2013

The Impact of High School Principal's Technology Leadership on the Sustainability of Corporate Sponsored Information Communication Technology Curriculum

Bruce Ryan Gottwig
The University of Montana

THE IMPACT OF HIGH SCHOOL PRINCIPAL'S TECHNOLOGY LEADERSHIP ON THE SUSTAINABILITY OF CORPORATE SPONSORED INFORMATION COMMUNICATION TECHNOLOGY CURRICULUM

By

BRUCE RYAN GOTTWIG

B.S.Ed., Montana State University – Billings, Billings, Montana, 1975
M.Ed., Lesley University, Cambridge, Massachusetts, 1998

Dissertation

presented in partial fulfillment of the requirements
for the degree of

Doctorate in Education
in Educational Leadership

The University of Montana
Missoula, MT

May 2013

Approved by:

Sandy Ross, Dean
Graduate School

Dr. John Matt, Chair
Department of Educational Leadership

Dr. Frances O'Reilly
Department of Educational Leadership

Dr. William McCaw
Department of Educational Leadership

Dr. Patricia M. McPherson Kero
Department of Educational Leadership

Dr. Darrell Stolle
Department of Curriculum & Instruction

Abstract

Gottwig, Bruce, Ed.D., Spring 2013 Educational Leadership

The Impact of High School Principal's Technology Leadership on The Sustainability of Corporate Sponsored Information Communication Technology Curriculum

Chairperson: John Matt, Ed.D.

The proliferation of information communication technology (ICT) has placed educational institutions in the forefront in educating and training students as skilled consumers, engineers, and technicians of this widely used technology. Corporations that develop and use ICT are continually building a skilled workforce; however, because of the growth and ultimately the need for a strong, skilled workforce they are reaching out to educational institutions to help bridge the gap in building this need. Corporations such as Cisco Systems, Microsoft, Oracle, Adobe, VMware, and others developed curricular programs that offer both K – 12 and higher education a means to educate and train students to become educated users, engineers, and technicians with the use of their products.

The purpose of this mixed method study is to examine the high school administrator's impact on the sustainability of corporate-sponsored ICT curriculum programs specifically within the State of Montana. The quantitative research examined the impact of high school principals' scores on the Principals' Technology Leadership Assessment (PTLA) scores and the number of months high schools participated in corporate-sponsored ICT curriculum (sustainability score); specifically the Cisco Networking Academy program. This study used the Spearman's Rank-Order Correlation Coefficient in order to evaluate the PTLA and sustainability scores both for the State of Montana as a whole and by separate high school class sizes.

The qualitative research was based upon a case study of the Cisco Networking Academy (CNA) program for Montana high school administrators on their impact on the sustainability of the CNA program within their individual high schools. This was combined with a post hoc item analysis of the PTLA scores primarily for the purpose to understand the eighteen (18) participants better.

The results of both the qualitative and quantitative studies helped to develop factors that described the sustainability of corporate-sponsored ICT curricula in Montana high schools.

ACKNOWLEDGEMENTS

Albert Schweitzer once said, “Sometimes the light goes out but is blown into flame by another human being. Each of us owes deepest thanks to those who have rekindled this light.” My travels through the superhighway of my dissertation and doctorate would not have happened if it weren’t for the support of a number of people.

First of all, I have the greatest gratitude for the Educational Leadership faculty of the University of Montana Phyllis J. Washington College of Education and Human Sciences who taught the educational leadership classes that I took. Their knowledge, support, and leadership helped me strive to do my best. I also have the highest appreciation and gratitude to Dr. Frances O’Reilly, Dr. William McCaw, Dr. Patricia M. McPherson Kero, and Dr. Darrell Stolle for their expertise and willingness to share it with me by being on my committee. I would like to add a special thank you to Dr. John Matt for his willingness to be both my mentor and chair of my graduate committee. Dr. Matt’s steadfast support helped to “rekindle my light” all the way to the end of my educational journey.

I would also thank the faculty, administration, and staff at Great Falls College MSU for their encouragement, patience, and support as they cheered me on over the years. I would like add a note of appreciation to those at the Cisco Networking Academy and specifically Christa Hughes who ran point in helping me gather the necessary data I needed for my research. I would also like to thank those at the Cisco Networking Academy who were involved in granting me approval for the use of this data.

I would also like to thank my Mother, Father and brother, David. My Mother and Father instilled in me the importance of education. I appreciate the pride my Mother

expressed on my success: and I know that if my Dad were still alive he would be proud of my accomplishment as well. I also appreciate my brother, David. He has always been one of my biggest supporters.

I also acknowledge that I would not have been able to pursue my doctorate degree is it weren't for the undying support of my family. I would like to thank my two sons and their wives; Jeremy and Danielle and Joshua and Angela for their continual encouragement throughout the years as I continued my education. I appreciate their pride in their Dad and father-in-law. Finally, I would like to thank my wife Susan. Her sacrifices of time and money allowed me to earn my doctoral degree. If the truth be known, I probably would not have pursued my advanced degree or any of my advanced degrees if it weren't for her strong encouragement for me to do so. Her unselfish nature looks toward others rather than herself. This nature kept the light burning in me. I thank her with all of my heart. Her time and prayers did not go unappreciated.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

Tables

Figures

CHAPTER ONE

INTRODUCTION TO THE STUDY

"Developments in technologies have often played a critical role in bringing about social and institutional change. Enthusiasts predict that the sweeping technological changes experienced in the worlds of business and entertainment must also take place in schools" (Collins & Halversion, 2009, p. 9). When discussing information and educational technologies most people think specifically about the desktop computer; however, educational technology includes much more (Stallard & Cocker, 2001). Stallard and Cocker (2001) continues that schools tend to use educational and information technologies interchangeability, within this discussion educational technology is a subset of information technology.

The use of technology has often found practical usages in the academic world. Schools have found the use of information technology a matter of efficiency. In the early years, much of the software developed was for data-processing applications rather than educational applications (Picciano, 1998, 2011). The driving force for its effective use in the school environment comes from a number of directions. Within K-12 school districts the initial use of computers was for simplification of administrative tasks such as school finance, student grades and transcripts. In many of the cases the school secretary or district clerk was the one who managed the administrative servers and workstations (Picciano, 1998, 2011).

Early classroom use of computers was primarily driven by math teachers who used the computers to teach students how to solve mathematical problems using early programming languages. The school administration tended to view computer technology as a luxury rather than a useful teaching tool. Most early computers were expensive and their classroom usage was limited. In the late 1970's and early 1980's, computer technology began to improve and become more affordable. Computer companies such as Apple, for example, developed a program with the goal of placing an Apple computer in every school (Apple Computer Inc - Early History, 2011). This type of driving force, along with highly innovative teachers, began to find many uses of computer technology in the classroom (Wozniak & Smith, 2006). Yet, justifying the large capital expense of a classroom of computers continued to be difficult. As computers began to appear in homes and businesses, many district stakeholders pushed school districts to teach their children how to use this new technology. Many districts began to hire computer teachers who would teach weekly computer classes; however, many school districts were slow to accept this new technology (Picciano, 2011).

The challenge was to prioritize computer technology within the school district. In order to accomplish this, districts needed to truly determine what this quickly advancing technology would do for educators and students. Many new educational based computer companies opened their doors. School districts were inundated with sales people and advertising of all types presenting products covering nearly all curricular areas. Still, school

administration found computer technology as a useful tool and still viewed it as a luxury for use in the classroom.

Business and industry will embrace any new information technology if it provides them a competitive edge. The need for a technologically trained work force drove companies to develop curriculum for use in secondary and post-secondary educational providers. Because of the growth of information technologies, employers have taken the responsibility of the cost to train their employees in the utilization of these new technologies. The employers expressed frustration that their workforce was not adequately trained in information technologies in schools (Collins & Halversion, 2009).

Educators, however, seemed to agree that this new technology needed to be taught to students in order to prepare them as citizens of society and to fulfill the need for trained workers for an ever expanding and changing workforce (Collins & Halversion, 2009). Schools were eager to introduce information technology curriculum into their curriculum. Initially, corporate-sponsored information technology curriculum was embraced by a small number of school districts; however, the number began to increase greatly.

Cisco Systems, a network infrastructure company, for example, was growing so quickly that they were unable to find sufficient numbers of technically trained workforce to populate their quickly growing industry. In 1997 Cisco Systems piloted a curriculum in an inner-city high school in San Francisco, California in order to find out whether students would be motivated by learning fundamentals of computer networking (Murnane, Sharkey, &

Levy, 2002). The curriculum was mapped to learning indicators that pointed to objectives for the Cisco Certified Networking Associate (CCNA) industry standard technical certification. After the first pilot year, the Cisco Networking Academy program was born and quickly grew throughout the United States and Canada.

Currently, the Cisco Networking Academy Program has grown to include 3,697 academies in the United States and 13,286 academies worldwide (Cisco Networking Academy Netspace, 2009; The Cisco Networking Academy Program, 2001; Global participating academy count 2008; Impact in Montana, 2011). As a result, other information technology based companies developed academic programs and began offering this curriculum to educational institutions.

Growth in corporate-sponsored IT curriculum programs continued within the first ten years of their inceptions. However, in the State of Montana the numbers of active academies has dropped significantly (Impact in Montana, 2011). One important question to those high schools that still have active academies is what drives their sustainability of that and other corporate-sponsored IT academy programs? Another natural question is whether this is a trend specifically for Cisco Networking Academies, or is it a trend for other industry sponsored IT curriculum offerings?

Many school districts have successfully integrated computer technology into their curriculum. The driving force for this can come from a number of sources, whether from the administration or the teaching staff. The larger

question is whether there is an observable trend to the sustainability of corporate-sponsored IT academy programs in educational institutions; and what impact the administration has on it?

Problem Statement

Information technology has become a significant tool in education. School district stakeholders provide resources for the specific purpose of purchasing computer equipment and services for school management and instructional purposes. "Corporations, government agencies, and schools have made significant investments over the past three decades to take part in the information age by developing, expanding and improving their computer-based information systems" (Picciano, 1998, p. 60). Using computer technologies as an instructional tool does not necessarily prepare students to participate in a constantly evolving, highly-technical information technology global industry (Greenberg, 1999). Students need to be prepared to become workers in the many faceted information technology fields. The school administrator is in a position to influence programs within his/her school building/district (Boyd, 2002). This places program sustainability under the guidance of the school administrator.

However, the trend since 1998 - the beginning of the Cisco Networking Academy Program in the State of Montana - shows the number of active academies has diminished to a fraction of the original number of academies. Consequently, this poses a number of important questions dealing with those

factors that either show the sustainability of information technology programs or symptoms of their demise.

Purpose of the Study

The purpose of this empirical study was to determine the driving force of successful and sustainability of corporate-sponsored information technology curricular programs. Specifically, the purpose was to determine whether the school administration training and knowledge of educational technology has an impact on the integration of corporate-sponsored curricula in schools.

The theoretical framework of this study was partially based upon an earlier study by Dawson and Rakes (2003) on whether a principal's knowledge of educational technology has an impact on the integration of educational technology in the classroom. This study specifically looked at information communication technology rather than its subset of educational technology.

This study would further delineate whether the student population size of the school and/or school district impacts the corporate-sponsored curriculum sustainability. School administration has a large impact on which programs are funded and consequently, which programs can potentially succeed or fail. This responsibility can influence the vision of the school and the educational emphasis of the school. Vocational education programs are traditionally expensive programs which places them constantly under scrutiny at budget time. This same scrutiny applies to corporate-sponsored IT

curricular programs as well. School administrators who have received information and educational technology training prior to making decisions on IT curricular programs might influence a school's ability to sustain this type of program.

This study concentrated on the Cisco Networking Academy program for a number of important reasons. First, this program has experienced a rapid growth within a very few years from its inception. Secondly, this program is aimed primarily at high schools and community colleges whose students are not seeking a four-year higher education. Thirdly, within the United States, the Cisco Networking Academy program is being delivered primarily to high schools and community colleges in order to prepare students to become part of the quick growth industry of computer networking. Fourth, the materials being used are aligned with national skills standards. Lastly, students who complete the training and earn the appropriate industry standard certification will be credentialed to work in a high-growth industry (Murnane, et al., 2002).

The Cisco Networking Academy growth within the State of Montana matches the statistics per capita within the United States (View quality metrics report section, 2011). The State of Montana Cisco Networking Academy program provides a logical, convenient target to collect data and quantitatively evaluate its sustainability within high schools. By choosing to adopt this curriculum, districts demonstrated their willingness to initially invest large amounts of available funding for instructor training and equipment.

Research Questions

This study utilized a mixed research method answering questions both quantitatively and qualitatively. In research a well-crafted strong question is necessary in order to guide the researcher throughout the remainder of the writing and researching process (DeArmond, Booth, Colomb, & Williams, 1995). It is noted that the research question is often stated in the context of some theory that has been advanced to address the problem (Structure of research, 2006)

Central Question

Q1 - What factors determined successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools?

Secondary Question

Q2 - What was the relationship between a school administrator's competence in information technology and the sustainability of corporate-sponsored IT curriculum programs?

Tertiary Question

Q3 - What was the relationship between school district size and the sustainability of corporate-sponsored IT curriculum programs?

Hypothesis

A hypothesis is a type of research statement or idea which makes a statement about some idea or concept thought to be true. This prediction by

the researcher tentatively describes the possible results of a research project (Cozby, 2007).

Secondary Question (Q2):

H_0 – Null Hypothesis - School administrator competency has no impact on the sustainability of corporate-sponsored IT curriculum programs.

H_1 – Research Hypothesis - School administrator competency in information technology has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Tertiary Question (Q3):

H_0 – Null Hypothesis – School district size has no impact on the sustainability of corporate-sponsored IT curriculum programs.

H_1 – Research Hypothesis – School district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Definition of Terms

Academy

Academies can be public or private colleges or schools or a group of specific subject authorities who dictate standards within that subject. An academy can also be a training program specializing in a primary subject or curricular area (Academy, 2013).

Administrator, School

School administrators are part of the leadership team of a school district. Superintendents are district-wide administrators who manage and implement district policies. Principals are school building administrators whose responsibilities include but are not limited to management of the physical facility(s), guide and implement district policies in the individual school building, and guide the direction of the personnel within the local school building (Education Administrators, 2009).

Cisco Networking Academy Program (CNAP)

The Cisco Networking Academy Program is a corporate sponsored hybrid eLearning tool used to train students how to develop, implement, and maintain computer network infrastructures. This curriculum was and is written by Academy instructors from all over the world. The instructor training piece of this program is based upon a hierarchical design where Cisco Academy Training Centers are responsible to train Regional Cisco Networking Academies; and Regional Academies are responsible to support and train Local Academies. The cost to become an Academy includes equipment, training, and support. Cisco Systems fully supports the program by paying for the development of the curriculum and supporting the eLearning Academy portal. Local Academies pay for yearly support from Regional Academies.

Corporate Sponsored Curriculum

Corporate sponsored curriculum is partnerships between profit based corporations or non-profit organizations and school(s) or school districts in order to provide academic and/or vocational curriculum (Schrum, 2002).

Educational Technology

"…is the use of technology to support the learning process. Although the term can refer to all kinds of analogue technologies, e.g. photographs, film, video, audio recordings etc., it is usually used to talk specifically about digital computer technology" (What is educational technology?, 2008, p. 1).

Information Communication Technology (ICT)

Information communication technology encompasses all forms of technology used to create, store, exchange and utilize information in its various forms including business data, conversations, still images, motion pictures and multimedia presentations (Vocational Training, 2010).

International Society for Technology in Education (ISTE)

The International Society for Technology in Education is the premier membership association for educators and education leaders engaged in advancing learning and teaching through innovative and effective uses of technology in PK-12 and teacher education (News, 2011).

The ISTE NETS and Performance Indicators for Administrators (NETS-A)

The National Educational Technology Standards for Administrators (NETS-A) are widely accepted standards for the school administrators in the area of educational technology. Although most standards are content specific, the NETS-A standards are not subject-matter specific; but rather, a list of

skills necessary for one to be effective technology users in a digital world (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009; NETS for administrators 2002, 2002; Standards, 2011).

Program Sustainability

Program sustainability is primarily having the human, financial, technological, and organizational resources to provide services to meet needs and attain results towards mission on an ongoing basis. Sustainability requires the organizational / programmatic infrastructure to carry out core functions independent of individuals or one-time opportunities (Bischoff-Turner, 2007).

School District

"A school district is a geographic area within a state whereby a public school system operates as a governmental entity with responsibility for operating public schools in that geographic area. School districts may be wholly contained in one county or parts of many counties" (Census 1990 concepts & definitions, 2008).

Stakeholder

"Person, group, or organization that has direct or indirect stake in an organization because it can affect or be affected by the organization's actions, objectives, and policies" (BusinessDictionary.com, 2008).

Vocational / Technical Education

Vocational education or training is defined as "…training for a specific vocation in industry or agriculture or trade" (Vocational Training, 2010). Vocational / technical education is based upon training student in curriculum

which leads to a technically-based employment opportunity. Generally speaking, vocational education leads one directly into the workforce upon completion.

Delimitations

Delimitations of a study are synonymous with its external validity. "…external validity of a study is the extent to which the results can be generalized to other populations and settings" (Cozby, 2007, p. 87). This is important in replicating the results of the study in similar situations with similar populations. The external validity of this study would be impacted by the limited scope of the researched group. The scope of this study was delimited to school districts within the State of Montana, specifically, those who have or are offering corporate-sponsored information technology curriculum programs. The specificity of the scope is related to a district's commitment to invest funding to subscribe to a relatively costly sustainable curriculum.

Although the research group was delimited to school districts in Montana that have or are currently participating in the Cisco Networking Academy Program, Academies exist throughout the United States and world. This adds to this study's ability to be duplicated. This study excluded those Montana school districts that do or did not participate in the Academy program. This delimitation excluded successful educational technology programs being offered in non-academy districts; however, the scope of the study was pointed to those school districts that choose to make the investment

in corporate sponsored curriculum and being that the Cisco Networking Academy is one of the first and might be seen as most popular, these districts will be the primary scope of the study. This study was also delimited to school districts in the State of Montana participating in the Oracle Academy, Microsoft Academy, and / or the VMware Academy programs as well.

Limitations

The limitations of a study evaluate variables based upon their internal validity. "Internal validity refers to the ability to draw conclusions about causal relationships from our data" (Cozby, 2007, p. 87). Furthermore, Cozby (2007) states that strong internal validity exists when one variable or factor can cause changes in the other variables or factors within the study.

Within this study, a number of factors might control its internal validity. Because population size impacts sample size, it was difficult to find enough participants willing to take part in the study impacted the study's validity. A school district and its administration's opinion of the Cisco Networking Academy, whether positive or negative, might have affected their desire to participate. Administrators might determine this study superfluous and refuse to participate. The lack of participation, eighteen (18) out of a possible forty-six (46), limited this study's external validity. Another factor might have been the reliability of the survey tool and whether the survey tool has a proven validity; however, the PTLA has proven success (Principals Technology Leadership Assessment, 2008).

The selection of participating administrators and school districts was a limitation. Only those Montana administrators of high schools who have offered corporate-sponsored ICT curriculum within the last two school years was asked to participate.

Another limitation is the fact that this researcher has been part of the Cisco Networking Academy program for over nine years as an instructor as well as part of the Academy assessment team developing questions for various courses.

Significance of the Study

This study would extend the Dawson and Rakes (2003) study to further evaluate what impact the school administration has on the success and sustainability of corporate-sponsored information technology training programs within school districts. In addition, while school districts are placed in a position to decide how to allocate limited resources, often information technology and educational technology programs can become a victim. Opinions often differ on the importance of using computer technology as a learning tool. Instructors can find practical uses for computer technology in the classroom as an effective teaching tool.

The fact that information technology is a vital part of society and the world economy is irrefutable. With the high growth in information technology job fields, industry is eager to build relationships with educational institutions in order to bridge the gap between the need for qualified skilled workers and student seeking positions in high growth technical companies.

School-industry partnerships between information technology based companies and local school districts can aid in bridging that gap. Once these bridges have been developed, school districts are placed in the position to either grow that relationship or allow it to diminish. School districts are in a position to support corporate-sponsored programs and curriculum with personnel and finances. Administration is in a position to make decisions on the sustainability of such programs based upon a number of factors.

Information communication technology is a high growth industry; however, costs to sustain or maintain the technologies can be a drain on school districts. Training instructors and maintaining equipment add to the cost of sustaining corporate sponsored IT curriculum. Once IT curriculum is adopted, schools need to determine whether the school vision, students, and stakeholders are willing to support the high cost of this type of curriculum offerings.

Schools are in a position to determine whether they wish to develop industry-school partnerships or if philosophically they are unable to support industry or corporate invasion into schools.

By studying specifically those school districts that adopted the Cisco Networking Academy program, and other such programs, the conclusions may be generalized to other states and to other corporate sponsored curriculum providers besides those sponsored by the Cisco Networking Academy program. Ultimately, this study will identify those dynamics within

school districts that help define the sustainability of information technology curriculum provided by corporate-school partnerships.

Finally, as noted earlier, why study the Cisco Networking Academy? With all of the possible technology academy available, studying the Cisco Networking Academy offers a widely used curriculum used both in public and private institutions. Richard Murnane, Nancy Sharkey, and Frank Levy (2002) points out five reason that the Cisco Networking Academy program should be studied.

> First, the program has grown extraordinarily rapidly, passing the market test of whether a great many high schools, community colleges, and not-for-profit organizations find it valuable. Second, the program is aimed primarily at high school students and other people who do not have a four-year college degree. As such, it is an exception to the general pattern in the United States that the most in-depth training goes to workers who have the most formal education. Third, in the United States the program is delivered primarily in public high schools and community colleges, institutions central to the effort to prepare the next generation of Americans for life in a rapidly changing society. Understanding how the Academies program achieved such rapid growth within existing institutions may provide insights about ways to improve the performance of these institutions. Fourth, materials describing the program state that it is aligned with national skills standards. This is intriguing because it suggests the possibility that the

> Academies program may not only prepare students to build and maintain computer networks but also might teach more generic skills useful in other occupations. Finally, students who complete the program and pass examinations administered by an independent organization receive credentials that may improve access to good jobs. (p. 127)

Summary

In summary, historically vocational training has been part of high schools for over one hundred years. High schools were developed to train workers for the industries within towns and cities. These industry-school relationships were developed to build adequate workforces for the factories of the time. Over time, academics replaced much of the vocational training. Industry was in a position to self-train its own workforce.

In modern time, the growth of information technologies has allowed industry to once again introduce relationships between them and schools in order to build highly trained workforces. The tradition of the early high schools has moved to an academic institution preparing students to attend institutions of higher education rather than training grounds for building a qualified workforce for industry. The question is whether modern information age high schools are willing to build school-industry relationships again to help train a highly skilled workforce? Are modern high schools willing to sustain vocational training programs? Who is responsible to evaluate these

programs based upon what standard to determine their sustainability? Are these programs for the good of the students, or are school districts working directly for local industry?

Understanding these relationships are foundational to determine the future of the public and private school system; and, education position in a world economy (Friedman, 2007). School districts are continually asked to do more with less. School districts are in a position to continually re-allocate their resources in order to meet the educational and technical needs of its students. School boards and school administrators are in a position to make value judgment on behalf of the district's stakeholders on what educational and vocational programs should be emphasized. This study was designed to discover if there is a correlation between the school administration and the sustainability of corporate-sponsored curriculum based upon industry-school partnerships. The scope of the study included Montana school districts that have adopted the Cisco Networking Academy curriculum offerings either currently or in the past.

This study was designed in order to provide data by which conclusions can be developed on vocational programs specifically, ICT program sustainability.

CHAPTER TWO

REVIEW OF THE LITERATURE

"A substantive, thorough, sophisticated literature review is a pre-condition for doing substantive, thorough, sophisticated research" (Boote & Beile, 2005). According to Cozby (2007) prior to conducting any research, an investigator must have a thorough knowledge of the research subject. The literature review is used to frame the problem statement (Creswell, 2007). Therefore, this review of the literature will further define the purpose of the study.

This review of the literature will concentrate on literature which discusses the impact of school administration on the sustainability of corporate sponsored information technology curriculum within public and private high schools. This will continue with a critical discussion of specifically commercially designed computer technology academy programs offered to K-12 school districts. The discussion will review the most implemented corporate-sponsored curriculum offerings; specifically concentrating on the Cisco Networking Academy Program because of its wide spread use in public and private K-12 schools.

This review will look at the impact the school or district administrator has on the sustainability of the use of corporate-sponsored academy programs. This discussion will look to see what others have discovered on the subject of school or district administrator's knowledge of educational technology and its impact on corporate-sponsored academy programs.

Information Technology Training in K-12 Schools

Many school districts are still stuck in the 19th century; in that, "…computers are not at the core of schools. They are used mainly for special courses in schools, such as programming, tech prep, and business applications, or for basic computer literacy" (Collins & Halversion, 2009, p. 9; Stallard & Cocker, 2001). With a few exceptions, K-12 schools did not become involved in teaching computers until the microcomputers came on the market in the late 1970's. Much of the earliest educational use of computers in the classroom was primarily students learning to program the computers or computer related skills such as word processing or spreadsheet manipulation (Reiser, 2001). With the development of educationally based software, computers and computer technology was used in classrooms as a means to supplement instruction. Early adopters of computer aided instruction found ways to include the use of computers into the curriculum.

The issue was still the cost of computer technology and the need to justify the cost. Instructor training became another issue in the use of computer technology. School district stakeholders, particularly those in business using computers noted the emerging importance of computer technology. These stakeholders encouraged schools to find ways to incorporate computer technologies into curricular areas. At the same time, some computer vendors were finding ways to build interest in their products by offering discounts to schools. For example, Apple computers in the 1980's began their education initiative with a goal of placing their products in schools

and colleges. One feature of the program was their desire to offer every school district a free Apple computer. This program continued for a number of years with school districts receiving Apple IIe and Macintosh computers (Wozniak & Smith, 2006). The effort of computer vendors caused enthusiasm among educators to find ways to seamlessly incorporate this technology into all areas of their curriculum (Wagner, 2010). By placing computers into the hands of educators, schools and computer vendors developed partnerships that advanced the use of computers in the classroom.

Corporate Sponsorship of Curriculum in K-12 School Districts

The idea of a business-school partnership is not a recent development; however, because of No Child Left Behind, low performing schools are actively seeking businesses willing to financially support low performing schools (Hann, 2008; Seven strategies for success, 2011). Susan Kranberg (1993) stated that there are four levels of school-business partnerships: (a) Helping hands; (b) Programmatic initiatives; (c) Policy changes, and (d) Alliances, Compacts, Community Coalition Efforts.

Level one, helping hands, develops an adopt-a-school program where business provides funding and support in areas where schools are unable to fund directly. Level two; programmatic initiatives include specifically curricular areas unique to the business supplying the curriculum or curriculum support. Level three, policy changes, include lobbying efforts from business to change public policy in order to benefit the school district. Level four, alliances, compacts, and community coalition efforts include developing

school district support organizations built from a number of businesses and/or corporations in order to support specific goal(s) of the districts (Kranberg, 1993).

Public Views on School-Business Partnerships

School-business partnerships present a wide range of relationships between the school district and the sponsoring business. School district stakeholders are in a position to view these relationships as a benefit to the schools; but, at what cost. Both educators and corporate leaders find ways to support business efforts to improve education while mitigating the possible negative impact. For a number of years, schools have traditionally sold products in order to fund various programs or student projects. These products included school spirit items, various consumable food items, bookstore items, magazines, etc. Local school stakeholders are strategically in a position where they support local school districts and buying these foods, books, magazines, and other items along with paying property taxes along with supporting sporting events as well.

> In 2000 the Government Accounting Office completed a study on commercialism in public schools and identified "…four distinct types of school-based commercialism: (1) Product sales, including arrangements with companies to sell their products in and to schools, as well as rebate and fundraising programs; (2) direct advertising, including ads in school publications and free product samples; (3) indirect advertising using such methods as

> corporate-sponsored incentive programs, educational materials that display brand names, product samples, and corporate gifts; and (4) market research using questionnaires, taste tests, and online surveys. (Public education: Commercial activities in schools, 2000, p. 3)

Commercialism in K-12 school districts has always been contentious, forcing school districts to weigh their responsibility to district stakeholders with the requirements for donated equipment from corporate donors. "Commercialism is an expression of advanced capitalist culture and a profound threat to democratic institutions. Its impact on schools is, at its most basic, to transform the guiding ideal of public schools as centers of learning serving the public good to centers of profit benefiting private interests…. Schools have come to be seen as markets for vendors, venues for advertising and marketing, and commodities to be bought and sold" (Molnar, 2005, p. 16).

Molnar continues by arguing that the commercialism of schools interferes with the schools ability to provide a quality education (Molnar, 2001). However, proponents argue that relationships between business and schools can be mutually beneficial in that underfunded schools have resources typically common in well-funded schools (Supporting students or selling access?, 1998).

Purpose for Educational Technology in Schools

Educational technology uses information technologies to enhance and expand traditional teaching and learning practices. While educators were early adopters of information technologies within classrooms, school

administrators were aware that educational technologies would become necessary to improve learning and teaching (Bennett & Gelernter, 2001). Early within the information age, many teachers were uncomfortable with information technology and even reticent to use these new technologies (Dawson & Rakes, 2003). Although schools seldom found time to offer training for educators, administrators realized the importance for teachers to learn how to integrate information technologies into the curriculum (Dawson & Rakes, 2003).

Early enhancements to curriculum became required as computer technologies became more common to school districts. Funding computer technology is an ongoing issue. Cost and access to computer technology has always been one of the modern challenges for school districts. An ideal ratio for student to computer is 1:1; however in reality the ratio is at least 1:9 (Collins & Halversion, 2009). School districts seek alternate sources of funding; however, dealing with the commercialization of the public school system leads school districts to controversy; although, it can also potentially yield rewards for students and educators. There must be a large enough advantage or schools would not pursue corporate funding.

Students are comfortable using computers for social networking, listening to downloaded music, manipulate digital photographs and videos, surfing the Internet for research, and gaming virtually with others around the globe (McCormack & Ross, 2010). Educational technology is more than learning basic computer skills in the classroom or creating simple searches of

data on the Internet. "New technologies can leverage empowerment through access to new sources of information and relationships" (November, 2001, p. xxi). "Technology can be a powerful tool to increase motivation, engagement, and achievement" (Park, Khan, & Petrina, 2009). Computer technology in schools has evolved from an experimental technology for use in science and mathematics classrooms to a vital educational tool. In the purest sense, technology is the art of making or crafting in order to satisfy human needs (Dugger, 2002). Students recognize the importance and utility of the use of technology in an educational setting. "Students, the report argues, are trendsetters in using technology in their personal lives and, more recently, to organize and complete schoolwork" (Manzo, 2009). Although educators seem divided on the utility of educational technology, some studies show that students can learn important life skills by using computers to participate in simulations and gaming. The European Parliament Committee on Internal Market and Consumer Protection stated that students can learn skills such as …"strategic thinking, creativity, cooperation and innovative thinking" (Computer games 'can teach children essential life skills, 2009). The view of educational technology as a means to supplant traditional instruction has limited educators' vision on the usefulness of traditional and nontraditional gaming as a teaching and learning tool.

Although the use of educational technology is not necessarily the only way or the best way to promote creativity and imagination, it presents itself as an interactive tool to do so. Einstein considered imagination more important

than knowledge, and that knowledge grew only when the mind was receptive to the unfamiliar and when old things were perceived in new ways (Penick, 1996).

Early studies on the use of educational technology within school districts pointed out that educational technology must be able to improve K-12 learning and at the same time be sustainable, adaptable, and scalable (Simkins, Vodicka, & Gonzales, 2009). Because of the speed of change in technology some districts are promoting a nimble attitude by providing all students with notebook computers (Stover, 2007).

Overall, school districts are responsible to decide how they will respond to educational technology in all of its iterations. The lack of expertise can no longer be an excuse because most new teachers are already comfortable with the new technologies, and research and development have already developed a number of hardware and software applications that have proven to improve education (Picciano, 1998). The research continues to expand on educational technology utility within the public and private sectors of education especially in how student learning has improved.

Information Technologies Career Training in High Schools

Why Career Training in High Schools

Recently, there has been a lack of support for vocational education in school districts. Daniel A. Domenech (2011), executive director of the American Association of School Administrators, stated that school

administrators know that, perhaps for very legitimate reasons, vocational education has fallen out of favor.

> For many years, occupational education programs were the dumping ground for minority students. Today, we envision a world where every child is college-bound, even though the reality is that only about one-third of our students wind up with a college degree. And many of our students who do go to college and graduate from college are ill prepared for the workforce. (Aring, 1993; Domenech, 2011, p. 42)

Domenech (2011) suggested that "…there is a good chance that many of the 30 percent of our students who drop out of high school would stay in school if they were learning a marketable skill that would lead to employment upon graduation" (Bishop, 1988; Domenech, 2011, p. 42). Finally, Domenech (2011) summarized that the current culture against teaching the trades needs to change in order to encourage both those students who are college bound and along with those students who are not, discover the value of taking vocational classes in high school.

Why IT Training in High Schools

Beginning in the 1980's, industry has been involved in information technology training in the high schools. Although career training is not a new concept to high schools, the introduction of information communication technologies (ICT) training in the high schools is. ICT based companies have found it expedient to provide curriculum in order to increase the number of

qualified computer and network technicians into the continually expanding IT fields (Joyce, 2008). The number of IT academies began to grow as the need for qualified skilled workers grew. In year 2000 employers needed to fill 1.6 million IT skilled jobs worldwide (Brotherton, 2001). Industry and academic partnerships continue to grow offering schools a variety of training opportunities for students.

Corporate-Sponsored IT Curriculum Offerings

Cisco Networking Academy

Cisco Networking Academy was introduced in 1997 with one academy and since then has grown to over ten thousand academies training over two million students worldwide at an average of seven hundred-thousand each year (Global participating academy count 2008; Impact in Montana, 2011; An interview with Carroll McGillin, 2009; Pignatiello, 2009). “The academy program covers 280 hours of training using a combination of Web-based and instructor-led sessions along with a hands-on lab environment to teach students how to design, build and maintain computer networks” (Cisco's global training machine, 2008; Murnane, et al., 2002). "The academy is not a business line; it's a not-for-profit enterprise. Part of the mission is to invest in the communities where we do business. This is a long-term global perspective” (Cisco's global training machine, 2008).

The Cisco Networking Academy Program provides a dynamic curriculum written and reviewed by IT instructors from both high schools and colleges. The Academy also provides an instruction learning management

web-based system where students can view the curriculum, take assessments, and download applications to be used in a lab environment. In order to become an academy, a school must complete appropriate documentation consisting of commitment agreements. The commitments include: the training of instructors and the purchase of lab bundled equipment. Each local academy is under the mentorship of a regional academy that is responsible for the initial training and any updates (Behrens, Mislevy, Bauer, Williamson, & Levy, 2004; Brush & Bitter, 2000; The Cisco Networking Academy Program, 2001; Murnane, et al., 2002). The Academy program provides coursework targeted toward the Cisco Certified Networking Associate and Professional industry standard certification along with curriculum targeted toward the CompTIA A+ and Network+ industry standard certification. The course work is continually upgraded to meet the changing industry standards. The primary goal is to prepare students to complete certifications and compete successfully in information technologies career fields (Brown, 2007).

In the past, however, the curriculum developed by the Cisco Networking Academy program promoted little success in passing the industry standard certifications (Thompson, 2004). Thompson (2004) stated also that the high school students need more basic IT preparation prior to enrolling into a Cisco Networking Academy curriculum offering. The Academy program responded by developing its curriculum on two tracks: one for high school students and one for college. Thus far, by dividing the curriculum into two tracks, academies have found a higher retention rate for high school students.

Out of one-hundred and seventy-five (175) high schools only forty-eight (48) of those high schools were or are currently active academies. As of fall 2013, only three (3) are fully active (Cisco Networking Academy Netspace, 2009; Impact in Montana, 2011).

The Cisco Networking Academy program in Montana began in 1998 under the leadership of Dr. Suzanne Waring, Director of Outreach Programs at Great Falls College Montana State University (MSU) (formerly Montana State University – Great Falls, College of Technology). Dr. Waring attended a statewide meeting sponsored by the Cisco Networking Academy in Helena, Montana and was introduced to the fledgling academy program. After receiving approval from the then Dean/CEO of Great Falls College MSU, she began recruiting regional and local academies. In November 1998, an open house celebration was held to kick-off the Cisco Networking Academy in Montana. The event was attended by representatives from the five new regional academies; Great Falls, Billings, Missoula, Helena, and Butte along with college administrators, John Morgridge, Cisco Systems Chairman of the Board, representatives from Montana State Department of Administration, and a number of donors (Waring & Kirkendall, 2000).

Because of the high expense of starting an academy, Dr. Waring sought out granting institutions that would supply seed funding for the Cisco Networking Academy program in Montana. Funding came initially from grants from Cisco Systems, General Mills Co., Century Link (formerly Qwest), The Montana Department of Administration, and a number of private

donors. This funding was used to help regional and local academies to defray some of the initial cost, approximately fifteen thousand dollars ($ 15,000) – see Appendix XII - of becoming an academy (Waring, 2012; Waring & Kirkendall, 2000). Once the funding sources dried up, academies were responsible to fund their programs themselves (Waring, 2012).

Oracle Academy

The Oracle Academy program was developed to prepare students in the area of database design and programming. The program consists of three courses that lead students to prepare for Oracle industry standard certifications. The academy provides schools with teacher training, curriculum, and application software. "Students, in turn, receive a high-touch, high-quality learning experience on skills all employers require. The business/IT curriculum emphasizes both high-tech and professional skills--such as critical thinking, problem solving, debate, negotiation, presentation and organizational skills--necessary for all future careers" (Oracle Academy: Four success stories model the competitive edge of CTE, 2004). The cost of the program consists of a three-thousand dollar training fee for each instructor and a five-hundred dollar yearly subscription fee (Sands, 2003). Oracle as of year 2013 has not changed the cost of the program.

Industry and education have continued to leverage each one's advantage in preparing students to become important members of an ever expanding workforce. Most academies have put much time into developing their curriculum in ways to match the learning goals of state and local boards

of education. These curriculum offerings are well developed and continue to improve with the technologies.

Although in the past, a number of high schools and technical colleges have participated in the Oracle Academy program, currently, Montana does not have any active Oracle Academies (Find an academy school near me, 2011).

Microsoft Academy

The Microsoft IT Academy program was developed to train students for desktop productivity careers using Microsoft operating systems and Microsoft Office products. The most basic package was developed for K-12 students preparing them to use Microsoft Office products (Sands, 2003). According to Sands (2003), instructors must become Microsoft certified prior to teaching the curriculum to students. This training costs between five-hundred and fifteen-hundred dollars, depending upon which format the instructor uses to take the class, along with an annual membership cost. Other than the instructor training, schools are required to purchase the software and curriculum for each class (Microsoft IT Academy program requirements, 2009).

Currently, there are three (3) Microsoft IT Academies in the State of Montana: Chief Dull Knife College, Fort Peck Community College, and the University of Montana, School of Business Administration. No Montana public high schools were listed (Find a Microsoft IT Academy, 2011).

The Influence of E-Learning on School Districts

Much of the corporate - sponsored curriculum developed utilizes e-learning technologies. The concept of e-learning has evolved out of the major computer technological advancements available to school districts. The growth of the Internet and the increase in network bandwidth has allowed e-learning to become more available and practical.

The early history of K-12 e-learning becomes possible with the invention of satellite television transmissions (ETV). High school students were able to take courses that were not available within the local school district. Colleges and universities with satellite television transmission ability would create classes and instruct them using this media. Early versions of e-learning was primarily using the electronic media to present the content while having students completing assignments and submitting them using the postal service (Baggaley, 2008; Casey, 2008). With the development of the Internet, and particularly its ability to transmit streaming audio and video e-learning became not only more available but also more interactive. This created classrooms with walls where students are able to take classes from home or any other location with Internet access. "We took teachers out of brick-and-mortar classrooms and put them in virtual ones" (Coyle, Jones, & Pickle, 2009).

E-learning has, however, opened the conversation on the quality of the coursework delivery and the value of face-to-face interactions.

> Still, experts caution schools not to embrace the speed of change unless it clearly leads to improvement. Because online learning is still a relatively new development in education, especially at the K-12 level, researchers are just beginning to evaluate its effectiveness. As it is, there are no definitive studies proving that e-learning is more effective than traditional learning. (Ash, 2009)

Many modern students become conversant in e-learning at an early age. Their vast experience with social networking such as: blogs, Facebook, MySpace, Friendster, etc. have allowed them to become comfortable using the computer as a communication tool (Pempek, Yermolayvena, & Calvert, 2009). Some school districts have begun to embrace these Web 2.0 technologies as a means of instruction and communication" (Techsoup, 2009). A National School Boards Association (NSBA) report found that 96% of students with online access are already using social networking technology to chat, text message, blog, and build personal Web pages (McKibben, 2008). Further, students are using these sites as tools to discuss education--on their own time. Almost 60% of students who use social networking talk about education topics online and 50% talk specifically about schoolwork"(McKibben, 2008).

School districts and computer technology will continue to grow together. Districts can benefit from embrace the number of growing online tools available to them. Schools continue to be in a place where they are pushed to respond to technology. Computer technology will continue to be a

growth industry at the same time traditional schools are losing their walls. Students already know the technology and schools need to provision themselves in a position to mentor students in its proper use (Dillon, 2008).

Leadership in Educational Technology

Prerequisite Leadership Qualities

Key to understanding the relationship between school leadership and information technology understands the basic relationship between school leaders and the function of information technology. In order to fully understand this relationship one needs to fully define what qualities a technical savvy school leader should possess and how it relates to the sustainability of information technology programs.

Although many of the same leadership attributes apply to all those who are educational leaders, leaders and specifically school administrators directly involved in both information and communication technologies and its subset educational technology, expand their knowledge to include those functions specific to the required technologies. Within organizations some administrators take on the rolls of Chief Information Officer or Chief Technology Officer or technology coordinators (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009). Although most schools will designate someone to do the day to day school technology duties, someone must provide school technology and educational technology oversight.

Defining leadership and particularly effective leadership builds the foundation needed to understand the importance of a school principal's technical expertise. A basic definition of an organizational leader is "…a person who influences individuals and groups within an organization, helps them in establishing goals, and guides them toward achievement of those goals, thereby allowing them to be effective" (Nahavandi, 2009, p. 4). Yukl (2002) further suggests that leadership should be described broadly as a social process where members of the group influence internal and external events based upon goals in order to accomplish desired outcomes. The leader becomes the center point where organizational objectives meet organizational personnel. According to Burns (1978), the primary attribute of leadership separates the interests of the leader toward the goals of the organization. These goals are a combination of interests of both leaders and followers. Leaders and followers are both functions of an organization. Essentially, a school administrator is responsible to guide a school according to the vision and goals of the organization.

The effectiveness of an organization's programs depends on the effectiveness of its leaders. Effective leadership is essential in order to achieve organizational visions and objectives.

> The definitions of leadership effectiveness are as diverse as the definitions of organizational effectiveness. The choice of a certain definition depends mostly on the point of view of the person trying

> to determine effectiveness and on the constituents who are being considered. (Nahavandi, 2009, p. 4)

Simply stated, effective leadership is responsible for the sustainability of curricular programs, student success, and instructor professional growth. "The effective leader creates conditions for acceptance by encouraging participation, providing ongoing professional development, encouraging failure, and story sharing" (Calabrese, 2002, p. 79). Effective leaders allow followers to invest themselves into an effective organization. One study suggested that "…effective leaders provided a sense of direction and concern for the future" (Harris, 2001, p. 10). A summary of research on effective leadership suggests that effective schools are dependent on the school administrator (Harris, Day, & Hadfield, 2003).

Effective school leadership is foundational to both school management and student achievement (Nahavandi, 2009; Sweeney, 1982). Administrative effectiveness is strongly based upon his/her expertise as an administrator and primary leader in a school (Blase, 1987). According to Hoy and Miskel (2008), the three indicators to educational leader effectiveness are personal perceived reputation, organizational goal attainment, and individual performance satisfaction Nahavandi (2009). further defines leadership effectiveness in terms of three elements: goal achievement, smooth internal processes, and external adaptability. Research summarizes that effective leaders should focus on outcomes; that is, their success is measured by successful results (Nahavandi, 2009). Sometimes the most effective leader is

the one who simply moves aside and allows success and change to happen (Calabrese, 2002).

Leadership in Educational Technology

In the early years of computing during the 1960's and 1970's, schools were excluded from the computer revolution for a number of reasons; but, primarily because computer equipment and software were expensive and designed for data-processing applications (Picciano, 1998). Education is experiencing a major transition which demands a new type of educational leader (Collins & Halversion, 2009). Building principals have traditionally been viewed as the technology leader as well (Yee, 2001). Holland & Moore-Steward (2000) stated that the building principal is a key facilitator in the effort to include technology into the school (Anderson & Dexter, 2005; Davies, 2010; Holland & Moore-Steward, 2000). Because school administrators are considered the technology leader, they need to understand the impact of technology and how to use knowledgeable staff effectively (Fitton, 2011).

> Administrators play a pivotal role in determining how well technology is used in our schools. The NETS for Administrators enable us to define what administrators need to know and be able to do in order to discharge their responsibility as leaders in the effective use of technology in our schools. (Standards - NETS for Administrators, 2011)

Unfortunately, few school district administrators can be considered "tech savvy" to fully understand the function of information technology within their schools. "A principal or superintendent who knows technology and information management is a rare commodity and extremely valuable" (Stallard & Cocker, 2001, p. 54).

Don Knezek, ISTE CEO, wrote that

> …Integrating technology throughout a school system is, in itself, significant systemic reform. We have a wealth of evidence attesting to the importance of leadership in implementing and sustaining systemic reform in schools. It is critical, therefore, that we attend seriously to leadership for technology in schools. (Standards - NETS for Administrators, 2011)

The use of information technology in K-12 school districts has grown substantially. Schools have always used some form of educational technology; the only difference is how the technology has been defined. Educational technologies include everything from mechanical pencils to film strip projectors. Until recently, computer technology has been added to never ending list of technologies. School districts have always been placed in a position to find educational uses for the newest technology. Determining how to allocate resources has always been a challenge. The responsibility for the leadership and management ultimately falls on the school or district administration (Weiner, 2000). Administrators play a pivotal role in determining how well technology is used in our schools" (Knezek, 2008). As

a result, administrators need to have a shared vision of the integration of technology and inspire this vision to all other staff members (NETS for administrators 2002, 2002). School administrators also need to support policies which allow for equal access to technology by students, teachers, staff, and administration. These responsibilities include providing skilled personnel in the use of educational technology along with those who can support its use. In addition, administrators need to provide professional development for those who use and support educational technologies (Knezek & Thomas, 2002).

However, technological innovation has challenged school administrators with expanding a school's use of technology beyond comfortable levels. In 2011, Idaho's State Superintendent of Public Instruction challenged all freshman students in the state to take two online courses by providing each one with a notebook computer (Quilici & Russell, Winter 2011-12). School principals are asked to expand schools beyond its walls because of the expansion of technology and therefore need to expand their knowledge of higher levels of pedagogical learning and teaching; therefore, learning the online environment becomes extremely important (Picciano & Seaman, 2010).

The ISTE organization outlines six areas for which administrators need to be involved in educational technology. These areas are leadership and vision; learning and teaching; productivity and professional practice; support management, and operations; assessment and evaluation; and social, legal, and

ethical issues ("NETS for administrators 2002," 2002). Each administrator in a school district has important responsibilities when implementing successful educational technology programming within each school. The administration's educational technology team included the superintendent, principals, and the district program director. The ISTE standards outline each member of the school district's administration's responsibility in implementing the six goals (NETS for administrators 2002, 2002). These standards are the foundation that frames the administration survey used in this study.

School Administrator as Information Technology Planner

"It is a long-standing maxim in educational technology circles that a district or school technology plan is key to the success of technology utilization" (Stallard & Cocker, 2001, p. 55). Administrators need to keep five lessons in mind when technology planning: It's Not About the Technology, Let the Plan Fit the School, Build in Professional Development, Give Collaboration Its Due, and Become Turnover-Proof (Overbay, Mollette, & Vasu, 2011).

Educational Technology Survey Tools

In order to fully understand the many aspects of educational technology, including design and implementation, a number of school districts, educational consortiums, universities, and educational testing companies have developed and implemented educational technology survey tools of various types. One major criterion all educational technology surveys

need to have in common is mapping to a set of standards. The International Society of Technology in Education (ISTE) has been active in developing and maintaining a set of standards for students, administrators, and teachers. The National Educational Technology Standards (NETS) is a performance based set of standards. "ISTE's National Educational Technology Standards (NETS) are the most recognized set of technology education standards in use by teachers and educational leaders around the world today" (NETS seal of allignment, 2008).

A number of surveys have used the National Educational Technology Standards in developing each product. The Taking a Good Look at Instructional Technology (TAGLIT) online assessment, for example, maps its assessment items to specific NET Standards (Teacher TAGLIT-Basic, 2007). The Internet and Computing Core Certification (IC^3) managed by Certiport is designed to test technology competencies of hardware and software. The NET standards were used in developing this product (Internet and computing core certification, 2008).

The CEO Forum on Education and Technology (2001) developed two separate survey tools to be used to collect data on readiness of K-12 schools, and colleges and Universities that implement educational technologies (CEO forum on education and technology, 2001). The results of these survey tools were published in the CEO Forum on Education and Technology four year plan (Key building blocks for student achievement in the 21st century: Year four, 2001). This survey tool was used in Dawson and Rakes (2003) research

study on determining whether technically trained principals have an influence on educational technology within their schools.

"The STaR Chart Assessment questionnaire is composed of five sections or components: (a) Connectivity, (b) Hardware, (c) Content, (d) Professional Development, and (e) Integration and Use" (Dawson & Rakes, 2003, p. 34). The scores rate respondents as low, medium, high, or target tech (Dawson & Rakes, 2003; Key building blocks for student achievement in the 21st century: Year four, 2001).

The Principals' Technology Leadership Assessment (PTLA) was developed by and for University Council for Educational Administration (UCEA) Center for the Advanced Study of Technology Leadership in Education (CASTLE). Funding came from a grant from United States Department of Education Fund for the Improvement of Postsecondary Education (Principals Technology Leadership Assessment, 2008). The PTLA is based upon the National Educational Technology Standards for Administrators (NETS-A) domains developed through the International Society for Technology in Education (ISTE) (Knezek, 2008).

The American Institutes for Research (AIR) did the validation and creation of the Principals' Technology Leadership Assessment (PTLA). The AIR piloted the survey to seventy-four (74) school administrators within seven states and Canadian providences.

The reliability of the test as a whole is high: Cronbach's alpha (α) = 0.95. The item-test correlations show the correlation between each

> item and the overall instrument; the range of item-test correlations is r = 0.39 to 0.80, with only seven (7) items correlated less than 0.50. The item-rest correlation shows how the item is correlated with a scale computed from all other items, minus the item under consideration. For all items, this correlation is lower than the item-test correlation, indicating that each item contributes to measurement of the PTLA construct. Further, the values associated with 'Alpha if item removed' indicate that the instrument does not benefit from the removal of individual items. (Development of the instrument, 2008; McLeod, 2012)

Technology Standards for Administrators

The idea of standards for school administrators is not a new concept with organizations such as the National Policy Board of Educational Administration (NPBEA) and the Interstate School Leaders Licensure Consortium (ISLLC) who developed standards for school administrators (Hancock & Fulwiler, 2007). This lead an organization called Educational Leadership Constituent Council (ELCC) to release the ELCC guidelines directed to higher educational institutions of general areas, school administrators need to be proficient (Richardson, Bathon, Flora, & Lewis, Winter 2012-13).

> Although the ISLCC Standards and the ELCC Standards remain central to educational leaders and educational leadership preparation, it became clear that there was a need to not simply infuse technology

> into these existing standards, but to create new standard that focused exclusively on the technology needs of school administrators. (Richardson, et al., Winter 2012-13, p. 132)

While technology leadership can be expanded to include school faculty, staff, and administrators, the primary school administrator holds an important position within the organization to ultimately guide its present and future use of information and communication technologies. Because of this, standards have been developed from various educational leadership groups to include school administrators' organizational responsibilities within the areas of technology.

Technology Standards for Administrators (TSSA) Collaborative

> "The Collaborative for Technology Standards for School Administrators (TSSA Collaborative) has facilitated the development of a national consensus on what P-12 administrators should know and be able to do to optimize the effective use of technology. This consensus is presented by the Collaborative (November 2001) as Technology Standards for School Administrators (TSSA)". (Bosco, 2001, p. 3).

International Society for Technology in Education (ISTE)

ISTE through its members have developed a series of National Educational Technology Standards (NETS) for students – NETS-S, teachers - NETS•T, and administrators – NETS-A. Because ISTE believes that school administrators hold a critical role in the direction of technology in schools, in

2001 they released their first version of the NETS-A standards (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009).

The International Society of Technology in Education (ISTE) in 2001 enlisted the National Association of Secondary School Principals (NASSP) , National Association of Elementary School Principals (NAESP), American Association of School Administrators (AASA), National School Board Association (NSBA), and North Central Regional Educational Laboratory (NCREL) along with states departments of education, university faculty, and other interested parties in order to develop the NETS●A 2002 standards (Schrum, Galizio, & Ledesma, 2011). In 2009 ISTE realized the use of technology expanded within the workplace and ISTE created a refresh version of the NETS-A standards (Richardson, et al., Winter 2012-13).

The ISTE NETS-A 2002 standards domains included:

1. Leadership and Vision
2. Learning and Teaching
3. Productivity and Professional Practice
4. Support, Management, and Operations
5. Assessment and Evaluation
6. Social, Legal, and Ethical Issues

(Bosco, 2001; NETS for administrators 2002, 2002)

The ISTE NETS-A 2009 standards domain refresh include:

1. Visionary Leadership
2. Digital Age Learning Culture

3. Excellence in Professional Practice
4. Systemic Improvement
5. Digital Citizenship

(Bosco, 2001; *The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009)(see Appendix I).

The primary structure of the standards remained the same with the exclusion of the 2002 standard four (4) on Support, Management, and Operations. These functions were absorbed into the 2009 standards (see Table 1).

Table 1 - ISTE NETS-A Standards Harmonization

ISTE NETS-A Standards Harmonization

ISTE NETS-A 2002	ISTE NETS-A 2009
Leadership and Vision	Visionary Leadership
Learning and Teaching	Digital Age Learning Culture
Productivity and Professional Practice	Excellence in Professional Practice
Support, Management, and Operations	
Assessment and Evaluation	Systemic Improvement
Social, Legal, and Ethical Issues	Digital Citizenship

ISTE (2009) stated that the NETS-A refresh provide a "…framework for school leaders to follow as they transition schools from industrial-age to digital-age places of learning. Specifically, these standards emphasize educational administrators' abilities to facilitate systemic growth…" within

the standards domains (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009, p. i).

Introduction to ISTE NETS-A Standards

The ISTE NETS-A defined "…the responsibilities of district and school leaders in the effective use of technology in education" (*National educational technology standards for administrators*, 2009). The ISTE NETS-A is a suite of standards including the ISTE NETS-T for teachers and the ISTE NETS-S for students

Standard 1 - Visionary Leadership

Technology by its nature is always in constant change; and therefore requires visionary leadership primed to lead rapid organizational change (Calabrese, 2002). "Educational Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization" (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009, p. 16). This includes the following performance indicators:

(a) "Inspire and facilitate among all stakeholders a shared vision of purposeful change that maximizes use of digital-age resources to meet and exceed learning goal, support effective instructional practice, and maximize performance of district and school leaders.

(b) Engage in an ongoing process to develop, implement, and communicate technology-infused strategic plans aligned with a shared vision.

(c) Advocate on local, state, and national levels for policies, programs, and finding to support implementation of a technology-infused vision and strategic plan" (p. 22).

Visionary leadership is essential during times of change presenting followers with the importance of vision, building empowerment and confidence within followers, focusing on flexibility and change, and building teamwork and cooperation (Nahavandi, 2009). A visionary leader needs to inspire the development of purposeful change based upon sound educational practices using current research tools and other strategic resources in order to evolve technology to meet student's educational needs (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009). Visionary leaders are well aware that useful knowledge is based upon sound data collection procedures and accurate information. Utilization of accurate, sound knowledge can efficiently motivate change. "The astute leader appreciates that knowledge is power" (Calabrese, 2002, p. 6).

Exemplary visionary leaders need to commit themselves to continually question old beliefs and assumptions in order to develop dynamic visions (Nahavandi, 2009). "Even in schools that are deeply committed to shared vision, principals remain the key players, both before and after the school adopt a new direction" (Lashway, 2006). Grimes (2004) noted that "…the strength of visionary district leadership is crucial to sustain current- and modify future - systemic growth in the area of technology integration" (Grimes, 2004, p. 40).

Standard 2 - Digital Age Learning Culture

"Educational Administrators create, promote and sustain a dynamic digital-age earning culture that provides a rigorous, relevant, and engaging education for all students (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009, p. 16). This includes the following performance indicators:

(a) Ensure instructional innovation focused on continuous improvement of digital-age learning.

(b) Model and promote the frequent and effective use of technology for learning.

(c) Provide learner-centered environments equipped with technology and learning resources to meet the individual, diverse needs of all learners.

(d) Ensure effective practice in the study of technology and its infusion across the curriculum.

(e) Promote and participate in local, national, and global learning communities that stimulate innovation, creativity, and digital-age collaboration (p. 22)

School administrators are in a position to assess the amount and type of digital information to expose students to on a regular basis (Larson, Miller, & Ribble, 2009). Curriculum is adapting to include a rich amount of digital content through online databases, publisher websites and the Internet as a whole. Clearly, today's K – 12 students live in a time where they are

inundated in ICT sources daily. Parents and community stakeholders expect schools to use computer technology in instruction. School administrators are expected to provide a digital-age learning environment.

Standard 3 - Excellence in Professional Practice

"Educational Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources" (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009, p. 16). This includes the following performance indicators:

(a) Allocate time, resources, and access to ensure ongoing professional growth in technology fluency and integration.

(b) Facilitate and participate in learning communities that stimulate nurture, and support administrators, faculty, and staff in the study and use of technology.

(c) Promote and model effective communication and collaboration among stakeholders using digital-age tools.

(d) Stay abreast of educational research and emerging trends regarding effective use of technology and encourage evaluation of new technologies for their potential to improve student learning (p. 22-23).

Standard 4 (2002) Support, Management, and Operations

"Educational leaders ensure the integration of technology to support productive systems for learning and administration" (NETS for administrators 2002, 2002). This includes the following performance indicators:

(a) Develop, implement, and monitor policies and guidelines to ensure compatibility of technologies.

(b) Implement and use integrated technology-based management and operations systems.

(c) Allocate financial and human resources to ensure complete and sustained implementation of the technology plan.

(d) Integrate strategic plans, technology plans, and other improvement plans and policies to align efforts and leverage resources.

(e) Implement procedures to drive continuous improvements of technology systems and to support technology replacement cycles (p. 1).

This specific area discusses electronic databases, learning management systems (LMS) electronic student information management systems including grading and attendance, building level systems used to manage the operations of schools and districts including: budgeting, teacher evaluation, transportation, , special education, food service.

Standard 4 - Systemic Improvement

"Educational Administrators provide digital age leadership and management to continuously improve the organization through the effective use of information and technology resources" (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009, p. 17). This includes the following performance indicators:

(a) Lead purposeful change to maximize the achievement of learning goals through the appropriate use of technology and media-rich resources.

(b) Collaborate to establish metrics collect and analyze data, interpret results and share findings to improve staff performance and student learning.

(c) Recruit and retain highly competent personnel who use technology creatively and proficiently to advance academic and operational goals.

(d) Establish and leverage strategic partnerships to support systemic improvement.

(e) Establish and maintain a robust infrastructure for technology including integrated interoperable technology systems to support management, operations, teaching, and learning. (p. 23)

Standard 5 - Digital Citizenship

"Educational Administrators model and facilitate understanding of social ethical and legal issues and responsibilities related to an evolving

digital culture" (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009, p. 17). This includes the following performance indicators:

(a) Ensure equitable access to appropriate digital tools and resources to meet the needs of all learners

(b) Promote, model, and establish policies for safe, legal, and ethical use of digital information and technology.

(c) Promote and model responsible social interactions related to the use of technology and information.

(d) Model and facilitate the development of a shared cultural understanding and involvement in global issues through the use of contemporary communication and collaboration tools. (p. 23)

Summary

The challenge in this literature review was to limit its scope to the research questions. By providing a background on how and why corporate-sponsored ICT curriculum was developed, this research project drew a picture on the importance of the school administrator in the sustainability of this type of program. The discussion expanded to include educational technology standards for school administrators in order to discuss the important responsibility school administrators have in the decision making process in order to sustain programs such as corporate-sponsored ICT curricular areas. The discussion continued with the indicators that define a school leader as a technology leader as well. With the expansion of educational and

informational technologies, school administrators have found themselves in a position as learner and mentor on how to effectively use these technologies. Growth in information and communication technologies will continue to push schools and its leaders to become well versed educational technology leaders.

CHAPTER THREE

METHODOLOGY

Chapter three described the design and methodologies of this research project. The data collected drew the distinction, or lack of, between school administrator's knowledge of technology and that of the faculty members. The framework and methodology of this study was based upon a dissertation mixed-method research project as framed by Michelle Miller (2007) which discussed elementary principal's leadership in integrating using educational technology within their schools. The scope of this study was to view the school principal's leadership in the integration of educational technology into schools that are currently or have participated in the Cisco Networking Academy program in the state of Montana. The remainder of the chapter will discuss data collection procedures, participant selection and sampling techniques.

Research Design

This research project used a mixed-methods design. The researcher collected quantitative data through the administration of the Principals' Technology Leadership Assessment (PTLA) and duration in the program data from Montana high school administrators and Cisco Networking Academy. The use of the PTLA is licensed and free to disseminate through UCEA Center for the Advanced Study of Technology Leadership in Education (see Appendix II). The qualitative data was collected through in-depth interviews

with Montana State high school principals whose schools are currently offering Cisco Networking Academy curriculum along with early stakeholders in initiating corporate-sponsored ICT curriculum.

The qualitative data collection followed a cross-case analysis study model of the currently active Montana Cisco Networking Academies based on the Robert Stake (1995) case study research models. The case study used the definition of the theta (Θ) or the case and the iota (ϑ) representing the issues or questions (Stake, 1995). Montana high schools who offer or has offered corporate-sponsored ITC curriculum within the last two school years (2011 – 2013), specifically the Cisco Networking Academy program, is the case (Θ). The central and research questions for this study represent the (ϑ).

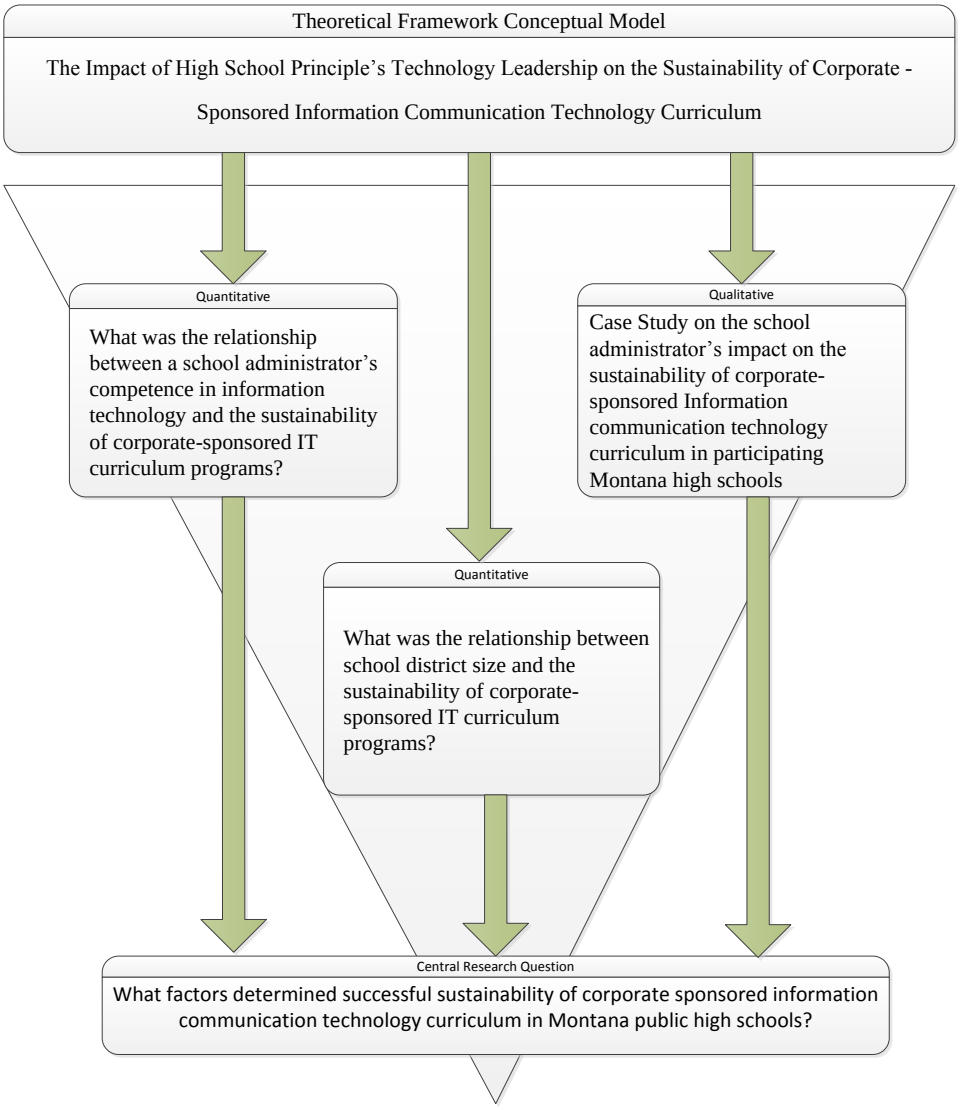
The qualitative and quantitative data was triangulated (Bogdan & Biklen, 2006) in order to answer the central research question: What factors determine successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools?

The quantitative results are based upon a relational, non-experimental design using a self-reporting survey instrument used to show a relationship between an independent variable(s) and a dependent variable(s) (Johnson, 2001). This self-reporting survey instrument polled and collected data from all high school administrators who chose to participate. In order to analyze the data, school districts were grouped by relative size is loosely based upon the Montana High School Association athletic programs divisions (Class AA = 826+; Class A = 340-825; Class B = 120-339; Class C = 1-119) (Montana

High School Association 2012-13 Handbook, 2012). However, the final divisions were developed by dividing schools into five (5) somewhat equal number of schools of a relative size (see table 2).

The Cisco Networking Academy data was collected from databases provided by the Cisco Learning Institute data collection team. This data is current as of January 2012.

Figure 1 - Theoretical Framework Conceptual Model



Central Question

In research a well-crafted strong question is necessary in order to guide the researcher throughout the remainder of the writing and researching process (DeArmond, et al., 1995). "The research question is often stated in the context of some theory that has been advanced to address the problem" (Structure of research, 2006, p. unp).

The central question was answered by triangulating the qualitative and quantitative data. The secondary and ternary questions were evaluated and explained through an analysis of data collected through the PTLA survey tool and the sustainability score (total months Montana high school participated in corporate-sponsored ICT curriculum).

Central Question

Q1 - What factors determined successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools?

Secondary Question

Q2 - What was the relationship between a school administrator's competence in information technology and the sustainability of corporate-sponsored IT curriculum programs?

H_0 – Null Hypothesis - School administrator competency has no impact on the sustainability of corporate-sponsored IT curriculum programs.

H_1 – Research Hypothesis - School administrator competency in information technology has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

The Tertiary Question

Q3 - What was the relationship between school district size and sustainability of corporate-sponsored IT curriculum programs?

H_0 – Null Hypothesis – School district size has no impact on the sustainability of corporate-sponsored IT curriculum programs.

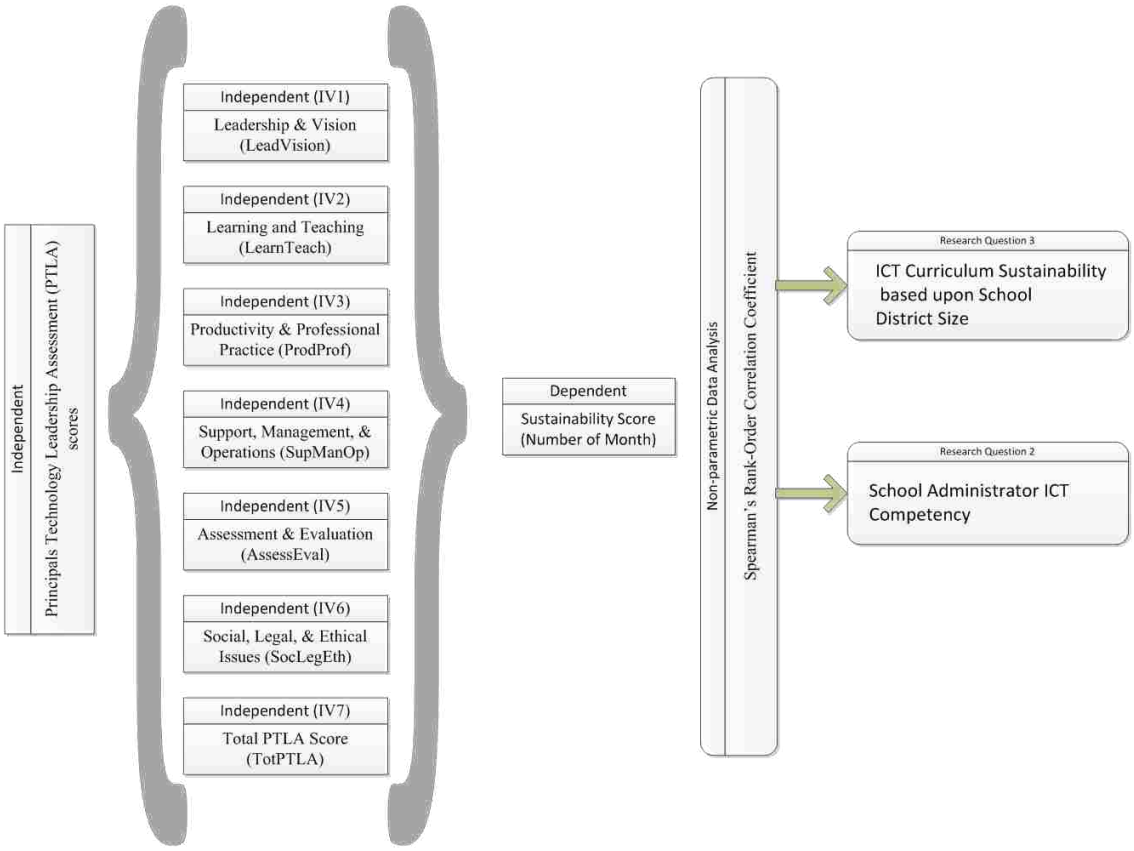
H_1 – Research Hypothesis – School district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Variables Definitions

Introduction

"A variable is any event, situation, behavior, or individual characteristic that varies" (Cozby, 2007, p. 67). Independent variables are those variables that can be manipulated by the researcher, and dependent variables are those variables that are not under the researcher's control (Howell, 2007).

Figure 2 - Study Variable Flow



Independent Variables

The Principals Technology Leadership Assessment (PTLA) scores represent the independent variables. Respondents rated each question based upon a Likert scale from one (1) to five (5). The numeration of the Likert scale is defined as the following: (a) 1 = not at all, (b) 2 = minimally, (c) 3 = somewhat, (d) 4 = significantly, and (e) 5 = fully (Principals' Technology Leadership Assessment (PTLA), 2010). The PTLA consists of six (6) sub-sections with a total of forty-one (41) items. Each sub-section was based upon the International Society for Technology Education National Technology

2002 Standards for Administrators (NETS – A) (Knezek, 2008). The PTLA sub-sections include:

I. Leadership & Vision – six (6) items

II. Learning and Teaching – six (6) items

III. Productivity & Professional Practice – five (5) items

IV. Support, Management, & Operations – six (6) items

V. Assessment & Evaluation – five (5) items

VI. Social, Legal, & Ethical Issues – seven (7) items

Dependent Variable

The Sustainability Score was a dependent variable based upon the total number of months a Montana high school participated in the Cisco Networking Academy program. The Sustainability score was calculated for each participating high school individually and later grouped into five (5) subgroups for data analysis.

i. Hypothesis: Corporate-sponsored IT Program sustainability increased with administrators who score high on the PTLA.

ii. Null Hypothesis: School administrator scores on the PTLA has no impact on the sustainability of corporate-sponsored IT programs

The Sustainability Score was also determined group wise. Schools were grouped according to the high school's total 2009-2010 population as recorded by the Montana Office of Public Instruction (OPI) database. A review of the 2010 – 2011 from the Montana OPI database, noted that the

student population numbers did not change significantly from 2009 – 2010. The Sustainability score was the mean of all high schools Sustainability scores from that group.

i. Hypothesis: The Sustainability score will be higher in larger school districts.

ii. Null Hypothesis: There will not be any perceptible difference in Sustainability scores among each high school group.

Participants

Quantitative data elicited from all Montana high school principals working in high schools that participated in the Cisco Networking Academy from 1998 to 2013. Qualitative data will be collected from those Montana high school principals who participated in the PTLA survey and are currently administrating high schools that currently offer corporate-sponsored ICT curriculum or have offered the curriculum between 2010 and 2012. Although there are a number of corporate-sponsored ICT curricula, this study specifically will concentrate on the Cisco Networking Academy.

Population and Sampling

Population in statistics consists of a complete group sharing at least one measurable attribute (Hoffman, 2006). This study was a census; that is, using the entire population (N) rather than any sampling (n) technique.

The population for this study included all high school principals in Montana who have adopted corporate sponsored computer training academy programs, specifically the Cisco Networking Academy between 1998 and

2013. The initial demographics of the study include: the total number of public high schools in Montana is one-hundred and seventy five (175) of which forty-six (46) were or are currently Cisco Networking Academies which represents 26.2 percent of all public high schools. This population included both those who are currently active in the program and those who did participate in the program and have since ended their participation. Currently there are only three (3) active public high schools in the Cisco Networking Academy program which represents two percent of the total high schools who have or are participants in the Academy program (Cisco Networking Academy Netspace, 2009; Impact in Montana, 2011). Because the Academy program is primarily in secondary schools, this study developed its pool of participants from Montana public high schools. The administrator surveyed was the school principal and in the case of smaller school districts, the school superintendent who was the principal of record.

Schools were grouped or categorized into five (5) categories (I – V) using the total student population as of the 2009 – 2010 student censes as recorded by the Montana Office of Public Education. The categorization divided the five groups with nearly equal number of participants roughly designed around the Montana High School Association categories.

Table 2 – School District Categories

Categories	Student Population	# of Schools
I	>= 1000	9
II	>= 400 < 999	8
III	>= 200 < 399	8
IV	>=100 <199	9
V	>=0 < 99	12
Totals		46

Data Collection Procedures

Qualitative Data Collection

Qualitative data was collected through face to face interviews with Montana State high school principals whose schools are currently participating in the *Cisco Networking Academy* program. The data collection processes and methodologies including the *Subject Information and Informed Consent* form (see Appendix VII) were reviewed and approved by *The University of Montana Institutional Review Board* (IRB Protocol No. 5-12) (see Appendix VI).

Participants agreed to participate in an interview by the Principle Investigator (PI) at each one's preferred location. Each participant was read the information on the *Subject Information and Informed Consent* form and asked to sign the PI's copy (see Appendix VII). Each participant was also provided a signed copy by the PI as well. Participants were then given a copy of the interview protocol (see Appendix IX) to read and follow along with the PI as he asked each question. The respondent was reminded that he / she could choose not to respond to any or all of the questions. The PI took notes

during the interview and recorded it using a digital voice recording device, and the digitally recorded file was later removed from the recording device and moved to the PI's personal computer. Once the interview was transcribed, the digital file was removed from the PI's personal computer and stored on a flash drive stored in a lock box at the PI's personal residence. Each participant interview was identified with an identification number generated using an online randomly number generator. The random number generator was located on a website sponsored by the Social Psychology Network (Urbaniak & Plous, 2012).

Once interviews were collected and transcribed, the files were loaded into *Dedoose: Qualitative Research Analysis Software v4.5.91* (Lieber & Weisner, 2011). *Dedoose* is an online secure application designed to collect, organize, and analyze qualitative, quantitative, and mixed mode research data. *Dedoose* was used to create a codes tree and apply them to interview excerpts used in this research project.

Dedoose allowed the PI to upload transcripts from all of the qualitative research interviews. Once interviews were uploaded, the PI was able to define significant themes into the code tree prior to assigning respondent's comments to themed words and or phrases. Once all of the interviews were coded, the PI was able to view each theme with interview comments listed. Dedoose was also able to evaluate themes and theme families by listing themes with similar responses. Once complete the PI can pull download each theme with all

interview quotations into text files in order to use them in the writing of the case study.

Quantitative Data Collection

Quantitative data was collected through an online assessment instrument and Online *Survey Confidentiality* form approved by *The University of Montana Institutional Review Board* (IRB Protocol No. 5-12) (see Appendix VI). The survey instrument was created using *Adobe FormsCentral* online survey subscription service (see Appendix V). *Adobe FormsCentral* servers will securely compile and store the survey data until the principle investigator (PI) logs into the Adobe website and retrieves the data formatted as a *Microsoft Excel* workbook. This *Microsoft Excel* workbook was later imported into *IBM SPSS Statistics Premium Grad Pack version 20* for analysis.

In order to protect the identity of participants, each participant was assigned a randomly generated identification number that was emailed to each along with the Uniform Resource Locator (URL) to the survey as supplied by *Adobe FormsCentral* (see Appendix IX). The rationale for the research projects along with each participant's randomly generated identification number and an attached University of Montana IRB approved *Online Survey Confidentiality* document Portable Document Format (PDF) were included (See Appendix VIII). Participants included the supplied randomly generated identification number in the ID input box within the survey instrument. This number identified their identity to the PI only. The PI used this number to

match each survey with the participant in order to classify the results to the correct school district grouping used for analysis.

Quantitative Assessment Instrument

This study used a systematic method of data collection based upon a standards based assessment tool. Invited administrators completed a technology integration assessment tool called the *Principals Technology Leadership Assessment* (PTLA) (Principals Technology Leadership Assessment, 2008). The PTLA consists of five general areas: Access and Support, Leadership, Professional Development, and Use of Technology (see Appendix IV). Question rating was based upon a scale from 1 (Not at all) to 5 (Fully). The survey tool will also include a field for number of years as an administrator.This is mapped to the National Educational Technology for Administrator Standards (NETS-A) as developed for International Society for Technology in Education (About the history of TAGLIT, 2007; Knezek, 2002). The NETS-A consists of thirty-one performance indicators divided into six subscales: (a) Leadership and Vision; (b) Learning and Teaching; (c) Productivity and Professional Practice; (d) Support, Management, and Operations; (e) Assessment and Evaluation; and (f) Social, Legal, and Ethical Issues (Knezek, 2008).

A pilot of the PTLA was conducted by surveying seventy-four school principals from seven states and providences in order to test the survey's reliability. Allen (2003) conducted a usability test on the assessment tool and found that those participating respondents found items and

instructions clear and complete. The usability of the tool Allen (2003) utilized the Cronbach's Alpha (α) to determine each subset's validity and found a range between .7124 and .8335 which determined that the items in the survey were highly inter-correlated.

> The reliability of the test as a whole is high: Cronbach's alpha (α) = 0.95. The item-test correlations show the correlation between each item and the overall instrument; the range of item-test correlations is r = 0.39 to 0.80, with only 7 items correlated less than 0.50. The item-rest correlation shows how the item is correlated with a scale computed from all other items, minus the item under consideration. For all items, this correlation is lower than the item-test correlation, indicating that each item contributes to measurement of the PTLA construct. Further, the values associated with 'Alpha if item removed' indicate that the instrument does not benefit from the removal of individual items. (p. 3)

A complete analysis of the PTLA tool is available in the PTLA information packet within section *Development of the Instrument* (Principals Technology Leadership Assessment, 2008)

Demographic data on the number of academies and participants was mined from data collected for the Cisco Networking Academy by the Cisco Learning Institute. These will include both current and historic data on every academy in Montana for each curriculum offered. This will be important to establish a foundation for comparison with data collected from the

administrator's district assessment survey. These data were supplied with the caveat that no single Montana Cisco Networking Academy would be identified without the school administrator's permission. Data collected as a result of the PTLA is based upon a survey of self-reported responses. Typical responses were based upon the district's current state of educational technology excluding any historic data.

Quantitative Data Collection Process

According to Krantz, Ballard, & Scher (1997) the use of online or web based assessment tools has been found to be comparable to more traditional methods of data collection. By using online data collection tools, the speed and accuracy of data evaluation can be improved. By using an online assessment tool, the data can be readily available while it is stored on the provider's website.

The primary survey tool was adapted so that it can be administered using an online survey administration tool. Once complete, the raw data was collected from the online management database. Each survey was identified using a reference ID number known only by this researcher. The validity of the survey was protected by the use of a secure login invitation for each user based upon the user identification numerical reference ID. Note that although collecting data by way of a secure online survey tool, the concern for security can be an issue. "Security issues can be addressed by having respondents visit secure web sites rather than e-mailing" (Evans & Mathur, 2005, p. 211). This survey was conducted on a secure website using a single one time login. "Yet

there is a solution that does work: providing each person in the sample with an unique password that can only be used to fill out the survey once (coupled with a properly configured server)" (Wiersma, 2011, p. 7). .Although there are can be ways to challenge the security of this survey, trust is placed on the professionalism of the respondents

surveys as attachments.Matching Cisco Networking Academy data was supplied from the Cisco Learning Institute (CLI) – Cisco Systems database in order to develop correlations between school administration's vision and sustainability of educational technology programs and sustainability of the Cisco Networking Academy at that district.

Internal Validity

"Internal validity refers to the ability to draw conclusions about causal relationships from our data. A study has high internal validity when strong inferences can be made that one variable caused changes in the other variable" (Cozby, 2007, p. 87). Internal validity was threatened because a number of selected participants choose not to participate in the study.

External Validity

"…The external validity of a study is the extent to which the results can be generalized to other populations and settings" (Cozby, 2007, p. 87). The limited participant scope threatened the external validity of the study. Participation is limited to only Montana high schools that have or are participating in the Cisco Networking Academy program currently or in the past.

Data Analysis

This study used a number of variables supplied from the PTLA survey tool and data supplied by the Cisco Systems Data Reporting Team. The dependent variable was used to answer questions having to do with sustainability.

The Principals Technology Leadership Assessment (PTLA) was designed to measure to what degree administrators value each of the thirty-one performance indicators found in the National Educational Technology Standards for Administrators (NETS-A) . The PTLA utilizes a one (1) to five (5) Likert scale in order to rate each response. These responses represent ordinal data ranking each response was (1) not at all, (2) minimally (3) somewhat (4) significantly, and (5) fully. The following table describes the independent variables from the PTLA.

Independent Variables

Table 3 – PTLA Variables

Variable	Variable Name	PTLA Sub-Section Description	Type
IV1	LeadVision	Leadership and Vision	Categorical
IV2	LearnTeach	Learning and Teaching	Categorical
IV3	ProdProf	Productivity and Professional Practice	Categorical
IV4	SupManOp	Support, Management, and Operations	Categorical
IV5	AssessEval	Assessment and Evaluation	Categorical
IV6	SocLegEth	Social, Legal, and Ethical	Categorical
IV7	TotPTLA	Total from all sub-sections	Categorical

IV1. Leadership and Vision

i. Hypothesis: the school administrator's leadership and vision in ICT have an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: the school administrator's leadership and vision in ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

IV2. Learning and Teaching

i. Hypothesis: the school administrator's ability in learning and teaching of ICT has an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: the school administrator's ability in learning and teaching of ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

IV3. Productivity and Professional Practice

i. Hypothesis: the school administrator's ability in productivity and professional practice in ICT have an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: the school administrator's ability in productivity and professional practice ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

IV4. Support, Management and Operations

i. Hypothesis: the school administrator's ability in support, management, and operations in ICT has an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: the school administrator's ability in support, management, and operations in ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

IV5. Assessment and Evaluation

i. Hypothesis: the school administrator's ability in assessment and evaluation of ICT has an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: the school administrator's ability in assessment and evaluation of ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

IV6. Social, Legal, and Ethical

i. Hypothesis: the school administrator's knowledge of social, legal, and ethical aspects of ICT has an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: the school administrator's knowledge of social, legal, and ethical aspects of ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

IV7. Total from all sub-sections

i. Hypothesis: a principal's knowledge and ability in ICT does have an impact on a principal's support of corporate – sponsored ICT curriculum.

ii. Null hypothesis: a principal's knowledge and ability in ICT has no impact on a principal's support of corporate – sponsored ICT curriculum.

Dependent Variable

The dependent variable, Sustainability, indicates the number of months a Montana high school has participated in the Cisco Networking Academy program (CNAP). This continuous variable will be determined by calculating the number of months from the high school local CNAP establishment until it offered its last complete class. This sustainability rating acted as a dependent

variable by which the independent variables calculated from the PTLA and demographic data from Cisco Systems Data Reporting Team was correlated.

Data Analysis Methodology

Data analysis used the Spearman's Rank-Order Correlation Coefficient test (r_s) for nonparametric data. The assumptions for any correlation test are normality, linearity, and homoscedasticity. Normality assumes normally distributed data on a histogram; linearity assumes that when the X and Y variables are plotted on a scatterplot that should roughly form a straight line; and homoscedasticity assumes that while viewing data on a scatterplot the plotted points should form a fairly even cigar shape along its length (Pallant, 2007). These assumptions define parametric data that can be defined through a bell shaped curve. Nonparametric cannot be defined by the parametric assumptions and therefore are not considered. Nonparametric assumptions are (a) random samples and (b) independence observation.

The Spearman's Rank-Order Correlation Coefficient, sometimes referred to as the Spearman's rho, is used when there is no way to prove normality within the population such as with nominal and ordinal data (Levin, Fox, & Forde, 2010). "A correlation analysis is used to describe the strength and direction of the linear relationship between two variables" (Pallant, 2007, p. 126). The formula structure of the Spearman's Rank-Order Correlation Coefficient is: $r_s = 1 - \frac{6\sum D^2}{N(N^2-1)}$ where r_s = rank-order correlation coefficient, D = difference in rank between X and Y variables, and N = is the number of cases (Levin, et al., 2010). The results yield a correlation coefficient used to

determine the strength of the relationship. The coefficient would fall between -1 and 1 noting either a positive or negative relationship. If the results yield a positive or negative 0.10 to 0.29 the relationship of r_s is considered small; if the results yield a positive or negative 0.30 to 0.49 the relationship of r_s is considered medium; and if the results yield a positive or negative 0.50 to 1.0 the relationship of r_s is considered large (Cohen, 1988).

The PTLA used a rank ordinal evaluative method of data collection through a Likert scale from "Not at all" ranked one (1) up to "Fully" five (5). Ordinal level data simply yields ordering of data but does not indicate any magnitude of difference between numbers (Levin, et al., 2010). Data from the PTLA measured each subscale based upon importance and proficiency. Because of the lack of normality the data from the PTLA, the descriptive statistics was primarily frequency; however, because the Sustainability score is based upon continuous data, descriptive statistics included primarily the median, mode and range. The statistical analysis tool was IBM SPSS software version 20.0.

The a priori comparison was planned before data was collected in order to maximize the power of type 1 errors and minimize type 2 errors (Howell, 2007). The a priori assumption of this study was $\alpha = 0.05$. This was based upon individual t score that were used to reject the null hypothesis (Howell, 2007).

Role of the Researcher

The role of the researcher or primary investigator (PI) was that of an interpreter and advocate (Stake, 1995). As an interpreter this researcher seeks to find new meanings from the research. "Whoever is a researcher has recognized a problem, a puzzlement, and studies it, hoping to connect it better with known things" (Stake, 1995, p. 97). Bias is noted that the interviewer has been a Cisco Networking Academy local, regional, and Cisco Academy Training Instructor for over ten (10) years and involved in a number of projects for the Cisco Networking Academy program as well. At this point, this researcher is no longer an instructor for a regional and Cisco Academy Training Center; however, is still a local academy instructor and legal main contact. Although this researcher does not desire to show bias in this study, this researcher indirectly acts as an advocate for corporate-sponsored ICT curriculum. "Discretely or not, they [the researcher] do their level best to convince their readers that they too should believe what the researchers have come to believe" (Stake, 1995, p. 93).

Note however that this researcher has had little or no direct contract with high school principals prior to the interview.

Summary

This study collected data from high schools from within the state of Montana from those who have adopted the Cisco Networking Academy program within the last ten years. This is not to exclude other corporate – sponsored academy group; but rather, finding that high schools who adopt any

academy curriculum usually also participated in the Cisco Networking Academy Program (CNAP). The administration participant's selection was also based upon his/her willingness to participate in the study.

Data analysis used the Spearman's Rank-Order Correlation Coefficient because of the use of a Likert based survey tool. The collected data was considered to be nonparametric. Sustainability, data and ordinal data collected from the Principals Technology Leadership Assessment (PTLA) were correlated in order to answer the research questions.. Descriptive statistics was limited according to the type of variables utilized; that is, ordinal data using frequency and ratio data using mean, median, mode, and range. Along with individual data collection and analysis, groups based upon student population from within each school was utilized in order to see if school size has any impact on program sustainability.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

This study used a mixed-methods design. The researcher collected quantitative data through the administration of the *Principals' Technology Leadership Assessment* (PTLA) and qualitative data through in-depth interviews with Montana state high school principals whose schools are currently offering Cisco Networking Academy curricula. The qualitative data collection followed a cross-case analysis study of the currently active Montana Cisco Networking Academies based on the Robert Stake (1995) case study research model. The qualitative and quantitative data were triangulated in order to answer the central research question: What factors determine successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools?

The quantitative results are based upon a relational, non-experimental design using a self-reporting survey instrument used to show a relationship between an independent variable(s) and a dependent variable(s) (Johnson, 2001). This self-reporting survey instrument polled and collected data from all high school administrators who chose to participate. In order to analyze the data, school districts were grouped by relative size based upon Montana State Office of Public Instruction divisions.

The Cisco Networking Academy data were collected from databases provided by the Cisco Learning Institute data collection team. These data were current as of July 2012.

Study Demographics

This study was based upon a total population of Montana high school districts that have participated or are participating in corporate-sponsored ICT curriculum. The demographic data was used to develop a framework on the sustainability of corporate-sponsored ITC curriculum. The Cisco Networking Academy program was used because of wide spread use with the State of Montana. Other academies such as Oracle and Microsoft represent a much smaller demographic statewide. The primary source for this information was the Cisco Networking Academy program and the Montana State Office of Public Instruction. The following table (see Table 4) summarizes the collected data.

The total number of public high schools in Montana is one-hundred and seventy five (175) of which forty-six (46) were or are currently Cisco Networking Academies which represents 26.8 percent of all public high schools. This population will include both those who are currently active in the program and those who have since dropped their participation. Currently there are three (3) active public high schools in the Cisco Networking Academy program (CNAP) which represents two percent of the total high schools who have or are participants in the Academy program (see Table 4) (Cisco Networking Academy Netspace, 2009; Impact in Montana, 2011)

Table 4 – Summary Montana State Participation

Total Number of High Schools in Montana (2012)	175
Total Number of High School that Participated in Cisco currently and in the past (2012)	46
Percentage of Participation in corporate-sponsored ICT Curriculum	26%
Total Number of current participation in Cisco (2012)	3
Current Percentage of Participation in corporate-sponsored ICT Curriculum	2%

All high schools that reported their participation in a corporate-sponsored ICT curriculum in the State of Montana were categorized into five (5) categories (see Table 5) based upon the student 2011 census as reported to the Montana Office of Public Instruction. Once all of the principals in each of the high schools who participated in corporate-sponsored ICT curriculum, primarily the Cisco Networking Academy program, were given the opportunity to participate in the web based PTLA survey, principal participation data was collected and recorded. This data was listed in the table below (see Table 5). Out of the total forty-six (46) Montana high schools that participated in the Cisco Networking Academy Program, the total percentage of respondents to the survey was thirty-nine and thirteen hundredths percent (39.13%). The data was also collected and recorded according to each Montana high school's population category (I – V). The highest reporting category was II with fifty percent (50%) and the lowest was category III at twenty-five percent (25%) (see Table 5).

Table 5 – Division of Data by Categories

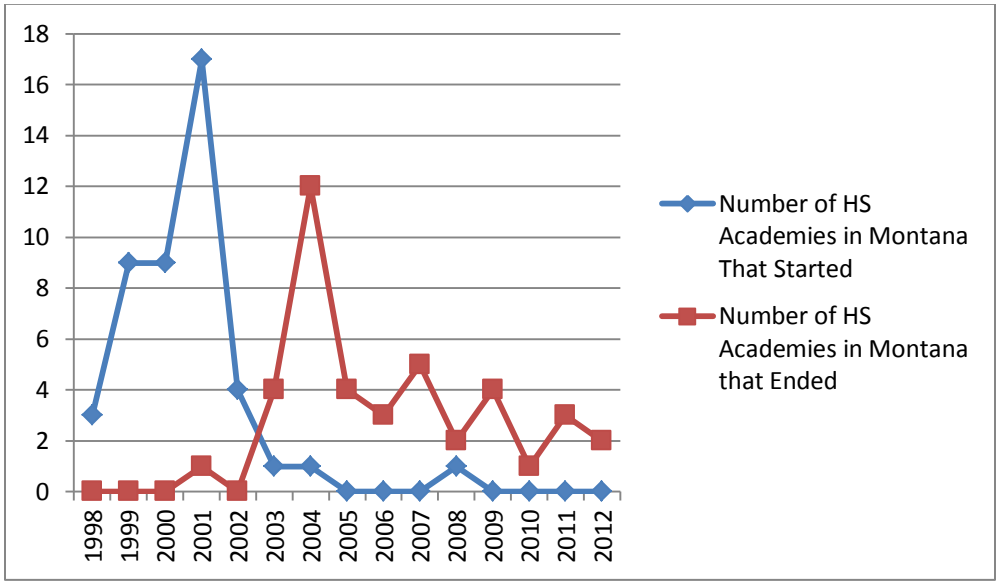
Categories	Student Population	# of Schools	# of Schools Reported	Diff.	Percentage Reporting
I	>= 1000	9	4	4	44.44%
II	>= 400 < 999	8	4	4	50.00%
III	>= 200 < 399	8	2	6	25.00%
IV	>=100 <199	9	3	6	33.33%
V	>=0 < 99	12	5	7	41.67%
Totals		46	18	27	39.13%

Baseline program sustainability data was also collected in order to show a trend of Montana high schools that initially participated in the Cisco Networking Academy and the year they offered their last class. The greatest growth of new participants was between 1999 and 2001 with thirty-eight (38) new academies. Conversely, the dates of the greatest decline fell between years 2004 and 2009 with the loss of thirty (30) academies statewide (see Table 6). Note the line graph below visually shows the sustainability trends of the Cisco Networking Academy in Montana (see figure 3). The 1998 instructor's class was offered statewide, and since then the five (5) regional Cisco Networking Academies independently recruited, trained, and supported local academies and instructors (Waring & Kirkendall, 2000).

Table 6 – Sustainability of Cisco Networking Academies in Montana

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of HS Academies in Montana That Started	3	9	9	17	4	1	1	0	0	0	1	0	0	0	0
Number of HS Academies in Montana that Ended	0	0	0	1	0	4	12	4	3	5	2	4	1	3	2

Figure 3 - Chart Representing Sustainability of Cisco Networking Academies in Montana



Study Data

Dependent Variable

The dependent variable is the number of months that high schools offered the Cisco Networking Academy program. The data was supplied by the data team for the Cisco Networking Academy Program. The Academy program supplied this information with the caveat that there would be no way

that individual academies can be identified. Table 8 summarized total Montana high schools (N = 46) who were asked to participate in the study. The data was collected, evaluated, and recorded (see Table 7) summarized by the maximum, minimum and median values for each Montana high school population category. The least number of months an academy existed was ten (10) months with the most was one hundred seventy five (175) months. Both values were within Category V (between 0 and 99 high school students) high schools. Note that Table 8 includes all Montana high schools that participated in the Cisco Networking Academy program since its inception.

The table below (see table 8) shows the descriptive non-parametric statics for months in the program for those school districts that participated in the survey.

Table 7 – Dependent Variable (months) Summary Chart (N=46)

Category	Maximum (Months)	Minimum (Months)	Median
I	160	48	110
II	122	35	72
III	94	29	50.5
IV	132	38	85
V	175	10	53
Total Average Values	136.6	32	74.1

Table 8 – Descriptive Non-Parametric Statistics for Total Months in the Program (N=18)

Months in the Program		
N	Valid	18
	Missing	0
Median		87.00
Mode		122
Range		155
Minimum		20
Maximum		175

Independent Variables

The independent variables are based upon the results of *The Principals Technology Leadership Assessment* (PTLA). A fully secure online study using *Adobe FormsCentral* was developed based upon the PTLA and was emailed to all Montana high school principals in schools that have or are currently participating in the Cisco Network Academy program. Forty-six (46) survey invitations were initially sent along with two reminders. Of the forty-six (46) surveys eighteen (18) were returned complete with three (3) refusals. Twenty-seven (27) did not respond which represented thirty-nine (39) percentage participation. The descriptive statistics for the number of high school principals who completed and returned the PTLA survey (N=18) based upon the total months academies participated in the program was recorded in Table 9.

Quantitative Data Analysis

Data analysis used the Spearman's Rank-Order Correlation Coefficient test (r_s) for nonparametric data. The PTLA utilizes a one (1) to five (5) Likert scale in order to rate each response. These responses represent ordinal data ranking each response: (1) Not at all, (2) Minimally, (3) Somewhat, (4) Significantly, and (5) fully.

The PTLA consists of six (6) domains with a total of thirty-five (35) questions (see Table 9).

Table 9 – PTLA Summary Chart

Domain	# of Questions
Leadership and Vision	6
Learning and Teaching	6
Productivity and Professional Practice	5
Support, Management, and Operations	6
Assessment and Evaluation	5
Social, Legal, and Ethical	7

Table 10 shows the median scores by domain and category. The lowest median score is 3.3 represented in categories III domains 2, 4, 5, and 6 The highest median scores are 3.7 in category V The overall median score for the PTLA is 3.5.

Table 10 – PTLA Mean Scores by Category and Domain

MEDIAN SCORES							
Category*	Domain						
	1	**2**	**3**	**4**	**5**	**6**	MEDIAN
I	3.8	3.5	4.0	3.6	3.4	3.3	3.6
II	3.3	3.5	3.8	3.6	3.4	3.5	3.5
III	3.6	3.3	3.6	3.3	3.3	3.3	3.3
IV	3.1	3.6	3.5	3.9	3.1	4.0	3.5
V	3.8	3.6	3.5	4.0	3.4	4.1	3.7
MEDIAN	3.6	3.5	3.6	3.6	3.4	3.5	3.5

* Category I = high school population greater than 1000 students; Category II = high school population between 400 and 999 students; Category III = high school population between 200 and 399 students; Category IV = high school population between 100 and 199 students; Category V = high school population less than 99 students

The analyses of the data were used to answer research question two and three. The results of the data analysis of research question two (2) and three (3) along with the results from the qualitative case study was used to triangulate the final results of the study.

Research Question Three

What is the relationship between school district size and sustainability of corporate-sponsored IT curriculum programs?

H_0 – Null Hypothesis – School district size has no impact on the sustainability of corporate-sponsored IT curriculum programs.

H_1 – Research Hypothesis – School district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

The relationship between the total PTLA (ToPTLA) score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a weak positive correlation between the two variables, rho= .244, n= 18, p > .330. There was a

weak correlation that high school principal's ability and knowledge of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. The P value was greater than .05. The results are not statistically significant.

An evaluation of the sub-categories within the PTLA further subdivides the analysis of the school administrator's responses. The study shows some inter-domain correlation significance; however, the relationships are expanded within the inter-item correlations (see Appendix XII).

Leadership and Vision (LeadVision)

The relationship between the total PTLA (ToPTLA) subdivision LeadVision score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a very weak correlation between the two variables, rho= .088, n= 18, p = .730. The weak correlation suggests that the high school principal's leadership and vision of ICT negatively impacts the sustainability corporate-sponsored ICT curriculum. The results confirm the null hypothesis that states the school administrator's leadership and vision in ICT has no impact on a principal's support of corporate – sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 11).

Learning and Teaching (LearnTeach)

The relationship between the total PTLA (ToPTLA) subdivision LearnTeach score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a weak positive correlation between the two variables, rho= .307, n= 18, p =

.216. The weak correlation suggests that the high school principal's ability in learning and teaching of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. The results state that the school administrator's ability in learning and teaching of ICT has an impact on a principal's support of corporate – sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 11).

Productivity and Professional Practice (ProdProf)

The relationship between the total PTLA (ToPTLA) subdivision ProdProf score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a very weak positive correlation between the two variables, rho= .059, n= 18, p = .815. The weak correlation suggests that the high school principal's ability in productivity and professional practice of ICT slightly positively impacts the sustainability corporate-sponsored ICT curriculum. The results confirm the research hypothesis that states that the school administrator's ability in productivity and professional practice in ICT have an impact on a principal's support of corporate – sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 11).

Support, Management, and Operations (SupManOp)

The relationship between the total PTLA (ToPTLA) subdivision SupManOp score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a weak positive correlation between the two variables, rho= .283, n= 18, p =

.255. The weak correlation suggests that the high school principal's ability in support, management, and operations of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. The results slightly confirm the research hypothesis that states that the school administrator's ability in support, management, and operations of ICT has an impact on a principal's support of corporate – sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 11).

Assessment and Evaluation (AssessEval)

The relationship between the total PTLA (ToPTLA) subdivision AssessEval score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a weak positive correlation between the two variables, rho= .346, n= 18, p = .159. The weak correlation suggests that the high school principal's ability in assessment and evaluation of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. The results confirm the research hypothesis that states that the school administrator's ability in assessment and evaluation of ICT has an impact on a principal's support of corporate – sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 11).

Social, Legal, and Ethics (SocLegEth)

The relationship between the total PTLA (ToPTLA) subdivision LeadVision score and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was

a weak negative correlation between the two variables, rho= -.123, n= 18, p = .330. The weak negative correlation suggests that the high school principal's ability in assessment and evaluation of ICT negatively impacts the sustainability corporate-sponsored ICT curriculum. The results confirm the null hypothesis that states that the school administrator's knowledge of social, legal, and ethical aspects of ICT has no impact on a principal's support of corporate – sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 11).

Table 11 – Spearman's Rho Analysis of the Totals

Spearman's rho		LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Months in the Program	Correlation Coefficient	-.088	.307	.059	.283	.346	-.123	.244
	Sig. (2-tailed)	.730	.216	.815	.255	.159	.627	.330
	N	18	18	18	18	18	18	18

Category I

The relationship between the total PTLA (ToPTLA) score for category I and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). Because this test is for non-parametric data, no assumption of normality, linearity and homoscedasticity were assumed. There was a medium positive correlation between the two variables, rho= .400, n= 4, p = .600. There is a weak correlation that category I high school principal's ability and knowledge of ICT positively impacts the sustainability corporate-sponsored ICT curriculum.

The P value was greater than .05. The results were not statistically significant (see Table 12).

Table 12 – Spearman's Rho Analysis of Category I

Category I Spearman's rho		LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Months in the Program	Correlation Coefficient	.800	.800	-.316	.400	.400	-.316	.400
	Sig. (2-tailed)	.200	.200	.684	.600	.600	.684	.600
	N	4	4	4	4	4	4	4

Category II

The relationship between the total PTLA (ToPTLA) score for category II and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). Because this test is for non-parametric data, no assumption of normality, linearity and homoscedasticity were assumed. There was a medium negative correlation between the two variables, rho= -.400, n= 4, p = .600. There is a medium negative correlation that category II high school principal's ability and knowledge of ICT negatively impacts the sustainability corporate-sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 14).

Table 13 – Spearman's Rho Analysis of Category II

Category II Spearman's rho		LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Months in the Program	Correlation Coefficient	-.400	.200	-.632	-.800	.105	-.105	-.400
	Sig. (2-tailed)	.600	.800	.368	.200	.895	.895	.600
	N	4	4	4	4	4	4	4

Category III

The relationship between the total PTLA (ToPTLA) score for category III and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). Because this test is for non-parametric data, no assumption of normality, linearity and homoscedasticity were assumed. There was a large positive correlation between the two variables, rho= 1.0, n= 2, p =. 000. There is a high correlation that category III high school principal's ability and knowledge of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. Because of the small N value (N=2) there was not sufficient numbers to generate a p value suggesting that the results were not statistically significant (see Table 15).

Table 14 – Spearman's Rho Analysis of Category III

Category III Spearman's rho		LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Months in the Program	Correlation Coefficient	1.000	1.000	1.000	1.000	1.000	-1.000	1.000
	Sig. (2-tailed)							
	N	2	2	2	2	2	2	2

Category IV

The relationship between the total PTLA (ToPTLA) score for category IV and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). Because this test is for non-parametric data, no assumption of normality, linearity and homoscedasticity were assumed. There was a large positive correlation between the two variables, rho= 1.0, n= 3, p =. 000. There is a high correlation that category IV high school principal's ability and knowledge of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. Because of the small N value (N=2) there was not sufficient numbers to generate a p value suggesting that the results were not statistically significant (see Table 16).

Table 15 – Spearman's Rho Analysis of Category IV

Category IV Spearman's rho		LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Months in the Program	Correlation Coefficient	1.000**	1.000**	-.866	0.000	1.000**		1.000**
	Sig. (2-tailed)			.333	1.000			
	N	3	3	3	3	3	3	3

Category V

The relationship between the total PTLA (ToPTLA) score for category V and the number of months in the program was investigated using the Spearman's Rank-Order Correlation Coefficient test (r_s). Because this test is for non-parametric data, no assumption of normality, linearity and homoscedasticity were assumed. There was a small positive correlation between the two variables, rho=.200, n= 5, p = .747. There is a weak correlation that category V high school principal's ability and knowledge of ICT positively impacts the sustainability corporate-sponsored ICT curriculum. The P value was greater than .05. The results were not statistically significant (see Table 17).

Table 16 – Spearman's Rho Analysis of Category V

Category V Spearman's rho		LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Months in the Program	Correlation Coefficient	-.205	.359	.359	.500	.100	-.100	.200
	Sig. (2-tailed)	.741	.553	.553	.391	.873	.873	.747
	N	5	5	5	5	5	5	5

In response to question 3, according to the data, there is no evidence that the size of the high school and high school principal's ability and knowledge in ICT impacts the sustainability of corporate-sponsored ITC curriculum (H_0 = = the null hypothesis is not rejected).

Research Question Two: Significant Patterns within the PTLA Assessment Tool

Q2 - What is the relationship between a school administrator's competence in information technology and the sustainability of corporate-sponsored IT curriculum programs?

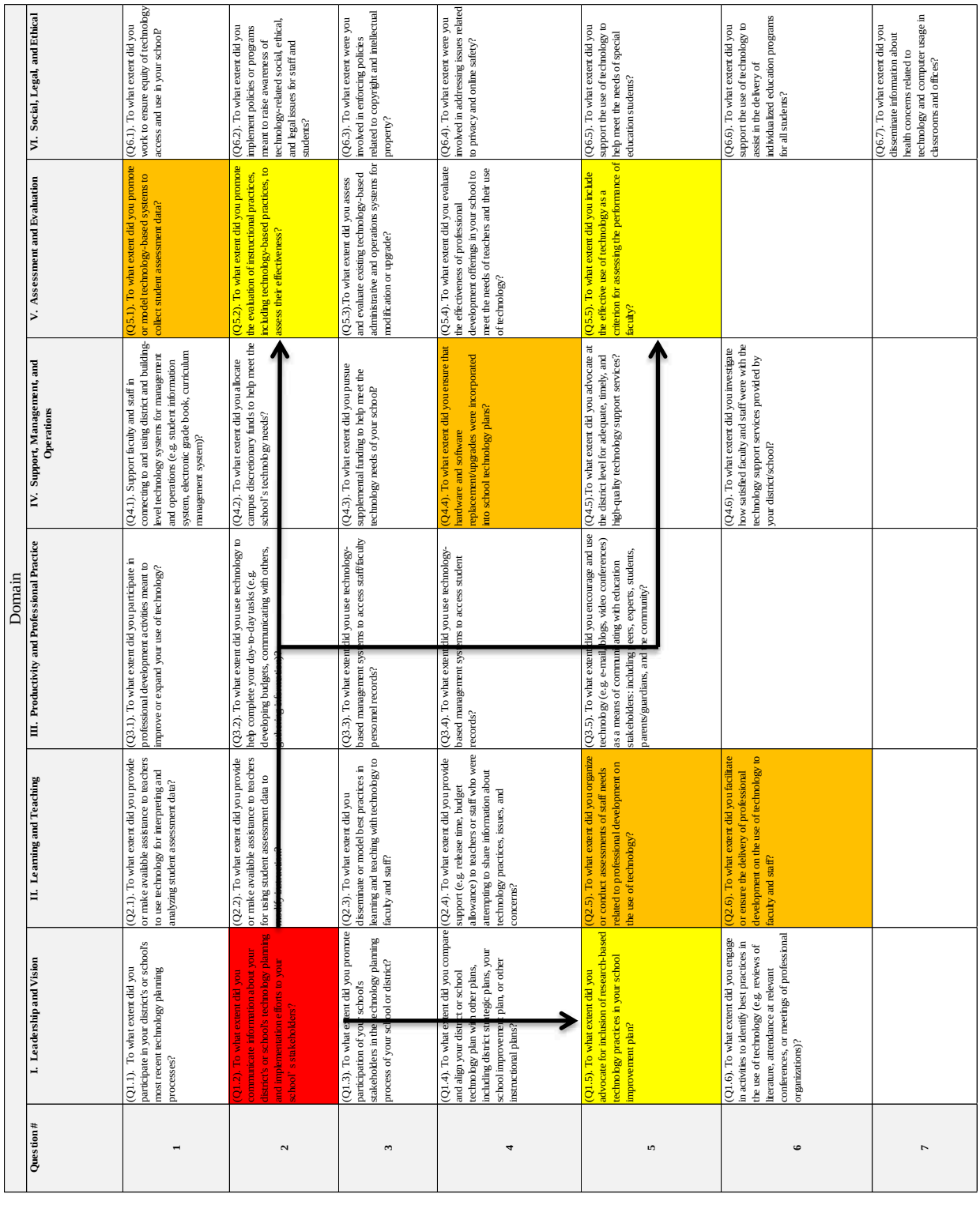
H_0 – Null Hypothesis - School administrator competency has no impact on the sustainability of corporate-sponsored IT curriculum programs.

H_1 – Research Hypothesis - School administrator competency in information technology has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

The PTLA assessment tool noted a number of significant correlations among survey items. The items show moderate to high correlations that show the impact a principal has on the sustainability of ITC programs within his/her schools. It is important to note that a moderate (.4 – 7) is desirable in determining reliability and validity among items; however, high inter-item correlation might present a difficulty to discriminate whether the questions are measuring the same thing or not. Therefore, the inter-item correlation has been performed as a post hoc item analysis primarily for the purpose to understand the eighteen (18) participants better, but not for the purpose to make inferences relative to the sustainability variable because there was no statistically significant correlation to begin with.

The summary of the results are located within appendices XIII, XIV, and XV. Assessment items are color coded (for the digital version of this study) in order to represent the strength of the correlation and its significance. Red represents the question being correlated. Orange represents low to moderate correlations significant at the 0.05 level (2-tailed). Yellow represents moderate to high correlations significant at the 0.01 level (2-tailed). Only those assessment items are included where a significant correlation exists.

Figure 4- PTLA Question 1.2 Inter-item Correlation



PTLA Question 1.2: To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders? Question 1.2 has a moderate (0.30 - 0.49) to large (0.50 – 1.0) statistically significant positive correlation with questions:

1.5 - To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?

5.2 - To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

5.5 - To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?

This includes two primary areas: evaluation and communication of technology planning. Sustainability of any ICT program includes a strong emphasis on technology planning (see Figure 4).

Figure 5– PTLA Question 1.3 Inter-item Correlation

PTLA question 1.3: To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district? Question 1.3 has a moderate (0.30 – 0.49) to high (0.50 – 1.0) statistically significant positive correlation with questions:

2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

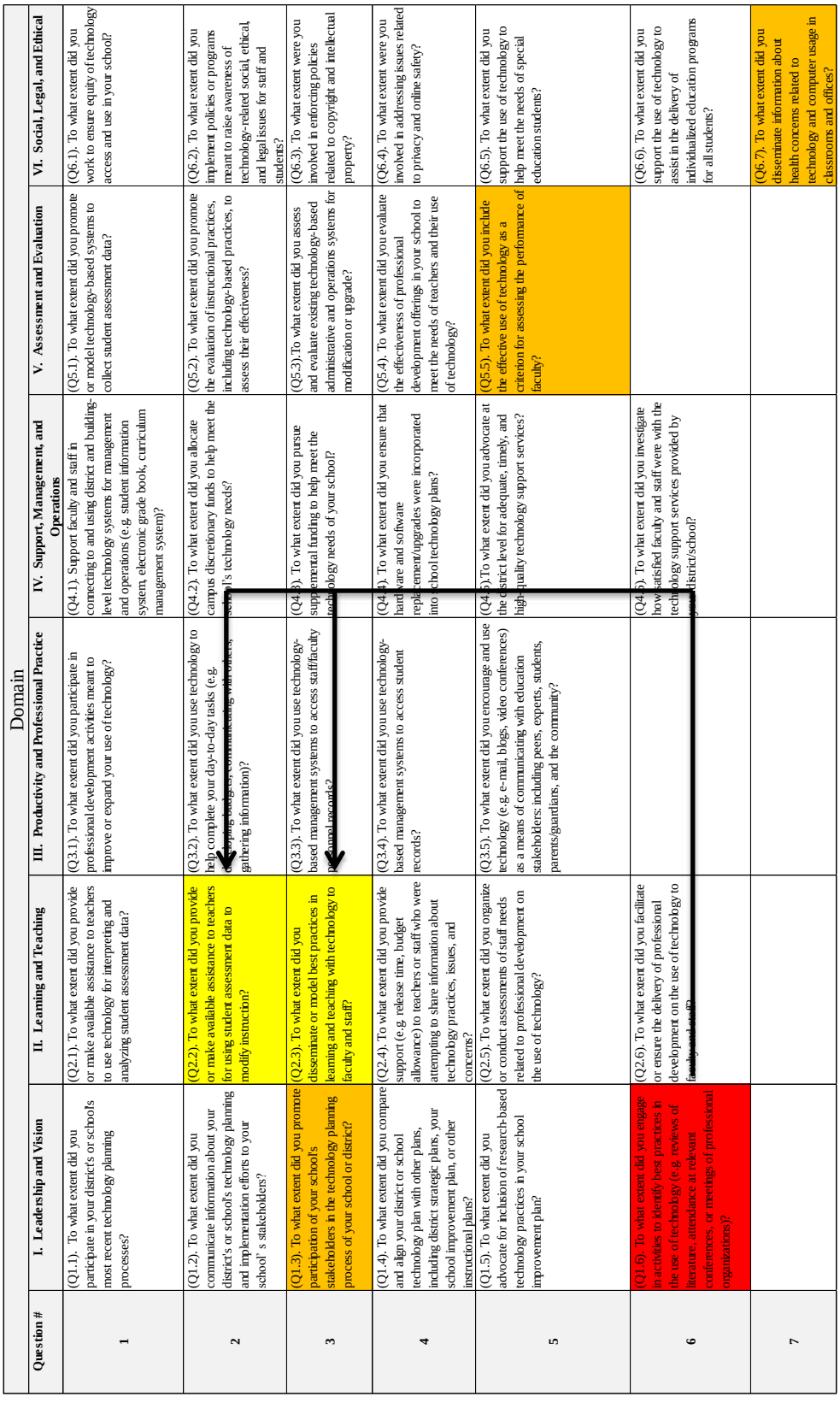
4.6 - To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?

5.4 - To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

5.5 - To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?

All of which tie the importance of technology planning to the requirements and needs of all stakeholders particularly members of the faculty and staff. This included the evaluation of the professional development needs of the school and their effectiveness (see Figure 5).

Figure 6– PTLA Question 1.6 Inter-item Correlation



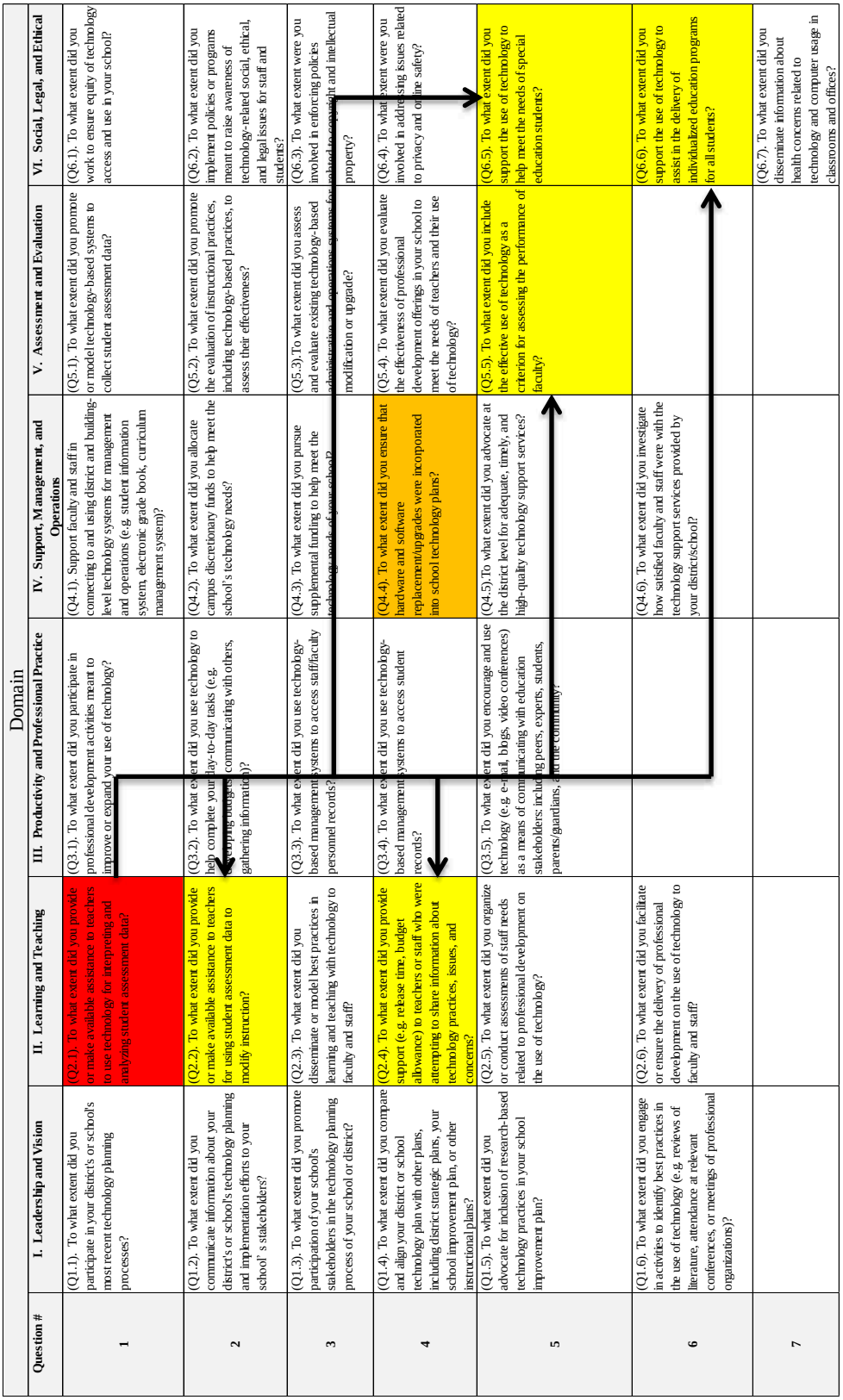
PTLA question 1.6: To what extent did you engage in activities to identify best practices in the use of technology (e.g. reviews of literature, attendance at relevant conferences, or meetings of professional organizations)? Question 1.6 has a moderate (0.30 - 0.49) to large (0.50 – 1.0) statistically significant positive correlation with questions:

2.2 - To what extent did you provide or make available assistance to teachers for using student assessment data to modify instruction?

2.3 - To what extent did you disseminate or model best practices in learning and teaching with technology to faculty and staff?

The correlation seems to suggest the importance of adequate research to determine the best practices required to best assist faculty and students in the use of and the importance of technology in adapting curriculum (see Figure 6).

Figure 7– PTLA Question 2.1 Inter-item Correlation



PTLA question 2.1: To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data? Question 2.1 has a moderate (0.30 - 0.49) to high (0.50 – 1.0) statistically significant positive correlation with questions:

2.2 - To what extent did you provide or make available assistance to teachers for using student assessment data to modify instruction?

2.4 - To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

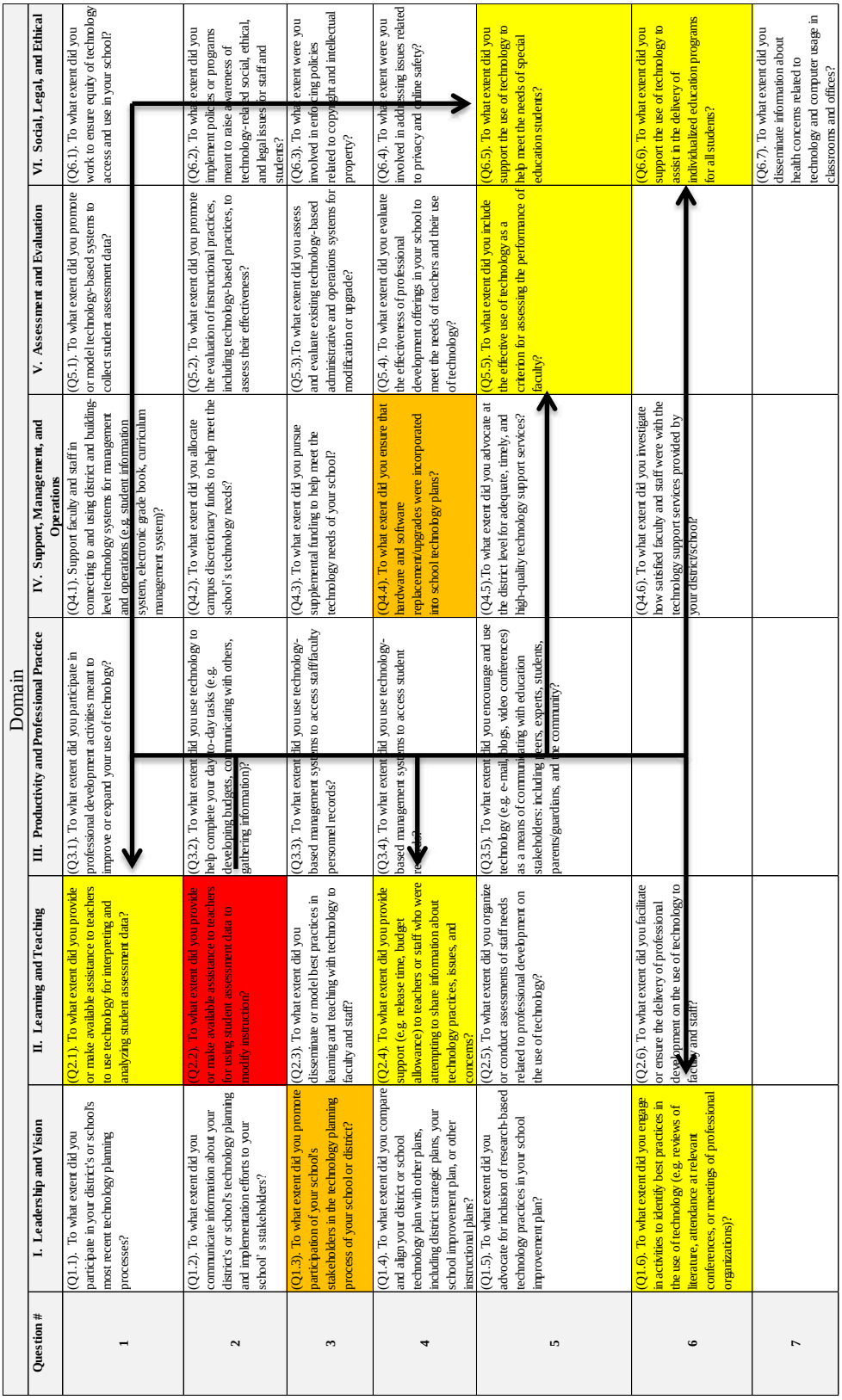
5.5 - To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?

6.5 - To what extent did you support the use of technology to help meet the needs of special education students?

6.6 - To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

The correlation seems to point out the importance of the principal's responsibility in helping the faculty and the staff understand student assessment data and how that data can be used to improve teaching and learning of all students in all programs. These data were also important in assessing the sustainability of ICT curricular programs as well (see Figure 7).

Figure 8– PTLA Question 2.2 Inter-item Correlation



PTLA question 2.2: To what extent did you provide or make available assistance to teachers for using student assessment data to modify instruction? Question 2.1 has a moderate (0.30 - 0.49) to high (0.50 – 1.0) statistically significant positive correlation with questions:

1.6 - To what extent did you engage in activities to identify best practices in the use of technology (e.g. reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?

2.1 - To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

2.4 - To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

5.5 - To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?

6.5 - To what extent did you support the use of technology to help meet the needs of special education students?

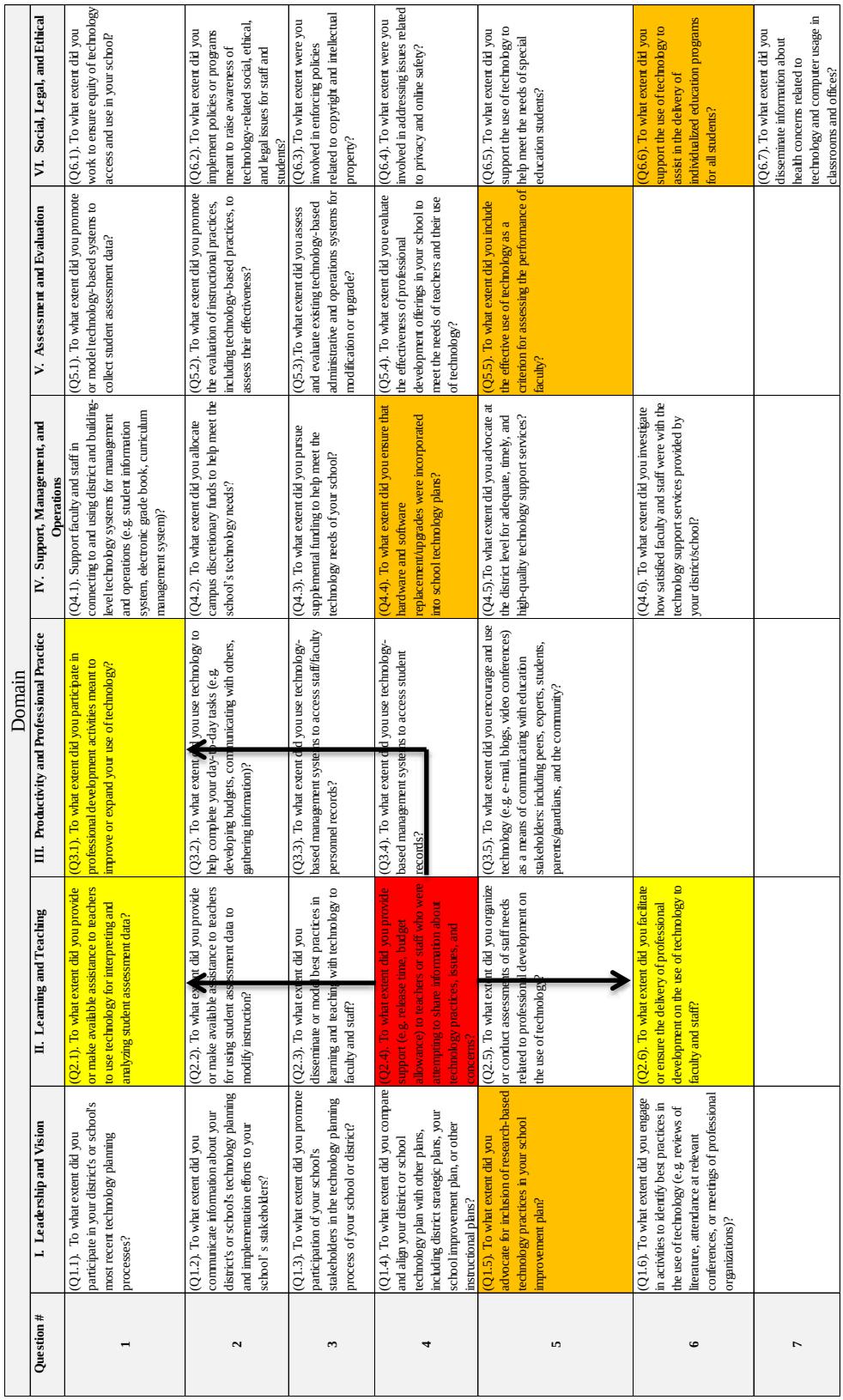
6.6 - To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

The correlations for question 2.2 emphasized the importance of assessment as it applied the knowledge of the impact student assessment data

has on making changes to curriculum, teaching techniques, and learning for all students.

Student assessment data is essential in determining the sustainability of corporate-sponsored ICT curriculum. These data can be used to determine the effectiveness of the curriculum and the instructor (see Figure 8).

Figure 9– PTLA Question 2.4 Inter-item Correlation



PTLA question 2.4: To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns? Question 2.4 has a moderate (0.30 – 0.49) to high (0.50 – 1.00) statistically significant positive correlation with questions:

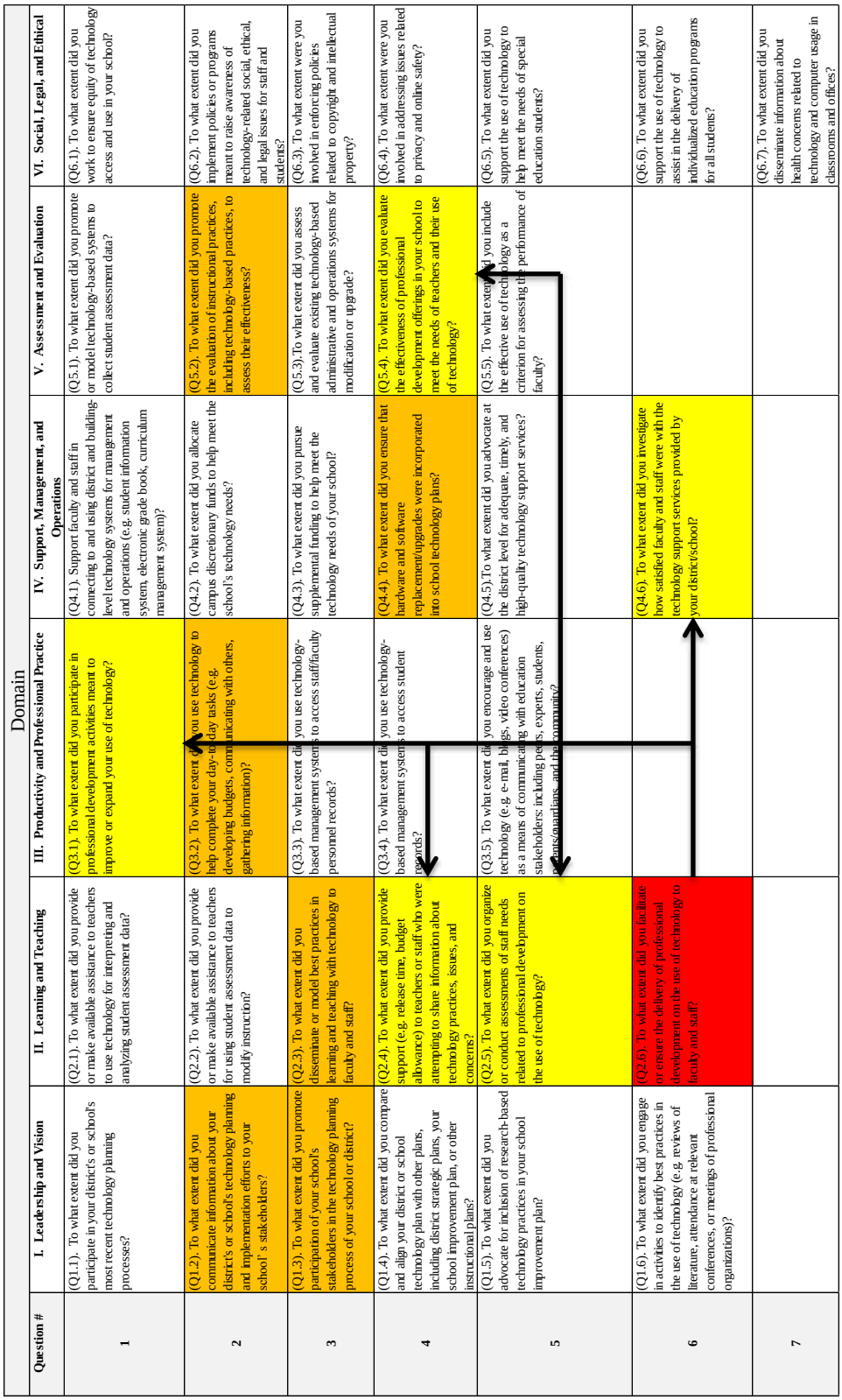
2.1 - To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

2.6 - To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

3.1 - To what extent did you participate in professional development activities meant to improve or expand your use of technology?

This question 2.4 correlated the importance of providing professional development to faculty and staff dealing with the use of student evaluation data, efficient and effective use of technology; systematic means to improve the use of technology in the classroom; and understanding and use of technology as a fundamental educational skill as a foundation of any learning environment (see Figure 9).

Figure 10– PTLA Question 2.6 Inter-item Correlation



PTLA question 2.6: To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff? Question 2.6 has a moderate (0.30 – 0.49) to high (0.50 – 1.0) statistically significant positive correlation with questions:

2.4 - To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

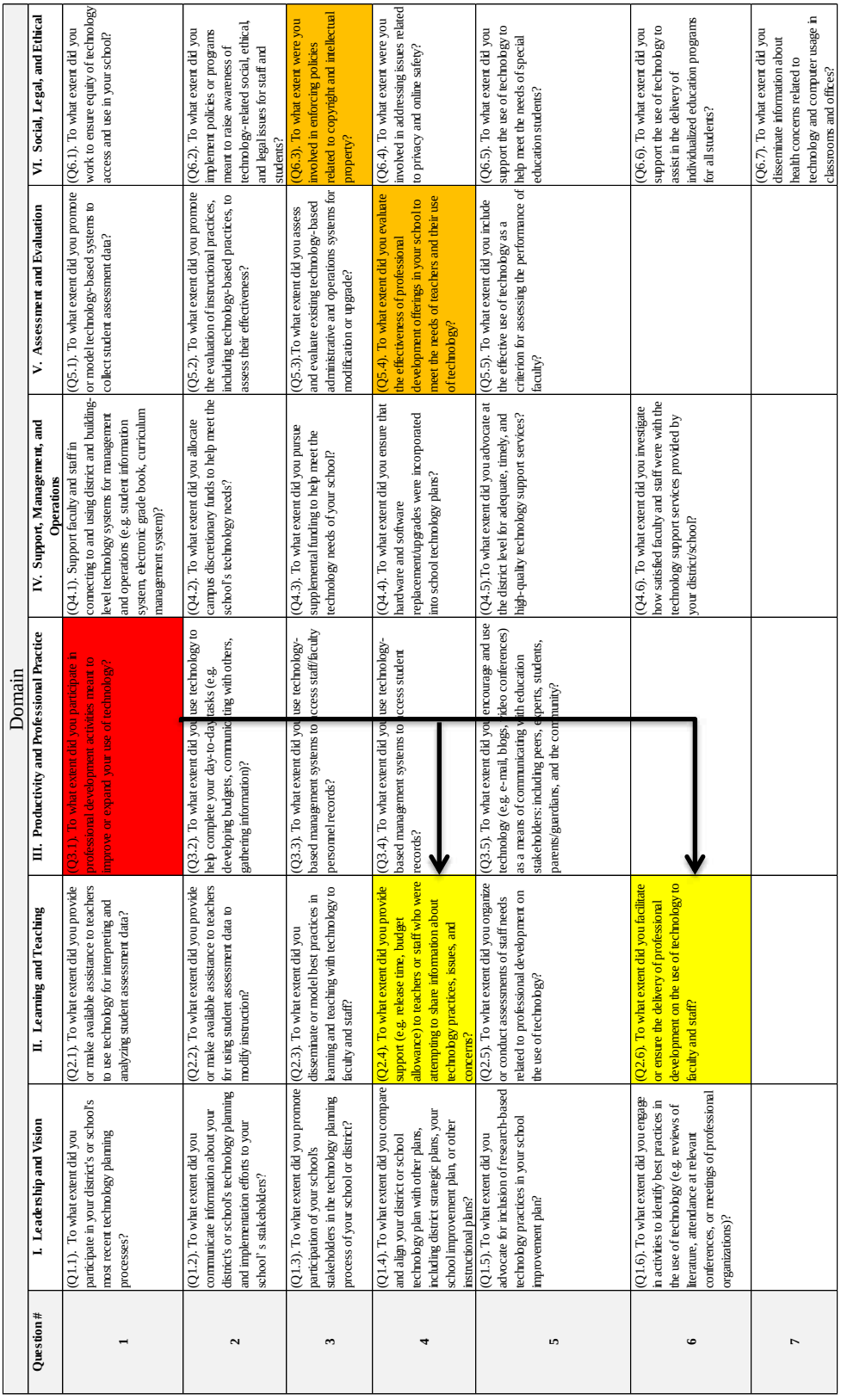
3.1 - To what extent did you participate in professional development activities meant to improve or expand your use of technology?

4.6 - To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?

5.4 - To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

Question 2.6 correlates the principal's responsibility to ensure the delivery of technology professional development to faculty and staff including finding and budgeting finances, adjusting scheduling, and evaluating specific technology needs. This correlation applied directly to the sustainability of corporate-sponsored ICT curricula. (see Figure 10).

Figure 11– PTLA Question 3.1 Inter-item Correlation



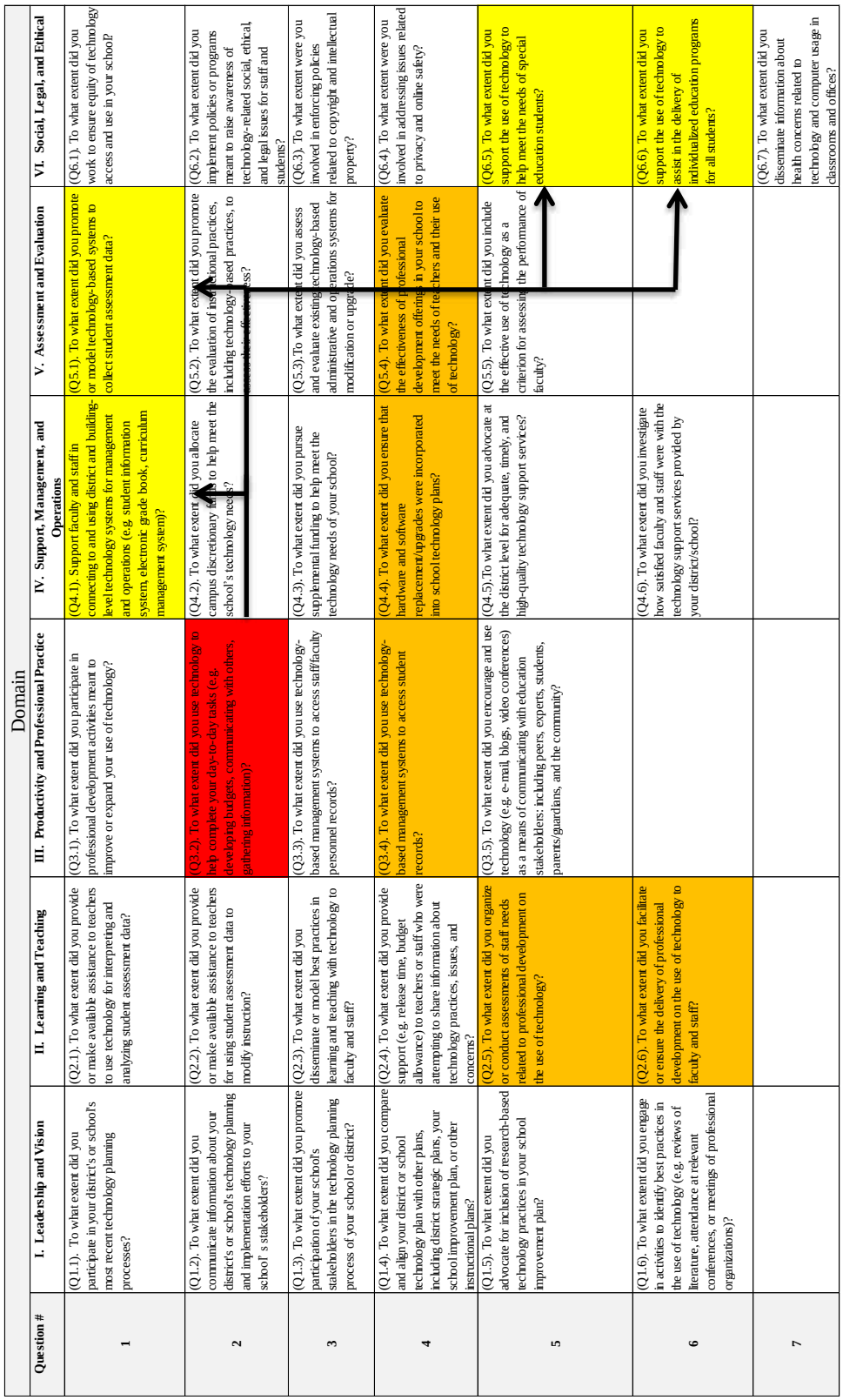
PTLA question 3.1: To what extent did you participate in professional development activities meant to improve or expand your use of technology? Question 3.1 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

2.4 - To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

2.6 - To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

Question 3.1 correlated specifically to the hypothesis that the principal's knowledge of ICT impacts the sustainability of corporate-sponsored ICT curriculum and more generally to the use of educational technology within his / her school. This correlation includes providing funding and time for principals to improve their working knowledge of technology and supplying this knowledge to faculty and staff (see Figure 11).

Figure 12– PTLA Question 3.2 Inter-item Correlation



PTLA question 3.2: To what extent did you use technology to help complete your day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)? Question 3.2 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

4.1 - Support faculty and staff in connecting to and using district and building-level technology systems for management and operations (e.g. student information system, electronic grade book, curriculum management system)?

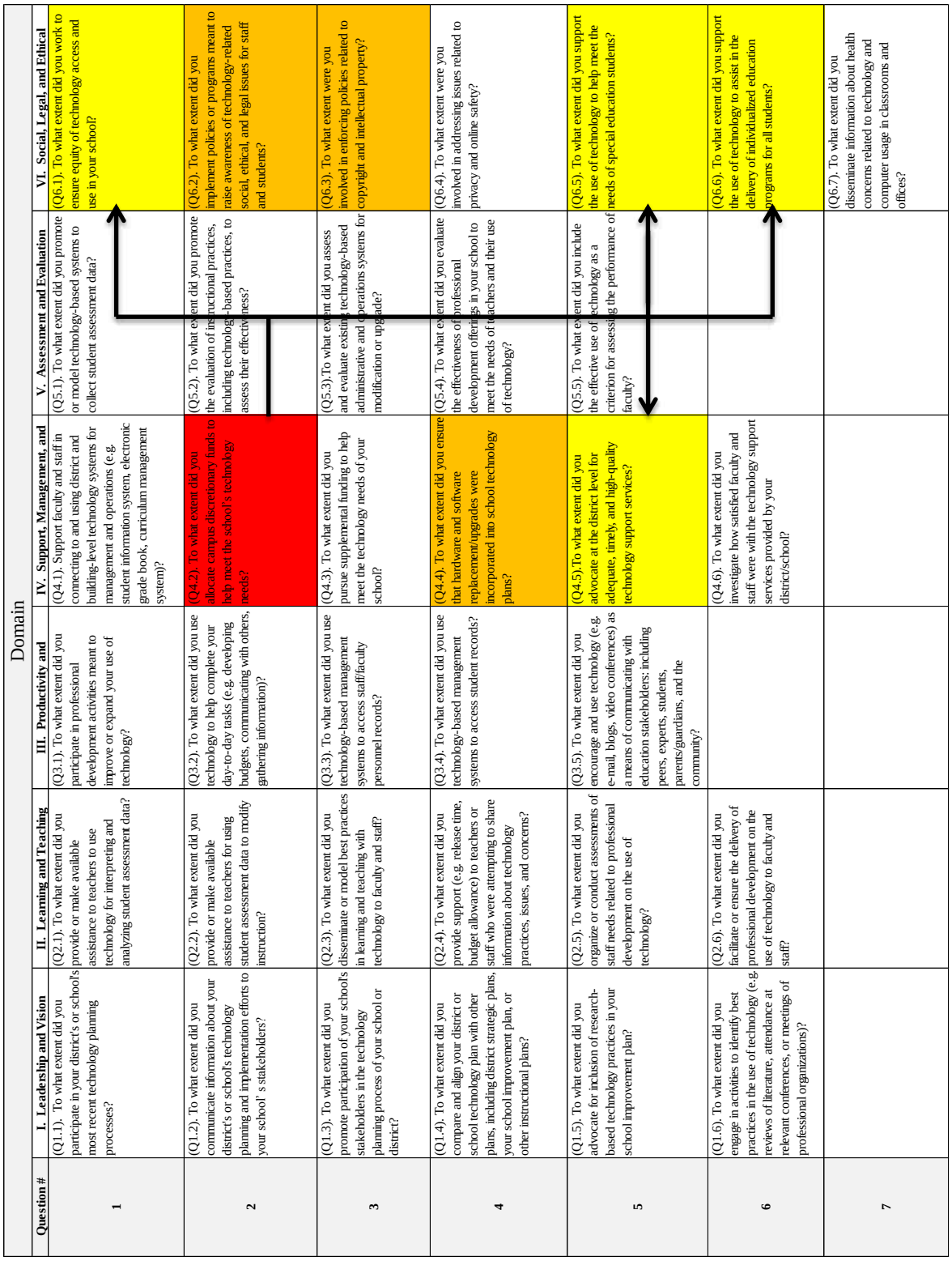
5.1 - To what extent did you promote or model technology-based systems to collect student assessment data?

6.4 - To what extent were you involved in addressing issues related to privacy and online safety?

6.6 - To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

The question 3.2 correlation seemed to suggest that principals, who use technology daily for administrative functions should expect faculty and staff to do so as well. In addition, administrators who use technology daily should also support the ethical use of technology for all students. Although this does not provide data to prove the sustainability of corporate-sponsored ICT curriculum, it does show a propensity of an administrator toward practical use of technology (see Figure 12).

Figure 13– PTLA Question 4.2 Inter-item Correlation



PTLA question 4.2: To what extent did you allocate campus discretionary funds to help meet the school's technology needs? Question 4.2 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

4.5 - To what extent did you advocate at the district level for adequate, timely, and high-quality technology support services?

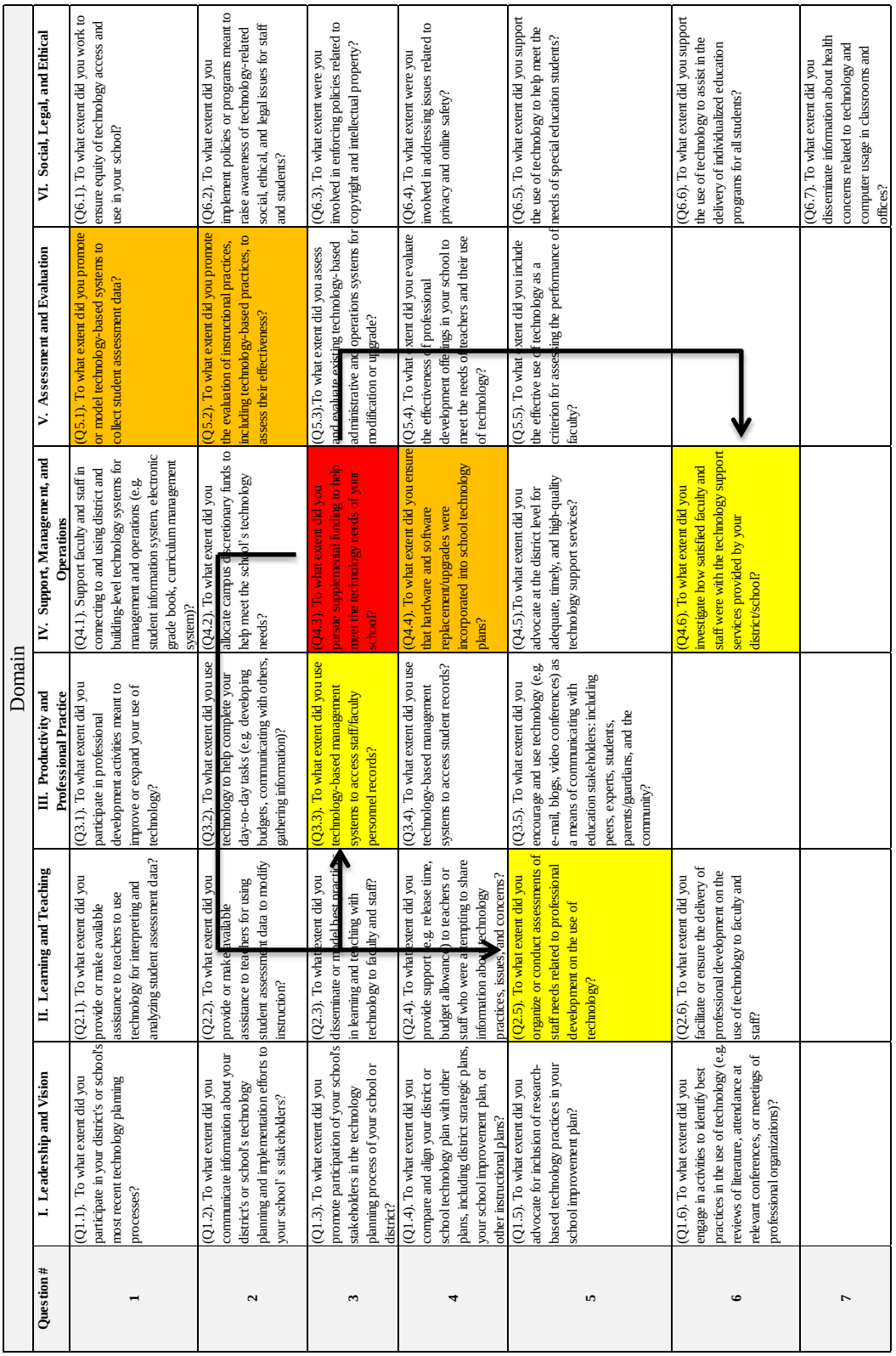
6.1 - To what extent did you work to ensure equity of technology access and use in your school?

6.5 - To what extent did you support the use of technology to help meet the needs of special education students?

6.6 - To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

Question 4.2 correlated the impact a principal has by assigning school and / or district discretionary funds for technological needs. This includes funding equal access to technology for all students. Since one of the key issues with the sustainability of corporate-sponsored ICT curriculum is sufficient funding, the correlation of this question is significant to the best practices that maintain such a program (see Figure 13).

Figure 14– PTLA Question 4.3 Inter-item Correlation



PTLA question 4.3: To what extent did you allocate campus discretionary funds to help meet the school's technology needs? Question 4.3 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

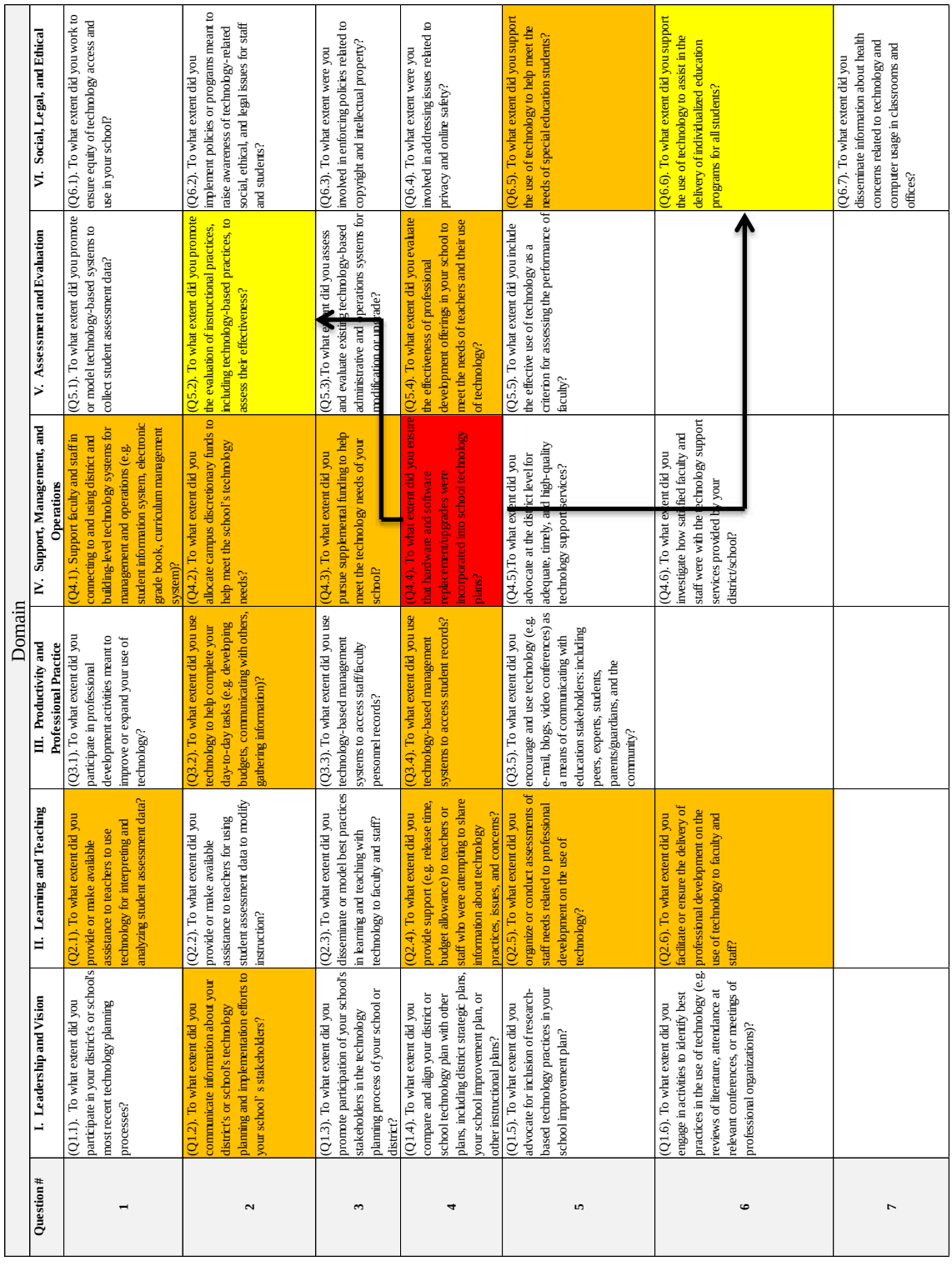
2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

3.3 - To what extent did you use technology-based management systems to access staff/faculty personnel records?

4.6 - To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?

There is a strong correlation with question 4.3 with other questions dealing with those funding activities that are normally not included within a school budget often including administrative software and professional development. In addition, this would include federal, state, and private party grant sources that are considered as one time only funds and federal grants such as Perkins funding. This is important because when initializing new curricula such as corporate-sponsored ICT curriculum, school districts often seed this type of program with funding in part of the district discretionary funds in order to sustain the program. Many Montana school districts use Perkins funding to help sustain the Cisco Networking Academy programs (see Figure 14).

Figure 15– PTLA Question 4.4 Inter-item Correlation



PTLA question 4.4: To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans? Question 4.4 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

5.2 - To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

6.6 - To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

However, questions:

1.2 - To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school' s stakeholders?

2.1 - To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

2.4 - To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

2.6 - To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

3.2 - To what extent did you use technology to help complete your day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)?

3.4 - To what extent did you use technology-based management systems to access student records?

4.1 - Support faculty and staff in connecting to and using district and building-level technology systems for management and operations (e.g. student information system, electronic grade book, curriculum management system)?

4.2 - To what extent did you allocate campus discretionary funds to help meet the school's technology needs?

4.3 - To what extent did you pursue supplemental funding to help meet the technology needs of your school?

5.4 - To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

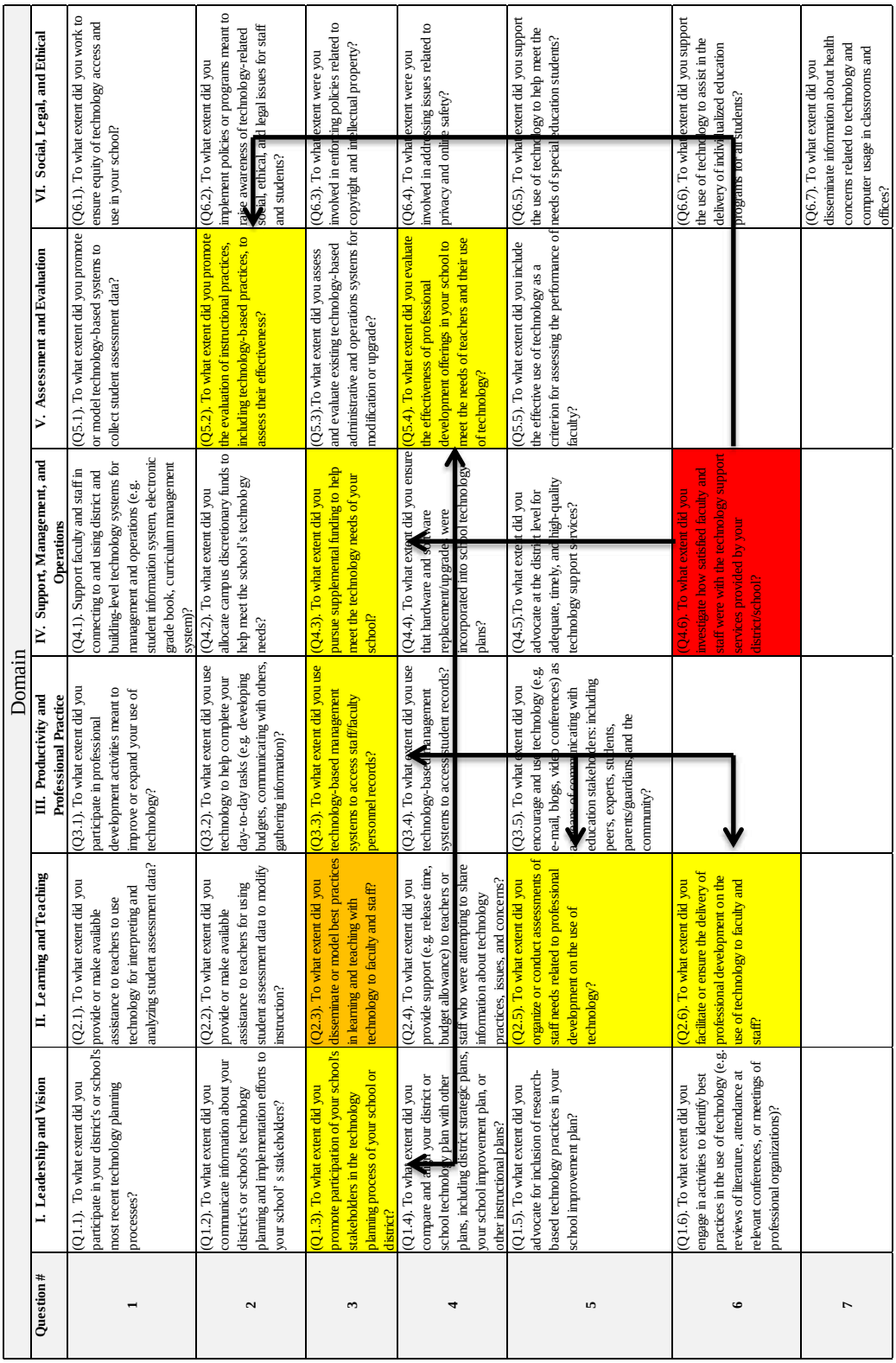
6.5 - To what extent did you support the use of technology to help meet the needs of special education students?

Although these questions only have a small (0.10 – 0.29) to medium (0.30 – 0.49) positive correlation and statistical significance, each of these questions correlate in order to describe the importance of a district technology plan to include funding sufficiently to meet the technological needs of the schools and district. This enunciates the issue that the school administrator is

responsible to make sure that any budgeting includes foundational funding to maintain the school's hardware and software with emphasis on maintenance and upgrading and updating.

The sustainability of any corporate-sponsored ICT curriculum will include the updating and upgrading of hardware and software required to maintain the curriculum. The Cisco Networking Academy program changes core equipment about every three years. Before undertaking this or any other academy program, an administrator needs to realize the sustaining cost of that program (see Figure 15).

Figure 16– PTLA Question 4.6 Inter-item Correlation



PTLA question 4.6: To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school? Question 4.6 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

1.3 - To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

2.6 - To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

3.3 - To what extent did you use technology-based management systems to access staff/faculty personnel records?

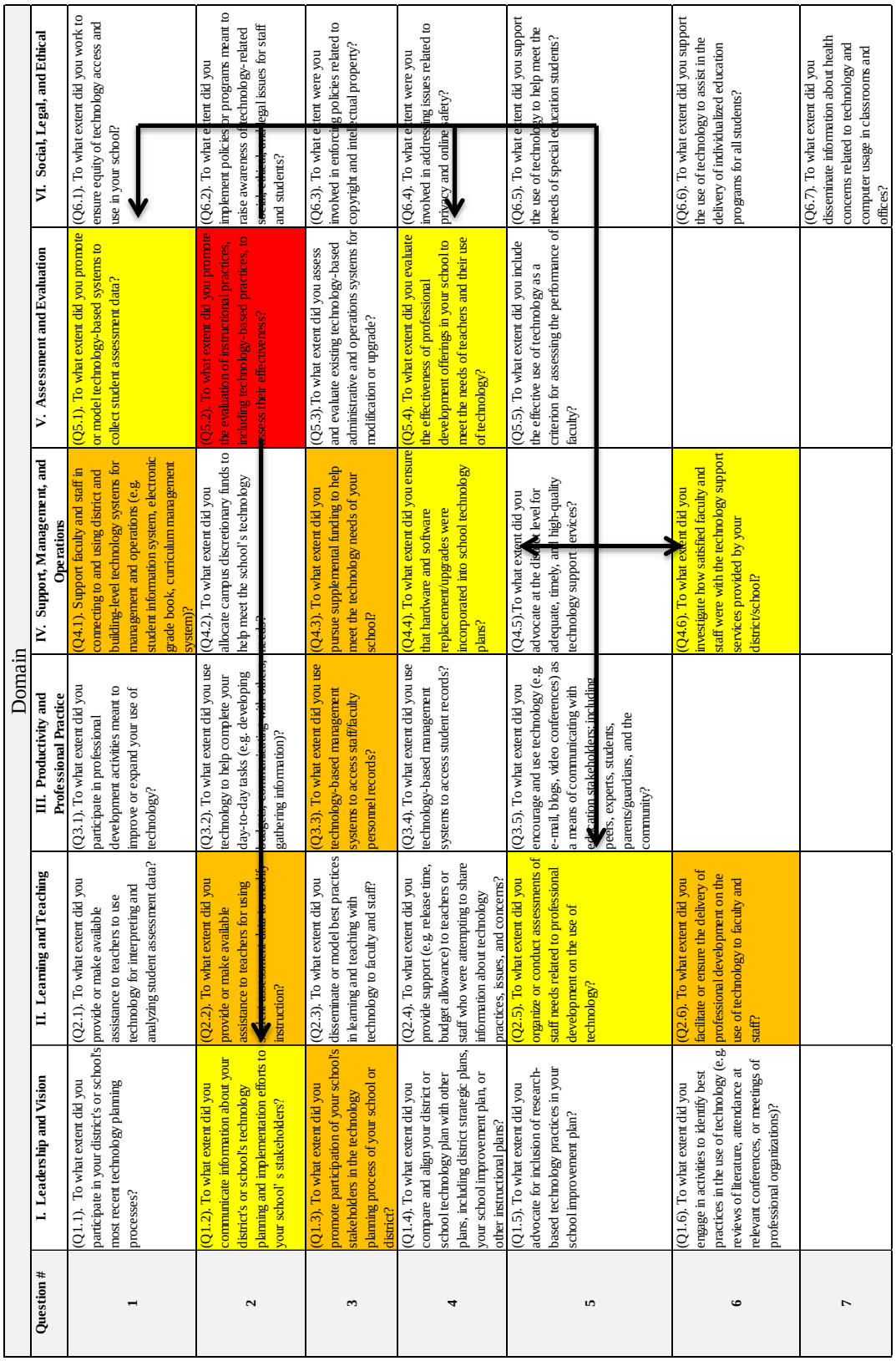
4.3 - To what extent did you pursue supplemental funding to help meet the technology needs of your school?

5.2 - To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

5.4 - To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

Question 4.6 correlates with questions dealing with technology planning as it applies to providing, and assessing technical support services for administration, faculty, and staff. These resources included providing and maintaining Internet connections through an Internet Service Provider along with proxy services and overall security services. In addition, question 4.6 also correlates with the importance of providing sufficient resources to meet the educational needs of the school and /or district (see Figure 16).

Figure 17– PTLA Question 5.2 Inter-item Correlation



PTLA question 5.2: To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness? Question 5.2 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

1.2 - To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders?

2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

4.4 - To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?

4.6 - To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?

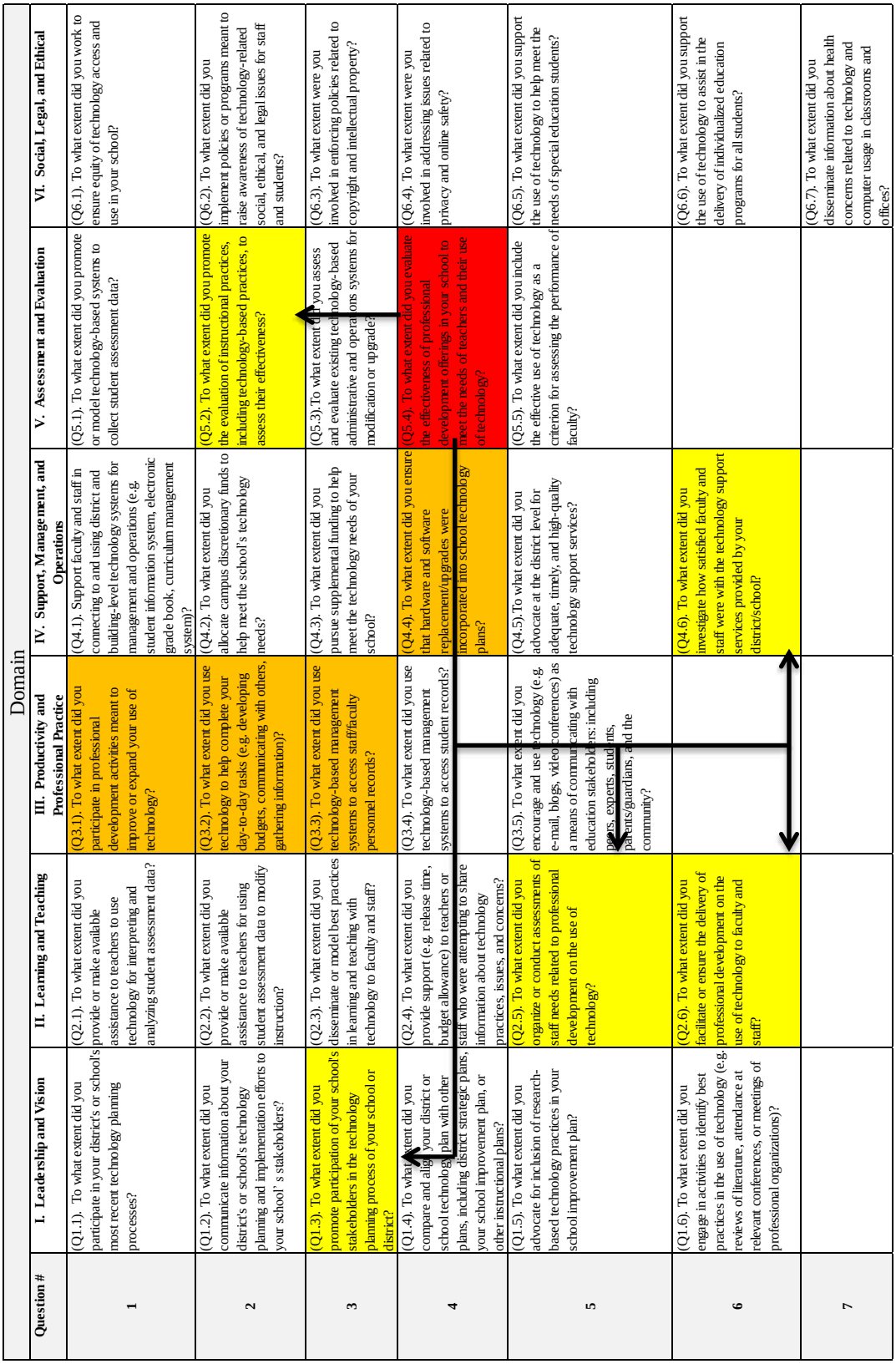
5.1 - To what extent did you promote or model technology-based systems to collect student assessment data?

5.4 - To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

Assessment of any program is essential to its sustainability. Question 5.2 enunciates the importance of an administrator to utilize data to determine

the effectiveness of how well a program is meeting the educational needs of its students. This includes determining whether professional development needs of faculty and staff sufficiently meets the needs of the district, school, and students. In addition, the evaluation of a program or curriculum includes the evaluation of the technology and the instructor as well (see Figure 17).

Figure 18- PTLA Question 5.4 Inter-item Correlation



PTLA question 5.4: To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology? Question 5.4 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

1.3 - To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

2.5 - To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

2.6 - To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

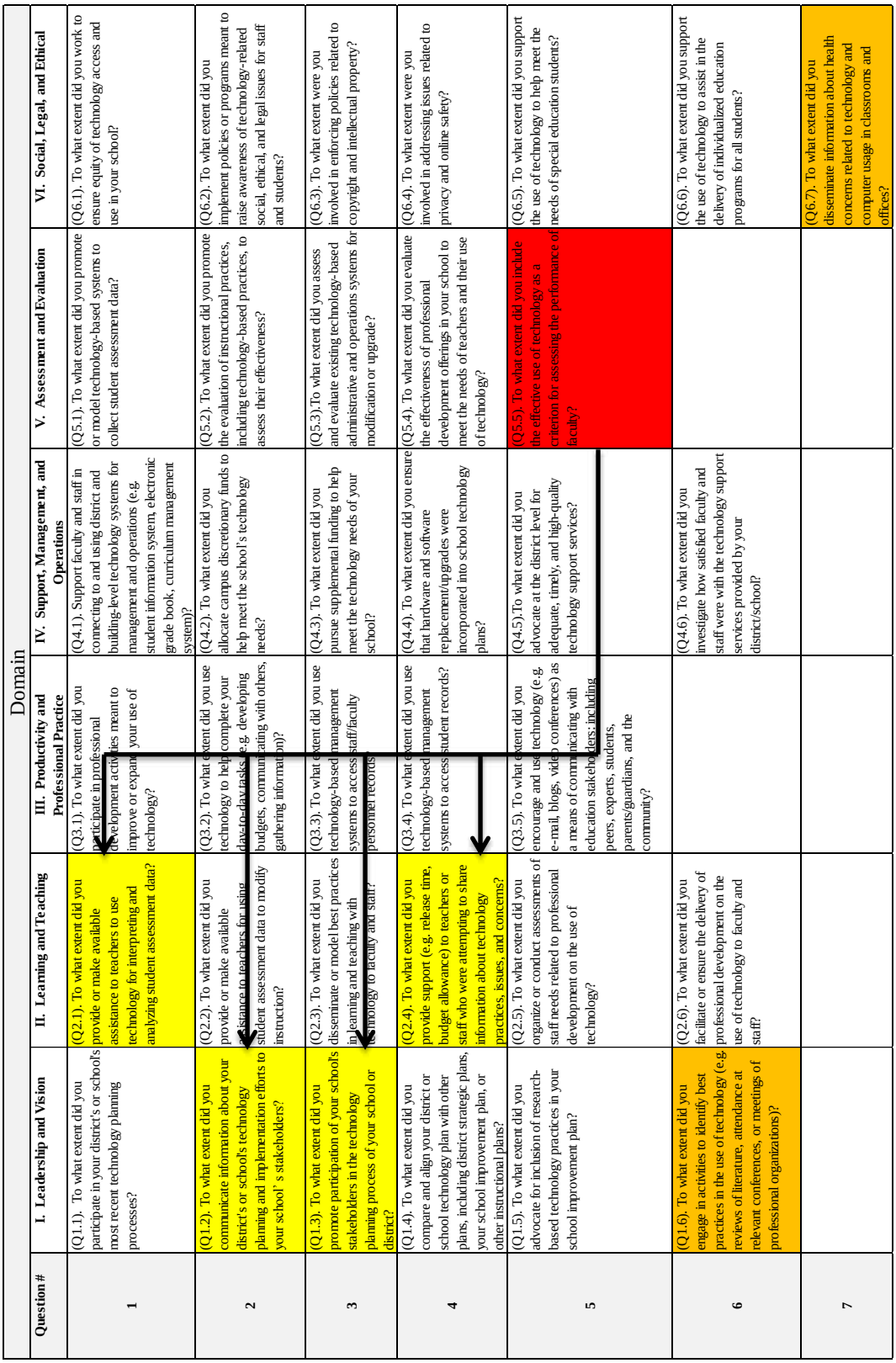
4.6 - To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?

5.2 - To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

Professional development is an important part of updating and maintaining an active skill set necessary in utilizing technology effectively in the classroom and administrative offices. Question 5.4 correlated with questions dealing with the overall effectiveness of technology. This included preparation of faculty and staff through professional development along with the evaluation of effectiveness of technology including personnel and student outcomes. This is an important factor dealing with the sustainability of corporate-sponsored ICT curriculum. Without appropriate professional

development, faculty cannot continue to stay current with new technologies ultimately leading to the ineffectiveness of the use of and the teaching of computer technology (see Figure 18).

Figure 19- PTLA Question 5.5 Inter-item Correlation



PTLA question 5.5: To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty? Question 5.5 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

1.2 - To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders?

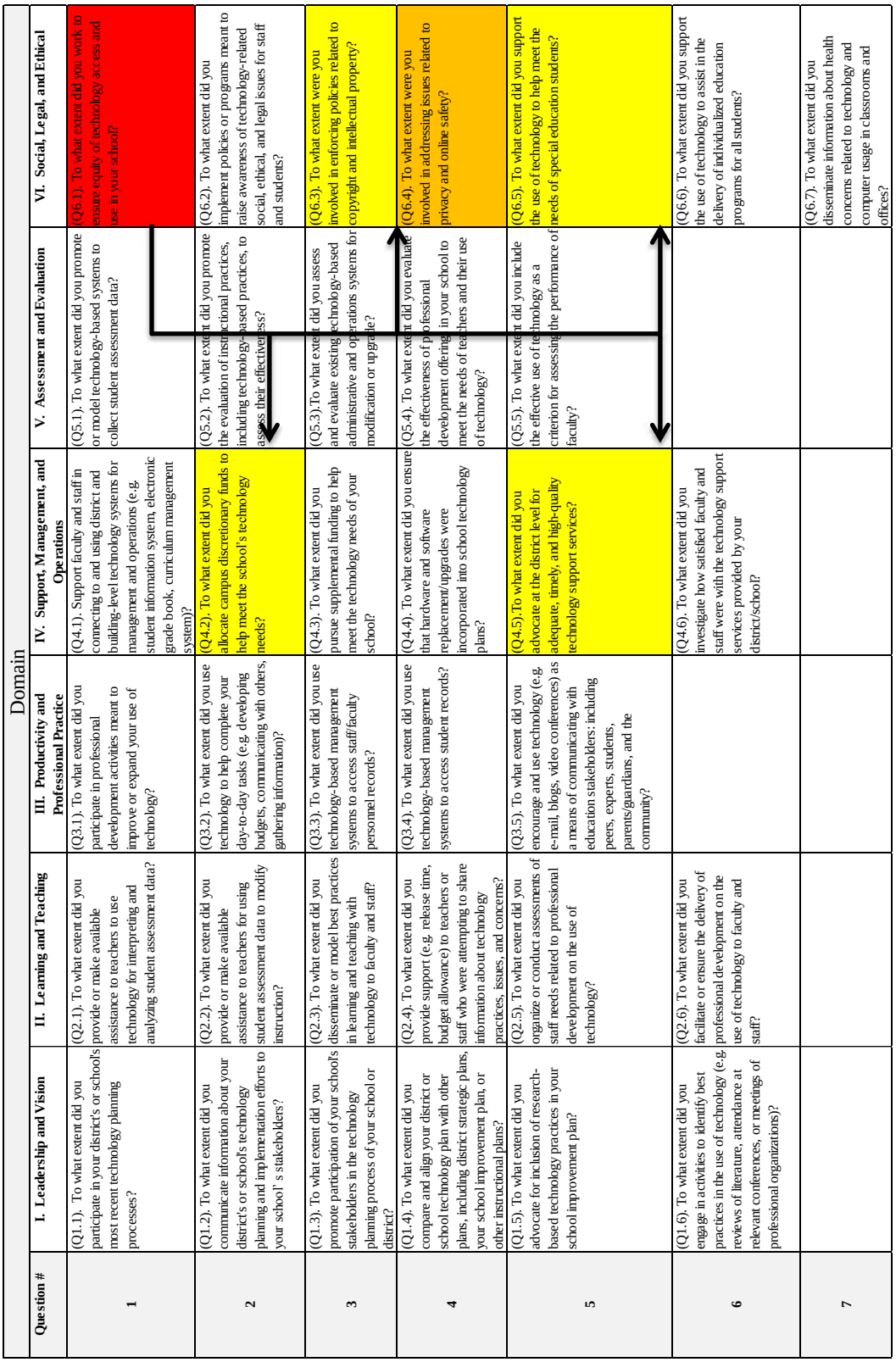
1.3 - To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

2.1 - To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

2.4 - To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

Question 5.5 correlated with questions that emphasized the importance of faculty evaluation with their use of educational technology. This should be an important aspect included within the district technology plan along with the inclusion of professional development in the use of educational technology along with an adequate funding model in order to support both the evaluation of faculty and staff and providing professional development of faculty and staff both school and district wide (see Figure 19).

Figure 20- PTLA Question 6.1 Inter-item Correlation



PTLA question 6.1: To what extent did you work to ensure equity of technology access and use in your school? Question 6.1 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

4.2 - To what extent did you allocate campus discretionary funds to help meet the school's technology needs?

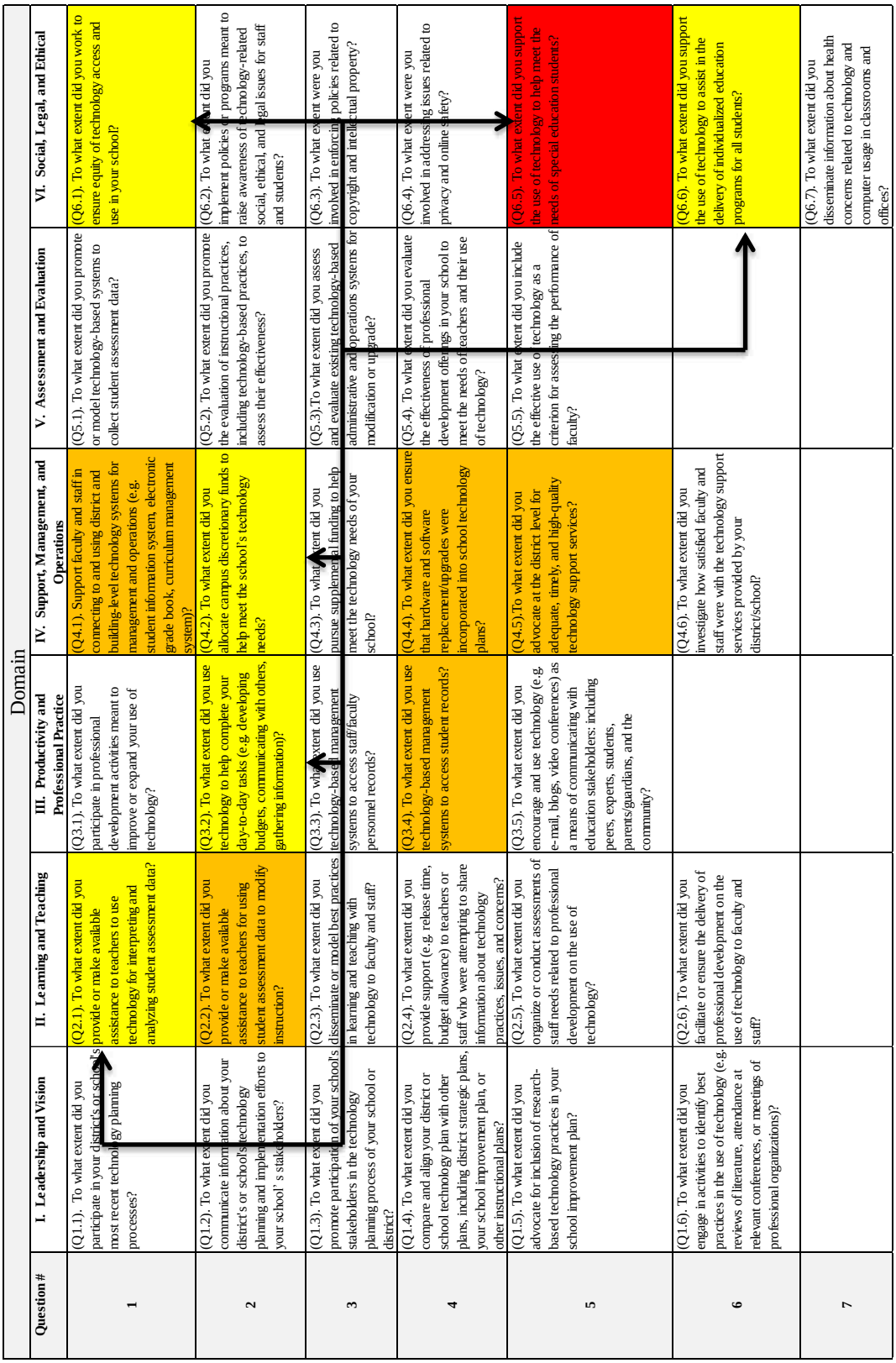
4.5 - To what extent did you advocate at the district level for adequate, timely, and high-quality technology support services?

6.3 - To what extent were you involved in enforcing policies related to copyright and intellectual property?

6.5 - To what extent did you support the use of technology to help meet the needs of special education students?

Question 6.1 correlates questions having to do with the principal's use of discretionary funds to assure equity of technology along with technology services such as Internet and computer security access for all students within the school or district. This also includes the protection of intellectual properties for all school faculty, staff, administration, and students (see Figure 20).

Figure 21- PTLA Question 6.5 Inter-item Correlation



PTLA question 6.5: To what extent did you support the use of technology to help meet the needs of special education students? Question 6.5 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

2.1 - To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

3.2 - To what extent did you use technology to help complete your day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)?

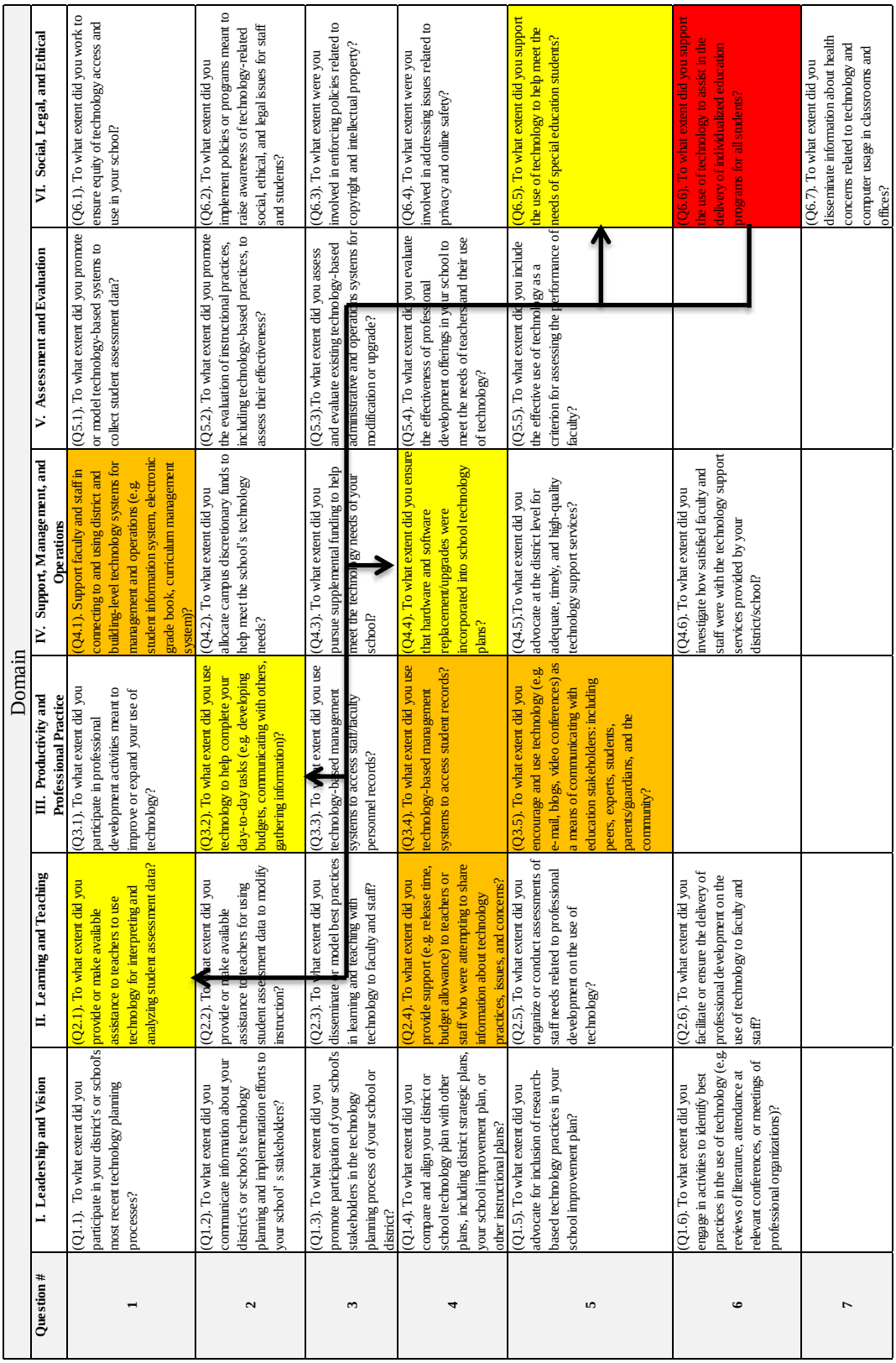
4.2 - To what extent did you allocate campus discretionary funds to help meet the school's technology needs?

6.1 - To what extent did you work to ensure equity of technology access and use in your school?

6.6 - To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

Question 6.5 correlates with questions describing the importance of providing equity both in the use of educational technology and services and providing adequate funding for not only special education students but for all students. This is a primary responsibility for school administrators (see Figure 21).

Figure 22- PTLA Question 6.6 Inter-item Correlation



PTLA question 6.5: To what extent did you support the use of technology to assist in the delivery of Individualized Education Programs (IEP) for all students? Question 6.5 has a moderate (0.30 – 0.49) to large (0.5 – 1.0) statistically significant positive correlation with questions:

2.1 - To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

3.2 - To what extent did you use technology to help complete your day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)?

4.4 - To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?

6.5 - To what extent did you support the use of technology to help meet the needs of special education students?

Question 6.5 has similar correlations as question 6.4. The issue is primarily that all students should have equal access to computer technology and services. This includes providing appropriate funding based upon the evaluation of programs and faculty (see Figure 22)

Summary

Research question two (2) asks: What is the relationship between a school administrator's competence in information technology and the sustainability of corporate-sponsored IT curriculum programs? Although this was a post hoc item analysis primarily for the purpose to understand the eighteen (18) participants better, the correlations did provide a number of important factors that emphasize the sustainability of use and teaching of ICT programs within a high school. In summary the sustainability of ICT programs and specifically corporate-sponsored ICT curricula programs include a number of important aspects including the importance of: (a) district and school technology planning, (b) providing relevant professional development, (c) program and faculty evaluation based upon the collection of data, (d) providing adequate funding from both district and supplemental sources (e) providing access to all students to technology and technological services, and (f) protecting the digital intellectual rights of all students, faculty and staff.

This specifically applies to corporate-sponsored ICT curricula in the areas of the initial training instructors; purchasing, maintaining, and updating curriculum based equipment and software, providing access to network services, evaluating programs and instruction through student proficiency data, and allowing all students access to this type of curriculum programming.

A Case Study on the Sustainability of Cisco Networking Academies in Montana

Introduction

The qualitative data collection followed a cross-case analysis study model of the currently active Montana Cisco Networking Academies based on the Robert Stake (1995) case study research models. The case study used the definition of the theta (Θ) or the case and the iota (ϑ) representing the issues or questions (Stake, 1995). Montana high schools who offer or have offered in the near past corporate-sponsored ITC curriculum, specifically the Cisco Networking Academy program, is the case (Θ). The central questions for this study represent the (ϑ).

The qualitative and quantitative data was triangulated in order to answer the central research question: What factors determine successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools?

Θ: The high school principal's impact on the sustainability of corporate-sponsored information communication technology curriculum specifically the Cisco Networking Academy.

ϑ_1: What factors determine successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools?

ϑ_2: Does the high school principal's competency in ICT impact the sustainability of corporate-sponsored ICT curriculum?

Background

Corporate-sponsored high school curriculum is not a new concept. In the past, corporations used public schools to train workers in industry; however, information communication technologies have grown in significance since the late 1960's. A number of educational technology companies developed computer software and hardware to teach core skills to students.

Cisco Systems: The Beginning of an Idea

Information communication technology companies realized that with the boom in their professions that they need an active trained workforce to sustain their future growth. Cisco Systems realized the same vision. "In 1993 John Morgridge, then CEO of Cisco Systems, hired George Ward to help build Cisco's market in educational institutions" (Murnane, et al., 2002, p. 131). George Ward, a consulting engineer for Cisco Systems, developed an idea to teach networking in order to increase the number of competent networkers in workforce. He discovered through his research that high school students easily grasped the concepts of networking; as a result, George Ward asked the principal of Thurgood Marshall High School in San Francisco to allow him to pilot his networking class. George Ward, along with Thurgood Marshall High School teachers Dennis Frezzo and Jai Gosine, piloted the networking course. Frezzo and Gosine developed the curriculum and hands-on activities as they taught the pilot. George Ward brought the idea to Alex Belous, Director of Technology Education for Arizona. Ward and Belous over the next five years developed the networking educational program.

In 1997, Ward and Belous brought their curriculum to Cisco Systems where John Morgridge, Chairman of the Board of Cisco Systems, announced the Cisco Networking Academy to the world. Following the public announcement, the Cisco Networking Academy grew quickly (Murnane, et al., 2002).

Cisco Networking Academy in Montana

As noted in Chapter 3, in 1998, members of Cisco Systems held a meeting for school administrators in Helena, Montana to promote the Cisco Networking Academy program. A number of representatives from many of the two year colleges throughout the state attended the meeting. The current Dean, Will Weaver, from Great Falls College MSU (formerly Montana State University – Great Falls, College of Technology) sent Dr. Suzanne Waring, Director of Outreach Programs, to the meeting to gather information. After reporting back to Dean Will Weaver, they decided to pursue bringing Cisco Networking Academy into the State of Montana (Waring, 2012; Waring & Kirkendall, 2000).

The cost of starting an academy with training and equipment was about fifteen-thousand dollars ($15,000) initially (see Appendix XI). As a result, Dr. Waring found sponsors to underwrite some of the cost of the new academies. November of 1998, the State of Montana celebrated the beginning of the Cisco Networking Academy. The celebration included the five new regional academies, Billings, Butte, Helena, Great Falls, and Missoula along with John Morgridge, Cisco Systems Chairman of the Board, dignitaries from

the Montana State government, financial supporters, and new instructors and coordinators for the academy program from throughout the state (Waring, 2012; Waring & Kirkendall, 2000).

Cisco Networking Academy developed a hierarchal instructor training design. Cisco Academy Training Centers are responsible to train regional academy instructors. Regional academy instructors are responsible to train local academies. The quality of training is important and is monitored closely. Cisco Networking Academy program realizes that it is extremely important to have competent instructors teaching students their curriculum. All instructors are required to successfully complete each curriculum by passing an online exam and a hands-on exam. They also need to demonstrate their competency in teaching as monitored by either CATC or regional instructors (Murnane, et al., 2002).

Recruitment of Local Academies

Once the Cisco Networking Academy program began in Montana, the five regional academies were responsible to grow the program by recruiting local academies from high schools and colleges throughout the state. Each regional academy was required to recruit at least ten (10) local academies before their contract renewal date (Waring, 2012; Waring & Kirkendall, 2000). Regional academy leadership, legal main contact, made contacts with principals and superintendents throughout the state to discuss the Cisco Networking Academy program. "As I remember, I think I sent a letter out to all of the different schools and introduced it to the superintendents. I had a

few call me and said they wanted some more information" (Waring, 2012). The process was to connect with schools and find an audience to sell the program. Dr. Waring noted,

> What I talked about was the thought process; maybe someone would never ever become a network administrator; but it was a type of learning that really challenged the brain and the thinking process. Then I talked about them having jobs right out of high school and a way to go on to college with an interest they already had. Every school board I talked to, purchased a Cisco kit and trained an academy; that is, sent teachers into training. We spent six to eight weeks doing that. (Waring, 2012)

Once the high school signs a Letter of Commitment, the local academy would select two instructors to complete the four week instructor's training course; two weeks each of two years, at a regional academy. The local academy would also purchase the hardware equipment needed to participate in the program. Local academies would also pay for a yearly support agreement. Each regional would provide continued training and support for each local. This included two personal visits by regional instructors or legal main contacts each year (Waring & Kirkendall, 2000).

School Administrator's Role in Program Sustainability

Program sustainability for the Cisco Networking Academies and other technology academies presents a number of challenges. Required curriculum is innately sustainable. English, math, history and government, for example,

are required curricular areas. This guarantees their continued existence in schools. Local and state boards of education, along with colleges and universities, strongly impact which courses high schools offer to its students. Co-curricular or extra-curricular courses on the other hand, must justify their existence sometimes yearly. High school principals consider a number of issues on whether co-curricular or extra-curricular offerings are sustainable at their institutions.

Principals are placed in a position where they need to decide the sustainability of programs within their schools. Principals use a number of tools in order to make decisions. One principal said, [We] "…make a decision taken from the technology committee and then the district wide initiatives are supported through recommendations from a local coordinator and the other principal and [me]." "I think the best decisions are made by sitting down with people who are better informed and adding discourse and saying with the information we have here are the best options." "I learned that a long time ago. I hire expertise because I don't have time to micro-manage." A superintendent said, "I lean heavily on my IT person. I trust him when I brought him here and hired him here … I trust him implicitly and accept his recommendation in all areas. When I go to the board, they accept my decisions." A principal said, "I really need to trust my teacher and let them to be the authority on the subject and let me know this is valuable for the kids." "I see myself as a facilitator." said a principal of a medium school district. "I can be by no means an expert in every curricular area. I hire

experts…I hire people's expertise and so what I want to know is that that person is to go out with fidelity going out on the emerging horizon and explore."

Challenges to the Sustainability of the Cisco Networking Academy Program

It is important to note primary hindrances to the sustainability of a program such as the Cisco Networking Academy program to help appreciate the principal's vision and responsibility in sustaining such a program. Principals noted primarily four areas that challenge them in sustaining the Cisco Networking Academy program: rigor of the curriculum, interest of the students, instructor training, and financing the program.

Rigor of the curriculum

The curriculum for the Cisco Networking Academy program is written for use by both high schools and colleges. The content is very technical and requires students to put in extra time to learn the program's concepts. One principal noted "The academic rigor is way too tough for the caliber of kid we are getting into the program [Cisco Networking Academy]." The principal continued, "More and more students dropped out at semester time because of the amount of rigor required." "They [schools offering Cisco Networking Academy programs] end up with students with extremely low GPA's, reading levels are very low and they use it as a fill in class. A lot of instructors are very disappointed. It is not the right type of program for this type of student." Counselors, who are responsible to help students register for classes, "…

don't understand the level of the understanding to be successful in this program."

If students are not well prepared or their experience in the program is not satisfying or challenging, they do not select to enroll. "We have now five kids in the program and that's all," stated one principal. Enrollment numbers are crucial in sustaining a program particularly in smaller school districts.

Instructor Training

Principals also noted that keeping trained instructors is challenging. Teachers need to be motivated to learn a new technology and / or curriculum. One district superintendent said, "Educational philosophy has changed from the time I started in this business." One principal said,

> Teachers now are not so willing to give up their summers to go to training. To ask a teacher to go to one or two weeks of intense training now is a lot to ask. They are burned out, tired and I can't do that. They don't want to do it right out of school they are crispy critters and they don't want to do it in August because they are getting ready to come back to work, and in the middle [of the summer] they have their own stuff going on.

High school administrators also noted that it is not only difficult to motivate an instructor to give up their summers to become trained and maintain that training. "Training for teachers are out of contract and now I have to pay them curriculum rate which our curriculum rate is $28 an hour and travel and per diem curriculum rate, registration you are into that 6 or 7

thousand bucks by the time you are done. That is a pretty sizable chunk for one instructor; but by contract we can't force an instructor to do it. It's all about the dollar and getting the most bang for your buck."

Financing the Program

Furthermore, the cost of the program is quite high relatively speaking. Initially in Montana, a number of grants helped schools to get the program off the ground; however, when the grants dried up school districts were forced to finance their Cisco Networking Academy within the district. "The training money disappeared and so schools had to pick up the cost of training themselves." Commented Dr. Waring, "It cost each new academy about fifteen thousand dollars to start that was largely picked up by grants we had initially. When schools are depending on school foundation moneys to pay for a program for the few students; when it's not there schools must sustain their own programs" (Waring, 2012). Another principal noted, "Money. Just flat out expensive just as everyone knows; and it will get worse."

Program sustainability can also be hindered by the shifting of administrators within and outside school districts. "It is interesting that principals and superintendents turn over; so when you sell the idea and he starts working on it in the next year you might have a whole new configuration of teachers and principals" commented Dr. Waring. The strength of an administrator's vision for his / her school district often shifts with administrative changes.

School administrators show an understanding of the challenges in sustaining a high cost, low enrollment program such as Cisco Networking Academy. They demonstrate their vision and management skills in maintaining programs that positively impact students, the school and the community in spite of its high cost and difficulty to sustain this type of program.

Successful Sustainability of the Cisco Networking Academy Program

The needs and interests of students are a driving force for the sustainability of co-curricular or extra-curricular programs. Not only that, school administrators and district school boards sustain programs that provide benefit for the school districts and community as well.

Advantage to Students

School administrators demonstrate their vision for programs that enable a student by giving the students skills that will lead to successful careers or further education. One principal said, "… the greatest benefit [to students] is that they could go directly into an entry-level position in IT and not have to go to a 2 year technical school or any other training first." "I think that students like technology;" said a school administrator, "and once they get into the nuts and bolts of [technology] really [get] it to work behind the scenes - seeing the interface of the computer screen; getting into the computer and, tinkering and making all of those things work is challenging for them." It seemed clear that school administrators wanted to find curriculum that both was easily available and benefited students. "I want something that will put our students on the

cutting edge making them college and career ready; putting them at a level where they are entering a profession or entering into a college at a level acceptable and on par [with] what is expected" noted one administrator.

One school administrators said "…[that we would] make sure we schedule time for this and make sure the kids are aware that it was an opportunity for them, [students]…" The community in some cases supported the Cisco Networking Academy program by participating in advisory groups and in some cases providing jobs for students. One superintendent of a small school noted, "The head of the telephone cooperative attends our annual Perkins meeting and is very supportive… [of the Cisco Networking Academy program]." "We do have students here who have gone on and are working with the local telephone cooperative. That certainly provides them with the foundation in the basics of wiring and the concepts within." One principal from a medium sized school said, "We were giving students the opportunity to complete a course where they can get certified and be workforce ready; and so that was the pathway. We have had a number of students who have completed that course and are actually working for a technology company providing Internet here in town." Another principal said, "We have one kid who is very successful in our program, went to Tech and [is] now working for the clinic. We have another young man who was security for Bill Clinton and now is in Homeland Security." "I want something that will put our students on the cutting edge making them college and career ready;" noted a superintendent, " putting them at a level where they are entering a profession

or entering into a college at a level acceptable and on par [with] what is expected."

School principals described their responsibility as one who can bring the school and community together in a symbiotic relationship where schools train students and community businesses hire those students. Learning technology is not only important to develop skill sets for current or future employment; but also, building a type of skill set students can use for higher education opportunities and other training possibilities. One principal noted, "[I] think the biggest thing for us is the technology offerings within our business curriculum that basically offer our students more exposure that is more in depth exposure to technology coursework than a keyboarding class;"

The benefits expand beyond the ability to be a system administrator or finding employment once out of high school. Dr. Waring noted, "I thought it would help to improve thought processing, improve their math skills, and in all kinds of areas. Another thing, I thought it was good for teachers." Dr. Waring continued, "[M] maybe someone would never ever become a network administrator; but it was a type of learning that really challenged the brain and the thinking process" (Waring, 2012).

Programs and Instruction Sustainability: Funding and Time

Sustainability of the Cisco Networking Academy program included finding and training instructors as needed. One principal reported "When I arrived here in [school name] and I needed to hire a new business and technology instructor and there was some concern early on; on what was

going to happen to Cisco. The board was extremely supportive of it and very happy when I hired a new guy who said he would go to Cisco training." School administrators would "…make sure that the teacher had the time for professional development needed providing time for him to seek that and pay for that professional development."

Part of school administrators' responsibility is to find or provide funding sources in order to sustain academy programs. One principal of a medium sized high school reported, "Through the technology committee the technology funds [from] the technology levy, … allowed by Montana law, … we use that money for training [along with] some Carl Perkins Vocation education money…. we are very willing to send our technology coordinator or other individuals to make sure we are ready to implement the set curriculum or programs in the school and be up to date." Another school administrator spoke of the importance of school board support of the Cisco Networking Academy program. "The board is very supportive of it [Cisco Networking Academy program]. They [the school board of trustees] have allowed me to seek out whatever resources I need in order to provide it."

In summary, the challenge of sustaining corporate-sponsored ICT curriculum involves strong administrative support, a sustainable funding source, curriculum that is designed to engage student participation in the program, a source of well prepared, trained faculty to teach the courses, and curriculum that provides a benefit to students, the school, and the community.

If any of these factors are weak and / or missing, the sustainability of any corporate-sponsored ICT curriculum is in jeopardy.

Summary

The data collected for this study came from three primary sources: the Principals Technology Leadership Assessment (PTLA), the number of months each Montana Cisco Networking Academy was or is active as collected from the Database team at the Cisco Networking Academy, and interviews of high school administrators of Montana high schools who are or have participated in the Cisco Networking Academy or other ICT academies within the last year.

The data was used to answer the research questions within this study. Although there was a low response to the PTLA survey (N = 18 out of 46), the data was useful in answering both quantitative research questions:

Q2 - What was the relationship between a school administrator's competence in information technology and the sustainability of corporate-sponsored IT curriculum programs?

Q3 - What was the relationship between school district size and the sustainability of corporate-sponsored IT curriculum programs?

Secondly, the results from the case study provided important insight on the sustainability of corporate-sponsored ICT curricula. By interviewing high school administrators, their experiences pointed out a number of important features that was used to sustain ICT programs from their respective schools.

Next, by correlating individual questions within the PTLA survey, a number of key themes appeared that was summarized into a number of key factors necessary to the sustainability of corporate-sponsored ICT curriculum offerings. By triangulating the results for each of the parts of this study a number of important key points were revealed. These results will be discussed in detail in the next chapter (Chapter 5).

CHAPTER FIVE

CONCLUSIONS

The results of this study were derived from quantitative data based upon a correlation [using Spearman's Rank-Order Correlation Coefficient test (r_s)] between (a) PTLA survey scores and (b) total month high schools participated in the Cisco Networking Academy program. These were triangulated with data from a qualitative case study on the sustainability of corporate-sponsored ICT curriculum in Montana high schools. The case study pointed specifically at the Cisco Networking Academy program, a well-established corporate-sponsored ICT curriculum. An evaluation of the results was used to answer the specific research questions used in this study.

Conclusions

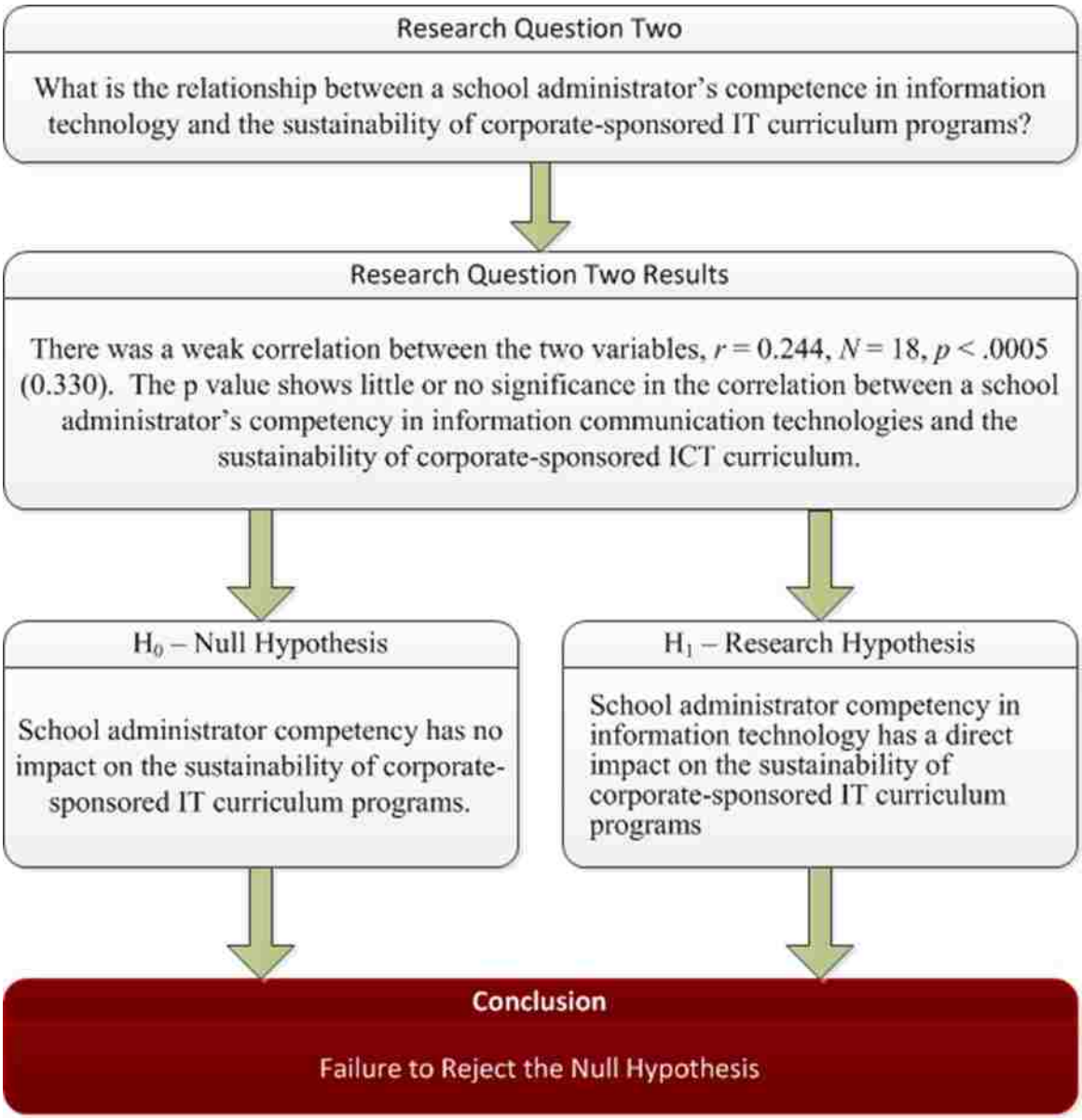
Central Question

The central research question is: What factors determine successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools? The answer is derived from interviews of Montana high school principals and or superintendents along with assumptions derived from the results of a correlation between school administrator's responses on the PTLA survey and the length of time in months their high school participated in a corporate-sponsored ICT curriculum.

Question Two

What is the relationship between a school administrator's competence in information technology and the sustainability of corporate-sponsored IT curriculum programs? This question was investigated by showing the relationship between the total score of all sub areas on the PTLA and the total months in the program using the Spearman's Rank-Order Correlation Coefficient test (r_s). There was a week correlation between the two variables, $r = 0.244$, $N = 18$, $p = 0.330$. The p value shows little or no statistical significance in the correlation between a school administrator's competency in information communication technologies and the sustainability of corporate-sponsored ICT curriculum. This trend continues when correlating the PTLA sub-categories with months in the program as well. The *Leadership and Vision* sub-category represented the lowest correlation coefficient (r_s) at a -0.088 which show virtually no strength to the correlation. The *Assessment and Evaluation* sub-category had the highest correlation coefficient (r_s) at 0.346 which shows a low strength of the correlation. Statistical significance (p) within each of the sub-categories was all greater than .05. Therefore, according to the quantitative results of the correlative data analysis, the null hypothesis for question two, school administrator competency has no impact on the sustainability of corporate-sponsored IT curriculum programs (see Figure 23).

Figure 23 - Research Question 2 Results Chart

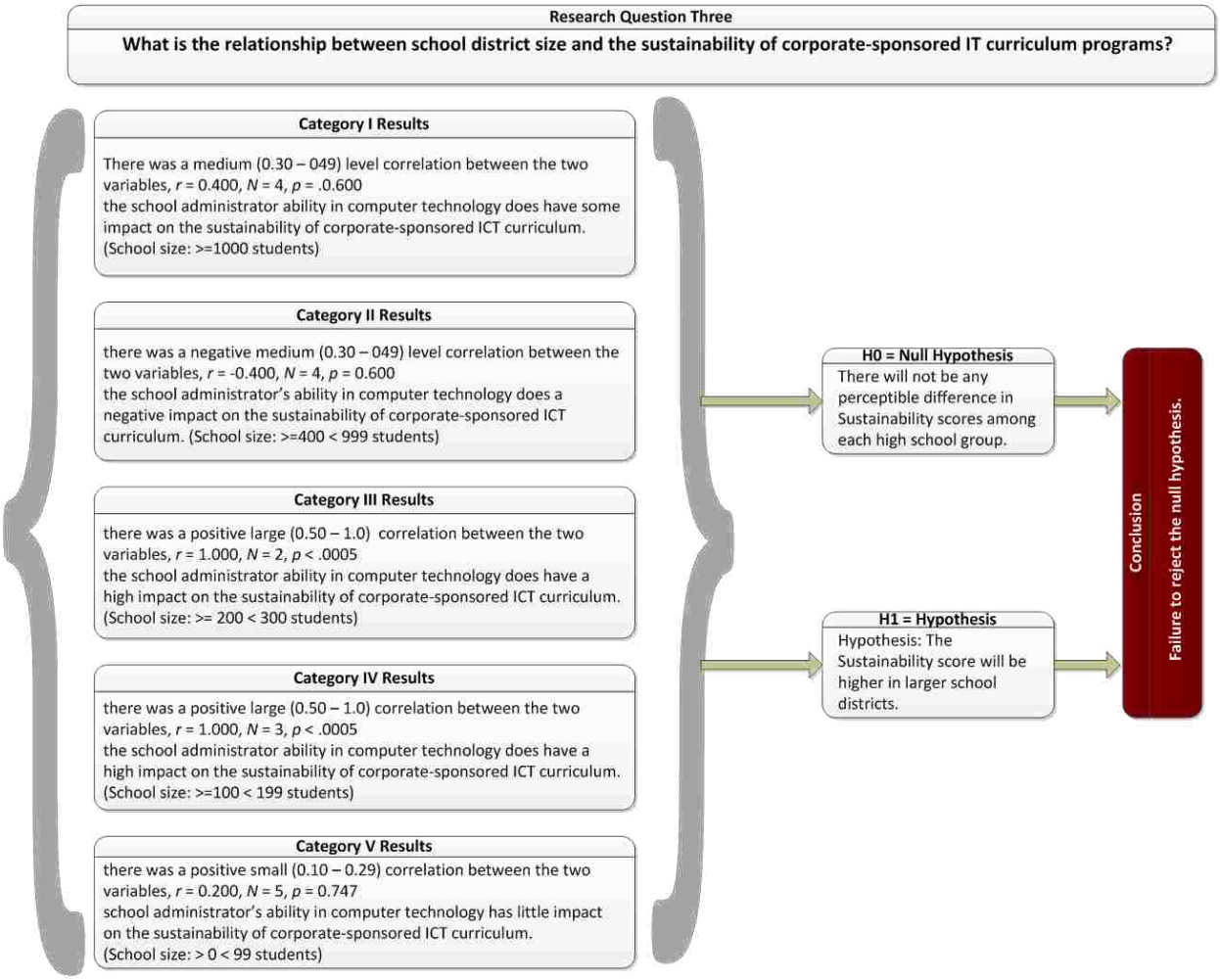


Question Three

What is the relationship between school district size and the sustainability of corporate-sponsored IT curriculum programs? This question views the impact a school administrator has on the sustainability of corporate-

sponsored ICT curriculum in school district of different sizes. This question may also be used to investigate whether other factors have more impact in schools based upon size on corporate- sponsored ICT curriculum; however, this study concentrates primarily on the impact of the school administrator. This was investigated by showing the relationship between the total score of all sub areas on the PTLA and the total months in the program of each district size group using the Spearman's Rank-Order Correlation Coefficient test (r_s). Five Montana school district size categories are based upon student population. The number of schools within each category that reported was between two (2) from category three (III) and five (5) from category five (V) (see Table 5). The small number of participants in each group challenged the statistical significance of the results therefore affecting the correlation results.

Figure 24 - Research Quest ion 3 Results Chart



Category I

In category I, there was a medium positive correlation between the PTLA scores and the sustainability score (total months a high school offered the Cisco Networking Academy curricula), $r = 0.400$, $N = 4$, $p =. 0.600$ (see Figure 24). Therefore, in category I the school administrator's ability in computer technology does have some impact on the sustainability of corporate-sponsored ICT curriculum. This is not meant to exclude other

factors such as: (a) number of students in the program, (b) instructor changing jobs and/or locations, and (c) loss of funding for the program; but, does suggest that the school administrator does have an impact in this category size school.

The results were not statistically significant because of the high p (> 0.005) value; therefore, according to the quantitative results of the correlative data analysis, the research hypothesis of category I research question three (3), proved that school district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Category II

In category II, medium negative correlation between the PTLA scores and the sustainability score (total months a high school offered the Cisco Networking Academy curricula), r = -0.400, N = 4, p = 0.600 (see Figure 24). Therefore, in category II the school administrator's ability in computer technology did have a negative impact on the sustainability of corporate-sponsored ICT curriculum. This could suggest that either a high school principal's lack or abundance of knowledge of ICT might negatively impact corporate-sponsored ICT curricula. The impact most likely would be impacted by a lack of knowledge without adequate means to learn about the ICT curriculum offerings; that is, a faculty or staff member with adequate knowledge about ICT issues. One principal said "I see myself as a facilitator. I can be by no means an expert in every curricular area. I hire experts; [that is, I], hire people's expertise and so what I want to know is that, that person is

to go out with fidelity going out on the emerging horizon and explore." Expertise could also include external sources of quality information on the benefits of corporate-sponsored ICT curriculum programs as well. Therefore, it does suggest that there are factors could impact a principal who lacks knowledge about the advantages of ICT curriculum programs.

However, the results may not be statistically significant because of the high p (> 0.005) value. Therefore, according to the quantitative results of the correlative data analysis, the research hypothesis of category II research question three (3) proved that school district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Category III

In category III, there was a large positive correlation between the PTLA scores and the sustainability score (total months a high school offered the Cisco Networking Academy curricula), $r = 1.000$, $N = 2$, $p = .000$ (see Figure 24). In a category III school district, the school administrator ability in computer technology does have a large impact on the sustainability of corporate-sponsored ICT curriculum. This is not meant to exclude other factors such as: (a) number of students in the program, (b) instructor changing jobs and/or locations, and (c) loss of funding for the program; but, does suggest that the school administrator does have an impact in this category size school.

The results may not be statistically significant because of the high p (> 0.005) value; it is highly likely that a low (N) value will impact the statistical

significance of the results. However, according to the quantitative results of the correlative data analysis, the research hypothesis of category III research question three (3) proved that school district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Category IV

In category IV, there was a large positive correlation between the PTLA scores and the sustainability score (total months a high school offered the Cisco Networking Academy curricula), $r = 1.000$, $N = 3$, $p = .000$ (see Figure 24). In a category IV school district, the school administrator ability in computer technology does have a large impact on the sustainability of corporate-sponsored ICT curriculum. This is not meant to exclude other factors such as: (a) number of students in the program, (b) instructor changing jobs and/or locations, and (c) loss of funding for the program; but, does suggest that the school administrator does have an impact in this category size school.

Again, the results may not be statistically significant because of the high p (> 0.005) value. In addition, it is likely that a low (N) value will impact the the results as well. However, according to the quantitative results of the correlative data analysis, the research hypothesis of category IV research question three (3) proved that school district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Category V

In category V, there was a small positive correlation between the PTLA scores and the sustainability score (total months a high school offered the Cisco Networking Academy curricula), $r = 0.200$, $N = 5$, $p < 0.747$ (see Figure 24). In a category V the school administrator's ability in computer technology has small impact on the sustainability of corporate-sponsored ICT curriculum. This suggests that other factors have a more significant impact on the sustainability of corporate-sponsored ICT curriculum than that of the computer technology ability of the school administrator. The results may not be statistically significant because of the high p (> 0.005) value. Therefore, according to the quantitative results of the correlative data analysis, the research hypothesis of category V research question three (3) proved that school district size has a direct impact on the sustainability of corporate-sponsored IT curriculum programs.

Summary

In summary, the answer to the research question: (What is the relationship between school district size and the sustainability of corporate-sponsored IT curriculum programs?) is much more complex than simply the school administrator's abilities in using and understanding information and communication technologies; however, for this particular study the school administrator is the primary focus. In order to not oversimplify the issue, this researcher is observing primarily a single aspect of the entire issue. The data gathered from the interviews, correlating PTLA scores with sustainability

scores, and by evaluating inter-item correlations of questions in the PTLA survey allowed this research project to further flesh out the administrator's impact on the sustainability of corporate-sponsored ICT curriculum along with determining factors that sustain corporate-sponsored ICT curriculum programs.

Recommendations

Within an analysis of the data from the questions from the PTLA survey, a number of significant correlations between questions illustrate the importance the school administrator is in the sustainability of ICT curricular programs generally; and , corporate-sponsored ICT curriculum specifically.

Again, it is important to note that a moderate (0.4 – 0.7) is desirable in determining reliability and validity among items; however, high inter-item correlation might present a difficulty to discriminate whether the questions are measuring the same thing or not. Therefore, the inter-item correlation has been performed as a post hoc item analysis primarily for the purpose to understand the eighteen (18) participants better, but not for the purpose to make inferences relative to the sustainability variable because there was no statistically significant correlation to begin with.

This quantitative data triangulated with data collected from school administrators through interviews provide a number of recommendations and commendations in sustaining ICT academy programs. The framework for these recommendations is based upon the ISTE NET-A 2009 performance

indicator domains (*The ISTE NETS and performance indicators for administrators (NETS•A)*, 2009).

Leadership and Vision

The school administrator is important in the school's technology planning. This includes both the evaluation of programs using technology and communication with stakeholders on the use of technology (see PTLA Question 1.2 as it correlated to questions: 1.5, 5.2, and 5.5; and question 1.3 as it correlated to questions: 2.5, 4.6, 5.4, and 5.5) (see Appendix XIV). Technology planning also includes means to assist teachers in using student assessment in order to modify instruction (see PTLA Question 1.6 as it correlated with questions: 2.2 and 2.3) (see Appendix XIV). This question applies to the sustainability of corporate-sponsored ICT curriculum in that schools need to carefully plan school and district wide in order to include this type curriculum into its technology planning and into its curriculum through a systematic method of evaluation assess the program's effectiveness in meeting the needs of students and community as a whole. As noted in the review of the literature; in order to sustain any ICT program school administrators must "…inspire and facilitate among all stakeholders a shared vision of purposeful change that maximizes use of digital-age resources to meet and exceed learning goal, support effective instructional practice, and maximize performance of district and school leaders" (*National educational technology standards for administrators*, 2009, p. 11).

Learning and Teaching

The school principal or administrator has the responsibility to help faculty and staff understand how student assessment data can be used to improve teaching and learning of all students within all programs (see PTLA Question 2.1 as it correlated with questions: 2.2, 2.4, 5.5, 6.5, and 6.6) (see Appendix XIV). The school administrator is also responsible to provide support, financial, release time, etc., in order to train faculty and staff in ways to use student assessment data. This includes assessment of faculty in its use for all students in all curricular areas (see PTLA Question 2.2 as it correlated with questions: 2.1, 2.4, 5.5, 6.5, and 6.6) (see Appendix XIV). The school principal or administrator should find means to provide professional development for faculty and staff in effectively using student data to improve teaching and learning using educational technology as a tool. (see PTLA question 2.4 as it correlated with questions: 2.1, 2.6, and 3.1 and question 2.6 as it correlated with questions: 2.4, 2.5, 3.1, 4.6, and 5.4) (see Appendix XIV). The sustainability of corporate-sponsored ICT curriculum requires administrative support by providing professional development in order to train new instructors and update current instructors. Instructors also need to be able to assess student data in order to determine ways to improve teaching and student learning. As stated in Chapter 4 within the case study, one interviewed school administrator said, "The board was extremely supportive of it and very happy when I hired a new guy who said he would go to Cisco training." School administrators would "…make sure that the teacher had the

time for professional development needed providing time for him to seek that and pay for that professional development."

Productivity and Professional Practice

School administrators benefit in participating in professional development in the use of ICT. This includes providing funding and release time in order to participate in ICT learning experiences. This can then be eventually provided for faculty and staff as well (see PTLA question 3.1 as it correlated with questions: 2.4 and 2.6) (see Appendix XIV). School administrators should use ICT in order to complete daily tasks by using management systems school finances, communication, and student records. School administrators need to be knowledgeable in the use of student assessment software in order to provide individualized learning plans for all students (see PTLA question 3.2 as it correlated with questions: 4.1, 5.1, 6.4 and 6.5) (see Appendix XIV). School administrators that understand the benefit of using ICT school management tools may appreciate the importance of teaching students to thrive in a digital society. Students who have the opportunity to learn corporate-sponsored ICT curriculum are prepared to enter the workforce earlier with highly marketable skills. One principal said, "That would be the greatest benefit is that they could go directly into an entry-level position in IT and not have to go to a 2 year technical school or any other training first." Another principal from a medium sized school said, "We were giving students the opportunity to complete a course where they can get certified and be workforce ready…"

Support Management and Operations

School administrators are in a position to allocate fiscal resources in order to support technology in their schools. This includes advocating at the district level funding for technology support services, Internet access, network security, etc., in order to ensure equity of technology for all students in all programs (see PTLA question 4.2 as it correlated with questions: 4.5, 6.1, 6.5, and 6.6) (see Appendix XIV). School administrators need to pursue supplementary funding in order to meet the ICT needs of his / her school (see PTLA question 4.3 as it correlated with questions: 3.3, 2.5, and 4.6). School administrators need to ensure that school educational technology be upgraded and updated regularly as noted in the school or district technology plan. This is done to continue support for all student programs that use technology (see PTLA question 4.4 as it correlated with questions: 5.2 and 6.6) (see Appendix XIV). Support for the sustainability of corporate-sponsored ICT curriculum includes not only the initial outlay of funding but continuing support to maintain and update equipment, software, and instructor training. Dr. Waring commented, "It cost each new academy about fifteen thousand dollars to start that was largely picked up by grants we had initially" (Waring, 2012). Another principal noted, "Money. Just flat out expensive just as everyone knows; and it will get worse." A hands-on ICT curriculum that trains students in installing and managing network infrastructure equipment requires a school to commit internal and external funding in order to support it. A school principal is placed in a position where he / she will need to evaluate the

benefits of such a program to the students, school, and community as well to determine whether to either become involved in it or whether to continue to sustain it.

Assessment and Evaluation

School administrators have the important responsibility to assess and evaluate programs to determine if they meet the educational needs of students. This evaluation includes assessing fiscal responsibilities, equipment purchase, update, and upgrade, professional development, and initial faculty training along with continual updating of necessary skills, faculty ability and responsiveness to effectively teach the content and labs, and assessment of student outcomes (see PTLA questions 5.2 and 5.4 as they correlated with questions: 2.1, 2.3, 2.5, 2.6, 4.4, 4.6, and 5.1) (see Appendix XIV). School administrators need to utilize a number of tools in order to determine the sustainability of costly programs like corporate-sponsored ICT curriculum. School administrators mentioned that the failure of a program, not necessarily only the Cisco Networking Academy program, can be attributed to improperly trained instructors, poor student preparation, equipment failure, poor support structures, lack of relevance based upon poorly supported course content, and the inability to engage students. School administrators need to evaluate data collected from relevant sources in order to determine program sustainability. A number of interviewed principals noted that they use and trust their experts in order to aid making decisions; however, the final decision is theirs.

Social, Legal, and Ethical

School administrators have the responsibility to use funding sources to provide equitable access to all computer and network technologies to all students. Along with this school administrators need to enforce the proper use of intellectual properties obtained using technology following the copyright laws and educational guidelines (see PTLA question 6.1 as it correlated with questions: 4.2, 4.5, 6.3, and 6.5) (see Appendix XIV). School administrators are responsible to make sure that programs that provide individualized educational plans to students using technology are fully supported and fully funded (see PTLA question 6.6 as it correlated with questions: 2.1, 3.2, 4.4, and 6.5) (see Appendix XIV). The curriculum provided by corporate sponsors commonly includes online curriculum and assessments. This software is copyrighted and faculty and students need to respect its ownership and use it appropriately. Improper use can place schools in legal jeopardy or simply loss of a program. School administrators need to make sure that the intellectual property of the corporate sponsors is used appropriately. School administrators also need to assure students who take courses within corporate-sponsored ICT curriculum that need special accommodations be provided the appropriate support in order to fully participate. For example, Cisco Networking Academy provides versions of their online curriculum that allow for the use of screen readers to aid visually challenged students. School administrators need to promote inclusion in academy programs for all students.

Summary

What factors determine successful sustainability of corporate sponsored information communication technology curriculum in Montana public high schools? By triangulating and correlating responses from the PTLA survey with interview responses from Montana high school principals and district superintendents, this study presented a number of factors that can determine successful sustainability of corporate sponsored ICT curriculum. Although this data is from Montana only, the results might be relevant in other states as well.

Implication for Further Research

The sustainability of corporate-sponsored ICT curriculum is much deeper than the school administrator. This study can be expanded to include the course instructors, the district ICT coordinator, students in the program, and corporate support personnel. In order to provide a complete support network that allows the sustainability of this type of program, corporate management of the program needs to consider the impact on the curriculum on all stakeholders directly or indirectly involved.

Within a larger scope, a study on factors that determine the sustainability of all school or district programs, curricular, co and extra-curricular, could provide an important guide to evaluative tools administrators can use to determine whether any school program should be sustained. The outcomes from this study can be used to view the strength of the leader - follower dynamic. Administrators more than once commented on the importance of

their ability to be able to trust their followers in providing them with useful data to be used to make decisions. This involves a strong level of trust between the school administrators and those with whom the administrator worked. This dynamic can be used to expand school leadership abilities.

Summary

Corporate-sponsored information communication technology curriculum offers schools expertly, well designed coursework they can use to enhance their student's education. Students benefit because the coursework allows them to be exposed to and learn real industry skills they can use in the workforce. The community benefits because it gains a trained workforce. However, corporate-sponsored ICT curriculum comes at a price to the school and school district. The cost and time required to sustain this type of curriculum asks school districts to continually invest in the initial cost and replacement of older technology and the initial training of faculty members along with yearly sustainability training.

The district and school administrator carries much of the responsibility for the sustainability of curricular offerings within the school district and individual schools. Although a strong knowledge and ability in computer technology would be beneficial and desired in order to understand the importance of corporate-sponsored ICT curriculum, it is not necessary. Administrators need to understand the priorities of district stakeholders and ultimately that of the students. With resources available to school districts at a premium, however, school and district administrators benefit from abilities

and understanding of the practical use of computer technology in order to help make knowledgeable decisions.

REFERENCES

References

About the history of TAGLIT. (2007). *Total Educational Solutions in Technology* Retrieved October 22, 2008, from http://www.testkids.com/taglit/history.htm

Academy. (2013). *Dictionary.com website* Retrieved January 24, 2013, from http://dictionary.reference.com/browse/academy

Allen, J. G. (2003). *A study of the professional development needs of Ohio principals in the area of educational technology.* Doctoral Dissertation, University of Cincinnati, Cincinnati. Proquest Dissertation and Theses database. (UMI No. 3093352)

Anderson, R. E., & Dexter, S. L. (2005). School technology leadership: an empirical investigation of prevalence and effect. *Educational Administration Quarterly, 41*(1), 49-82.

Apple Computer Inc - Early History. (2011) Retrieved June 9, 2011, from http://ecommerce.hostip.info/pages/51/Apple-Computer-Inc-EARLY-HISTORY.html

Aring, M. K. (1993). What the 'V' Word Is Costing America's Economy. *The Phi Delta Kappan 74*(5), 396-404.

Ash, K. (2009). E-learning industry evolving. *Education Week, 28*(26), 28-29.

Baggaley, J. (2008). Where did distance education go wrong? *Distance Education 29*(1), 39-51.

Behrens, J., Mislevy, R., Bauer, M., Williamson, D., & Levy, R. (2004). Introductions to evidence centered design and lessons learned from its applications in a global e-learning program. *International Journal of Testing*, 295-301.

Bennett, W. J., & Gelernter, D. (2001). Improving education with technology. *Education Week, 20*(26).

Bischoff-Turner, S. (2007). Building a Sustainable School Health Program. *The RMC Health Educator, 8*(1), 1.

Bishop, J. (1988). Occupational training in high school: when does it pay off? (N. Y. S. S. o. I. a. L. Relations, Trans.) *CAHRS Working Paper Series*. Ithaca, New York: Cornell University.

Blase, J. J. (1987). Dimensions of effective school leadership: The teacher's perspective. *American Educational Research Journal, 24*(4), 589-610.

Bogdan, R., & Biklen, S. K. (2006). *Qualitative research in education: An introduction to theory and methods* (Fifth ed.). Needham Heights, MA: Allyn and Bacon.

Boote, D. N., & Beile, P. (2005). Scholars before researchers: on the centrality of the dissertation literature review in research preparation. *ProQuest Psychology Journals, 34*(6), 3-15.

Bosco, J., Chair. (2001). *TSSA: Technology standards for school administrators*: TSSA Collaborative.

Boyd, P. W.-. (2002). *Educational leadership: A reference handbook*. Santa Barbara, CA: ABC - CLIO, Inc.

Brotherton, P. (2001). Winning partnerships. *Techniques (Association for Career and Technical Education), 76*(4), 18-21

Brown, J. (2007). On target. *T.H.E. Journal, 34*(1), 18-20, 22, 24.

Brush, T., & Bitter, G. (2000). An innovative approach to high tech learning. *Learning & Leading with Technology*, *28*(1).

Burns, J. M. (1978). *Leadership*. New York: Harper & Row.

BusinessDictionary.com (Producer). (2008). Stakeholder. *BusinessDictionary.com*. Retrieved from http://www.businessdictionary.com/definition/stakeholder.html

Calabrese, R. L. (2002). *The leadership assignment: Creating change*. Boston, MA: Allyn and Bacon.

Casey, D. M. (2008). A journey to legitimacy: The historical development of distance education through technology. *TechTrends, 52*(2), 45-51 doi: 10.1007/s11528-008-0135-z

Census 1990 concepts & definitions. (2008). *School districts demographics system,* from http://nces.ed.gov/surveys/sdds/ref.asp#S

CEO forum on education and technology. (2001) Retrieved February 16, 2011, from http://www.ceoforum.org/

Cisco's global training machine. (2008). *Workforce Management 87(19), 30*. Retrieved from http://search.ebscohost

Cisco Networking Academy Netspace. (2009) Retrieved April 12, 2011, from http://www.academynetspace.com

The Cisco Networking Academy Program. (2001). *International Telecommunication Union* Retrieved March 12, 2010, from http://www.itu.int/wsis/docs/pc2/roundtables/rt5/reilly.pdf

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd. ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Collins, A., & Halversion, R. (2009). *Rethinking education in the age of technology: The digital revolution and schooling in America*. New York: Teachers College Press.

Computer games 'can teach children essential life skills. (2009). *Education, 14637073*(343), 2-3.

Coyle, S., Jones, T., & Pickle, S. K. (2009). e-learning programs come in all shapes and sizes; from Alaska to Arkansas, districts are experimenting with online learning to solve access problems. *Learning & Leading with Technology, 37*(2), 12+.

Cozby, P. C. (2007). *Methods in behavioral research*. Boston: McGraw, Hill Higher Education.

Creswell, J. W. (2007). *Qualitative inquiry & research design; choosing among five approaches*. Thousand Oaks, CA: Sage Publications.

Davies, P. M. (2010). On school educational technology leadership. *Management in Education, 24*(2), 55-61. doi: 10.1177/0892020610363089

Dawson, C., & Rakes, G. C. (2003). The influence of principals' technology training on the integration of technology into schools. *Journal of Research on Technology in Education, 36*(1), 29 - 49.

DeArmond, C., Booth, W. C., Colomb, G. G., & Williams, J. M. (1995). The research toolkit define topic worksheet *The craft of research*. Chicago: University of Chicago Press.

. Development of the instrument. (2008) *Principals' Technology Leadership Assessment* (pp. 1). Minneapolis: College of Education and Human Development, University of Minnesota.

Dillon, N. (2008). A Tangled Web. *The American School Board Journal, 195*(12), 14-17.

Domenech, D. A. (2011). School leaders need more help, and not red tape, to transform education. *eSCHOOL NEWS, 14*(3), 42.

Dugger, W. E. (2002). *Standards for technological literacy: Content for the study of technology* (Second ed.). Reston, VA: International Technology Educational Association.

Education Administrators. (2009, December 17, 2009). *Occupational Outlook Handbook, 2010-11 Edition* Retrieved April 14, 2011, from http://www.bls.gov/oco/ocos007.htm

Evans, J. R., & Mathur, A. (2005). The value of online surveys. *Internet Research, 15* (2), 195-219. doi: 10.1108/10662240510590360

Find a Microsoft IT Academy. (2011). *Microsoft IT Academy Program* Retrieved April 12, 2011, from

http://www.microsoft.com/education/MSITAcademy/ITAPLocator.mspx

Find an academy school near me. (2011). *Oracle Academy* Retrieved April 12, 2011, from https://academy.oracle.com/pls/html/f?p=300:2:3755948810471910

Fitton, K. (2011). Is the computer plugged in? *Phi Delta Kappan, 92*(5), 62-64.

Friedman, T. L. (2007). *The world is flat: A brief history of the twenty-first century*. New York: Picador.

Global participating academy count (2008). *Cisco Networking Academy Connection* Retrieved March 12, 2010, from http://www.netacad-reports.net/academy_counts.php

Greenberg, R. (1999). Get with the partnership. *Techniques, 74*(4), 14(11).

Grimes, R., & Smith, Susan. (2004). The impact of standards-based technology professional development. *T.H.E. Journal, 31*(6), 40-43.

Hancock, R. J., & Fulwiler, J. (2007). Technology for 21st century educational leaders: A new standard for success. *Advances in Educational Administration, 10*, 41-56.

Hann, L. W. (2008, February 3, 2011). Profit and loss in school-business partnerships. *District Administration* Retrieved April 14, 2011, from http://www.districtadministration.com/viewarticle.aspx?articleid=1544&p=1#0

Harris, A. (2001). Effective school leadership : the deputy head's view. *Management in Education, 15*(1), 10-11. doi: 10.1177/089202060101500103

Harris, A., Day, C., & Hadfield, M. (2003). Teachers' perspectives on effective school leadership. *Teachers and Teaching, 9*(1), 67 — 77. doi: 10.1080/1354060032000049913

Hoffman, R. D. (2006). Population. *Internet Glossary of Statistical Terms* Retrieved March 25, 2011, from http://www.animatedsoftware.com/statglos/sgpopula.htm

Holland, L., & Moore-Steward, T. (2000). A different divide: Preparing techsavvy leaders. *Leadership, 38*(3), 37-38.

Howell, D. C. (2007). *Statistical methods for psychology* (6th ed.). Belmont, CA: Thomson Higher Education.

Hoy, W. K., & Miskel, C. G. (2008). *Educational administration: Theory, research, and practice*. New York: McGraw Hill.

. Impact in Montana. (2011). In C. N. Academy (Ed.), (pp. 1-6): Cisco Systems.

Internet and computing core certification. (2008). *Certiport*. Retrieved from http://www.certiport.com/Portal/DesktopDefault.aspx?tabid=229&roleid=102

An interview with Carroll McGillin. (2009). *Techniques 84*(4), 14-15.

The ISTE NETS and performance indicators for administrators (NETS•A). (2009). Eugene, OR: International Society for Technology in Education.

Johnson, B. (2001). Toward a new cassification of nonexperimental quantitative research. *Educational Researcher, 30*(2), 3-13.

Joyce, P. (2008). Facing the IT talent squeeze in a networked economy. *Techniques: Connecting Education & Careers, 83*(1), 23-27.

Key building blocks for student achievement in the 21st century: Year four. (2001). In T. M. Nevens, W. Rodrigues & A. L. Bryant (Eds.), *The CEO Forum School Technology and Readiness Report* Washington, DC: CEO Forum on Education and Technology.

Knezek, D. (2002). ISTE National educational technology standards (NETS) and performance indicators for administrators. *International Society for Technology in Education*. Retrieved from

Knezek, D. (2008). NETS for Administrators. *International Society for Technology Education*. Retrieved from http://www.iste.org/Content/NavigationMenu/NETS/ForAdministrators/NETS_for_Administrators.htm

Knezek, D., & Thomas, L. G. (2002). Essential conditions for implementing NETS for administrators. Eugene, Oregon International Society for Technology in Education.

Kranberg, S. (1993). 50 Important things you can do to improve education. In ERIC (Series Ed.) Retrieved from http://www.eric.ed.gov/PDFS/ED362990.pdf

Krantz, J. H., Ballard, J., & Scher, J. (1997). Comparing the results of laboratory and World Wide Web samples on the determinants of female attractiveness. *Behavior Research Mothods, Instrumentation, and Computers, 29*(2), 264–269.

Larson, L., Miller, T., & Ribble, M. (2009). 5 considerations for digital age leaders. *Learning & Leading with Technology*(December/January), 12-15.

Lashway, L. (2006). Visionary leadership. *Education World*. Retrieved from Education World website: http://www.educationworld.com/a_admin/admin/admin044.shtml

Levin, J., Fox, J. A., & Forde, D. R. (2010). *Elementary statistics in social research* (11th. ed.). Boston, MA: Allyn & Bacon.

Lieber, P. D., Eli , & Weisner, P. D., Thomas S. . (2011). Dedoose Retrieved 11/10/2012, 2012, from http://www.dedoose.com/

Manzo, K. K. (2009). Students see schools inhibiting their use of new technologies. *Education Week, 28*(27), 10.

McCormack, S., & Ross, D. L. (2010). Teaching with technology. *The Science Teacher 77*(7), 40-45.

McKibben, S. (2008). Real learning in virtual worlds. *Principal Leadership (Middle School Ed.), 9*(2), 58-60.

McLeod, J. D., Ph.D., Scott (2012). [Re: PTLA].

Microsoft IT Academy program requirements. (2009) Retrieved January 26 2011, from http://www.microsoft.com/education/MSITAcademy/requirements.mspx

Miller, M. L. (2007). *A mixed-method study to identify aspects of technology leadership in elementary schools.* Doctoral Dissertation, Regent University, Virginia Beach, VA. ProQuest Dissertations and Theses database. (UMI No. 3302010)

Molnar, A. (2001). Corporate involvement in schools: Time for A more critical look. *Center for the Analysis of Commercialism in Education*. Retrieved from http://nepc.colorado.edu/files/cace-01-01.html

Molnar, A. (2005). *School commercialism: From democratic ideal to market commodity* New York: Routledge.

Montana High School Association 2012-13 Handbook. (2012) Retrieved March 28, 2013, from http://www.mhsa.org/

Murnane, R., Sharkey, N., & Levy, F. (2002). A role for the internet in American education? Lessons from Cisco Networking Academies. In P. A. Graham (Ed.), *Knowledge economy and postsecondary education: Report of a workshop* (pp. 129-157). Washington, DC: National Academies Press.

Nahavandi, A. (2009). *The art and science of leadership fifth edition*. Upper Saddle River, NJ: Prentice Hall.

National educational technology standards for administrators. (2009). Washington, D.C.: International Society for Technology in Education.

NETS for administrators 2002. (2002). *International Society for Technology in Education*. Retrieved from http://www.iste.org/Content/NavigationMenu/NETS/ForAdministrators/2002Standards/NETS_for_Administrators_2002_Standards.htm

NETS seal of allignment. (2008). *International Society of Technology Education* Retrieved October 24, 2008, from http://www.iste.org/Content/NavigationMenu/NETS/NETSSealofAlignment/NETS_Seal_of_Alignment.htm

News. (2011). *International Society for Technology in Education* Retrieved April 15, 2011, from http://www.iste.org/news/fact-sheets.aspx

November, A. (2001). *Empowering students with technology*. Glenview, IL: Pearson Professional Developement.

Oracle Academy: Four success stories model the competitive edge of CTE. (2004, November/December). *Techniques (Association for Career adn Technical Education) v. 79 no. 8,* 50-54.

Overbay, A., Mollette, M., & Vasu, E. S. (2011). A technology plan that works. *Educational Leadership, 68*(5), 56-59,.

Pallant, J. (2007). *SPSS survival manual*. Berkshire, England: Open University Press.

Park, H., Khan, S., & Petrina, S. (2009). ICT in science education: A quasi-experimental study of achievement, attitudes toward science, and

career aspirations of Korean middle school students. *International Journal of Science Education 31*(8), 993 - 1012. doi: 10.1080/09500690701787891

Pempek, T. A., Yermolayvena, Y., & Calvert, S. I. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology, 30*, 227-238.

Penick, J. E. (1996). Creativity and the value of question in STS *Science/Teaching/Society as reform in science education* (pp. 84–94). Albany: State University of New York Press.

Picciano, A. G. (1998). *Educational leadership and planning for technology* (Second Edition ed.). Upper Saddle River, NJ: Merrill.

Picciano, A. G. (2011). *Educational leadership and planning for technology* (Fifth ed.). Boston: Pearson.

Picciano, A. G., & Seaman, J. (2010). Class connections: high school reform and the role of online learning Retrieved from http://www.babson.edu/Academics/Documents/babson-survey-research-group/class-connections.pdf

Pignatiello, R. (2009). New skills for a new generation. *Learning & Leading with Technology, 37*(1), 32+.

Principals' Technology Leadership Assessment (PTLA). (2010) Retrieved June 12, 2009, from http://schooltechleadership.org/research/projects/ptla/

Principals Technology Leadership Assessment. (2008). *UCEA Center for the Advanced Study of Technology Leadership in Education*. Retrieved from http://schooltechleadership.org/wordpress/wp-content/uploads/2010/02/ptla_info_packet.pdf

Public education: Commercial activities in schools. (2000) (E. Health, and Human Services Division, Trans.): United States General Accounting Office.

Quilici, S., & Russell, J. (Winter 2011-12). Investigating roles of online school principals. *Journal of Research on Technology in Education, 44*(2), 141-160.

Reiser, R. A. (2001). A History of instructional design and technology: Part I: a history of instructional media. *Educational Technology Research and Development, 49*(1), 53-64

Richardson, J. W., Bathon, J., Flora, K. L., & Lewis, W. D. (Winter 2012-13). NETS-A scholarship: A reveiw of published literature. *Journal of Research on Technology in Education, 45*(2), 131-151.

Sands, C. (2003). Techie training for students. *Technology and Learning*, 36, 38, 42.

Schrum, L. (2002). Education and commercialization: Raising awareness and making wise decisions. *Contemporary Issues in Technology and Teacher Education, 2*(2), 170-177.

Schrum, L., Galizio, L., & Ledesma, P. (2011). Educational leadership and technology integration: An investigation into preparation, experiences, and roles. *Journal of School Leadership, 21*(2), 241-261.

Seven strategies for success. (2011). *Business-Schools Partnerships,* from http://www.danielsfund.org/sevenstrategies/Strategies/

Simkins, M., Vodicka, D., & Gonzales, L. M. (2009). leveraging technology to transform our schools. *Leadership, 38*(3), 26-29.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publication.

Stallard, C. K., & Cocker, J. S. (2001). *The promise of technology in schools: The next 20 years*. Lanham, Maryland: The Scarecrow Press, Inc.

Standards. (2011). *International Soceity for Technology Education* Retrieved April 15, 2011, from http://www.iste.org/standards.aspx

Standards - NETS for Administrators. (2011). *International Soceity for Technology in Education* Retrieved April 15, 2011, from http://www.iste.org/standards/nets-for-administrators.aspx

Stover, D. (2007). The role of technology. *American School Board Journal, 194*(9), 29-30.

. Structure of research. (2006). *Research Methods Knowledge Base*, from http://www.socialresearchmethods.net/kb/strucres.php

Supporting students or selling access? (1998). *Education Update*(15).

Sweeney, J. (1982). Research sysntesis on effective school leadership. *Educational Leadership, 39*(5), 346.

Teacher TAGLIT-Basic. (2007). *Taking a Good Look at Instructional Technology* Retrieved October 23, 2008, from http://www.testkids.com/taglit/teacher.htm

Techsoup. (2009). Everything you need to know about Web 2.0. *Techsoup.org: The technology place for nonprofits* Retrieved November, 30, 2009, from http://www.techsoup.org/toolkits/web2/

Thompson, B. (2004). Evaluating high school IT. *Tech Directrions, 64*(3), 28-29.

Urbaniak, G. C., & Plous, S. (2012). Research Randomizer, 2012, from http://www.randomizer.org/

View quality metrics report section. (2011). *Cisco Networking Academy Connection* Retrieved January 10, 2011, from http://community.netacad.net/c/portal/layout;jsessionid=6D7F3A2E0C77CC7F844DF7C644776F6E.lrtc_2_1?p_l_id=229518&

Vocational Training. (2010). *WordNet* Retrieved October 16, 2010, from http://wordnetweb.princeton.edu/perl/webwn?s=vocational%20training

Wagner, L. (2010). A short history of educational media in america Retrieved February 1, 2011, from http://www.ataarticles.com/business/a-brief-history-of-educational-media/

Waring, S. (2012, 12/6/2012). [Origins of the cisco networking academy in the state of Montana].

Waring, S., & Kirkendall, K. (2000). Contract Renewal Questionnaire (B. a. Technology, Trans.). Great Falls: Great Falls College MSU (formerly Montana State Univeristy - Great Falls, College of Technology.

Weiner, R. S. (2000, December 27). Technology, *The New York Times*. Retrieved from http://www.nytimes.com/2000/12/27/technology/27EDUCATION.html?ex=1223179200&en=abf67812f163ac16&ei=5070

What is educational technology? (2008). *Educational Technology* Retrieved September 30, 2008, from http://edtech.twinisles.com/

Wiersma, W. (2011). The Validity of Surveys: Online and Offline. *Oxford Internet Institute*, 1-13. Retrieved from http://ebookbrowse.com/wiersma-wybo-the-validity-of-surveys-online-and-offline-pdf-d92575508

Wozniak, S., & Smith, G. (2006). *iWoz computer geek to cult icon: How I invented the personal computer, co-founded Apple, and had fun doing it*. New York: W. W. Norton & Company Ltd.

Yee, D. (2001). The many faces of ICT leadership. In B. Barrell (Ed.), *Technology, teaching and learning: issues in the integration of technology* (pp. 223-238). Calgary, AB: Detselig.

Yukl, G. (2002). *Leadership in organization* (5th. ed.). Upper Saddle River, NJ: Prentice Hall.

Appendix I – ISTE 2009 NETS-A

The ISTE National Educational Technology Standards (NETS-A) and Performance Indicators for Administrators

1. Visionary Leadership. Educational Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization. Educational Administrators:

- **a.** inspire and facilitate among all stakeholders a shared vision of purposeful change that maximizes use of digital-age resources to meet and exceed learning goals, support effective instructional practice, and maximize performance of district and school leaders
- **b.** engage in an ongoing process to develop, implement, and communicate technology-infused strategic plans aligned with a shared vision
- **c.** advocate on local, state, and national levels for policies, programs, and funding to support implementation of a technology-infused vision and strategic plan

2. Digital-Age Learning Culture. Educational Administrators create, promote, and sustain a dynamic, digital-age learning culture that provides a rigorous, relevant, and engaging education for all students. Educational Administrators:

- **a.** ensure instructional innovation focused on continuous improvement of digital-age learning
- **b.** model and promote the frequent and effective use of technology for learning
- **c.** provide learner-centered environments equipped with technology and learning resources to meet the individual, diverse needs of all learners
- **d.** ensure effective practice in the study of technology and its infusion across the curriculum
- **e.** promote and participate in local, national, and global learning communities that stimulate innovation, creativity, and digital-age collaboration

3. Excellence in Professional Practice. Educational Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources. Educational Administrators:

- **a.** allocate time, resources, and access to ensure ongoing professional growth in technology fluency and integration
- **b.** facilitate and participate in learning communities that stimulate, nurture, and support administrators, faculty, and staff in the study and use of technology
- **c.** promote and model effective communication and collaboration among stakeholders using digital-age tools
- **d.** stay abreast of educational research and emerging trends regarding effective use of technology and encourage evaluation of new technologies for their potential to improve student learning

4. Systemic Improvement. Educational Administrators provide digital-age leadership and management to continuously improve the organization through the effective use of information and technology resources. Educational Administrators:

- **a.** lead purposeful change to maximize the achievement of learning goals through the appropriate use of technology and media-rich resources
- **b.** collaborate to establish metrics, collect and analyze data, interpret results, and share findings to improve staff performance and student learning
- **c.** recruit and retain highly competent personnel who use technology creatively and proficiently to advance academic and operational goals
- **d.** establish and leverage strategic partnerships to support systemic improvement
- **e.** establish and maintain a robust infrastructure for technology including integrated, interoperable technology systems to support management, operations, teaching, and learning

5. Digital Citizenship. Educational Administrators model and facilitate understanding of social, ethical, and legal issues and responsibilities related to an evolving digital culture. Educational Administrators:

- **a.** ensure equitable access to appropriate digital tools and resources to meet the needs of all learners
- **b.** promote, model, and establish policies for safe, legal, and ethical use of digital information and technology
- **c.** promote and model responsible social interactions related to the use of technology and information
- **d.** model and facilitate the development of a shared cultural understanding and involvement in global issues through the use of contemporary communication and collaboration tools

Appendix II - Principals Technology Leadership Assessment Dissemination and Licensing

PRINCIPALS TECHNOLOGY LEADERSHIP ASSESSMENT

- Dissemination and Licensing –

The Principals Technology Leadership Assessment (PTLA) is intended to assess principals' technology leadership indicators and activities over the course of the last school year (or some other fixed period of time). Based on ISTE's National Educational Technology Standards for Administrators (NETS – A). the PTLA was developed and psychometrically validated by the American Institute for Research as part of a grant CASTLE received from the United states Department of Education Fund for the Improvement of Postsecondary Education (FIPSE).

The PTLA will be made available to K – 12 school organizations and educational leadership preparation programs as follows:

1. **PDF Download**. School organizations can download the PTLA assessment and instructions in PDF format. Organizations are responsible for their own data entry and analysis using Excel, SPSS, lr some other data analysis software program. This option is free to K – 12 school organizations and educational leadership preparation programs

2. **Questions Download**. School organizations can download the questions on the PTLA assessment in Microsoft Word format. The questions then can be cut-and-pasted into organizations' own online survey software. Organizations are responsible for their own data analysis using Excel, SPSS, or some other data analysis software program. This option is free to K – 12 school organization and educational leadership preparation programs.

3. **CASTLE online survey**. Organizations are welcome to use CASTLE's own online version of eh PTLA. CASTLE staff will send the resultant data file to organization in Excel format. Organizations are responsible for their own data analysis using Excel SPSS, or some other data analysis software program. This option is free to K – 12 school organizations and educational leadership preparation programs if they grant CASTLE permission to use the data (anonymously) as part of its ongoing nationwide research related to principals' technology leadership knowledge and preparation.

4. **CASTLE online survey and data analysis**. CASTLE not only will host the online version of the PTLA for organizations but also will analyze the data for them. This option is available to K – 12 school organizations and educational leadership preparation programs on the same terms as Option 3 but also will involve a small charge per PTLA participant to cover CASTLE's personnel and time cost.

CASTLE believes in making the PTLA as freely available as possible to school organizations. The PTLA also is available for a small licensing fee to for-profit corporations and other entities that stand to make money from their usage of the PTLA. We are open to other creative possibility for the PTLA. Please contact us if you are interested in using this assessment.

[redacted]

Appendix III - CASTLE Principals Technology Leadership Assessment

Instructions

CASTLE

INSTRUCTIONS
Principals Technology Leadership Assessment

You are being given this technology leadership assessment at the requiest of your school or district which will use the results to guide in leadership training and professional development programming. Assessment items are based on the International Society for Technology in Education's (ISTE) National Educational technology standards for administrators (NETS – A). The purpose of the assessmetn is to provide building-level administrators with detailed and comparative information about their technology leadership.

The individual items in the assessment ask you about the extent to which you have engaged in certain behaviors that relate to K – 12 school technology leadership. Answer as many of the questions as possible. If a specific question is not applicable, leave it blank. For example, if a question asks about technology planning activities in your district and your district has not engaged in any such activities, leave the item blank. Note that leaving multiple items blank may limit the usefulness of the assessment results.

As you answer the questions think of your actual behavior over the course of the last school year (or some other fixed period of time). Do not take into account planned or unattended behavior. As you select the appropriate response to each question it may be helpful to keep in mind the performances of other principals that you know. *Please note that the accuracy and usefulness of the assessment is largely dependent upon your candor*. If done with care, the results can provide you with valuable information as you seek to extend or improve your leadership skills.

When assessing behaviors and performance, individuals have a tendency to make several types of errors. You should familiarize yourself with the following errors:

> *Latency error*. This occurs when an individual gives himself an assessment higher than he deserves. This could occur for several reasons. The individual has relatively low performance standards for himself, the individual assumes that other individuals also inflate their ratings or for social or political reasons., the individual judges that it would be better not to give a poor assessment. As you assess yourself you should understand that accurate feedback will provide you with the best information from which to base further improvement.
>
> *Halo error*. This occurs when an individual assess herself based on a general impression of her performance or behavior, and to general impression is allowed to unduly influence all the assessments given. An example of halo error would be an individual who rates herself highly on every single assessment item. It is rare that individuals perm at exactly the same level on every dimension of leadership. It is more likely that an individual performs better in some areas than on others.
>
> *Recency error*. This occurs when an individual bases an assessment on his most recent behavior, as opposed to his entire behavior over some fixed period of time (e.g. the last year). This assessment should be based on your behavior over the entire year)or other fixed period of time).

The following terms appear throughout the assessment. Keep these definitions in mind as you read the items and make your responses

> *Technology* Generally refers to personal computers, networking devices, and other computing devices (e.g. electronic whiteboards and personal digital assistants (PDA)) also includes software, digital media, and communications tools such as the Internet, e-mail, CD-ROMs, and video conferencing.
>
> *Technology Planning* Any process by which multiple stakeholder groups (e.g. district administration, school administration, faculty, and parents) convene to develop a strategy for the use or expanded use of technology

in instruction and operations. Technology planning need not be separate from other planning efforts, but should be a recurring theme if integrated within a more comprehensive planning process

Research-based A practice that employs systematic empirical methods that draw on observation or experiment to provide reliable data. Research-based work uses research designs and methods appropriate to the research question posed and are presented in sufficient detail for replication. The strongest research-based practices typically obtain acceptance through peer-reviewed journals or expert panels.

Assessment A method of measurement used to evaluate progress. Student assessment typically refers to a method of evaluating student performance and attainment to determine whether or not student is achieving the expected outcome(s).

Average time to complete the assessment is about 15 minutes. To take the assessment log on to

?

Appendix IV - CASTLE Principals Technology Leadership Assessment

I. Leadership & Vision

1. To what extent did you participate in your district's or school's most recent technology planning processes?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

2. To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school` s stakeholders?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

3. to what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

4. To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

5. to what extent did you advocate for inclusion of research-based technology practices in your school improvement paln?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

6. To what extent did you engage in activities to identify best practices in the use of technology (e.g. reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

II. Learning and Teaching

1. To what extent did you provide or make available assistance to teachers to use technology for interpeting and analyzing student assessmetn data?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

2. To what extent did you provide or make available assistance to teachers for using student assessment data to modify instruction?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

3. To what extent did you disseminate or model best practices in learning and teaching with technology to faculty and staff?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

4. to what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

5. To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

6. to what extent did you facilitate or ensure the delivery of professional developmetn on the use of technology to faculty and staff?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

III. Productivity & Professional Practice

1. To what extent did you prticipate in professional development activities meant to improve or expand your use of technology?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

2. To what extent did you use technology to help complete yoiur day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

3. To what extent did you use technology-based management systems to access staff/faculty personnel records?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

4. to what extent did you use technology-based managemetn systems to access student records?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

5. To what extent did you encourage and use technology (e.g. e-mail, blogs, videoconferences) as a means of communicating with education stakeholders, including peers, experts, students, parents/guardians, and the community?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

IV. Support, Management, & Operations

1. Support faculty and staff in connecting to and using district and building-level technology systems for management and operations (e.g. student information system, electronic grade book, curriculum management system)?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

2. to what extent did you allocate campus discretionary funds to help meet the school's technology needs?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

3. To what extent did you pursue supplemental funding to help meet the technology needs of your school?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

4. To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

5. to what extent did you avocate at the district level for adequate, timely, and high-quality technology support services?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

6. To what extent did you investigate how satisfied faculty and staff were with the technology suypport services provided by your district/school?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

V. Assessment & Evaluation

1. To what extent did you promote or model technology-based systems to collect student assessment data?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

2. To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

3. to what extent did you assess and evaluate existing technology-based administrative and operations systems for modification or upgrade?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

4. To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

5. To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

VI. Social, Legal, & Ethical Issues

1. To what extent did you work to ensure equity of technology access and use in your school?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

2. To what extent did you implement policies or programs meant to raise awareness of technology-related social, ethical, and legal issues for staff and students?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

3. To what extent were you involved in enforcing policies related to copyright and intellectual property?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

4. To what extent were you involved in addressing issues related to privacy and online safety?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

5. To what extent did you support the use of technology to help meet the needs of special education students?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

6. To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

7. To what extent did you disseminate information about health concerns related to technology and computer usage in classrooms and offices?

Not at all	Minimally	Somewhat	Significantly	Fully
1	2	3	4	5

Appendix V - Online Survey using Adobe FormCentral

The University of Montana

Note to Survey Participant

This survey is part of a data collection process for a research project for Bruce R. Gottwig, a doctoral student in educational leadership through the Phyllis J. Washington College of Education and Human Sciences at the University of Montana. The topic of study is: *The Impact of High School Principal's Technology Leadership on The Sustainability of Corporate Sponsored Computer Information Technology Curriculum*. The study has been approved through this students graduate committee and the university's Institutional Review Board.

Your decision to take part in this research study is entirely voluntary. You may refuse to take part in or you may withdraw from the study at any time and for any reason without penalty or loss of benefits to which you are normally entitled.

As a participant your identity will be hidden and will be represented by a random identity number matched to your name. This list will be stored in a locking file cabinet and destroyed once the study has been completed. If your data is used in any subsequent study, your identity will remain anonymous.

Once again, thank you for your willingness to participate in this study. The insight gleaned for its results will be used to improve the Sustainability of corporate–sponsored curriculum in schools.

Next Page 1 of 2

PAGE 2

Survey Identification Number - required: (This number was provided to you in your invitation e-mail)*

I. Leadership & Vision

1. To what extent did you participate in your district's or school's most recent technology planning processes?

	Not at all	Minimally	Somewhat	Significantly	Fully
1.1	○	○	○	○	○

2. To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school' s stakeholders?

	Not at all	Minimally	Somewhat	Significantly	Fully
1.2	○	○	○	○	○

3. To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

	Not at all	Minimally	Somewhat	Significantly	Fully
1.3					

4. To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?

	Not at all	Minimally	Somewhat	Significantly	Fully
1.4					

5. To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?

	Not at all	Minimally	Somewhat	Significantly	Fully
1.5					

6. To what extent did you engage in activities to identify best practices in the use of technology (e.g. reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?

	Not at all	Minimally	Somewhat	Significantly	Fully
1.6					

II. Learning and Teaching

---

1. To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?

	Not at all	Minimally	Somewhat	Significantly	Fully
2.1					

2. To what extent did you provide or make available assistance to teachers for using student assessment data to modify instruction?

	Not at all	Minimally	Somewhat	Significantly	Fully
2.2	○	○	○	○	○

3. To what extent did you disseminate or model best practices in learning and teaching with technology to faculty and staff?

	Not at all	Minimally	Somewhat	Significantly	Fully
2.3	○	○	○	○	○

4. To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?

	Not at all	Minimally	Somewhat	Significantly	Fully
2.4	○	○	○	○	○

5. To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?

	Not at all	Minimally	Somewhat	Significantly	Fully
2.5	○	○	○	○	○

6. To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

	Not at all	Minimally	Somewhat	Significantly	Fully
2.6	○	○	○	○	○

III. Productivity & Professional Practice

---

1. To what extent did you participate in professional development activities meant to improve or expand your use of technology?

	Not at all	Minimally	Somewhat	Significantly	Fully
3.1	○	○	○	○	○

2. To what extent did you use technology to help complete your day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)?

	Not at all	Minimally	Somewhat	Significantly	Fully
3.2					

3. To what extent did you use technology-based management systems to access staff/faculty personnel records?

	Not at all	Minimally	Somewhat	Significantly	Fully
3.3					

4. To what extent did you use technology-based management systems to access student records?

	Not at all	Minimally	Somewhat	Significantly	Fully
3.4					

5. To what extent did you encourage and use technology (e.g. e-mail, blogs, video conferences) as a means of communicating with education stakeholders, including peers, experts, students, parents/guardians, and the community?

	Not at all	Minimally	Somewhat	Significantly	Fully
3.5					

IV. Support, Management, & Operations

---

1. Support faculty and staff in connecting to and using district and building-level technology systems for management and operations (e.g. student information system, electronic grade book, curriculum management system)?

	Not at all	Minimally	Somewhat	Significantly	Fully
4.1					

2. To what extent did you allocate campus discretionary funds to help meet the school's technology needs?

	Not at all	Minimally	Somewhat	Significantly	Fully
4.2					

3. To what extent did you pursue supplemental funding to help meet the technology needs of your school?

	Not at all	Minimally	Somewhat	Significantly	Fully
4.3					

4. To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?

	Not at all	Minimally	Somewhat	Significantly	Fully
4.4					

5.To what extent did you advocate at the district level for adequate, timely, and high-quality technology support services?

	Not at all	Minimally	Somewhat	Significantly	Fully
4.5					

6. To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?

	Not at all	Minimally	Somewhat	Significantly	Fully
4.6					

V. Assessment & Evaluation

---

1. To what extent did you promote or model technology-based systems to collect student assessment data?

	Not at all	Minimally	Somewhat	Significantly	Fully
5.1					

2. To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

	Not at all	Minimally	Somewhat	Significantly	Fully
5.2					

3.To what extent did you assess and evaluate existing technology-based administrative and operations systems for modification or upgrade?

	Not at all	Minimally	Somewhat	Significantly	Fully
5.3					

4. To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

	Not at all	Minimally	Somewhat	Significantly	Fully
5.4					

5. To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?

	Not at all	Minimally	Somewhat	Significantly	Fully
5.5					

VI. Social, Legal, & Ethical Issues

1. To what extent did you work to ensure equity of technology access and use in your school?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.1					

2. To what extent did you implement policies or programs meant to raise awareness of technology-related social, ethical, and legal issues for staff and students?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.2					

3. To what extent were you involved in enforcing policies related to copyright and intellectual property?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.3					

4. To what extent were you involved in addressing issues related to privacy and online safety?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.4	○	○	○	○	○

5. To what extent did you support the use of technology to help meet the needs of special education students?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.5	○	○	○	○	○

6. To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.6	○	○	○	○	○

7. To what extent did you disseminate information about health concerns related to technology and computer usage in classrooms and offices?

	Not at all	Minimally	Somewhat	Significantly	Fully
6.7	○	○	○	○	○

Prev Next Page 2 of 3

PAGE 3

Demographic Information

This information will be used for classification purposes only. Your identity or the identity of your school will not be revealed within the completed study.

Are you currently offering Cisco Networking Academy curriculum?

○ Yes ○ No

If No, when was the last semester and year that you did?

Were you the high school or K-12 principal / superintendent of your current school when your institution began to offer Cisco Networking Academy curriculum?

○ Yes ○ No

If you no longer offer the Cisco Networking Academy curriculum, Please answer the following question: Why was the decision made to drop the Cisco Program?

Appendix VI – Univeristy of Montana Institution Research Board Approval

The University of Montana

INSTITUTIONAL REVIEW BOARD
for the Protection of Human Subjects
FWA 00000078

Research & Development
University Hall 116
The University of Montana
Missoula MT 59812
Phone 406-243-6670 | Fax 406-243-6330

Date: January 25, 2012

To: Bruce Gottwig/John Matt, EDLD

From: ☒ Paula Baker, IRB Coordinator
☐ Dan Corti, IRB Chair

RE: IRB 5-12: "The impact of high school principal's technology leadership on the sustainability of corporate sponsored computer information technology curriculum"

Your IRB proposal cited above is **exempt** from the requirement of review by the Institutional Review Board in accordance with the Code of Federal Regulations, Part 46, section 101. The specific paragraph which applies to your research is:

___(b)(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

_X_(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i)Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

___(b)(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) The human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

___(b)(4) Research, involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

___(b)(5) Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

___(b)(6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

University of Montana IRB policy does not require you to file an annual Continuation Report (Form RA-109) for exempt studies. However, you are required to timely notify the IRB if there are any significant changes or if unanticipated or adverse events occur during the study, if you experience an increased risk to the participants, or if you have participants withdraw from the study or register complaints about the study.

al

Form RA-108
(Rev. 11/11)

VP RESEARCH & DEV. JAN 24 2012 THE UNIV. OF MONTANA

THE UNIVERSITY OF MONTANA-MISSOULA
Institutional Review Board (IRB)
for the Protection of Human Subjects in Research
CHECKLIST / APPLICATION

IRB Protocol No.: 5-12

At The University of Montana (UM), the Institutional Review Board (IRB) is the institutional review body responsible for oversight of all research activities involving human subjects outlined in the U.S. Department of Health and Human Services Office of Human Research Protection (www.hhs.gov/ohrp) and the National Institutes of Health, Inclusion of Children Policy Implementation (http://grants.nih.gov/grants/funding/children/children.htm).

Instructions: A separate application form must be submitted for each project. IRB proposals are approved for no longer than one year and must be continued annually. Faculty and students may email the completed form as a Word document to *IRB@umontana.edu.* or submit a hardcopy to the Office of the Vice President for Research & Development, University Hall 116. Student applications must be accompanied by email authorization by the supervising faculty member or a signed hard copy.

All fields must be completed. If an item does not apply to this project, write in: n/a.

1. Administrative Information

Project Title: The Impact of High School Principal's Technology Leadership on the Sustainability of Corporate Sponsored Computer Information Technology Curriculum	
Principal Investigator: Bruce Ryan Gottwig.	Title: M. Ed., Ed.D. Candidate
Email address: bgottwig@msugf.edu	
Work Phone: 406-268-3719	Cell Phone: 406-781-0456
Department: Educational Leadership	Office location: B125

2. Human Subjects Protection Training *(All researchers, including faculty supervisors for student projects, must have completed a self-study course on protection of human research subjects* ***within the last three years*** *(http://www.umt.edu/research/complianceinfo/IRB/) and be able to supply the "Certificate(s) of Completion" upon request. Add rows to table if needed.*

NAME and DEPT.	PI	CO-PI	Faculty Supervisor	Research Assistant	DATE COMPLETED Human Subjects Protection Course
Bruce Ryan Gottwig, M.Ed., Ed. Technology	☒	☐	☐	☐	01/13/2012
John Matt, D.Ed., Educational Leadership	☐	☐	☒	☐	11/23/2011
	☐	☐	☐	☐	
	☐	☐	☐	☐	

3. Project Funding *(If federally funded, you must submit a copy of the abstract.)*

Is grant application currently under review at a grant funding agency? ☐Yes *(If yes, cite sponsor on ICF if applicable)* ☒No		Has grant proposal received approval and funding? ☐Yes *(If yes, cite sponsor on ICF if applicable)* ☒No		
Agency	Grant No.	Start Date	End Date	PI
Is this part of a thesis or dissertation? ☐No ☒Yes If yes, whose? Bruce R. Gottwig				

For UM-IRB Use Only

IRB Determination:

___ Not Human Subjects Research
X Approved Exempt from Review, Exemption # 2 *(see memo)*
___ Approved by Expedited Review, Category #___ *(see* ***Note to PI****)*
___ Full IRB Determination
___ Approved *(see* ***Note to PI****)*
___ Conditional Approval *(see memo)* - IRB Chair Signature/Date: _____
___ Conditions Met *(see* ***Note to PI****)*
___ Resubmit Proposal *(see memo)*
___ Disapproved *(see memo)*

Risk Level: Minimal

*** Note to PI:** Study is approved for one year. Use any attached IRB-approved forms (signed/dated) as "masters" when preparing copies. If continuing beyond the expiration date, a continuation report must be submitted. Notify the IRB if any significant changes or unanticipated events occur. Notify the IRB in writing when the study is terminated

Final Approval by IRB ~~Chair~~/Coordinator: Paula M Bolton Date: 1/25/12 Expires: N/A

Appendix VII – Subject Information and Informed Consent Form

SUBJECT INFORMATION AND INFORMED CONSENT

Title: The Impact of High School Principal's Technology Leadership on the Sustainability of Corporate Sponsored Computer Information Technology Curriculum

Project Director(s):

Principle Investigator:
Bruce R. Gottwig, D. Ed. candidate
Phyllis J. Washington College of Education and Human Sciences
Department of Educational Leadership
The University of Montana,
Missoula MT 59812.
(406) 452-1437

Faculty Advisor:
John Matt, Ed. D, Assistant Professor,
Department Chair
Phyllis J. Washington College of Education and Human Sciences
Department of Educational Leadership
The University of Montana,
Missoula, MT 59812
(406) 243-5610

Special instructions: This consent form may contain words that are new to you. If you read any words that are not clear to you, please ask the person who gave you this form to explain them to you.

Purpose: Because of your position within your educational organization, you are being asked to take part in a research study discovering what administrative abilities and attitudes contribute to the success of corporate-sponsored curriculum offerings within your organization. Your participation may guide other school districts considering or sustaining corporate-sponsored curriculum both within and outside of the State of Montana.

Procedures: If you agree to take part in this research study, you will be interviewed by the principle investigator at place and time of your convenience. The estimated time for the interview will be one hour; but may extend beyond that time with your permission. This researcher will use a digital voice recorder with your permission to record both my questions and your responses.

You will also be asked to complete a short online survey as well.

Payment for Participation: There will be no payment for participating in this study

Risks/Discomforts: There is no anticipated discomfort for those contributing to this study, so risk to participants is minimal.

Benefits: There is no promise that you will receive any benefit from taking part in this study other than knowing that the data collected might impact how corporate-sponsored curriculum might be adapted and sustained in the future.

Confidentiality: Your records will be kept private and will not be released without your consent except as required by law. Only the researcher and her faculty supervisor will have access to the files. Your identity will be kept confidential. If the results of this study are written in a

scientific journal or presented at a scientific meeting, your name will not be used your permission. If you do not want to be acknowledged by name in any publica presentations, please initial here _____. The data will be stored in a loc cabinet. Your signed consent form will be stored in a cabinet separate from t The digital voice recording will be transcribed without any information tha identify you.

Compensation for Injury: Although we do not foresee any risk in taking part in this stu following liability statement is required in all University of Montana consent form

In the event that you are injured as a result of this research you should individuall appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by Department of Administration under the authority of M.C.A., Title 2, Chapter 9. event of a claim for such injury, further information may be obtained from the University's Claims representative or University Legal Counsel. (Reviewed by University Counsel, July 6, 1993)

Voluntary Participation/Withdrawal: Your decision to take part in this research study is voluntary. You may refuse to take part in or you may withdraw from the study time without penalty or loss of benefits to which you are normally entitled.

Questions: You may wish to discuss this with others before you agree to take part in this s you have any questions about the research now or during the study contact the p investigator and / or the faculty supervisor listed at the top of this form. If you h questions regarding your rights as a research subject, you may contact the Chai IRB through The University of Montana Research Office at 243-6670.

Statement of Consent to be Audiotaped: Your initials _____ indicate your permission record the interview. Audio recordings will be destroyed following transcription identifying information will be included in the transcription.

Statement of Consent: I have read the above description of this research study. I have been in of the risks and benefits involved, and all my questions have been answered satisfaction. Furthermore, I have been assured that any future questions I may h also be answered by a member of the research team. I voluntarily agree to take this study. I understand I will receive a copy of this consent form.

_____
Printed (Typed) Name of Subject

_____ _____
Subject's Signature Date

Approval Expires O
Date Approved By

Appenix VIII – Online Survey Statement of Confidentiality Form

IRB Protocol No.:

5-12

THE UNIVERSITY OF MONTANA-MISSOULA
Institutional Review Board (IRB)
for the Use of Human Subjects in Research

ONLINE SURVEY
(SurveyMonkey, Select Survey, Qualtrics, etc.)

Statement of Confidentiality

When developing the online survey instrument for my project, "The Impact of High School Principal's Technology Leadership on the Sustainability of Corporate Sponsored Computer Information Technology Curriculum," my signature below certifies that:

1) I will design my online survey so that the front page of the instrument includes the project description, a risk/benefit statement, and contact information for questions. Participants will not be forced to respond to a question before being able to move on to the next question. Participation will be clearly voluntary and subjects' consent will be implied by their proceeding into the survey; and,

2) If my survey is anonymous,
    a. I will provide the URL link to the survey via a hand-out, or in the body of an email, but will **not** send it electronically through a feature of the survey software; and
    b. I will **not** include any potentially identifiable technical data (e.g., IP address) in my collection configuration. If, however, I am unable to deselect and technical data is captured by default, I, as the instrument designer, will destroy it immediately. As a result, I will be the only one (of my research team, if applicable) to see this data, and it will not be used it in any way.

The highest form of online security available utilizes secure sockets layer (SSL) and ensures data is transmitted in an encrypted fashion. *Select Survey* does not use SSL and for some survey software (e.g. SurveyMonkey), this security is available only via purchase.

The survey software I am using is *Adobe FormsCentral*

It utilizes SSL: _X_ Yes ____ No

Bruce R. Gothwig — February 9, 2012

Signature of Principal Investigator — Date

I AM AWARE that electronic submission of this form from my University email account constitutes my signature.

Appenix IX – Interview Protocol

Interview Form: The Impact of High School Principal's Technology Leadership on the Sustainability of Corporate Sponsored Computer Information Technology Curriculum

Date: _____, 2012 Time: ___ __(am/pm) Survey ID: _____

Opening Statements:

Thank you for agreeing to take time from your busy schedule to participate in this research study. There are a few things that I would like to make sure you understand before we get started.

- I will be asking you some general questions and writing notes as we proceed.
- All information from this interview will be confidential. That is, you will not be identified by name, location, or place of employment in this study or in any report from this study.
- You will only be identified as "S" in these notes. A confidential subject code (survey ID) will be used to identify you for any follow up questions.
- No direct quotes from you will be used in the study without your prior permission. When quoted your identity, location, and place of employment, will remain confidential.
- You name will only be known by these researchers and Dr John Matt, Chair of the Department of Educational Leadership, The University of Montana. Dr Matt is the chair of my Dissertation Committee.
- The confidentiality of your name is also under the purview of the Institutional Review Board at The University of Montana
- You are free to withdraw from this study at any time with no penalties.

Interview Questions:

1. How were you introduced to corporate-sponsored information communication technology (ICT) curriculum?
2. Which corporate-sponsored ICT curriculum offering(s) do or did you offer in your high school?
3. What benefit did or do you ascribe to by offering this type of curriculum into your high school?
4. How was this curriculum supported at the systems and board leadership level within your school district? (Conferences, training, equipment, etc.)
5. What were the greatest hindrances to sustaining this type of curriculum within your high school?

6. In what ways did you as principal support the sustainability of corporate-sponsored ICT curriculum?
7. What could the corporate-sponsors of ICT curriculum do to better support your efforts to sustain these courses within your high school.
8. Specifically, is there anything that the College could do to facilitate your success?
9. As the high school and or district CEO, how do you perceive your roll in the decision making process in selecting curriculum?

Appenix X – Research Request E-mail

Research Request

Bruce Gottwig
Sent: Friday, February 10, 2012 3:01 PM
To: XXXXXXXXXXXXX
Attachments: Online Survey Confidential~1.pdf (18 KB)

Dear Principal XXXXX,

My name is Bruce R. Gottwig, and I am a doctoral candidate at the University of Montana. You are being asked to participate in my dissertation research study on the school administrator's impact on the sustainability of corporate-sponsored information and communication technology (ICT) curriculum offerings in your high school. The reason you are being asked is because your high school is currently or in the past has offered corporate-sponsored ICT curriculum such as the Cisco Networking Academy, the Oracle Academy, and / or the Microsoft Academy programs.

Because the school administrator has a huge impact on programmatic offerings in his / her high school, I will be asking you to respond to a short 10 to 15 minute self-reporting survey on your personal level of understanding and participation in the ICT decisions in your high school and / or school district. This survey will be using The Principals Technology Leadership Assessment (PTLA). "The Principals Technology Leadership Assessment (PTLA) is intended to assess principals' technology leadership indicators and activities over the course of the last school year (or some other fixed period of time). Based on ISTE's National Educational Technology Standards for Administrators (NETS – A). the PTLA was developed and psychometrically validated by the American Institute for Research as part of a grant CASTLE received from the United states Department of Education Fund for the Improvement of Postsecondary Education (FIPSE)" (Center for the Advanced Study of Technology Leadership in Education, 2008).

Attached is a statement of Online Survey Confidentiality. This form is on file at the IRB offices located at the University of Montana. Your identity will be protected according to IRB guidelines. Your identity will be replaced with a survey identification number. This number will connect you with your contact information and will not be used in any way within the results of the study. The table containing your contact information and identification number will be stored separately from the content of the study and data collected.

Please note that your decision to take part in this research study is entirely voluntary. You may refuse to take part in or you may withdraw from the study at any time without penalty or loss of benefits to which you are normally entitled

You may wish to discuss this with others before you agree to take part in this study. If you have any questions about the research now or during the study, contact the principle investigator and/or the faculty supervisor listed below. If you have any questions regarding your rights as a research subject, you may contact the Chair of the IRB through The University of Montana Research Office at (406) 243-6670.

Again, thank you for your time. Your participation will greatly aid me in my research and the completion of study.

Participant ID: XXXX
Survey Link: https://adobeformscentral.com/?f=XXXXXXXXXXXXX

Principle Investigator:
Bruce R. Gottwig, Ed. D. candidate
Phyllis J Washington College of Education and Human Science
Department of Educational Leadership
The University of Montana
Missoula, MT 59812
(406) 452-1437 – Home
(406)268 3719 – Work

Faculty Advisor:
John Matt, Ed. D., Assistant Professor and Department Chair
Phyllis J Washington College of Education and Human Science
Department of Educational Leadership
The University of Montana
Missoula, MT 59812
(406) 243-5610 - Office

Appendix XI – Follow-up Survey Request Letter

April 11, 2012,

«First_Name» «Last_Name», «Position»
«School»
«Address»
«City», «State» «Zip»

Dear «Position» «Last_Name»,

I hope your school year is going well. This letter is a follow up on two prior emails I sent to you over the last three months requesting your participation in a doctoral study in which I am currently engaged. The issue is that my study requires a substantial response rate to be effective. Because of the limited number of Montana High Schools that at one time or other participated in corporate-sponsored information and communication technology (ICT) curricular programs, for an adequate sampling I need a significant response. I know how busy you are and understand your reluctance to participate; however, please consider the positive impact this type of study could have on future school participation in corporate-sponsored ICT curriculum.

Your selection to participate is based upon your high school's vision and willingness to offer students the opportunity to participate in curriculum that can prepare them to enter the work force with a potentially strong technical skill set. The online survey will not identify you or your school directly but rather will be combined with schools of similar size in order to confirm the hypothesis that high school principals or school superintendents are actively engaged in schools offering informational and instructional technologies curriculum within their schools. The collected information will not be used for any commercial or recruitment reasons. For your protection, the methodology of the study and survey has been approved through the University of Montana Department of Educational Leadership and Institutional Research Board (IRB Protocol Number 5 – 12).

Finally, please reconsider your participation in this study. Your opinions are vital to its success. I will be sending another email with information on the study and a hyperlink to the survey tool being used. I will also include the link below if you wish to type it into a web browser now rather than waiting for the survey email. I have also included my business card in order for you to contact me if you have any questions and / or concerns. As an added incentive for those who participate I will put your Survey ID number into a drawing for a *Keurig® Elite Brewing System*. Thank you again for your consideration.

The survey link is: **https://adobeformscentral.com/?f=sTaoMP8-TSS44KYkhrbQFQ**

Your survey ID number is **«Survey_ID»**

Humbly yours,

Bruce R. Gottwig

Appendix XII – Cisco Local Academy Fact Sheet

Cisco Local Academy

Fact Sheet

Benefits of a Cisco Local Academy to a school district:

- ✓ Students learn skills leading to employment
- ✓ Students utilize skills for employment while attending college
- ✓ Students utilize skills after college to speak the language of computers
- ✓ Schools build customer service with projects in the community
- ✓ Schools receive current curricula and resources to teach students
- ✓ Schools are connected to the Internet and the World!
- ✓ Students will need projects, leading to networking additional facilities in the school
- ✓ Instructors learn important current knowledge through training
- ✓ Instructors have an opportunity to seek a new challenge

Costs Associated with Training, Mentoring, and Support received from the Great Falls Cisco Regional Academy

First Year:

Training of first instructor plus mentoring and support
$3,500

Training of Second instructor or each subsequent instructor
$1,200

Support Activities

Visits to the Local Academy by the Regional Academy instructors
Response to telephone calls (1-800-XXX-XXXX)
Response to email inquires
Intermediary to exchange of support materials
Maintain records for Local Academy with Cisco
15 hours continuing education every year

Cost of the Cisco Equipment Kit – First Year

$9,925

(Includes service contract for first year)

First-year expense for Computer Lab Hand Tools

$1,000

Ongoing Cisco Costs for the Local Academy

Service Maintenance Contract cost for each subsequent year

$1,200

Second and each of the subsequent years:
$1,000
Support, Mentoring and Continuing Education

Appendix XIII – Inter Item Correlations Chart by Domain

Correlations

			Months in the Program	LeadVision	LearnTeach	ProdProf	SupManOp	AssessEval	SocLegEth	TotPTLA
Spearman's rho	Months in the Program	Correlation Coefficient		-.088	.307	.059	.283	.346	-.123	.244
		Sig. (2-tailed)		.730	.216	.815	.255	.159	.627	.330
		N		18	18	18	18	18	18	18
	LeadVision	Correlation Coefficient	-.088		.498*	.087	.392	.674**	-.079	.584*
		Sig. (2-tailed)	.730		.035	.732	.107	.002	.755	.011
		N	18		18	18	18	18	18	18
	LearnTeach	Correlation Coefficient	.307	.498*		.368	.772**	.786**	.508*	.907**
		Sig. (2-tailed)	.216	.035		.133	.000	.000	.031	.000
		N	18	18		18	18	18	18	18
	ProdProf	Correlation Coefficient	.059	.087	.368		.507*	.493*	.344	.526*
		Sig. (2-tailed)	.815	.732	.133		.032	.037	.162	.025
		N	18	18	18		18	18	18	18
	SupManOp	Correlation Coefficient	.283	.392	.772**	.507*		.728**	.438	.854**
		Sig. (2-tailed)	.255	.107	.000	.032		.001	.069	.000
		N	18	18	18	18		18	18	18
	AssessEval	Correlation Coefficient	.346	.674**	.786**	.493*	.728**		.261	.880**
		Sig. (2-tailed)	.159	.002	.000	.037	.001		.295	.000
		N	18	18	18	18	18		18	18
	SocLegEth	Correlation Coefficient	-.123	-.079	.508*	.344	.438	.261		.547*
		Sig. (2-tailed)	.627	.755	.031	.162	.069	.295		.019
		N	18	18	18	18	18	18		18
	TotPTLA	Correlation Coefficient	.244	.584*	.907**	.526*	.854**	.880**	.547*	
		Sig. (2-tailed)	.330	.011	.000	.025	.000	.000	.019	
		N	18	18	18	18	18	18	18	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix XIV – PTLA Questions per Domain

Domain						
Question #	**I. Leadership and Vision**	**II. Learning and Teaching**	**III. Productivity and Professional Practice**	**IV. Support, Management, and Operations**	**V. Assessment and Evaluation**	**VI. Social, Legal, and Ethical**
1	(Q1.1). To what extent did you participate in your district's or school's most recent technology planning processes?	(Q2.1). To what extent did you provide or make available assistance to teachers to use technology for interpreting and analyzing student assessment data?	(Q3.1). To what extent did you participate in professional development activities meant to improve or expand your use of technology?	(Q4.1). Support faculty and staff in connecting to and using district and building-level technology systems for management and operations (e.g. student information system, electronic grade book, curriculum management system)?	(Q5.1). To what extent did you promote or model technology-based systems to collect student assessment data?	(Q6.1). To what extent did you work to ensure equity of technology access and use in your school?
2	(Q1.2). To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school' s stakeholders?	(Q2.2). To what extent did you provide or make available assistance to teachers for using student assessment data to modify instruction?	(Q3.2). To what extent did you use technology to help complete your day-to-day tasks (e.g. developing budgets, communicating with others, gathering information)?	(Q4.2). To what extent did you allocate campus discretionary funds to help meet the school's technology needs?	(Q5.2). To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?	(Q6.2). To what extent did you implement policies or programs meant to raise awareness of technology-related social, ethical, and legal issues for staff and students?
3	(Q1.3). To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?	(Q2.3). To what extent did you disseminate or model best practices in learning and teaching with technology to faculty and staff?	(Q3.3). To what extent did you use technology-based management systems to access staff/faculty personnel records?	(Q4.3). To what extent did you pursue supplemental funding to help meet the technology needs of your school?	(Q5.3).To what extent did you assess and evaluate existing technology-based administrative and operations systems for modification or upgrade?	(Q6.3). To what extent were you involved in enforcing policies related to copyright and intellectual property?
4	(Q1.4). To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?	(Q2.4). To what extent did you provide support (e.g. release time, budget allowance) to teachers or staff who were attempting to share information about technology practices, issues, and concerns?	(Q3.4). To what extent did you use technology-based management systems to access student records?	(Q4.4). To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?	(Q5.4). To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?	(Q6.4). To what extent were you involved in addressing issues related to privacy and online safety?
5	(Q1.5). To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?	(Q2.5). To what extent did you organize or conduct assessments of staff needs related to professional development on the use of technology?	(Q3.5). To what extent did you encourage and use technology (e.g. e-mail, blogs, video conferences) as a means of communicating with education stakeholders: including peers, experts, students, parents/guardians, and the community?	(Q4.5).To what extent did you advocate at the district level for adequate, timely, and high-quality technology support services?	(Q5.5). To what extent did you include the effective use of technology as a criterion for assessing the performance of faculty?	(Q6.5). To what extent did you support the use of technology to help meet the needs of special education students?
6	(Q1.6). To what extent did you engage in activities to identify best practices in the use of technology (e.g. reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?	(Q2.6). To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?		(Q4.6). To what extent did you investigate how satisfied faculty and staff were with the technology support services provided by your district/school?		(Q6.6). To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?
7						(Q6.7). To what extent did you disseminate information about health concerns related to technology and computer usage in classrooms and offices?

Appendix XV – Inter Item Correlations by Questions (1.1 – 3.5)

N = 18		Months in the Program	Q1.1	Q1.2	Q1.3	Q1.4	Q1.5	Q1.6	Q2.1	Q2.2	Q2.3	Q2.4	Q2.5	Q2.6	Q3.1	Q3.2	Q3.3	Q3.4	Q3.5
Q1.1	Correlation Coefficient	-.248																	
	Sig. (2-tailed)	.320																	
Q1.2	Correlation Coefficient	.088	.468																
	Sig. (2-tailed)	.729	.050																
Q1.3	Correlation Coefficient	.221	-.092	.413															
	Sig. (2-tailed)	.379	.717	.088															
Q1.4	Correlation Coefficient	.017	.701**	.189	.061														
	Sig. (2-tailed)	.946	.001	.452	.809														
Q1.5	Correlation Coefficient	-.214	.296	.691**	.295	.087													
	Sig. (2-tailed)	.395	.233	.002	.235	.731													
Q1.6	Correlation Coefficient	-.077	-.169	.195	.513*	-.182	.224												
	Sig. (2-tailed)	.762	.502	.439	.029	.471	.371												
Q2.1	Correlation Coefficient	.280	-.208	.239	.307	.011	.084	.344											
	Sig. (2-tailed)	.261	.407	.340	.215	.967	.742	.162											
Q2.2	Correlation Coefficient	.352	-.258	.301	.528*	-.171	.110	.658**	.591**										
	Sig. (2-tailed)	.152	.301	.226	.024	.498	.664	.003	.010										
Q2.3	Correlation Coefficient	.164	.081	.325	.545*	.189	.112	.647**	.370	.490*									
	Sig. (2-tailed)	.516	.749	.188	.019	.453	.659	.004	.131	.039									
Q2.4	Correlation Coefficient	.017	-.033	.414	.130	-.070	.500*	.220	.571*	.188	.229								
	Sig. (2-tailed)	.945	.898	.088	.608	.781	.035	.380	.013	.455	.361								
Q2.5	Correlation Coefficient	.371	.112	.469*	.611**	.204	.281	.281	.357	.533*	.496*	.346							
	Sig. (2-tailed)	.130	.657	.049	.007	.416	.258	.259	.146	.023	.036	.160							
Q2.6	Correlation Coefficient	.128	.099	.566*	.559*	.084	.413	.195	.342	.320	.492*	.621**	.816**						
	Sig. (2-tailed)	.614	.697	.014	.016	.741	.089	.437	.165	.195	.038	.006	.000						
Q3.1	Correlation Coefficient	.109	-.351	.222	.241	-.192	.180	.246	.434	.383	.261	.597**	.387	.605**					
	Sig. (2-tailed)	.667	.154	.376	.336	.445	.475	.324	.072	.117	.295	.009	.113	.008					
Q3.2	Correlation Coefficient	-.100	-.026	.455	.183	-.179	.147	.015	.364	.309	.099	.257	.502*	.556*	.313				
	Sig. (2-tailed)	.693	.919	.058	.468	.477	.561	.953	.138	.212	.696	.302	.034	.017	.207				
Q3.3	Correlation Coefficient	.419	-.073	.424	.483*	-.185	.063	.197	.053	.344	.173	.102	.567*	.441	.335	.376			
	Sig. (2-tailed)	.084	.773	.079	.042	.461	.803	.434	.836	.162	.492	.688	.014	.067	.174	.125			
Q3.4	Correlation Coefficient	.029	.076	.172	.010	-.018	-.303	.006	.366	.099	.111	.111	.211	.118	.089	.528*	.324		
	Sig. (2-tailed)	.909	.765	.496	.967	.945	.222	.980	.136	.696	.662	.661	.401	.641	.725	.024	.190		
Q3.5	Correlation Coefficient	-.193	-.057	.044	.082	-.302	-.217	.009	.365	.017	.076	.070	-.027	.143	.022	.454	.049	.591**	
	Sig. (2-tailed)	.443	.821	.862	.748	.223	.388	.973	.137	.946	.766	.784	.914	.571	.930	.058	.847	.010	

Appendix XVI – Inter Item Correlations by Questions (4.1 – 6.7)