering AP or College Courses	.89	3	.297	.275	.843
Recovering Credits	.79	3	.263	.688	.560
Reducing Class Size	3.53	3	1.177	1.056	.369
Individualizing Instruction	2.78	3	.925	1.138	.335
Increasing Opportunities to Succeed	3.38	3	1.126	1.210	.307
Providing Courses w/out Teachers	11.86	3	3.954	3.691	.013*
Providing Cost Effective Courses	.58	3	.192	.215	.886
Meeting Needs of At-Risk Students	1.66	3	.554	.610	.609
Reducing Scheduling Conflicts	3.14	3	1.047	1.552	.202
Retaking Courses	3.93	3	1.309	2.800	.041*
Meeting Enrichment Needs	12.88	3	4.294	4.405	.005**

*$p < .05$; **$p < .01$

In hypothesis 14, MANOVA results revealed no significant interactions among the enrollment and locale categories on the dependent variables, Pillai's Trace $F(120, 1520) = 1.265$, $p = .606$, partial $\eta^2 = .070$. As shown in Table 31, multivariate analysis of variance showed there is no significant interaction with the perceived effectiveness of online learning, $F(8, 176) = 1.657$, $p = .112$.

Table 31

Multivariate Analysis of Variance: Principals Perceptions of Effectiveness Based on the Interaction of Enrollment and Locale

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Between Groups					
Enrollment	2.775	4	.694	2.260	.038
Locale	1.752	3	.584	2.189	.091
Enrollment x Locale	3.573	8	.442	1.657	.112
Within Groups	49.970	176	.267		
Corrected Total	55.848	191			

To determine if there were significant differences among the interactions of the individual characteristics, the test of between-subjects was examined (Table 32). In this case, the test revealed there were significant interactions between the enrollment and locale of the principal's school and the perception of effectiveness of online learning in two characteristics, Offering Advanced Placement Courses $F(8, 194) = 2.074$, $p = .040$, partial $\eta^2 = .078$; and Reducing Scheduling Conflicts, $F(8, 194) = 2.145$, $p = .033$, partial $\eta^2 = .080$.

Table 32

Analysis of Variance for Interaction of Enrollment and Locale on the Perceived Effectiveness of Online Learning

Level of Effectiveness	Sum of Squares Type III	*df*	Mean Squares	*F* Ratio	Significance (*p*)
Differentiating Instruction	8.11	8	1.014	1.238	.279
Addressing Growing Populations	10.59	8	1.323	1.741	.091
Increasing Electives	8.15	8	2.810	1.019	.204
Offering Courses Not Available	11.04	8	1.380	1.943	.056
Offering AP or College Courses	17.91	8	2.238	2.074	.040*
Recovering Credits	1.37	8	.171	.447	.891
Reducing Class Size	17.11	8	2.139	1.920	.059
Individualizing Instruction	5.33	8	.666	.820	.586
Increasing Opportunities to Succeed	5.29	8	.662	.711	.682
Providing Courses w/out Teachers	8.22	8	1.028	.960	.469
Providing Cost Effective Courses	10.83	8	1.354	1.516	.154
Meeting Needs of At-Risk Students	10.23	8	1.278	1.408	.195
Reducing Scheduling Conflicts	11.58	8	1.447	2.145	.033*
Retaking Courses	1.98	8	.248	.530	.883
Meeting Enrichment Needs	4.73	8	.591	.606	.772

*$p < .05$

Null hypothesis 15. The 15th hypothesis was, "there is no relationship between the principal's age, gender, enrollment, and local of school and the barriers of implementing online learning in Indiana public high schools." A Pearson product-moment correlation coefficient was computed to assess the relationship between principal demographics and rating of barriers (Table 33). There was no significant correlation between principal demographics and barriers, $r = -.078$, $n = 230$, $p = .239$, therefore $H_0 15$ is not rejected.

Table 33

Correlation Between Overall Principal's Demographics and Barriers to Implementation (n = 241)

Principal Demographics	Implementation *M* (*SD*)	Correlation Coefficient of Demographics and Implementation
		Coefficient
Overall	2.43 (32)	-.078

*$p < .05$ (2-tailed)

Summary of Findings

This section provides a summary of the findings and is divided into two sections. Section one summarizes the descriptive data, and section two summarizes the findings of the 15 null hypotheses.

Summary of descriptive data. During the fall of 2010 the principals of 343 public non-charter high schools in Indiana with a grade configuration including grades 10 – 12 were electronically mailed and sent a survey in regards to perceptions of effectiveness and

implementation level of online learning. The analysis data set contains 241 records (N = 241), representing 70% of all public, non-charter, high school principals in the state of Indiana.

Within the population of principals in non-charter public high schools in Indiana, there are 305 males (88.93%) and 38 females (11.07%). Respondents were representative of the population with male respondents making up 88.40% of the pool, while 11.60% of the respondents were female.

Respondents represented four out of five possible age categories: (1) 24 and younger; (2) 25 - 37; (3) 38 - 50; (4) 51 - 63; (5) 64 and older. No respondents were recorded as 24 and younger. Principals aged 25 – 37 made up 11.20% of the sample; principals aged 38 – 50 made up 48.13% of the sample; principals aged 51 – 63 made up 39.00% of the sample; and principals 64 and older made up 1.66% of the sample.

Principals responding to the survey reported serving in the capacity of principal in schools ranging in size from less than 500 students to 2,001 or more students. Principals of 57 schools reported enrollments of 500 students or fewer; principals of 112 schools reported enrollments between 501 students and 1,000 students; principals of 28 schools reported enrollments between 1,001 students and 1,500 students; principals of 26 schools reported enrollments between 1,501 students and 2,000 students; and principals of 19 schools reported enrollments of 2,001 students or greater.

Principals of participating schools were located in a variety of contexts: urban, suburban, small town and rural. Of the fall 2010 participants, the schools in which they were the principal consisted of 12.86% located in urban contexts, 19.50% in suburban contexts, 27.80% in small town contexts, and 39.83% in rural contexts.

Summary of hypothesis testing. Fifteen hypotheses were tested with the following summarized results:

1. Through the use of the Pearson product moment correlation, the results indicated there was a significant positive correlation between scores on the effectiveness measure and those on the implementation measure ($r = .362$, $p < .001$). Table 15 illustrates these correlations. In all cases, as the principal's beliefs in effectiveness increased, so did the level of implementation. Based upon the number of significant relationships that exist, $H_0 1$ is rejected.
2. Through the use of the Pearson product moment correlation, the results indicated there were significant correlations at the .001 level between principals' perceptions of online learning and principals' perceptions of the implementation of online learning. Table 16 illustrates these correlations. In all cases, as the principal's beliefs in effectiveness increased, so did the level of implementation. Based upon the number of significant relationships that exist, $H_0 2$ is rejected.
3. Through the use of a multivariate analysis of variance, the results showed there is no significant difference across genders of the principal and the implementation of online learning in Indiana public high schools.
4. Through the use of a multivariate analysis of variance, the results showed there are no significant differences between age of the principal and the implementation of online learning in Indiana public high schools.
5. Through the use of a multivariate analysis of variance, the results showed there is no significant interaction between gender and age of the principal and the implementation of online learning in Indiana public high schools.

6. Through the use of a multivariate analysis of variance, the results showed there is no significant difference between genders of the principal and the perceived effectiveness of online learning in Indiana public high schools.
7. Through the use of a multivariate analysis of variance, the results showed there are no significant differences between age of the principal and the perceived effectiveness of online learning in Indiana public high schools.
8. Through the use of a multivariate analysis of variance, the results showed there is no significant interaction between gender and age of the principal and the perceived effectiveness of online learning in Indiana public high schools.
9. Through the use of a multivariate analysis of variance, the results showed there are no significant differences between school enrollment and the implementation of online learning in Indiana public high schools.
10. Through the use of a multivariate analysis of variance, the results showed there are no significant differences between school locality and the implementation of online learning in Indiana public high schools.
11. Through the use of a multivariate analysis of variance, the results showed there is no significant interaction between school enrollment and school locality on the implementation of online learning in Indiana public high schools.
12. The means of the enrollment of the schools reported by principals in regards to beliefs in the effectiveness of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample groups. The MANOVA results revealed significant differences among

school enrollment categories on the dependent variables, Pillai's Trace $F(60, 744) = 1.73$, $p = .001$. Significance was shown at the .01 level.

13. Through the use of a multivariate analysis of variance, the results showed there are no significant differences between school locality and the perceived effectiveness of online learning in Indiana public high schools.
14. Through the use of a multivariate analysis of variance, the results showed there are no significant interactions between school enrollment and school locality on the perceived effectiveness of online learning in Indiana public high schools.
15. Through the use of the Pearson product moment correlation, the results showed there was no statistically significant correlation between the principal's demographics and the barriers to implementation of online learning in Indiana public high schools.

CHAPTER 5

Discussion of Findings and Conclusions, Summary, Implications

This chapter is organized into four sections. The first section presents a discussion of the findings including a summary of the descriptive data and a summary of the hypotheses testing. The second section includes conclusions and research recommendations. The third section is a summary of the research. The final section discusses the implications of online learning as a result of this research.

The purpose of this quantitative study was to determine the principal perceptions and demographic relationship of the implementation and effectiveness of online courses in Indiana public high schools. An analysis was prepared to determine whether demographic factors play a role in the principal's perceptions of the implementation and effectiveness of online learning. Factors examined were school location, school size, technology costs, support costs, administrative costs, and existing technological infrastructure. Other factors were the principal's age, gender, number of years served as a principal, number of years served as a teacher, ability to control the school budget, and highest degree earned.

In general, the research design involved a population of 343 non-charter public high school principals serving grades (of at least) 10 – 12. Principal beliefs in the implementation and effectiveness of online learning were collected using a survey. Statistical analysis of the data included descriptive statistics regarding the mean, standard deviation, and frequency of

selected items. A Pearson product moment correlation and multivariate analysis of variance were used to test the null hypotheses. Significance was identified at the .05 level.

In all, 241 principals of non-charter public high schools in Indiana responded to the survey instrument which questioned the perceived level of effectiveness and perceived level of implementation of 15 specific uses of online learning (Appendix C). Of these 241 respondents, 213 (88.38%) were male and 28 (11.62%) were female. In terms of the age of the respondents, 116 (48.13%) were between the ages of 38 – 50, 94 (39.00%) were between the ages of 51 – 63, 27 (11.20%) were between the ages of 25 – 37, and four (1.66%) were older than 64.

The respondents represent schools with enrollments ranging under 500 students to schools with enrollments of over 2,000 students. In all, 112 respondents (46.28%) were principals of schools with an enrollment of 501 – 1,000 students; 57 respondents (23.55%) were principals of schools with an enrollment of less than 500 students; 28 respondents (11.57%) were principals of schools with an enrollment of 501 – 1,000 students; 26 respondents (10.74%) were principals of schools with an enrollment of 1,501 – 1,500 students; and 19 respondents (7.85%) were principals of schools with an enrollment of over 2,000 students.

The respondents of participating schools were located in a variety of locales including: urban, suburban, small town and rural. Of these participants, the schools in which they were the principal consisted of 95 (39.83%) being rural, 67 (27.80%) small town, 47 (19.50%) suburban, and 31 (12.86%) located in urban contexts.

Discussion of Findings

The purpose of this quantitative study was to determine the principal perceptions and demographic relationship of the implementation and effectiveness of online courses in Indiana public high schools. An analysis was prepared to determine whether demographic factors play

a role in the principal's perceptions of the implementation and effectiveness of online learning. Factors examined were school location, school size, technology costs, support costs, administrative costs, and existing technological infrastructure. Other factors were the principal's age, gender, number of years served as a principal, number of years served as a teacher, ability to control the school budget, and highest degree earned.

Summary of Descriptive Data

Surveys were electronically mailed and then sent to principals of all 343 non-charter public high schools in the state of Indiana. Principals were asked to respond to the first 15 items by rating the effectiveness of online learning, the second 15 items the principals were asked to rate the current level of online learning implementation in their high school. The next seven items principals were asked to rate the degree of a barrier to implementation of online learning they believed the item to be. The remaining nine items were demographic details of the principal and the schools in which they were employed (see Appendix C). The following is a summary of the descriptive data findings and the conclusions of such.

Effectiveness and implementation of online learning. The first section of the Principal's Perception of Online Learning survey dealt with the belief in effectiveness of online learning in meeting the needs of the students. By the use of a five - point Likert Scale, all survey items were rated on a scale of 1 to 5 with 1 being the lowest level of effectiveness, 3 being neutral, and 5 being strongly effective. The vast majority of respondents rated the 15 effectiveness items as neutral, effective, or strongly effective (M = 3.85, SD = .55). As seen in Table 11, a total of 241 public, non-charter high school principals responded to the survey items. Respondents overwhelmingly indicated using online learning for recovering credits (M = 4.56, SD = .37), and for retaking courses (M = 4.34, SD = .52) as two of the most effective

aspects of online learning. In addition, offering courses not otherwise available (M = 3.98, SD = .85), increasing the number of electives available (M = 3.96, SD = .83), increasing opportunities for success (M = 3.95, SD = .87), and meeting the needs of at-risk students (M = 3.95, SD = .92) were considered as effective uses of online learning. On the other hand, using online learning to reduce class size (M = 3.31, SD = 1.21) and to provide courses without teachers (M = 3.50, SD = 1.20) were reported as the least effective uses of online learning by the respondents.

The second section of the Principal's Perception of Online Learning survey dealt with what the respondents believed to be their current level of implementation in their individual schools. By the use of a five point Likert Scale, all survey items were rated on a scale of 1 to 5, with 1 being no implementation, 3 being somewhat implemented, and 5 being fully implemented. The vast majority of respondents rated the 15 implementation items as between not implemented and somewhat implemented (M = 2.78, SD = .81). As seen in Table 12 on page 68, a total of 241 public, non-charter high school principals responded to the survey items. Respondents indicated the implementation of online learning in their schools for recovering credits (M = 4.20, SD = 1.03), and for retaking courses (M = 3.86, SD = 1.20). The implementation of online learning to reduce class size (M = 2.39, SD = 1.32) and to provide courses without teachers (M = 2.58, SD = 1.42) were reported as the least used rationale for the use of online learning by the respondents.

The first two sections of the survey investigated the perceived effectiveness of online learning and the level of perceived implementation of online learning. There was a significant positive correlation between scores on the effectiveness measure and those on the implementation measure (r = .372, $p < .001$). Table 15 on page 79 illustrates these correlations.

In all cases, as the principal's beliefs in effectiveness increased, so did the level of implementation. This researcher found the strongest correlation coefficient for effectiveness and implementation was for reducing scheduling conflicts (r = .53), followed by meeting enrichment needs (r = .49), meeting the needs of at-risk students (r = .48), reducing class sizes (r = .46), and offering Advanced Placement courses (r = .46). The weakest correlation was the use of online learning for differentiating instruction (r = .30), which is considered a good correlation..

Barriers to the implementation of online learning. The third section of the survey asked the respondents to indicate on a five – point Likert scale the level of barrier each of seven factors played in the principal's school ability to offer online learning courses. Overall the respondents were neutral on their beliefs of the seven factors being a barrier to the implementation of online learning (M = 3.21, SD = .87), but as indicative in Table 10, course costs (M = 2.59, SD = 1.35) and course quality (M = 3.06, SD = 1.21) were most often indicated as the reason a school was not offering online learning as an alternative to the students. When looking at the cost of offering online courses, 140 respondents felt it was a strong barrier, as compared to 71 respondents who indicated it was not much of a barrier. Characteristics not seen as barriers to offering online learning included; the current technological infrastructure (M = 3.56, SD = 1.43), the current bandwidth (M = 3.52, SD = 1.43), and the master contract (M = 3.42, SD = 1.31), note that these all had high standard deviations.

Summary of Hypotheses Testing

The following is a summary of the 15 hypotheses tested and the conclusions drawn from the results.

1. The first hypothesis stated: There is no relationship between the principal's overall perceptions of online learning effectiveness and the overall implementation of online learning in Indiana public high schools. This hypothesis was tested using a Pearson product moment correlation. The two-tailed analysis revealed that a statistically significant correlation did exist at the .001 level between the overall factors of effectiveness and the overall factors of implementation.

   Conclusion: Even though the correlation was statistically significant, in terms of strength, the correlation can be considered a moderate positive association (r = .37) between the belief in the overall effectiveness of online learning and the overall level of implementation. This correlation lends itself to the understanding that principals in non-charter public high schools in Indiana are implementing online learning as a way to meet the needs of students.

2. The second hypothesis stated: There is no relationship between principal perceptions of effectiveness and implementation of each of the 15 items of online learning in Indiana public high schools. This hypothesis was tested using a Pearson product moment correlation. The two-tailed analysis revealed that a statistically significant correlation did exist at the .001 level between the 15 factors of effectiveness and the 15 factors of implementation.

   Conclusion: The analysis revealed that a large effect size (over .50) existed for the effectiveness and implementation of online learning for reducing schedule conflicts (.53). A moderate effect size (between .30 and .50) existed on the remaining 14 survey items. Even though these correlations were statistically significant, in terms of strength, the correlations can be considered moderate positive associations

between the belief in the individual effectiveness of online learning categories and the individual levels of implementation for each of the categories. These correlations also lend themselves to the understanding that principals in non-charter public high schools in Indiana are implementing specific categories of online learning, such as offering Advanced Placement courses, as ways to meet the needs of students.

3. The third hypothesis stated: There is no significant difference across genders of the principal and the implementation of online learning in Indiana public high schools. To analyze the data, a multivariate analysis of variance (MANOVA) was conducted. The means of the genders of the principals in regards to beliefs in the implementation levels of online learning in their respective high schools were examined to determine whether there was a significant statistical difference between the sample groups (Table 6). The MANOVA did not determine significant differences between the two groups through the use of the Pillai's Trace test with $F(15, 189) = .76$, $p = .73$.

   In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. Gender difference was significant for providing cost effective courses, $F(1, 211) = 4.11$, $p=.044$, partial $\eta 2 = .020$. In this characteristic, females rated the implementation significantly lower than males.

   Conclusion: Even though differences in the remaining 14 dependent variables were not significant, the analysis of hypothesis three indicating that males and females

had different beliefs in the level of implementation for online learning (Table 16). Males reported higher levels of implementation than females in the following: Differentiating Instruction, Addressing Growing Populations, Increasing Electives, Offering Courses Not Available, Recovering Credits, Reducing Class Size, Increasing Opportunities to Succeed, Providing Courses without Teachers, Providing Cost Effective Courses, Meeting Needs of At-Risk Students, Reducing Scheduling Conflicts, and Retaking Courses. Males may have rated these higher than females due to a multitude of reasons. Further study may be warranted as males made up 88.38% of the sample.

4. The fourth hypothesis stated: There are no significant differences between age of the principal and the implementation of online learning in Indiana public high schools. To analyze the data, a MANOVA was tested using the Pillai's Trace. The means of the age of the principals in regards to beliefs in the implementation levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference between the sample groups. No significance in the model summary was determined through a Pillai's Trace test with $F(45, 573) = .98$, $p = .513$.

   In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. The univariate tests examined the perception of the level of implementation of online learning characteristics with an alpha level of .05 and determined that none of the dependent variables were significantly different with regards to the age categories of the principals.

Conclusion: Even though the analysis of hypothesis four indicated that the age of the principal had no significant effect on the level of implementation for online learning, as seen in Table 34, respondents 64 years old or older rated eight categories of implementation higher than all other age groups. Further study may be warranted as principals aged 64 and older made up 1.66% of the sample.

Table 34

Age of the Principal and Rating Means of the Implementation of Online Learning in Indiana Public High Schools

Level of Implementation	25-37	38-50	51-63	64 & older
Differentiating Instruction	2.48	2.97	3.00	3.33
Addressing Growing Populations	2.52	2.87	2.94	3.00
Increasing Electives	2.68	2.97	2.99	3.67
Offering Courses Not Available	2.76	2.70	2.85	3.67
Offering AP or College Courses	2.76	2.59	2.60	4.00
Recovering Credits	4.28	4.26	4.15	3.00
Reducing Class Size	2.24	2.40	2.50	1.67
Individualizing Instruction	3.04	3.06	3.06	3.33
Increasing Opportunities to Succeed	3.64	3.33	3.16	1.67
Providing Courses w/out Teachers	2.56	2.55	2.58	3.00
Providing Cost Effective Courses	2.52	2.92	2.79	2.67
Meeting Needs of At-Risk Students	2.82	3.41	3.48	2.33
Reducing Scheduling Conflicts	3.38	3.04	3.38	3.00

Table 34 (continued)

Level of Implementation	25-37	38-50	51-63	64 & older
Retaking Courses	3.80	3.84	3.95	3.00
Meeting Enrichment Needs	2.92	2.84	2.65	3.67

5. The fifth hypothesis stated: There is no significant interaction between gender and age of the principal and the implementation of online learning in Indiana public high schools. The interaction between gender and age of the principal on the implementation of online learning in Indiana public high schools was tested using a MANOVA. Perceived implementation served as the dependent variable, gender and age served as the independent variables. The MANOVA results, Pillai's Trace $F(45, 573) = .816$, $p = .798$, partial $\eta 2 = .060$, indicated that significance was not shown at the .05 level. As shown in Table 18, multivariate analysis of variance showed there is no significant interaction with the perceived implementation of online learning, $F(3, 185) = .750$, $p = .523$. In order to determine if there were significant differences among the interactions of the individual characteristics, separate univariate tests were completed.

   Conclusion: The tests revealed there were no significant interactions between the age and gender of the principal and the perception of the level of implementation of online learning (Table 19).

6. The sixth hypothesis stated: There is no significant difference between genders of the principal and the perceived effectiveness of online learning in Indiana public

high schools. The MANOVA was tested using the Pillai's Trace test. The means of the genders of the principals in regards to beliefs in the effectiveness levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference. The MANOVA determined the two groups were not significantly different, Pillai's Trace $F(15, 192) = .822$, $p = .652$. In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed (Table 20). No significant differences between male principals and female principals were determined in regards to perceived effectiveness of online learning.

Conclusion: Both tests determined no significant difference between male principals and female principals in regards to perceived effectiveness of online learning. As presented in Table 20, in the following 10 out of 15 characteristics females rated the effectiveness level higher than males, but there was not a significant difference: Differentiating Instruction, Addressing Growing Populations, Offering Courses Not Available, Offering AP or College Courses, Recovering Credits, Individualizing Instruction, Increasing Opportunities to Succeed, Providing Courses without Teachers, Providing Cost Effective Courses, and Retaking Courses. Further study maybe warranted as female principals rated the effectiveness of online learning higher than males, yet females are not implementing online learning to the same degree as males.

7. The seventh hypothesis stated: There are no significant differences between age of the principal and the perceived effectiveness of online learning in Indiana public high schools. The means of the age of the principals in regards to beliefs in the

effectiveness levels of online learning in their respective high schools were examined to determine whether there is a significant statistical difference. The MANOVA determined the groups were not significantly different, Pillai's Trace $F(45, 582) = .86$, $p = .73$.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed. In this case, the test revealed there were no significant differences between the age of the principal and the perception of the level of effectiveness of online learning (Table 21).

Conclusion: The analysis of hypothesis seven indicated that the age of the principal had no significant effect on the belief in the level of effectiveness for online learning. As seen in Table 35, even though all age groups tended to rate online learning close to the level of "effective" (4.0) for the use of online learning, the use of online learning for reducing class sizes (overall mean of 3.32), teaching courses without a teacher (overall mean of 3.52), and meeting enrichment needs (overall mean of 3.61) were seen as the least effective uses of online learning by the majority of the age groups. The use of online learning for recovering credits (overall mean of 4.54), retaking courses (overall mean of 4.35), and offering courses not available (overall mean of 3.97) were rated as the most effective uses of online learning by the majority of the age groups.

Table 35

Age of the Principal and Rating Means of the Belief in Effectiveness of Online Learning in Indiana Public High Schools

Level of Belief in Effectiveness	25-37	38-50	51-63	64 & older
Differentiating Instruction	3.54	3.85	3.83	3.33
Addressing Growing Populations	3.75	3.78	3.67	3.67
Increasing Electives	4.00	3.94	3.96	4.33
Offering Courses Not Available	3.96	3.98	3.95	4.33
Offering AP or College Courses	3.88	3.70	3.61	4.33
Recovering Credits	4.50	4.58	4.54	3.67
Reducing Class Size	3.12	3.35	3.33	3.33
Individualizing Instruction	3.58	3.72	3.59	4.33
Increasing Opportunities to Succeed	3.88	3.95	3.98	3.33
Providing Courses w/out Teachers	3.75	3.53	3.40	4.33
Providing Cost Effective Courses	3.88	3.85	3.68	4.33
Meeting Needs of At-Risk Students	3.88	3.96	3.85	3.67
Reducing Scheduling Conflicts	3.83	3.97	3.83	4.33
Retaking Courses	4.45	4.31	4.37	4.33
Meeting Enrichment Needs	3.96	3.61	3.49	4.33

8. The eighth hypothesis stated: There is no significant interaction between gender and age of the principal and the perceived effectiveness of online learning in Indiana public high schools. The interaction between gender and age of the principal and

the effectiveness of online learning in Indiana public high schools was tested using a MANOVA. Perceived effectiveness served as the dependent variable and gender and age served as the independent variables. The MANOVA results, Pillai's Trace $F(45, 582) = .232$, $p = .332$, partial $\eta 2 = .077$, indicated that significance was not shown at the .05 level. To determine if there were significant interactions among the individual characteristics, the test of between-subjects was examined. Conclusion: Even though no significant interaction was detected overall, the between-subjects test revealed there were significant interactions between the age and gender of the principal and the perception of effectiveness of online learning in two characteristics: Recovering Credits $F(3, 206) = 2\ 9272$, $p = .035$, partial $\eta 2 = .041$, and Providing Courses without Teachers $F(3, 206) = 3.311$, $p = .021$, partial $\eta 2 = .046$, (Table 23). In the category of recovering credits for ages 25 – 37, females ($M = 5.00$) rated the effectiveness higher than males ($M = 4.46$); for ages 64 and older, females ($M = 5.00$) also rated the effectiveness higher than males ($M = 3.00$). In the category of providing courses without teachers for ages 51 – 63, females ($M = 4.14$) rated the effectiveness higher than males ($M = 3.25$); for ages 64 and older, females ($M = 5.0$) also rated the effectiveness higher than males ($M = 4.00$).

9. The ninth hypothesis stated: There are no significant differences between school enrollment and the implementation of online learning in Indiana public high schools. The MANOVA was tested using the Pillai's Trace test results revealed no significant differences among school enrollment categories on the dependent variables, Pillai's Trace $F(60, 732) = 1.26$, $p = .10$.

In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed (Table 24).

Conclusion: School Enrollment differences were significant for offering AP courses, $F(4, 194) = 5.00$, $p = .001$, partial $\eta 2 = .094$; reducing class size, $F(4, 194) = 2.47$, $p = .046$, partial $\eta 2 = .048$; cost effectiveness $F(4, 194) = 2.63$, $p = .036$, partial $\eta 2 = .051$; and reducing scheduling conflicts, $F(4, 194) = 3.89$, $p = .005$, partial $\eta 2 = .074$.

Principals in schools with a student enrollment of 1,000 – 1,500 reported the highest levels of implementation in the four significant categories. As seen in table 35, when looking at the perceived implementation level of online learning for offering Advanced Placement courses, principals of schools with enrollments of 1,501 – 2,000 reported a higher level of implementation than principals of other enrollment categories; When looking at the perceived implementation level of online learning for reducing class sizes, principals of schools with enrollments of 1,000 – 1,500 reported a higher level of implementation than principals of other enrollment categories; When looking at the perceived implementation level of online learning for providing cost effective courses, principals of schools with enrollments of 1,501 – 2,000 reported a higher level of implementation than principals of other enrollment categories; and when looking at the perceived implementation level of online learning for offering courses to reduce scheduling conflicts, principals of schools with enrollments of 1,501 – 2,000 reported a higher level of implementation than principals of other enrollment categories. Differences in the remaining 11

dependent variables were not significant. The means of all 15 categories across school enrollment are shown in Table 36.

Table 36

School Enrollment and Rating Means of the Implementation of Online Learning in Indiana Public High Schools

Level of Implementation	Less than 500	501 - 1000	1001-1500	1501-2000	2001 & over
Differentiating Instruction	2.92	2.69	3.19	3.25	3.39
Addressing Growing Populations	2.84	2.69	3.23	3.00	3.06
Increasing Electives	2.90	2.88	3.23	3.12	2.89
Offering Courses Not Available	2.78	2.78	2.81	3.04	2.39
Offering AP or College Courses	2.92	2.43	3.43	3.80	2.00
Recovering Credits	3.92	4.22	4.46	4.50	4.11
Reducing Class Size	2.24	2.26	3.12	2.42	2.61
Individualizing Instruction	2.92	3.06	3.31	3.08	3.00
Increasing Opportunities to Succeed	3.16	3.15	3.65	3.58	3.28
Providing Courses w/out Teachers	2.71	2.49	2.81	2.46	2.39
Providing Cost Effective Courses	2.90	2.59	3.46	2.92	2.72
Meeting Needs of At-Risk Students	3.04	3.41	3.73	3.42	3.62
Reducing Schedule Conflicts	3.12	3.14	3.54	3.25	2.22
Retaking Courses	3.88	3.92	3.85	3.75	3.67
Meeting Enrichment Needs	2.80	2.75	3.00	2.83	2.56

10. The 10th hypothesis stated: There are no significant differences between school locality and the implementation of online learning in Indiana public high schools. The means of the locality of the schools were examined to determine whether there is a significant statistical difference between the sample groups. The MANOVA results revealed no significant differences among school locality categories on the dependent variables, Pillai's Trace $F(60, 732) = 1.26$, $p = .10$. In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed.

    Conclusion: School Locale differences were significant for providing courses without teachers, $F(3, 194) = 4.64$, $p = .004$, partial $\eta^2 = .067$; and meeting enrichment needs, $F(3, 194) = 5.31$, $p = .002$, partial $\eta^2 = .076$. Principals in schools located in rural areas reported the highest levels of implementation for providing courses without teachers, and principals of schools located in small towns reported the highest level of implementation for meeting enrichment needs. In both significant categories, principals of schools located in urban settings reported the least amount of implementation. Differences in the remaining thirteen dependent variables were not significant. The means of all 15 categories across school locale are shown in Table 37.

Table 37

School Locale and Rating Means of the Implementation of Online Learning in Indiana Public High Schools

Level of Implementation	Urban	Suburban	Small Town	Rural
Differentiating Instruction	3.00	3.21	2.78	2.86
Addressing Growing Populations	2.81	2.95	3.02	2.70
Increasing Electives	3.08	2.88	3.10	2.85
Offering Courses Not Available	2.81	2.58	2.92	2.78
Offering AP or College Courses	2.77	2.42	2.58	2.75
Recovering Credits	4.00	4.37	4.25	4.25
Reducing Class Size	2.73	2.47	2.57	2.16
Individualizing Instruction	2.88	3.02	3.25	2.99
Increasing Opportunities to Succeed	3.00	3.60	3.30	3.17
Providing Courses w/out Teachers	1.92	2.44	2.63	2.80
Providing Cost Effective Courses	2.69	2.93	2.90	2.74
Meeting Needs of At-Risk Students	3.04	3.67	3.62	3.16
Reducing Scheduling Conflicts	2.77	2.88	3.33	3.20
Retaking Courses	3.46	3.84	4.02	3.89
Meeting Enrichment Needs	2.04	2.81	3.00	2.85

11. The 11th hypothesis stated: There is no significant interaction between school enrollment and school locality on the implementation of online learning in Indiana

public high schools. MANOVA results revealed no significant differences among the enrollment and locale categories on the dependent variables, Pillai's Trace $F(120, 1496) = 1.065$, $p = .306$, partial $\eta^2 = .079$. As shown in Table 26, multivariate analysis of variance showed there is no significant interaction with the perceived implementation of online learning, $F(3, 176) = 1.669$, $p = .077$. In order to determine if there were significant differences among the interactions of the individual characteristics, the test of between-subjects was examined.

Conclusion: The test revealed there were significant interactions between the enrollment and locale of the principal's school and the perception of implementation of online learning in one characteristic, Offering AP Courses $F(8, 194) = 2.403$, $p = .05$, partial $\eta^2 = .090$ (Table 27). The largest difference in means was that of schools with enrollments of 1,501 – 2,000 students located in small towns. The mean for these schools was 5.00, which indicated 100% implementation of online learning for offering Advanced Placement courses. There were no significant interactions in the remaining 14 characteristics.

12. The 12th hypothesis stated: There are no significant differences between school enrollment and the perceived effectiveness of online learning in Indiana public high schools. The MANOVA was tested using the Pillai's Trace test. The means of the enrollment of the schools were examined to determine whether there is a significant statistical difference between the sample groups. The MANOVA results revealed significant differences among school enrollment categories on the dependent variables, Pillai's Trace $F(60, 744) = 1.73$, $p = .001$. In order to determine the significant

differences among the individual characteristics, separate univariate tests were completed (Table 28).

Conclusion: School Enrollment differences were significant for Increasing Electives $F(4, 197) = 3.1664$, $p = .015$, partial $\eta^2 = .060$; Offering Courses Not Available, $F(4, 197) = 7.11$, $p = .001$, partial $\eta^2 = .126$; Offering AP Courses, $F(4, 197) = 3.29$, $p = .012$, partial $\eta^2 = .063$; Providing Cost Effective Courses, $F(4, 197) = 3.25$, $p = .013$, partial $\eta^2 = .062$; Reducing Scheduling Conflicts, $F(4, 197) = 4.26$, $p = .003$, partial $\eta^2 = .080$; and Meeting Enrichment Needs, $F(4, 197) = 2.64$, $p = .035$, partial $\eta^2 = .051$. Even though differences in the remaining nine categories were not significant, school enrollment plays a major role in perceptions of the effectiveness of online learning, especially in schools with enrollment less than 500 or 1,501 - 2,000 students. Principals in schools with enrollments of less than 500 students rated the following uses of online learning as most effective: Differentiating instruction, increasing electives, offering Advanced Placement courses, providing courses without teachers, providing cost effective courses, and meeting enrichment needs. Principals in schools with enrollments of between 1,501 and 2,000 students rated the following uses of online learning as most effective: Differentiating instruction, recovering credits, increasing opportunities to succeed, meeting needs of at-risk students, reducing scheduling conflicts, and retaking courses. The means of all 15 categories across enrollments are shown in Table 38.

Table 38

School Enrollment and Rating Means of the Effectiveness of Online Learning in Indiana Public High Schools

Level of Effectiveness	Less than 500	501 – 1,000	1,001-1,500	1,501-2,000	2,001 & over
Differentiating Instruction	4.06	3.70	3.56	3.72	4.06
Addressing Growing Populations	3.88	3.65	3.68	3.92	3.56
Increasing Electives	4.22	4.04	3.84	3.84	3.12
Offering Courses Not Available	4.14	4.08	3.72	4.24	2.88
Offering AP or College Courses	3.84	3.73	3.68	3.72	3.06
Recovering Credits	4.41	4.59	4.48	4.64	4.56
Reducing Class Size	3.33	3.25	3.60	3.40	3.25
Individualizing Instruction	3.69	3.72	3.64	3.56	3.44
Increasing Opportunities to Succeed	3.82	3.92	4.08	4.12	4.00
Providing Courses w/out Teachers	3.90	3.45	3.36	3.44	3.19
Providing Cost Effective Courses	3.98	3.77	3.80	3.88	3.25
Meeting Needs of At-Risk Students	3.69	3.98	4.16	4.16	3.38
Reducing Scheduling Conflicts	3.98	3.94	3.76	4.20	3.25
Retaking Courses	4.37	4.41	4.08	4.48	4.13
Meeting Enrichment Needs	3.82	3.68	3.68	3.48	2.63

13. The 13th hypothesis stated: There are no significant differences between school locality and the perceived effectiveness of online learning in Indiana public high schools. The

means of the locality of the schools were examined to determine whether there is a significant statistical difference between the sample groups. The MANOVA results revealed no significant differences among school enrollment categories on the dependent variables, Pillai's Trace $F(45, 555) = .896$, $p = .666$. In order to determine if there were significant differences among the individual characteristics, separate univariate tests were completed (Table 29).

Conclusion: School locale differences were significant for Providing Courses without Teachers $F(3, 197) = 3.69$, $p = .013$, partial $\eta^2 = .053$; Retaking Courses, $F(3, 197) = 2.80$, $p = .041$, partial $\eta^2 = .041$; and Meeting Enrichment Needs, $F(3, 197) = 4.41$, $p = .005$, partial $\eta^2 = .063$. Differences in the remaining 12 dependent variables were not significant. Even though differences in the remaining 12 categories were not significant, school locale plays a major role in perceptions of the effectiveness of online learning, especially in schools located in small towns. Principals in schools in small towns rated 13 out of the 15 categories of the use of online learning as most effective when compared to the effectiveness ratings of principals of schools located in urban, suburban and rural settings. The means of all 15 categories across school locale are shown in Table 39.

Table 39

School Locale and Rating Means of the Effectiveness of Online Learning in Indiana Public High Schools

Level of Effectiveness	Urban	Suburban	Small Town	Rural
Differentiating Instruction	3.62	3.90	3.71	3.86
Addressing Growing Populations	3.69	3.76	3.87	3.64
Increasing Electives	3.46	3.62	4.20	4.13
Offering Courses Not Available	3.46	3.71	4.18	4.13
Offering AP or College Courses	3.31	3.50	3.87	3.80
Recovering Credits	4.50	4.55	4.64	4.49
Reducing Class Size	3.27	3.50	3.57	2.16
Individualizing Instruction	3.42	3.64	3.84	3.63
Increasing Opportunities to Succeed	3.96	3.93	4.04	3.89
Providing Courses w/out Teachers	2.77	3.29	3.65	3.78
Providing Cost Effective Courses	3.58	3.60	3.96	3.86
Meeting Needs of At-Risk Students	3.77	3.95	4.20	3.74
Reducing Scheduling Conflicts	3.50	3.88	4.04	3.96
Retaking Courses	3.88	4.33	4.55	3.48
Meeting Enrichment Needs	3.17	3.38	4.67	3.48

14. The 14th hypothesis stated: There are no significant interactions between school enrollment and school locality on the perceived effectiveness of online learning in

Indiana public high schools. The MANOVA results revealed no significant differences among the enrollment and locale categories on the dependent variables, Pillai's Trace $F(120, 1520) = 1.265$, $p = .606$, partial $\eta^2 = .070$. As shown in Table 30, multivariate analysis of variance showed there is no significant interaction with the perceived effectiveness of online learning, $F(8, 176) = 1.657$, $p = .112$. To determine if there were significant differences among the interactions of the individual characteristics, the test of between-subjects was examined (Table 31).

Conclusion: The test revealed there were significant interactions between the enrollment and locale of the principal's school and the perception of effectiveness of online learning in two characteristics, Offering AP Courses $F(8, 194) = 2.074$, $p = .05$, partial $\eta^2 = .078$; and Reducing Scheduling Conflicts, $F(8, 194) = 2.145$, $p = .05$, partial $\eta^2 = .080$. There were no significant interactions in the remaining 14 characteristics. In terms of using online learning to offer Advanced Placement courses, the largest difference in means was that of schools located in urban settings with enrollments of less than 500 students, and schools located in small towns with enrollments of between 1,501 – 2,000 students. The means for these schools was 5.00, which indicated 100% agreement of online learning being strongly effective for offering Advanced Placement courses. When comparing the means of school usage of online learning for reducing schedule conflicts, schools located in an urban setting with enrollments between 1,501 and 2,000 students had the highest rating of the effectiveness of online learning.

15. The 15th hypothesis stated: There is no relationship between the principal's age, gender, enrollment, and local of school and the barriers of implementing online learning in Indiana public high schools. A Pearson product-moment correlation coefficient was

computed to assess the relationship between principal demographics and rating of barriers.

Conclusion: Even though the current technology infrastructure and bandwidths within the schools were seen as barriers for principals, there was no significant correlation between principal demographics and barriers, r = -078, n = 230, p = .239.

Research Recommendations

Based upon the perceived levels of effectiveness and perceived levels of implementation of online learning in non-charter public high schools in Indiana, the following recommendations for future research can be made:

1. A comparative study should be conducted to determine the relationship between principal perception of the effectiveness of online learning at each grade configuration (elementary, middle, and high school).
2. A comparative study should be conducted to determine the relationship between principal perception of the implementation of online learning at each grade configuration (elementary, middle, and high school).
3. A comparative study should be conducted between the results of this study and results of studies done in other states in the United States.
4. A qualitative research design should be conducted to understand principals' perceptions of effectiveness of online learning and actual levels of implementation within the schools.
5. A study could be conducted which examines the effectiveness of online learning differently. This might involve a broader sampling of the school including teachers and students.

Summary of the Study

This study was created to examine the beliefs of principals in non-charter public high schools in regards the effectiveness and implementation levels of online learning. The major research questions that guided this study were:

1. What is the principal's perception of the level of implementation of online learning in Indiana public high schools?
2. What is the principal's perception of the effectiveness of online learning for Indiana public high schools?
3. Is there a relationship between the principal's perception of the level of implementation of online learning and principal perception of effectiveness of online learning in Indiana public high schools?
4. What are the barriers that impede the development of online learning in Indiana public high schools?
5. Are there differences in perceptions and implementation of online learning due to demographics of principals and high schools?

As reported in the review of the current literature, online learning provides at least two ways to reduce expenses being paid for faculty and staff. The first way online learning can be used to reduce faculty and staff costs is by increasing class sizes/reducing the number of course sections. The increase in the number of students in the class effectively reduces the number sections of courses offered, thus reducing the number of faculty members needed to teach the course content. The second way to reduce faculty and staff costs is to employ a non-certified individual as a monitor for online classes and allow a teacher or administrator to serve in the capacity of teacher-of-record. In this research, when reporting their level of implementation of

online learning in their respective schools, the principals indicated the use of online learning for helping students recover credits (228 principals reporting it as being implemented) and permitting students to retake a course (207 principals reporting it as being implemented) as the most implemented uses of online learning in non-charter public high schools in Indiana. The principals also reported the use of online learning for reducing class sizes (110 principals reporting it as being implemented) and providing courses without teachers (112 principals reporting it as being implemented) as the least implemented uses of online learning (Appendix H). As indicated in this research, principals in Indiana are reporting they are not specifically using online learning as a cost effective measure to reduce class sizes or to provide courses without teachers. A closer look at the data reveals that when students use online learning to recover credits or to retake a course, schools are able to keep class sizes down and provide courses to students without utilizing a teacher within the school.

When looking at the data in regards to the principal's belief in the effectiveness of online learning, it's important to recall that an analysis of online learning by Means et al. (2009) drew national attention due to significant results in the area of effectiveness. The evaluation included more than 1,000 studies from 1996 to 2008 that compared online learning to traditional learning. The analysis investigated how the effectiveness of online learning compared with traditional instruction and whether supplementing traditional instruction with online teaching enhanced students' learning. Significant inferences in the report included:

> Online classes, whether completely online or hybrid, on average produce stronger student learning outcomes than those conducted solely in a traditional classroom environment (Means et al., 2009, p. 17).

> Online learning is more conducive to an expansion of learning time; therefore, students in online classes benefitted from more time-on-task (Means et al., 2009, p. 18).
>
> Hybrid learning plus the expansion of time-on-task for online learners produced observed learning advantages (Means et al., 2009, p. 19).

This researcher found when reporting the belief in the level of effectiveness of online learning, the principals viewed the use of online learning for helping students recover credits (227 principals reporting it as effective or strongly effective) and permitting students to retake a course (214 principals reporting it as effective or strongly effective) as the most effective uses of online learning in non-charter public high schools in Indiana. The principals also reported the use of online learning for reducing class sizes (107 principals reporting it as effective or strongly effective) and providing courses without teachers (146 principals reporting it as effective or strongly effective) as the least effective uses of online learning (Appendix G).

The data of this study revealed there was a positive relationship in regards to the perceptions of effectiveness of online learning and the level of implementation of online learning for principals of Indiana high schools. School principals who believed the specific uses of online learning were effective tended to have higher implementation levels than those principals who believed the specific uses of online learning were not effective in meeting the needs of students. What needs to be noted in this regards is that this researcher found a difference in the use and effectiveness reported by high school principals in Indiana as compared to other published studies. The National Center for Educational Statistics released the first comprehensive report of online education in public schools in 2005 conveying that 36% of public school districts in the United States had students enrolled in courses via distance education (Setzer & Greene, 2005). The NCES key finding indicated a greater proportion of

large districts than medium or small districts had students enrolled in distance education courses (50%, 32% and 37%, respectively). In Indiana, principals in schools located in rural areas reported the highest levels of implementation for providing courses without teachers, and principals of schools located in small towns reported the highest level of implementation for meeting enrichment needs. In both significant categories, principals of schools located in urban settings reported the least amount of implementation.

This researcher believes the difference in use of online learning in non-charter public high schools in Indiana as compared to high schools across the United states can be somewhat attributed to the 2001 Indiana Department of Education's (IDOE) commitment to increase technology use by high school students. The IDOE termed this initiative Indiana Access (Affordable Classroom Computers for Every Secondary Student) or inACCESS. The IDOE tracked the grant recipients from 2006-2009 and released information indicating that there were approximately 130 schools that took advantage of the inACCESS grant programs (D. Ryan, personal communication, November 8, 2009). The IDOE developed what many considered an innovative approach to allow a computer for every student in every Language Arts classroom in every Indiana public high school. As a result of the IDOE commitment to technology, many Indiana public high schools contain the infrastructure to use online learning without having to be concerned with the startup costs associated with such.

When looking at the barriers to implementing online learning, the cost associated with offering online learning was reported as the number one barrier. Principals of non-charter public high schools in Indiana reported the course development and purchasing costs (140 principals reporting it as being a barrier) as the most often seen barrier to implementing online learning in their schools. The principals responded that their current technological

infrastructure (67 principals reporting it as being a barrier) and bandwidth (110 principals reporting it as being a barrier) were sufficient to handle the needs of online learning (Appendix I). As reported in the earlier research, costs can be measured in various ways. Jung (2005) found cost-effectiveness research results typically conclude that online learning is more cost-effective than classroom teaching mainly due to the increased class load (i.e. increased number of students). The University of British Columbia's Department of Distance Education & Technology conducted a two-year study which was federally funded by the Canadian TeleLearning Networks of Centres of Excellence (Zlomislic & Bates, 1999). In the study, Zlomislic & Bates investigated the possible cost benefits and limitations of incorporating online learning. The researchers divided the cost factors into three groups, capital and recurrent cost – computer equipment and support for the equipment, production and delivery costs - development and delivery of the course, and fixed and variable costs - those that either remain constant regardless of the number of participants or change with the number of participants. This and other research indicate the startup costs associated with the use of online learning is typically high, the costs then trail off making the use of online learning an economically sound undertaking for schools.

Although there was little statistical significance found between the demographic factors of the principal and implementation of online learning, the following differences should be noted:

1. Gender Differences: When looking at gender differences, males reported higher levels of implementation of online learning than females.
2. Age Differences: When looking at age differences, respondents aged 64 and older rated eight categories of implementation higher than all other age categories; respondents 51

– 63 rated four categories of implementation higher than all other age categories; respondents 25 – 37 rated three categories of implementation higher than all other age categories; and respondents 38 – 50 rated one category of implementation higher than all other age categories.

3. School Enrollment: When looking at school enrollment, principals with a student population of 1,001 – 1,500 students reported higher levels of implementation in nine out of the 15 categories of online learning as compared to the other four school student population categories; principals with a student population of 1,501 – 2,000 students reported higher levels of implementation in three out of the 15 categories of online learning as compared to the other four school student population categories. Principals with a student population of 2,001 and over reported higher levels of implementation in 2 out of the 15 categories of online learning as compared to the other four school student population categories; and principals with a student population of 501 – 1,000 students reported higher levels of implementation in one out of the 15 categories of online learning as compared to the other four school student population categories. The reported level of implementation was the lowest in all 15 categories for schools with student populations below 500 students.
4. School Locale: When looking at school locality, principals of schools located in small towns reported higher levels of implementation in seven out of the 15 categories of online learning as compared to the other three school location categories; principals of schools located in suburban areas reported higher levels of implementation in five out of the 15 categories of online learning as compared to the other three school location categories.

Principals of schools located in urban areas reported higher levels of implementation in two out of the 15 categories of online learning as compared to the other three school location categories; and principals of schools located in rural areas reported higher levels of implementation in one out of the 15 categories of online learning as compared to the other three school location categories.

Implications

This research project opened with this one pointed sentence "The news about public school education in the United States (U.S.) has been less than impressive over the past 35 years." Christensen (2008) asks:

> Could it be that the U.S. teaching model is simply broken…? To help answer this question, picture a school where, in every classroom the teacher stands at the front of the room and lectures all day to the students. The students never speak, and even if they do not understand a concept, they never ask for help. The teacher just keeps lecturing. Exams test rote memorization. (p. 4)

Due to the technological advances over the past five to 10 years, education in today's high schools should bear little resemblance to that of 15 to 20 years ago. This transformation from teacher lecturing to hands-on computer oriented learning is a positive change due to the students being connected with the tools and opportunities that not only meet their individual needs, but also meet their needs to be successful in the twenty-first century. Ikenberry (2000) stated "the knowledge explosion, the technology revolution, and our increased global interdependence are transforming virtually every segment of our societies" (p. 1). Ikenberry also emphasized the need for students to be successful in the conceptual era in which prosperity and well-being are defined less by traditional metrics, less by the ability to handle

labor intensive positions, and more by educational levels, intellectual strength, creativity, and ingenuity (Ikenberry, 2000).

How does this study help Indiana educators? Fortunately for many students, at least in Indiana non-charter public high schools, educators agree that online learning holds tremendous potential for schools in the ability to provide for the needs of every student. Online technology enables students anywhere, poor inner cities, remote rural areas, even at home, to take any course they like, from the best instructors in the world, and to customize learning to their own needs, schedules, styles, interest, and academic growth (Moe & Chubb, 2009).

Nationally, 38% of schools were using online learning in 2005. This study indicates that 96.3% of the Indiana educators who responded to the survey are taking advantage of the opportunity to provide classes via online learning where the teaching methods are varied, students interact non-stop, where participation is encouraged, and where teachers facilitate the learning process. In non-charter public high schools in Indiana, student needs are being met in an effective, non-traditional manner.

When looking at the use of online learning based upon school enrollment, nationally a greater proportion of large schools than medium or small schools had students enrolled in online learning. In Indiana, when looking at school enrollment, principals of schools with a population of 1001 – 1500 students reported higher levels of implementation in nine out of the 15 uses of online learning as compared to the other four school student population categories. The reported level of implementation was the lowest in all 15 categories for schools with student populations below 500 students. Also, nationally, large schools most often report online learning as effective for meeting student academic needs. In Indiana, principals of

schools with less than 500 students were most likely to report online learning as effective for meeting student academic needs.

When looking at the use of online learning based upon school locale, nationally online learning has been reported as being implemented in rural or urban schools. In Indiana, principals of schools located in small towns reported the highest levels of implementation of online learning. Principals of schools located in rural areas reported the lowest levels of implementation of online learning.

Why the difference in the national studies and this study? This researcher believes the difference in the belief in effectiveness and the use of online learning in non-charter public high schools in Indiana as compared to high schools across the United States can be somewhat attributed to the 2001 Indiana Department of Education's commitment to increase technology use by high school students. The IDOE termed this initiative Indiana Access (Affordable Classroom Computers for Every Secondary Student) or inACCESS. The IDOE tracked the grant recipients from 2006-2009 and released information indicating that there were approximately 130 schools that took advantage of the inACCESS grant programs (D. Ryan, personal communication, November 8, 2009). The IDOE developed what many considered an innovative approach to allow a computer for every student in every Language Arts classroom in every Indiana public high school. As a result of the IDOE commitment to technology, many Indiana public high schools contain the infrastructure to use online learning.

Even though this research indicated online learning in public high schools in Indiana is being most often used for students needing to recover credits, principals in public high schools in Indiana would benefit from understanding that the use of online learning for high school students knows no boundaries. The use of online learning for students needing to recover

credits may simply be the result of the mandate over the past two years by Indiana State Superintendent of Public Schools, Tony Bennett, for all high schools to have a four-year graduation rate at or above 90%. This mandate has occurred at the same time that Indiana changed the funding process for Indiana schools resulting in less revenue for the schools. Principals in Indiana public high schools have been forced to find innovative ways, without increasing costs, to meet the needs of the students most likely to not graduate in four years.

As stated in the review of the research, due to the accountability measures addressed in No Child Left Behind, it has become common knowledge that secondary schools continue to have roughly 30% of the students to drop out of school instead of graduating within a four-year time span. Providing rigorous academic coursework has been shown to be at the top of the list in terms of how to increase student achievement and reduce the number of students who drop out. The implementation of online learning provides schools that would otherwise not be able to offer challenging courses the ability to do so. Whereas credit recovery tends to focus on the slow learners or those who have been receiving special services, there are other groups of students who are at-risk of not completing high school. If not given the correct amount of stimulation and challenge, high school students may become bored and simply drop out of school.

Studies of high school implementation at the national level reveal online learning is most often being used for offering Advanced Placement courses. Respondents in Indiana indicated the implementation of online learning in their schools is most often being used for recovering credits and for retaking courses. As changes are currently being made for the reporting of accountability in Indiana, the new Indiana state accountability report card may have a major Advanced Placement test score component. If so, online Advanced Placement

courses such as those offered by the Florida Virtual Academy may provide an opportunity that public school principals in Indiana will be looking for in terms of increasing the number of students who earn a 3, 4 or 5 on the Advanced Placement tests. If Indiana adopts an Advanced Placement test score component to the accountability report card, a shift in focus from using online courses for students who tend to be in the bottom tier academically, to students who are in the upper tier academically will be warranted.

Data from this study in regards to the implementation and effectiveness of online learning indicates that all ability levels of students can benefit tremendously from online learning by lifting the restraint of required seat time and replacing it with required proficiency. Students can move through an online course at their own pace, thus removing the burden of having to wait until every student has mastered a concept before the class can move on. In 2009, virtually every required class needed for graduation was available online in an asynchronous format, allowing students to decide when and where they would attend class, and understood accredited online classes were available 24 hours per day, seven days per week.

The research literature suggests that only online courses can give students access to the best teachers and most rigorous and relevant courses regardless of where the student lives or attends school.

> Online classes, whether completely online or hybrid, on average produce stronger student learning outcomes than those conducted solely in a traditional classroom environment (Means et al., 2009, p. 17).
>
> Online learning is more conducive to an expansion of learning time; therefore, students in online classes benefitted from more time-on-task (Means et al., 2009, p. 18).

> Hybrid learning plus the expansion of time-on-task for online learners produced observed learning advantages (Means et al., 2009, p. 19).

The advances in technology provide an efficient way to personalize education for every student. Once the startup costs have been covered, the use of online learning has potential to meet the academic needs of the students. When looking at the costs of offering online courses in Indiana public high schools, 140 respondents to this study felt it was a strong barrier to implementation of online learning, as compared to 71 respondents who indicated it wasn't a much of a barrier. Characteristics not seen as barriers to offering online learning in Indiana public high schools included the current technological infrastructure in the schools and the current bandwidth. The reason for this may be that in Indiana, up until recent years, school personnel have had the opportunity to build whatever they have wanted as long as the local taxpayers were in agreement. School districts were not required to take a formal vote from the community. Indiana's consolidated school systems managed to sustain enough funding to lay the groundwork for online learning by building the technological infrastructure when online learning didn't exist.

In addition to the positive aspects of the use of online learning, principals in public high schools in Indiana also need to be aware of the possible issues that may arise from the use of online learning. As stated earlier, teaching and learning via the use of online learning should look much different than that of a traditional classroom. Whereas rigor in a tradition classroom can be conceived as how much information a student can memorize, in an online environment, rigor must change from the memorization of information to the application of knowledge. In essence a pedagogical transformation will need to take place in order for students to be ultimately successful using online learning.

There is also a need for school personnel to understand that online learning is not only for those students who do not fare well in traditional classrooms, i.e. the at-risk students. If not managed properly, student enrollment may disproportionately consist mainly of students considered to be "trouble makers." Online courses hold promise for all students of all ability levels. School personnel should make every effort to offer opportunities that are in the best interests of every student to every student.

Also of concern can be the lack of face-to-face interaction. Online learning provides a great avenue for students to "say" whatever they want whenever they want. This ability to speak without repercussion has been of tremendous value for shy students and students who rarely speak in traditional classrooms. The downside to this anonymity is that students using chat rooms tend to speak without regards to the emotional element of learning. In traditional classrooms, body language plays a role in the social ability of the students. In online learning, this socialization can be lost if not managed appropriately by allowing face-to-face interactions along with the technology-based learning.

In conclusion, even though the news about public school education in the U.S. has been less than impressive over the past 35 years, this researcher believes online learning will provide the impetus for tremendous positive change. Principals in 241 out of 343 non-charter public high schools in Indiana responded to the survey that guided this research. In their responses, the principals indicated they have already implemented online learning as an effective way to meet the needs of at-risk students. As these principals investigate other effective uses of online learning in their schools, this researcher predicts a tremendous increase in the number of students using online learning to not only meet the needs for graduation, but also to meet the needs of flexible and individualized learning.

REFERENCES

Adkins, S. (2009). *The US market for self-paced eLearning products and services: 2009-2014 Forecast and Analysis: Revenue opportunities re-emerge in the economic recovery.* Retrieved from http://www.ambientinsight.com/Resources/Documents/AmbientInsight_2009_2014_eLearningMarket_ExecutiveOverview.pdf

Alexander, S. (1997). *Teaching and learning on the world wide web*. Retrieved from http://ausweb.scu.edu.au

Allen, I. E., & Seaman, J. (2006). *Making the grade: Online education in the United States 2006.* Retrieved from http://www.sloan-c.org/publications/survey/pdf/making_the_grade.pdf

Alliance for Excellent Education. (2007). *In need of improvement: NCLB and high schools*. Washington, DC: Author.

Apex Learning. (2010). *Curriculum overview*. Retrieved from http://www.apexlearning.com/Curriculum/Overview.htm

Aronson, J. Z., & Timms, M. J. (2004). *Net choices, net gains: Supplementing high school curriculum with online courses.* San Francisco, CA: WestEd.

authorGEN Technologies. (2010). *Maximizing learning outcome through online collaboration* [Brochure]. Raleigh, NC: Author.

Bates, A. W. (2000). *Managing technological change: Stratagies for college and university leaders*. San Francisco, CA: Jossey-Bass.

Bates, A. W., & Poole, G. (2003). *Effective teaching with technology in higher education*. San Francisco, CA: Jossey-Bass.

Bellah, R. N., Madsen, R., Sullivan, W. M., Swidler, A., & Tipton, S. M. (1985). *Habits of the Heart: Individualism and commitment in American life*. New York, NY: Harper & Row.

Berman, E. (2003, September 2). *Jeb Bush speaks for education reform*. Retrieved from http://www.wibc.com/news/Story.aspx?id=1135750

Bridgeland, J., DiIulio, J., & Morison, K. B. (2006, March). *The silent epidemic: Perspectives of high school dropouts*. Washington, DC: Civic Enterprises.

Cavanaugh, C. (2009). *Getting students more learning: Distance education in support of expanded learning time in k-12 schools.* Retrieved from http:// www.americanprogress.org/issues/2009/05/distance_learning.html

Cavanaugh, C., Dawson, K., White, S., Valdes, N., Ritzhaupt, A., & Payne, D. (2006). *Leveraging laptops: Effective models for enhancing student achievement* Retrieved from http://etc.usf.edu/laptops4learning/resources/reports/miami_dade.pdf

Christensen, C. M., Horn, M. B., & Johnson, C. W. (2008). *Disrupting class: How disruptive innovation will change the way the world learns*. New York, NY: McGraw-Hill.

Duff, A. (2004). *Online learning: A definition*. Retrieved from http:// www.unisanet.unisa.edu.au/Resources/workshop-ready4online/Learning%20Online/ Online%20learning%20-%20a%20definition.htm

Foundation for Excellence in Education. (2007). *Excellence in action*. Retrieved from http://www.excelined.org/

Georgia Department of Education. (2009). *Credit recovery: FAQs*. Retrieved from http:// www.gavirtualschool.org/FAQ/tabid/56/Default.aspx

Henke, R. R. (2000). *Progress through the teacher pipeline: 1992–93 college graduates and elementary/secondary school teaching as of 1997*. (NCES 2000–152). Retrieved from http://nces.ed.gov/pubs2000/2000152.pdf

Hiltz, S. (1990). Evaluating the virtual classroom. In *Online education: Perspectives on a new environment* (pp. 133-169). New York, NY: Praeger.

Ikenberry, S. O. (2000, August 22). *Higher education in a changing world: An opportunity for global collaboration.* Paper presented at the International Association of Universities, Durban, South Africa.

International Association for K-12 Online Learning (iNACOL). (2009). *The international association for K-12 online learning*. Retrieved from http://www.inacol.org/

Indiana Department of Education. (2009a). *General fund summary of expenditures by program and per pupil costs* (*January 1 to December 31, 2008*). Retrieved from http:// www.doe.in.gov/finance/pdf/Calendar_Year_2008.pdf

Indiana Department of Education. (2009b). *What is the Indiana ACCESS program?* Retrieved from http://www.doe.in.gov/olt/InACCESS/about_inaccess.html

Indiana Department of Education. (2009c). *Teachers' average salary 2008-09*. Retrieved from http://mustang.doe.state.in.us/TRENDS/top10.cfm?var=sal&corp=0000

Indiana Department of Education. (2009d). *Compare schools.* Retrieved from http://mustang.doe.state.in.us/SEARCH/critieria.cfm?

Jung, I. (2005). Cost-effectiveness of online teacher training. *Open Learning, 20*(2), 131-146.

Kubala, T. (1998). Addressing student needs: Teaching on the internet. *THE Journal, 25*(8), 71-75.

Massachusetts Institute of Technology. (2009). *MIT open courseware*. Retrieved from http://ocw.mit.edu/OcwWeb/web/home/home/index.htm

Means, B., Toyama, Y., Murphy, R., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies.* Washington, DC: U.S. Department of Education.

Moe, T. M., & Chubb, J. E. (2009). *Liberating learning: Technology, politics, and the future of American Education*. San Fransico, CA: Jossey-Bass.

Morabito, M. G. (1997). *Online distance education: Historical perspective and practical application*. (Doctoral dissertation). Retrieved from http://www.dissertation.com/library/1120575a.htm

Morgan, B. M. (2000). *Is distance learning worth it? Helping to determine the costs of online courses*. Working paper, Marshall University. Retrieved from http://www.marshall.edu/distance/distancelearning.pdf

National Center for Education Statistics. (2005). *The condition of education 2005: Availability of advanced courses in high schools*. [NCES 2005-094]. Washington, DC: U.S. Government Printing Office.

National Center for Educational Statistics. (2010). *Locale Codes* [Description of School Locations]. Available November 14, 2010, from National Center for Educational Statistics Web site: http://nces.ed.gov/ccd/rural_locales.asp

Pearson Digital Learning. (2005). *NovaNET*. Retrieved from http://nclb.pearsondigital.com/

Phipps, R., & Merisotis, J. (2000). *Quality on the line: Benchmarks for success in internet-based distance education*. Washington, DC: Institute for Higher Education Policy.

Picciano, A., & Seaman, J. (2007) *K-12 online learning: A survey of U.S. school district administrators*. New York, NY: The Sloan Consortium. Retrieved from www.k12hsn.org

Picciano, A., & Seaman, J. (2009). *K–12 online learning: A 2008 follow-up of the survey of U.S. school district administrators*. Retrieved from http://www.sloan-c.org/publications/survey/k-12online2008

PLATO Learning. (2010). *Secondary solutions*. Retrieved from http://www.plato.com/Secondary-Solutions.aspx

President's Committee of Advisors on Science, & Technology. (1997). *Report to the president on the use of technology to strengthen K-12 education in the United States*. Washington, DC: Panel on Educational Technology. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-nov2007k12.pdf

Ruthart, B. (2009a, October 9). State's revenue forecast misses mark. *The Indianapolis Star*. Retrieved from http://www.indy.com/posts/state-s-revenue-forecast-misses-mark

Ruthart, B. (2009b, December 5). Universities will share state's revenue burden. *The Indianapolis Star*. Retrieved from http://www.indy.com/posts/universities-will-share-state-s-revenue-burden

Setzer, J. C., & Greene, B. (2005). *Distance education courses for public elementary and secondary school students: 2002–2003*. Retrieved from http://nces.ed.gov/pubs2005/2005010.pdf

Spellings, M. (2007, May 9). *National summit on America's silent epidemic* [Press release]. Retrieved from http://www2.ed.gov//news/pressreleases/2007/05/05092007.html

The Claremont Instutitute. (2000, July 14). *Public education, then and now*. Retrieved from http://www.claremont.org/publications/precepts/id.113/precept_detail.asp

Turoff, M. (1996). Costs for the development of a virtual university. *Journal of Asynchronous Learning Networks,1*(2), 17-27.

United States Department of Education. (1996a). *Getting America's students ready for the 21st century: Meeting the technology literacy challenge: A Report to the Nation on Technology and Education.* Retrieved from http://www2.ed.gov/about/offices/list/os/technology/plan/national/index.html

United States Department of Education. (1996b). *Star school grants to boost adult learning.* Retrieved from http://www.ed.gov/PressReleases/08-1996/star.html

University of Nebraska. (2004). *The CLASS project*. Retrieved from http://class.unl.edu/index.html#

Watson, J. (2005, October). *Keeping pace with K-12 online learning 2005: A review of state-level policy and practice.* Naperville, IL: Learning Point Associates.

Watson, J. F. (2007). *A national primer on K-12 online learning.* Vienna, VA: North American Council for Online Learning (NACOL).

Wright, P. W. D., & Wright, P. D. (2002, January 8). *President Bush signs no child left behind act*. Retrieved from http://www.wrightslaw.com/news/2002/nclb.sign.htm

Zlomislic, S. B., & Bates, A. W. (1999). *Assessing the costs and benefits of telelearning: A case study from the University of British Columbia*. Retrieved from http://research.cstudies.ubc.ca/nce/index.html

APPENDIX A: COVER LETTER TO HIGH SCHOOL PRINCIPALS

Indiana State University

PRINCIPAL PERCEPTIONS ABOUT THE IMPLEMENTATION AND EFFECTIVENESS OF ONLINE LEARNING IN PUBLIC HIGH SCHOOLS IN INDIANA

You are being invited to participate in a research study about the perceptions of public high school principals in regards to the use and effectiveness of online learning. This study is being conducted by Timothy Rayle as part of a doctoral dissertation with Dr. Todd Whitaker serving as the faculty sponsor from the department of Educational Leadership and Foundations at Indiana State University.

There are no known risks if you decide to participate in this research study. There are no costs to you for participating in the study. The information you provide will be used to provide a better understanding of the public high school principal perceptions about online learning in Indiana. The questionnaire will take about fifteen minutes to complete. The information collected may not benefit you directly, but the information learned in this study should provide more general benefits.

This survey is anonymous. No identifying information including names, e-mail addresses or IP addresses will be collected. Even though this is an anonymous survey, absolute anonymity cannot be guaranteed over the Internet. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Individuals from the Institutional Review Board may inspect these records. Should the data be published, no individual information will be disclosed.

Please follow this link to participate in the study http://indstate.qualtrics.com/SE?SID=SV_42Pc6HQOvUHhNpa Your participation in this study is voluntary. By completing the survey you are voluntarily agreeing to participate. You are free to decline to answer any particular question you do not wish to answer for any reason.

If you have any questions about the study, please contact Timothy Rayle at 1049 West Deer Creek Drive, Brazil, IN 47834, (317) 605-4526 or trayle@indstate.edu . You may also contact

Dr. Todd Whitaker at Indiana State University, UH 317B, Terre Haute, IN 47809, (812) 237-2904 or Todd.Whitaker@indstate.edu.

If you have any questions about your rights as a research subject or if you feel you've been placed at risk, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of Sponsored Programs, Terre Haute, IN, 47809, by phone at (812) 237-8217, or by e-mail at irb@indstate.edu.

APPENDIX B: FOLLOW-UP LETTER TO HIGH SCHOOL PRINCIPALS

Indiana State University

Three weeks ago I sent you an e-mail inviting you to participate in a study examining the perceptions of public high school principals in regards to the use and effectiveness of online learning.

If you have completed the survey, thank you very much for your valuable responses.

If you have not yet completed the survey, attached is a hard copy of the survey which consists of 44-items plus a demographic section. This study is being conducted by Timothy Rayle as part of a doctoral dissertation with Dr. Todd Whitaker serving as the faculty sponsor from the department of Educational Leadership and Foundations at Indiana State University.

There are no known risks if you decide to participate in this research study. There are no costs to you for participating in the study. The information you provide will be used to provide a better understanding of the public high school principal perceptions about online learning in Indiana. The questionnaire will take about fifteen minutes to complete. The information collected may not benefit you directly, but the information learned in this study should provide more general benefits.

This survey is anonymous. No identifying information including names, e-mail addresses or IP addresses will be collected. Even though this is an anonymous survey, absolute anonymity cannot be guaranteed over the Internet. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Individuals from the Institutional Review Board may inspect these records. Should the data be published, no individual information will be disclosed.

Please follow this link to participate in the study http://indstate.qualtrics.com/SE?SID=SV_42Pc6HQOvUHhNpa or return the hard-copy of the survey by mail. If returning the survey by mail, please do not write your name on the survey. Your participation in this study is voluntary. By completing the survey you are voluntarily agreeing to participate. You are free to decline to answer any particular question you do not wish to answer for any reason.

If you have any questions about the study, please contact Timothy Rayle at 1049 west Deer Creek Drive, Brazil, IN 47834, (317) 605-4526 or trayle@indstate.edu . You may also contact Dr. Todd Whitaker at Indiana State University, UH 317B, Terre Haute, IN 47809, (812) 237-2904 or Todd.Whitaker@indstate.edu.

If you have any questions about your rights as a research subject or if you feel you've been placed at risk, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of Sponsored Programs, Terre Haute, IN, 47809, by phone at (812) 237-8217, or by e-mail at irb@indstate.edu.

APPENDIX C: SURVEY SENT TO HIGH SCHOOL PRINCIPALS

1. Please use the following scale to identify how effective you believe online learning is for high schools to meet the needs of students and also your current level of implementation of online learning in your high school:

Belief in effectiveness	**Level of implementation in your school**
1 = Strongly Ineffective	1 = Not Implemented
2 = Ineffective	2 = Between Not & Partially
3 = Neutral	3 = Partially Implemented
4 = Effective	4 = Between Partially & Fully
5 = Strongly Effective	5 = Fully Implemented

Providing methods for differentiating instruction.	1 2 3 4 5	1 2 3 4 5
Addressing growing populations and limited space.	1 2 3 4 5	1 2 3 4 5
Increasing the number of electives available for students.	1 2 3 4 5	1 2 3 4 5
Offering courses not otherwise available at school.	1 2 3 4 5	1 2 3 4 5
Offering Advanced Placement or college-level courses.	1 2 3 4 5	1 2 3 4 5
Helping students recover credits.	1 2 3 4 5	1 2 3 4 5
Reducing class sizes.	1 2 3 4 5	1 2 3 4 5
Providing individualized instruction.	1 2 3 4 5	1 2 3 4 5
Providing students who dislike school an opportunity to succeed.	1 2 3 4 5	1 2 3 4 5
Providing courses where certified teachers are not available.	1 2 3 4 5	1 2 3 4 5
Providing a cost-effective way of offering courses where low enrollment numbers are typical.	1 2 3 4 5	1 2 3 4 5
Meeting the needs of at-risk students.	1 2 3 4 5	1 2 3 4 5
Reducing scheduling conflicts for students.	1 2 3 4 5	1 2 3 4 5

	Belief in effectiveness	**Level of implementation in your school**
	1 = Strongly Ineffective	1 = Not Implemented
	2 = Ineffective	2 = Between Not & Partially
	3 = Neutral	3 = Partially Implemented
	4 = Effective	4 = Between Partially & Fully
	5 = Strongly Effective	5 = Fully Implemented
Permitting students who failed a course to take it again.	1 2 3 4 5	1 2 3 4 5
Meeting the needs of students requiring enrichment.	1 2 3 4 5	1 2 3 4 5

2. Please indicate how much of a barrier the following areas would be (or are) to your high school to offer online learning courses.

	Barrier 1 = Very Much a barrier at all 2 = Between Very Much & Neutral 3 = Neutral 4 = Between Neutral & Not 5 = Not a barrier at all
Course development or purchasing costs.	1 2 3 4 5
Limited technological infrastructure to support online learning.	1 2 3 4 5
Concerns about bandwidth needed to support online learning.	1 2 3 4 5
Concerns about course quality.	1 2 3 4 5
Concerns about teacher Master Contracts.	1 2 3 4 5
Concerns about the need for teacher training.	1 2 3 4 5
Concerns about students desiring to take online and/or blended/hybrid courses instead of traditional courses.	1 2 3 4 5

3) What is your gender?
1. Male
2. Female

4) With what ethnic group would you identify yourself?
1. White
2. Black
3. Hispanic
4. Asian
5. Other

5) What is your age group?
1. 24 and under
2. 25-37
3. 38-50
4. 51-63
5. 64 or older

6) How many total years have you served as principal of this or other schools, including this current year?
1. Less than 5
2. 5 - 15
3. 16 - 25
4. More than 25

7) How many years of teaching experience, regardless of level, did you have prior to taking your present position? Do not include years as a full-time
administrator or supervisor.
1. Less than 5
2. 5 - 15
3. 16 - 25
4. More than 25

8) What is the highest degree you have earned?
1. Master's Degree
2. Master's degree plus some additional graduate work
3. Educational Specialist, six-year program or equivalent
4. Doctorate
5. Other

9) How many students are currently enrolled in your school?
1. Less than 500
2. 501 - 1000
3. 1001 -1500
4. 1501- 2000
5. 2001 or more

10) What grades are included in the school of which you are principal?
1. 6-12
2. 7-12
3. 9-12
4. 10-12
5. Other

11) What is the best descriptor of your school's locality?
1. Urban
2. Suburban
3. Small Town
4. Rural

APPENDIX D: INFORMED CONSENT

Indiana State University

Principal Perceptions About The Implementation And Effectiveness Of Online Learning In Public High Schools In Indiana.

I am a doctoral student at Indiana State University conducting this study for my dissertation. The purpose of this research project is to examine principal perceptions about the implementation and effectiveness of online learning in public high schools in Indiana. Your participation in this study is greatly appreciated by the researcher at the university.

As a participant in this study, you will be asked to complete the online survey which consists of 44-items and a demographic section. The entire survey will take approximately 15 minutes to complete.

Clicking on the link to the survey or returning a completed hard copy of the survey will be an indication of consent. You are under no obligation to complete this survey and participate in the research. If you choose to participate, you have the right to withdraw from the study at any time.

The merits of this study include providing a greater depth of knowledge and understanding of the factors which could influence the use of online learning in public high schools. Due to the anticipated shortages of qualified content area teachers and the projected shortfall of finances available to schools, participation in this study may result in knowledge about alternative ways to meet the needs of high school students.

Your responses to the survey will be kept confidential. The primary investigator will be unable to identify your responses. Participation in this study is completely voluntary and participants are free to withdraw from the study at any time.

This study has been explained to me. By clicking on the link below to the questionnaire, I understand and voluntarily agree to the conditions of my participation.

Click here to go to survey: http://indstate.qualtrics.com/SE?SID=SV_51mf2Fim1rljeoA

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at (317) 605-4526 or at trayle@indstate.edu You may also contact Dr. Todd Whitaker at (812) 237-2904 or Todd.Whitaker@indstate.edu.

If you have any questions about your rights as a research subject, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of Sponsored Programs, Terre Haute, IN 47809, by phone at (812) 237-8217, or by e-mail at irb@indstate.edu.

Thank you very much for your help.

Principal Investigator
Timothy Rayle
email: trayle@indstate.edu
(317) 605-4526

Faculty Supervisor
Dr. Todd Whitaker
email: Todd.Whitaker@indstate.edu
(812) 237-2904

APPENDIX E: PERMISSION TO USE SURVEY

11-24-2009

Tim,

Please accept this email as my permission to use the survey to which you refer below. Please give due credit by citing our work. Good luck with your study.

Dr. Anthony G. Picciano
Professor and Executive Officer
PhD Program in Urban Education
Graduate Center - City University of New York
365 Fifth Ave.
NYC, NY 10016
212-817-8281

Good morning Dr. Picciano, I am a graduate student at Indiana State University working on a Ph.D. in Educational Leadership, Administration and Foundations. The focus of my dissertation is the implementation and effectiveness of online learning in public high schools in Indiana.

The reason for my e-mail is to request permission to use yours and Dr. Seaman's survey questions and definitions from your survey used in K–12 Online Learning: A Survey of U.S. School District Administrators (http://www.sloan-c.org/publications/jaln/v11n3/pdf/v11n3_3piccianoseaman.pdf).

Thanks for the consideration.
Have a great day!

Tim Rayle

APPENDIX F: LOCALE CODE

11 City, Large Territory inside an urbanized area and inside a principal city with population of 250,000 or more.

12 City, Midsize Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.

13 City, Small Territory inside an urbanized area and inside a principal city with population less than 100,000.

21 Suburb, Large Territory outside a principal city and inside an urbanized area with population of 250,000 or more.

22 Suburb, Midsize Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.

23 Suburb, Small Territory outside a principal city and inside an urbanized area with population less than 100,000.

31 Town, Fringe Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

32 Town, Distant Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

33 Town, Remote Territory inside an urban cluster that is more than 35 miles of an urbanized area.

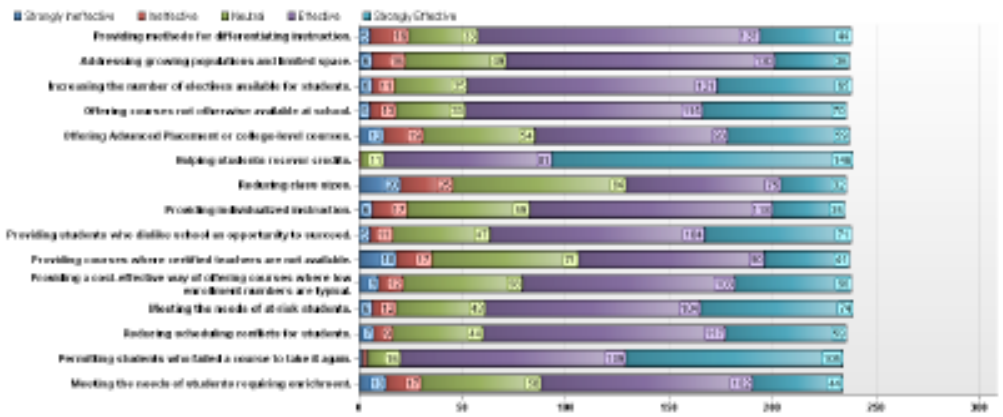
41 Rural, Fringe Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

42 Rural, Distant Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

43 Rural, Remote Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

APPENDIX G: PRINCIPAL EFFECTIVENESS RESPONSES

1. Please use the following scale to identify how effective you believe online learning is for high schools to meet the needs of students.



#	Question	Strongly Ineffective	Ineffective	Neutral	Effective	Strongly Effective	Responses	Mean
1	Providing methods for differentiating instruction.	5	19	33	137	44	238	3.82
2	Addressing growing populations and limited space.	6	16	49	130	36	237	3.73
3	Increasing the number of electives available for students.	6	11	35	121	65	238	3.96
4	Offering courses not otherwise available at school.	5	13	33	115	70	236	3.96
5	Offering Advanced Placement or college-level courses.	12	19	54	93	59	237	3.71
6	Helping students recover credits.	0	1	11	81	146	239	4.56
7	Reducing class sizes.	20	25	64	75	32	236	3.31
8	Providing individualized instruction.	6	17	59	118	35	235	3.68
9	Providing students who dislike school an opportunity to succeed.	5	11	47	104	71	238	3.95
10	Providing courses where certified teachers are not available.	18	17	71	90	41	237	3.50
11	Providing a cost-effective way of offering courses where low enrollment numbers are typical.	9	12	58	103	56	238	3.78
12	Meeting the needs of at-risk students.	6	12	43	104	74	239	3.95
13	Reducing scheduling conflicts for students.	7	9	44	117	59	236	3.90
14	Permitting students who failed a course to take it again.	2	2	18	109	105	234	4.34
15	Meeting the needs of students requiring enrichment.	13	17	58	102	44	234	3.63

Statistic	Providing methods for differentiating instruction.	Addressing growing populations and limited space.	Increasing the number of electives available for students.	Offering courses not otherwise available at school.	Offering Advanced Placement or college-level courses.	Helping students recover credits.	Reducing class sizes.	Providing individualized instruction.	Providing students who dislike school an opportunity to succeed.	Providing courses where certified teachers are not available.	Providing a cost-effective way of offering courses where low enrollment numbers are typical.	Meeting the needs of at-risk students.	Reducing scheduling conflicts for students.	Permitting students who failed a course to take it again.	Meeting the needs of students requiring enrichment.
Min Value	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1
Max Value	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	3.82	3.73	3.96	3.96	3.71	4.56	3.31	3.68	3.95	3.50	3.78	3.95	3.90	4.34	3.63
Variance	0.80	0.79	0.83	0.85	1.17	0.37	1.21	0.82	0.87	1.20	0.98	0.92	0.85	0.52	1.09
Standard Deviation	0.90	0.89	0.91	0.92	1.08	0.60	1.10	0.90	0.93	1.10	0.99	0.96	0.92	0.72	1.05
Total Responses	238	237	238	236	237	239	236	235	238	237	238	239	236	234	234

APPENDIX H: PRINCIPAL IMPLEMENTATION RESPONSES

2. Please use the following scale to identify your current level of implementation of online learning in your high school

#	Question	Not Implemented	Between Not & Somewhat Implemented	Somewhat Implemented	Between Somewhat & Fully Implemented	Fully Implemented	Response	Mean
1	Providing methods for differentiating instruction.	27	44	97	57	15	240	2.95
2	Addressing growing populations and limited space.	50	39	89	63	19	240	2.84
3	Increasing the number of electives available for students.	44	41	97	61	27	240	2.94
4	Offering courses not otherwise available at school.	63	39	59	49	31	241	2.70
5	Offering Advanced Placement or college-level courses.	84	33	42	48	34	241	2.65
6	Helping students recover credits.	9	4	42	62	124	241	4.20
7	Reducing class sizes.	88	42	57	34	19	240	2.39
8	Providing individualized instruction.	39	33	74	65	26	237	3.03
9	Providing students who dislike school an opportunity to succeed.	35	30	62	68	45	240	3.24
10	Providing courses where certified teachers are not available.	84	34	49	46	27	240	2.56
11	Providing a cost-effective way of offering courses where low enrollment numbers are typical.	66	31	59	53	29	238	2.70
12	Meeting the needs of at-risk students.	31	31	53	61	61	237	3.38
13	Reducing scheduling conflicts for students.	47	31	55	61	43	237	3.09
14	Permitting students who failed a course to take it again.	17	16	41	75	91	240	3.86
15	Meeting the needs of students requiring enrichment.	57	40	59	60	21	237	2.78

Statistic	Providing methods for differentiating instruction.	Addressing growing populations and limited space.	Increasing the number of electives available for students.	Offering courses not otherwise available at school.	Offering Advanced Placement or college-level courses.	Helping students recover credits.	Reducing class sizes.	Providing individualized instruction.	Providing students who dislike school an opportunity to succeed.	Providing courses where certified teachers are not available.	Providing a cost-effective way of offering courses where low enrollment numbers are typical.	Meeting the needs of at-risk students.	Reducing scheduling conflicts for students.	Permitting students who failed a course to take it again.	Meeting the needs of students requiring enrichment.
Min Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Value	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	2.95	2.84	2.94	2.70	2.65	4.20	2.39	3.03	3.24	2.56	2.70	3.38	3.09	3.86	2.78
Variance	1.12	1.56	1.81	1.88	2.19	1.06	1.74	1.52	1.89	2.01	1.91	1.80	1.91	1.44	1.70
Standard Deviation	1.06	1.25	1.27	1.37	1.48	1.03	1.32	1.23	1.30	1.42	1.38	1.34	1.38	1.20	1.30
Total Responses	240	240	240	241	241	241	240	237	240	240	238	237	237	240	237

APPENDIX I: BARRIERS TO IMPLEMENTSTION RESPONSES

2. Please use the following scale to identify your current level of implementation of online learning in your high school

#	Question	Not Implemented	Between Not & Somewhat Implemented	Somewhat Implemented	Between Somewhat & Fully Implemented	Fully Implemented	Responses	Mean
1	Providing methods for differentiating instruction.	27	44	97	57	15	240	2.65
2	Addressing growing populations and limited space.	50	39	89	63	19	240	2.64
3	Increasing the number of electives available for students.	44	41	97	61	27	240	2.84
4	Offering courses not otherwise available at school.	63	39	59	49	31	241	2.70
5	Offering Advanced Placement or college-level courses.	64	33	42	48	34	241	2.65
6	Helping students recover credits.	9	4	42	62	124	241	4.20
7	Reducing class sizes.	68	42	57	34	19	240	2.39
8	Providing individualized instruction.	39	33	74	65	26	237	3.03
9	Providing students who dislike school an opportunity to succeed.	35	30	62	68	45	240	3.24
10	Providing courses where certified teachers are not available.	64	34	49	46	27	240	2.58
11	Providing a cost-effective way of offering courses where low enrollment numbers are typical.	66	31	59	53	29	238	2.70
12	Meeting the needs of at-risk students.	31	31	53	61	61	237	3.38
13	Reducing scheduling conflicts for students.	47	31	55	61	43	237	3.09
14	Permitting students who failed a course to take it again.	17	16	41	75	91	240	3.86
15	Meeting the needs of students requiring enrichment.	57	40	59	60	21	237	2.78

Statistic	Providing methods for differentiating instruction.	Addressing growing populations and limited space.	Increasing the number of electives available for students.	Offering courses not otherwise available at school.	Offering Advanced Placement or college-level courses.	Helping students recover credits.	Reducing class sizes.	Providing individualized instruction.	Providing students who dislike school an opportunity to succeed.	Providing courses where certified teachers are not available.	Providing a cost-effective way of offering courses where low enrollment numbers are typical.	Meeting the needs of at-risk students.	Reducing scheduling conflicts for students.	Permitting students who failed a course to take it again.	Meeting the needs of students requiring enrichment.
Min Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Value	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	2.65	2.64	2.84	2.70	2.65	4.20	2.39	3.03	3.24	2.58	2.70	3.38	3.09	3.86	2.78
Variance	1.12	1.58	1.81	1.88	2.18	1.06	1.74	1.52	1.69	2.01	1.91	1.80	1.91	1.44	1.70
Standard Deviation	1.06	1.25	1.37	1.37	1.48	1.03	1.32	1.23	1.30	1.42	1.38	1.34	1.38	1.20	1.30
Total Responses	240	240	240	241	241	241	240	237	240	240	238	237	237	240	237