Glitched:

Why School Districts Need to Cultivate Partnerships with Technology Leaders to Thrive in a Digital Education Environment

A Thesis

Presented

To

The Faculty of the Graduate School

of Millersville University of Pennsylvania

In Partial Fulfillment

Of the Requirements for the Degree

of Master of Science in Technology & Innovation

By Henry
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Spring 2023

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with Technology Leaders to Thrive in a Digital Education Environment

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DEDICATION

I dedicate this work to my family. My wife, Meredith, for her ongoing love, encouragement, and insights. My kids, Andrew and Aubrey, for their enthusiasm for learning and countless hugs. My parents, Hank and Ro, for their love and support of my passions. They have shown me success in life comes in many forms. I deeply appreciate the love and encouragement of my extended family. The unwavering support of my family carried me throughout my studies.

ACKNOWLEDGEMENTS

I would like to first acknowledge Dr. Kathleen Kennedy-Reilly for her guidance throughout the program. Her support was the first step in my decision to pursue a master's degree. Our discussions focused on my work and inspired me in my studies.

I would like to acknowledge the Souderton Area School District administration and my colleagues for their encouragement. A special thanks to Dr. Frank Gallagher, Dr. Christopher Hey and Mr. John-Paul Franzen for their support.

I want to thank my committee members who were more than generous with their expertise and time. Thank you Dr. Nazli Hardy, Dr. Charles Stricker and Dr. Molly Miller for agreeing to serve on my committee. A special thanks to Dr. Scott Warner, my committee chairman, for his countless hours of proofreading, feedback, and most of all patience throughout the entire process.

ABSTRACT OF THE THESIS

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Why School Districts Need to Cultivate Partnerships

with Technology Leaders to Thrive in a Digital Education

Environment

By:

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Millersville University, 2023

Millersville, Pennsylvania

The purpose of this research was to identify and analyze how K-12 public school district information technology departments may be unintentionally separated, or isolated, from the teaching and learning vision. This research explored the characteristics of this isolation and how it impacts effectiveness within a K-12 public school district. This research outlined the possible need and benefits of cultivating a new organizational structure that promotes cross-departmental collaboration. A case study was conducted to examine the impact of a new organizational structure for the information technology department of a K-12 public school district that focused on cross departmental collaboration. The case study also helped to identify the modern role of technology leader(s) in a K-12 public school district environment.

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Chapter 1

Introduction

A few decades ago, the primary responsibility of a school district technology department was fixing devices. In this early role, technology departments were merely expected to take a request to make a repair or provide a service with much of their responsibility thought of as a luxury. "IT and business interaction were usually an afterthought by companies, and the IT services that were provided were primarily seen as commodities" (Goodgion, 2020, para. 2). The expectation of technology as a break-fix entity that was often as an afterthought contributed to the distance between decision makers and instructional technology (IT)"It's really easy for IT staff to make decisions in a silo and not really think about all of the implications and ramifications for some of those decisions" (McGreath, 2019, para. 7). In his paper, Haines outlined how the break-fix expectation of technology directors and their department was prevalent for 30 years. Only in the last 10 years has this expectation started to change (Haines, 2017).

> Today this role can no longer be filled by a "tech guy/gal" who happens to be the most advanced IT person in the school or district, but it requires a more strategic view of the place technology has in today's education. (Leedy, 2019, para. 4)

The findings outlined in this thesis will demonstrate why the role of IT needs to be redefined and seen as a partner that joins with the district administrative team. This partnership opens the opportunity for cross departmental collaboration offering a broad insight into the needs of the district.

Many schools still treat the Chief Technology Officer as a middling manager.

> But to utilize their unique perspective, they should be an executive first and a technologist second. If they are not privy to the educational challenges your school faces, how can they deliver successful solutions? How can they solve problems or make improvements when they don't know what issues exist or what challenges the solutions should address. (Leedy, 2019, para. 11)

This research will also outline how a technology department becoming a partner in the educational environment is a benefit to school districts and all stakeholders.

> Many school districts seeking to advance their use of technology or take on a major technology project such as a one-to-one initiative, may desire to create the leadership position director of technology. But rather than attach specific role responsibilities to such a title, it might be more beneficial to think of the staff member in a district who plays the role of the district technology leader, or DTL, and who is responsible for building district technology capacity. (Haines, 2017, para. 3)

This need for change has been accelerated by the pandemic which necessitated many school districts offering a form of virtual learning. According to UNESCO, during the pandemics peak in mid-April, the virus caused nationwide school closures in 190 countries, impacting 90% of total enrolled learners, or almost 1.6 billion people globally (Gilchrist, 2020; UNESCO, n.d.) . Even during the 2020-2021 school year, more than 75% of public-school districts are reporting hybrid or fully remote schooling (Gilchrist, 2020; CBN Insights, n.d).

Statement of the Problem

What is the impact when a disconnect exists between a public school district technology

department and the contemporary K-12 teaching and learning vision of the district?

Statement of the Purpose

The purposes of this research were as follows:

1. To determine if the expectations and responsibilities of technology leadership in a K-12 public school district teaching and learning environment has evolved from a role of fixing devices to contributing to the teaching and learning vision of the district.
2. To identify the qualifications needed to meet the contemporary expectations and responsibilities of leading technology in a K-12 public school district teaching and learning environment.
3. To explore the impact and problems that exist when a K-12 public school district technology department is isolated from the modern teaching and learning vision of the district.
4. To illustrate the importance of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision.

Research Questions

1. What do you see as the essential connection between the role of the technology department and the K-12 teaching and learning vision of the district?
2. What is the impact if a disconnect exists between the role and the vision?
3. How would you measure the health of the connection between the role and the vision?
    A. What would be the key indicators of the healthy connection?
    B. What would be the key indicators of the unhealthy connection?
4. What is the impact to the technology department when there is an unhealthy connection?
5. What is the potential impact to the K-12 teaching and learning environment and

the stakeholders when there is an unhealthy connection with the technology department?

6. What could be done to overcome the unhealthy connection between the technology department and the K-12 teaching and learning vision?
7. What steps could support and protect the essential connection between the role of the technology department and the K-12 vision?
8. What role does the organizational structure play in supporting a healthy connection?
9. What is the profile/characteristics of the people who could lead and facilitate healthy connections between the technology department and the K-12 teaching and learning vision?
10. Is there anything that I did not ask you that I should know to better understand the connections between the technology department and the K-12 teaching and learning vision.

The Need for this Research

Technology within education is rapidly advancing, accelerated by the adoption by districts of digital learning environments, especially during the recent pandemic. There is a need to see the technology leadership beyond fixing devices and reacting to technology issues. A new organizational structure needs to be considered that promotes cross functional team collaboration to effectively advance the vision of modern K-12 teaching and learning.

Assumptions

All generalizations and conclusions were based on these assumptions.

1. School board and administrators are implementing technology to support education
2. School districts currently have technology leadership

3. School districts see the technology department and its leadership as disconnected, only reacting to problems rather than contributing to the vision of K-12 teaching and learning
4. All stakeholders need to be a part of the technology planning process
5. Those in the role of technology leadership are not biased or lead with their own agenda

Terminology

App vetting - Vetting educational applications, to ensure that a minimum standard of privacy and security is met, provides assurance that the information gathered by these educational applications is being used responsibly (IMS Global Consortium, n.d.).

Computer Assisted Instruction - Computer-assisted instruction (CAI) has been defined as a systematic approach to developing students' knowledge and/or skills that uses a computer as a central feature to support instruction via activities including, but not limited to, presenting materials, assessing progress, and guiding activities (Anohina, 2005)

CERN - The commonly used acronym for the Conseil Européen pour la Recherche Nucléaire, which is the European science research organization that operates the world's largest particle collider and is a significant network hub for the electronic exchange of data. It is also considered the birthplace of the World Wide Web (World Wide Web Foundation, n.d.)

Class or Cyber Invasion - Where unauthorized users gain access to online classes and video conference meetings, often disrupting them with hate speech, threats of violence and obscene images, sounds and videos (Paykamian, 2021).

Consortium for School Networking (CoSN) - The premier professional association for school system technology leaders. CoSN provides thought leadership resources, community, best practices, and advocacy tools to help leaders succeed in the digital

transformation. CoSN represents over 13 million students in school districts nationwide and continues to grow as a powerful and influential voice in K-12 education (CoSN, n.d.).

Chief Technology Officer (CTO) - CTOs are education technology leaders who are responsible for technology that is increasingly complex, greater in number and scope, and ever more integrated into the daily instructional and administrative routines of today's school districts. CTOs are known by many titles, including Chief Information Officer and Technology Director (COSN, n.d.).

Education Technology (edtech) - Edtech, or educational tech, is the utilization of apps and tech devices for the purpose of teaching and learning. Edtech can happen inside or outside of classrooms, at any time, and in any place. Most modern edtech involves the use of a wireless internet connection and an electronic device such as a smartphone, tablet, laptop, or desktop computer. Edtech allows for one learner or five million to learn, anywhere on earth, and to take the same classes as each other. However, asynchronous learning is also a part of edtech and allows learners to pace themselves while learning new information. Edtech includes most domains of the educational process. Its fundamental principles encompass the creation of collaborative learning environments in which peers help to coach, tutor, explain, and inspire one another (Lynch, 2020).

Help Desk - A help desk is the individual, group, organizational function or external service that an IT user calls to get help with a problem. A help desk can be as simple as a physical desk where a support person takes calls. It also can be a global organization that accepts support requests submitted online or in person from around the world. The help desk function is often outsourced to support specialists (Loshin).

Learning management systems (LMS) - Help teachers deliver online lessons, share

reading materials, and grade assignments. These platforms can streamline much of the work for teachers by centralizing several features on one platform, including the tools needed to run a virtual, hybrid, or in-person classroom, as well as assisting with tracking student progress and connecting with parents. (CBN Insights, n.d.)

Microcomputer - An electronic device with a microprocessor as its central processing unit (CPU). Microcomputer was formerly a commonly used term for personal computers, particularly any of a class of small digital computers whose CPU is contained on a single integrated semiconductor chip. Thus, a microcomputer uses a single microprocessor for its CPU, which performs all logic and arithmetic operations. The system also contains a number of associated semiconductor chips that serve as the main memory for storing program instructions and data and as interfaces for exchanging data of this sort with peripheral equipment—namely, input/output devices (e.g., keyboard, video display, and printer) and auxiliary storage units. Smaller microcomputers first marketed in the 1970s contain a single chip on which all CPU, memory, and interface circuits are integrated (Encyclopedia Britannica, n.d.).

Security Awareness Training - Security awareness training is the process of providing formal cybersecurity education to a workforce about a variety of information security threats and a company's policies and procedures for addressing them. Topics covered in security awareness training often expand beyond the digital world and discuss physical security and how employees can keep themselves and loved ones secure. Such training can take a variety of forms but is most often presented in an online or computer-based format (MediaPro, n.d.).

Teaching Machine - A teaching machine is an automatic or self-controlling device that

(a) presents a unit of information (B. F. Skinner would say that the information must be new), (b) provides some means for the learner to respond to the information, and (c) provides feedback about the correctness of the learner's responses (Benjamin, 1988).

Time-sharing - The name given to the computer technology established to provide on-line access to a large computer through remote terminals and better utilization of equipment by having more than one user share a computer (Bell & Gold, 1972).

Chapter II

Review of Literature

To understand the role and the evolution of responsibilities of a Chief Technology Officer, the history of how computers entered education must first be understood. An early example of computers in the classroom is the teaching machine.

The Teaching Machine

The teaching machine is most often credited to B. F. Skinner, an American psychologist, behaviorist, and author.

> It began in 1953 with a visit to his daughter's fourth-grade class where he made two observations during an arithmetic assignment: (a) All students had to proceed at the same pace, and (b) students had to wait 24 hours to learn the accuracy of their responses to the problems. A few days later, he built a primitive machine to teach arithmetic. His machine presented a problem, the student moved levers to create the numerical answer, and a light appeared when the answer was correct. He demonstrated a modified machine the following year at a conference on practical applications of behavioral science at the University of Pittsburgh. (Benjamin, 1988, p. 708)

Skinner described the teaching machines and programmed instruction as “the arrangement of materials so that the student could make correct responses and receive reinforcement when correct responses were made” (Saettler, 1990, p. 294).

These new machines that promised faster learning, while relieving some of

> the teacher's burden, were met with an enthusiasm... By 1962 there were 65 different teaching machines on the market, ranging in price from $20 to $6,500, and nearly 200 private companies were producing teaching machines, programmed texts, or both (Benjamin, 1988).

Saettler (1990), described the basic techniques for using these machines as follows:

> The student was asked to make simple responses, fill in the blanks, choose among a restricted set of alternatives, or supply a missing word or phrase. If the response was wrong, the machine would assume control, flash the word 'wrong' and generate another problem. If the response was correct, additional material would be presented. (p. 307)

Mainframe Computer

According to Berry (2015), the learning principles from the Skinner teaching machine provided the basis for the development of the learning systems used in the 1960's. Berry noted that

> Computers were first used in education in the 1960s in a way that was intended to individualize instruction. This method became known as computer assisted instruction (CAI). Initially, the only difference between CAI and teaching machines was the type of technology used to deliver the material. (para. 60)

The computer assisted instruction programs used mainframe computers which were costly. In an attempt to maximize student access, time sharing was created as a way for multiple students to remotely connect to a single mainframe computer (Bell & Gold, 1972).

Learning Lab

During this same decade, Dr. Patrick Suppes, a philosopher of science began collaborating with Richard C. Atkinson, a Stanford psychology professor, on a proposal for an automated learning lab.

> With funding from the Carnegie Foundation, they used a TV screen and a teletype machine connected by phone to tutors at Stanford to deliver one-on-one instruction to low-achieving students in a Palo Alto elementary school. The program flashed arithmetic problems on the screen and showed a smiling face if the student typed in the right answer and a frowning one if wrong. The drills were tailored to each student's ability, increasing in difficulty once mastery of lower skills was demonstrated. (Woo, 2014, para. 12)

Suppes then founded the Computer Curriculum Corporation. in 1967 to develop educational software for use in elementary schools. Believed to be the first company of its kind, its programs were used by millions of students in the 1970s and 1980s (Woo, 2014).

Microcomputers

Initially, because computers were expensive, educators purchased time-shared systems and adopted procedures to ration or restrict usage to provide access to as many people as possible given limited resources. In 1975, low-cost microcomputers changed that model and started a personal computer revolution.

> In the late 1970s the cost and availability of microcomputers reached a level at which it was more practical to place computers in K-12 schools. For a variety of reasons, parents, industry leaders, and government officials put pressure on

> school districts and principals to introduce computers into the schools. One reason for this computer enthusiasm was the fear that the United States was continuing to fall behind other world powers in terms of technology, and teaching students to learn how to use computers seemed like one solution to this problem. Another reason for the external pressure to use computers in schools was the perceived need to teach children job-related skills. In the late 1970s and early 1980s, the importance of computers in the business world increased rapidly. As a result, teaching students how to use computers provided them with real-world skills and helped them become more competitive in the job market. Finally, it was argued that computers would make the educational process more efficient. Many computer advocates argued that a more refined version of the mainframe computer-assisted instruction would allow larger class sizes and, therefore, there would be a need for fewer teachers, since students would be able to rely on the computer for a significant portion of their learning. (Berry, 2015, para. 63)

Apple

As microcomputers gained popularity, professionals in the instructional design field turned their attention to producing computer-based instruction while others in the field discussed the need to develop new models of instructional design to accommodate the interactive capabilities of this technology (Reiser, 2001). The computer manufacturer making a name for itself in education during the 1970's was a newly formed company called Apple.

In 1978, just two years after it was founded, Apple won a contract with the Minnesota

> Education Computing Consortium (MECC) to supply 500 computers for schools in the state. MECC had developed a sizable catalog of educational software, including the Oregon Trail, which it made freely available to Minnesota schools. This partnership soon made the two companies popular in other parts of the country (Watters, 2015). According to a 1995 interview given by Apple co-founder Steve Jobs, the spread of personal computing was not happening fast enough.
>
> We saw the rate at which this was happening and the rate at which the school bureaucracies were deciding to buy a computer for the school, and it was real slow. We realized that a whole generation of kids was going to go through the school before they even got their first computer, so we thought: The kids can't wait. We wanted to donate a computer to every school in America. (Computerworld, 2011, para. 40)

Jobs approached members of Congress to work on legislation that would offer a tax deduction to companies that donated computers to schools. Though it never passed, the state of California, where Apple headquarters was located, approached Jobs, and said:

> This was such a good idea they came to us and said "You don't have to do a thing. We're going to pass a bill that says, 'Since you operate in the State of California and pay California Tax, we're going to pass this bill that says that if the federal bill doesn't pass, then you get the tax break in California'. You can do it in California, which is ten thousand schools". So, we did. We gave away ten thousand computers in the State of California. We got a whole bunch of the software companies to give away software. We trained teachers

> for free and this thing over the next few years. It was phenomenal.
>
> (Computerworld, 2011, para. 45)

Under the bill known as The Kids Can't Wait Program, Apple donated a computer to each of the roughly 9000 eligible elementary and secondary schools in California. Though the retail value of the computer packages donated was approximately $21 million dollars, the tax reduction meant it cost Apple $1 million, to put an Apple in every elementary, middle, and high school in California (Watters, 2015). Other companies donated computers as well throughout the 1980's including IBM, Hewlett-Packard, and Tandy (Russell, 2006). This led to a large increase in the number of computers in schools.

Computers in Schools

A survey found an increase of 100,000 computers in schools over the year and a half between fall 1980 and spring 1982. Between 1982 and 1984 the number of computers in schools grew to 325,000. By 1988, there were an estimated 3 million computers in schools (Russell, 2006). The rate at which computers entered schools in the 1980's is evident when looking at a 10-year period. In 1981, 18% of schools had computers; in 1991, 98% had them. In 1981, 16% of schools used computers for instructional purposes. By 1991, 98% did so. In 1981, there were, on average, 125 students per computer; in 1991, there were 18 (Cuban, 1992). By the 1990's, there was another digital revolution that was connecting devices and increasing the use of computers in schools.

World Wide Web

In the early days of computers in the classroom, it was often difficult and cumbersome to access a wide range of information. Networking between and among other computers was often limited or non-existent. The World Wide Web Foundation, quoting British scientist, Sir

Tim Berners-Lee, (n.d.) described the situation this way

> In those days, there was different information on different computers, but you had to log on to different computers to get at it. Also, sometimes you had to learn a different program on each computer. Often it was just easier to go and ask people when they were having coffee… (para. 3)

In 1989, Berners-Lee laid out his idea for what would become the World Wide Web in his paper called, Information Management: A Proposal. In his paper, Berners-Lee outlined to his employer, CERN, that a global hypertext system was in its best interest. By 1990, he wrote the conceptual framework of the World Wide Web that is still used today. By 1993, CERN agreed to make the code free and available worldwide (World Wide Web Foundation, n.d.). Trends show that soon after this, computers in schools became more connected.

As recently as 1998, there were 0.15 computers per student and only half of these computers had Internet access. The most recent data available from the National Center for Education Statistics (NCES), which is from 2008, indicates that there are 0.32 computers per student and essentially all computers have Internet access (Bulman & Fairlie, 2016, p. 5). The increase in connectivity in schools led to online learning products, otherwise known as e-learning.

> The Internet-based training got mature in late 1990's and early 2000 in a form of e-learning. The hype around e-learning is a kind of classical example of creating needs. Thousands of websites, articles and companies made it clear for all somehow related to education that this is something you must be involved in. The IT managers of thousands of educational

> institutions and organizations were asked by the educational experts to come up with e-learning solutions and companies were happy to help the IT managers. The e-learning industry was built, even though it was not proven that anyone (except the IT managers) needed these products. The markets for e-learning courses and especially for Learning Management Systems (LMS) were created. (Leinonen, 2005, para. 19)

Most recently, e-learning solutions have been prominently used in education as the COVID-19 pandemic has prompted some schools to close for in-person education.

Pandemic Learning

According to UNESCO, during the pandemic's peak in mid-April, the virus caused nationwide school closures in 190 countries, impacting 90% of total enrolled learners, or almost 1.6 billion people globally (Gilchrist, 2020). Even during the 2020-2021 school year, more than 75% of public-school districts were reporting hybrid or fully remote schooling for the 2020-2021 school year (CBN Insights, 2020).

> The COVID-19 pandemic initiated an extensive, sudden, and dramatic digital transformation in the society. The pandemic forced us to take an extraordinary digital leap in our everyday life and practices, including our children and their education. In a flash, their education was transformed from a traditional classroom practice to a remote, digitalized one. Suddenly, an entire generation of children had to start managing and mastering with digital tools to participate in their compulsory basic education. This required significant adjustments not only from children and their teachers, but also

> from their families, school administration and the entire society. Teachers and schools had to take the lead in this sudden, unexpected digital transformation of children's basic education, without being well prepared for it. Even if digitalization in education has been a hot topic already for ages within different disciplines and digital tools are extensively already utilized in schools, teachers, schools, and educational administration have been poorly prepared for acting as leaders and change agents in digital transformation. (Sharma & Ventä-Olkkonen, 2020, p. 4)

With these factors in mind, the education industry began exploring how to better use technology to improve the learning experience. In 2021-2022, education technology accounts for less than 5% of the $1.6 trillion spent on education in the US each year, according to LearnLaunch (as cited in CBN Insights, 2020). Venture and equity financing for education technology start-ups has more than doubled, surging to $12.58 billion worldwide last year from $4.81 billion in 2019, according to a report from CBN Insights, a firm that tracks start-ups and venture capital (Singer, 2021). During the same period, the number of laptops and tablets shipped to primary and secondary schools in the United States nearly doubled to 26.7 million, from 14 million, according to data from Futuresource Consulting, a market research company in Britain (Singer, 2021). Applications (apps) that enable online interactions between teachers and students are reporting extraordinary growth. One way that teachers deliver online lessons is through Learning Management Systems (LMS). Apps that enable online interactions between teachers and students are reporting extraordinary growth.

During the pandemic, Florida-based LMS company Nearpod — which helps K-12 teachers create lessons through pop quizzes and virtual reality field trips — offered its services

free of cost to schools across the US (CBN Insights, 2020) . Tech giants like Google are also getting involved. The company had much of the market for education computers prior to the pandemic. The pandemic has served to strengthen this market position: Google's LMS platform, Google Classroom, saw its user base double from March to April 2020 (CBN Insights, 2020). The tech giant also began to offer schools free access to advanced features of its Hangouts Meet app during Covid-19. In addition, it donated 4,000 Chromebook laptops and pledged free internet access to 100,000 households in the US (CBN Insights, 2020).

> 'This has sped the adoption of technology in education by easily five to 10 years,' said Michael Chasen, a veteran ed-tech entrepreneur who in 1997 co-founded Blackboard, now one of the largest learning management systems for schools and colleges. 'You can't train hundreds of thousands of teachers and millions of students in online education and not expect there to be profound effects.' (Singer, 2021, para. 6)

IT Support

IT help desk workers had to pivot from previously supporting district employees and staff to now becoming the first line of contact for just about every student and parent with a remote learning inquiry. The calls and emails were flooding in around the clock, according to interviews with district technology officials in an EdWeek Research Survey (Bushweller, 2020). Daily call volume for the San Antonio schools' IT help desk escalated from 75 before the pandemic to 600 during the building closures. Nearly 9 out of every 10 teachers reported spending more time troubleshooting technology problems during COVID-19 than they did when they were in their physical classrooms (Bushweller, 2020).

> The downside of that finding is that, in many cases, teachers were devoting what would have been instructional time to tackling technology challenges, whether struggling to get up to speed learning the intricacies of a learning management system or fixing access problems on Zoom calls. The upside is that now you have a teacher corps full of educators who are much better technology troubleshooters than they were before school buildings were closed. They might not need to call the IT help desk quite as much as they used to. And that means their problems will possibly get fixed faster. (Bushweller, 2020, para. 20)

The switch to online learning is being fueled partly from the access students and teachers have to digital devices. All told, 42% of educators who responded to the EdWeek Research Center survey said their students had more access to school-issued personal devices than they did prior to the pandemic (Bushweller, 2020). The 55,000-student Boston public schools, for instance, purchased 20,000 new laptops in March to try to make sure that all students in the district had access to learning during the school building closures (Bushweller, 2020). The competition to get those laptops was intense. In an article in Education Week, Bushweller (2020) quoted a district's chief technology officer as saying "Everybody is fighting for them. We had some districts reach out to us and say, 'Can we buy some off of you?'(para. 23). Sales of laptops and desktops increased by 40% in the first three weeks of March in the U.S., while sales of keyboards, PC headset and monitor sales increased 64%, 134% and 138%, respectively (Rexaline, 2020).

> Organizations would have had to incur a budget overspend, but any such spending would be a point to assess post crisis and not during the crisis. By the time the severity

> of the situation in China started becoming apparent and the epidemic escalated to a pandemic, organizations would have had 2 months at best to prepare. Although in retrospect this may appear to be a potentially sufficient time, one needs to remember that on one hand organizations would have to keep operating as usual and at the same time plan for a response that was not clear. (Papagiannidis et al., 2020, p. 3)

Seventy-three percent of district leaders and teachers who responded in the EdWeek Research Center survey believed when school buildings reopen, greater access to 1-to-1 computing will make high-quality teaching easier (Bushweller, 2020). The increase in the number of devices also means an increase in the numbers of accounts needed from online apps.

Online Educational Apps

Several edtech start-ups reporting record growth had sizable school audiences before the pandemic. Then, in the Spring of 2020, as school districts switched to remote learning, many education apps hit on a common pandemic growth strategy: Temporarily make premium services free to teachers for the rest of the school year (Singer, 2021).

> 'What unfolded from there was massive adoption,' said Tory Patterson, a managing director at Owl Ventures, a venture capital firm that invests in education start-ups like Newsela. Once the school year ended, he said, ed-tech start-ups began trying to convert school districts into paying customers, and 'we saw pretty broad-based uptake of those offers.' (Singer, 2021, para. 1

By the end of December, schools were paying for 11 million student accounts on Newsela, an increase of about 87% from 2019. Last month, the start-up announced that it had raised $100 million. Now Newsela is valued at $1 billion, a milestone that may be common among consumer apps like Instacart and Deliveroo but is still relatively rare for education apps aimed at American public schools (Singer, 2021). Nearpod also reported exponential growth. After making the video lesson app free, the start-up saw its user base surge to 1.2 million teachers at the end of last year — a fivefold jump over 2019. In 2021, Nearpod announced that it had agreed to be acquired by Renaissance, a company that sells academic assessment software to schools, for $650 million (Singer, 2021). The worldwide audience for Google Classroom, Google's free class assignment and grading app, skyrocketed to more than 150 million students and educators, up from 40 million early in 2020. Zoom Video Communications reported that it provided free services during the pandemic to more than 125,000 schools in 25 countries (Singer, 2021).

During the Covid-19 pandemic, authorities needed to act as quickly as possible to keep the structures of teaching and learning running. Educational institutions have searched for ways to ensure students can continue their studies despite the crisis and social distancing. This has created an unprecedented push to online learning.

In many cases, to ensure the continuation of studies, educational institutions have proceeded to find quick fixes with ed-tech. This has created a sellers' market, where ed-tech companies have eagerly jumped on the opportunity to provide their services, in some cases for free. "Under the circumstances, there is no time for detailed comparisons of digital learning platforms and to ponder broader and deeper social and educational visions of their uses" (Teras et al., 2020, p. 868). Companies that offer software for free may be looking to gather

user data for profit (Teras et al., 2020, p. 868). “This in mind, it is questionable whether many such service providers are there to develop better learning opportunities as such” (Teras et al., 2020, p. 868). In using educational technology programs, schools need to vet applications to ensure student privacy and data security.

> Educational applications are created and managed by suppliers. Suppliers manage the identity of the individuals accessing the system and the data that they generate. However, there are many factors that need to be considered to ensure that each application used by institutions is appropriate for students. The student’s privacy, data security, or other safety considerations implemented by suppliers when developing educational tools may not match the needs of an institution; thus, it is the responsibility of the institution to ensure required student data safeguards are in place. (IMS Global Consortium, 2020, para. 1)

App Vetting

There are three ways that school districts can choose to complete an app vetting process. The first is crowd-sourced vetting where a consortium uses its collected resources and knowledge once one of the members has vetted an application (Onstad, 2019). Instructional Management System (IMS) Global is an example of a consortium that has developed a standard for vetting educational applications. IMS evaluates applications using its IMS TrustEd rubric which has four core identifiers. One is data collected which covers data the supplier collects as the user interacts with the app. This area concerns who owns the data, what right the user has to have their data deleted, and how long an app supplier may retain the data. Security addresses data protection practices, handling of confidential and

sensitive information, authentication, and use of cookies. Third-party data sharing reviews the sharing of user data with third parties. Advertising covers how the supplier manages advertisements and whether there is advertisement targeting or tracking. (IMS Global Consortium, 2020).

Though consortiums such as IMS Global are available, school districts are also independently seeing the need to vet educational applications. This is considered solo vetting where the district itself evaluates privacy policies (Onstad, 2019). Kristy Sailors is the director of educational technology at the Houston Independent School District. She carefully vets edtech applications before the school system's 29,000-member staff can use them in the classroom.

> Sailors shared her experiences with three questionable ed tech applications and websites — one took photos of her via webcam without any prompt or warning, another put her in an anonymous chat, and the third contained graphic content found through a simple keyword search. To avoid these scenarios in the classroom, Sailors and the district's curriculum and student safety departments maintain a resource toolbox, an index of vetted applications that have been deemed safe and secure for use in an education environment. (Johnston, 2019 para. 4)

The third option school districts can choose for app vetting is outsourcing (Onstad, 2019). Education Framework offers this type of service known as EdPrivacy. The service vets a district's applications and websites as well as monitors changes in privacy policies over time (Onstad, 2019). With the addition of new devices, educational applications, and student data, districts also need to be focused on security. "Not surprisingly privacy and

security were among the top concerns for IT teams. An organization under stress is always a prime target for social engineering attacks e.g., password resetting over the phone without verifications, phishing attempts, or malware" (Papagiannidis et al., 2020, p. 3).

Cybersecurity

The public K-12 education system in the United States is a $760 billion sector, serving over 50 million students (Levin, 2021). The educational technology systems applications in school districts collect and manage sensitive data about students, their parents, guardians, and families, educators, other school staff, and school district operations (Levin, 2021).

> In some cases, these IT systems are locally hosted on school district premises or in shared hosting arrangements with other local government entities; increasingly, they are hosted by an ecosystem of vendors 'in the cloud' on systems accessible by any internet-connected device. While there are myriad benefits to the adoption and use of IT systems by school districts—and to the collection and sharing of education-related data with trusted partners—it is important we acknowledge that any adoption of technology also introduces cybersecurity risk. (Levin, 2021, p. 17)

According to a report by a public data resource called the K-12 Cybersecurity Resource Center, in association with the nonprofit K12 Security Information Exchange, 2020 marked a "record-breaking" year for cyber-attacks against public schools in the U.S. (Paykamian, 2021, para. 1). The report includes data from the center's K-12 Cyber Incident Map, which recorded 408 publicized school cyber-attacks in 2020, representing an 18% increase over 2019 (Levin, 2021). The trend of cyber-attacks against schools has been

trending up in the last several years. In his paper, Levin outlined that school cyber incidents grew from less than 100 in 2016 to just over 400 in 2020 (Levin, 2021). Most attacks, nearly 40% of K-12 cyber incidents, included data breaches and leaks, while approximately 12% involved ransomware (Levin, 2021). Others included denial-of-access attacks, which impeded access to programs widely used for remote learning (Levin, 2021). Schools also reported an emerging threat of "cyber invasions," where unauthorized users gain access to online classes and video conference meetings, often disrupting them with hate speech, threats of violence and obscene images, sounds, and videos (Paykamian, 2021, para. 5).

Due to the COVID-19 pandemic, the presentation of school cyber incidents over the course of the 2020 calendar year was atypical (Levin, 2021). The first quarter of 2020 was mostly before the pandemic and the shift toward online learning. The pattern of school cyber incidents disclosed during that period seems a direct extension of trends from the prior year (Levin, 2021).

> In the second quarter of 2020, —coincident with the rise of COVID-19 and the corresponding adoption of remote learning—marked a sharp departure from the prevailing trend line. During this period, many schools ceased in-person operations and adopted video conferencing tools to host synchronous online classes and school community meetings. This shift also introduced a new class of school cyber threats that plagued districts almost to the complete exclusion of other incident types during that period: class invasion. (Levin, 2021, p. 3)

Another threat in recent years to school districts is phishing e-mails.

Phishing e-mails

According to Keith Krueger, CEO of the ed-tech advocacy group the Consortium for School Networking (CoSN), “In a school environment, about 3 percent of teachers click inappropriately on phishing scams. That was jumping to 15 to 20 percent from home, so a lot of cyber criminals are getting into the network” (Paykamian, 2021, para. 13). Google reported stopping 18 million COVID-19 scam emails per day worldwide in 2020 (Tidy, 2020).

> Tackling such instances would have required the establishment of clear communication links and expectations so that all users would be more vigilant. Training users to recognize threats is among the most effective ways of dealing with such threats. Still, for such training to be effective, it would have needed to be wider in scope than the typical organizational settings demands were. (Papagiannidis et al., 2020, p. 3)

One form of that training can come from security awareness training.

> Rather than a one-time event, security awareness training is most useful when approached as a critical ongoing practice in the context of a bigger security awareness program. The training and the program are integral to building a culture of security in modern, digitally dependent organizations. (MediaPro, n.d., para. 1)

Keith Krueger, CEO of CoSN, said the group’s surveys have found cybersecurity a top concern among chief technology officers across the nation (Paykamian, 2021).

> The reality is that, nowadays, school districts are home to a vast amount of valuable personal data that cybercriminals are interested in stealing — that is

> why the FBI has warned that K-12 education is the most targeted public sector for ransomware attacks. But schools lack the federal funding required to effectively combat these intrusions. (Government Technology, 2021, para. 6)

CoSN

CoSN is a resource for school technology leaders and has developed a certification known as the CETL or Certified Education Technology Leader (CoSN, n.d.).

> The CETL program is the only practice-based certification program available to education technology leaders that bridges technical knowledge, understanding of the educational environment, leadership and vision, and the management of technology and support resources needed to integrate technology across the curriculum to advance student outcomes. The CETL credential is a true measure of today's education technology leaders, identifying those who have mastered the framework skills and knowledge needed to bring 21st-Century skills to schools. The CETL program is also a professional development tool that can be used to guide education technology leaders' study of learning technologies. (CoSN, n.d., para. 3)

In addition to the certification, CoSN conducts an annual survey of education technology leaders known as the State of Edtech Leadership Report.

According to CoSN, “The survey provides valuable information about how education leaders are leveraging technology and paints a picture of potential changes in the field (CoSN, n.d., para. 1). The 2020 survey, the most recent available, shows several key findings. Cybersecurity remains the number one technology priority for IT leaders, yet the threat is

generally underestimated. For the third straight year, cybersecurity has ranked as the top. Priority. IT leaders oversee education & administrative technology. Nearly three quarters (74%) of respondents have responsibilities that encompass both educational and administrative technology. This is a notable increase over the prior year's 63%. The top three challenges persist: budget, professional development, and department silos (CoSN, n.d.).

CTO Expectations

The challenges faced by education Chief Technology Officers (CTO) reflect the diverse skill sets they must possess. "Add it all up, and it means the modern K-12 chief technology or information officer must be a technologist and an educator, a risk manager and an innovator, a leader and a team player" (Herold, 2019, para. 8). Despite the survey suggesting department silos remain a challenge, some Superintendents are understanding the need for collaboration.

> 'Consider the way K-12 leadership cabinets make most big decisions now', said Superintendent Doug Brubaker of the Fort Smith, Ark., school system. 'Cross- functional teams with multiple departments represented are a must. The role of technology-team members varies from project to project. Good CTOs are equally comfortable as leaders of some groups and role players in others.' (Herold, 2019, para. 13)

Brubaker was part of a Superintendent's panel at the January 2019 Future of Education Technology Conference. Superintendents on the panel shared the top priorities including the CTO be a full-fledged member of the district leadership team at the superintendent cabinet level (McMullan, 2019). Another shared interest Superintendents identified as key

to superintendent-CTO partnerships is the understanding that every school district is in the learning business, not the technology business.

> For that understanding to exist, it is important for the CTO to have meaningful conversations with the principals and teachers in the district. If a teacher or principal makes a request for a specific digital program, the superintendent and CTO need to work together to determine if it is feasible. (McMullan, 2019, para. 8)

Summary

> The modern Chief Technology Officer's role has metamorphosed from that of part-time teacher/part-time repair person to one of a visionary leader. The change positions the district and its shareholders to understand how to use technology effectively as a tool rather than learn it as a standalone subject. (Lynch, 2018, para. 1)

The review of literature has provided a strong foundation of how the role and responsibilities of an educational CTO has changed. The CTO must do more than understand how to fix a computer or build a network. His or her role has merged with curriculum and impacts decisions made at the cabinet level. Though the Superintendents in the panel discussion expressed interest in greater collaboration, the results of the CoSN 2020 survey suggest this culture may not yet be widely adopted.

Chapter III

Methodology

Introduction

The purpose of this chapter was to introduce the research methodology for this thesis. The research methodology chosen was a qualitative case study. The case study focused on: (a) determining if the expectations and responsibilities of technology leadership in a K-12 public school district teaching and learning environment has evolved from a role of fixing devices to contributing to the teaching and learning vision of the district, (b) identifying the qualifications needed to meet the contemporary expectations and responsibilities of leading technology in a K-12 public school district teaching and learning environment, (c) exploring the impact and problems that exist when a K-12 public school district technology department is isolated from the modern teaching and learning vision of the district, and (d) illustrating the importance
of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision.

Case Study

A case study is defined as, “an empirical inquiry that investigates a contemporary phenomenon (the ‘case’) in depth and within its real-world context” (Yin, 2003, p. 16). According to Yin, a case study design should be considered when: (1) the focus of the study is to answer “how” and “why” questions; (2) you cannot manipulate the behavior of those involved in the study; (3) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or (4) the boundaries are not clear between the phenomenon and context (Yin, 2003). A qualitative research approach for this study was

chosen because qualitative methods are especially useful in discovering the meaning that people give to events that they experience (Merriam, 1998).

In this case study, purposive sampling was adopted which is, "a method of sampling where the researcher deliberately chooses who to include in the study based on their ability to provide necessary data" (Parahoo, 1997, p. 232). The participant for this study was from a suburban school district in the Mid-Atlantic section of the United States. A pseudonym (Kevin) is used to protect the identity of the participant. The participant was between 45 and 55 years old. At the time of the research, Kevin worked in the technology and curriculum department. Kevin had been with the district for over twenty years in various level roles that include technician, manager, and supervisor. For part of that time, the technology department was its own entity, before becoming a sub-department within the business department. At the time of the research, the technology department was partnered with the curriculum department. This department transition, coupled with the participant's years of experience, was why this school district and participant was chosen for the case study.

> According to Yin, case studies can be used to explain, describe, or explore events or phenomena in the everyday contexts in which they occur. These can, for example, help to understand and explain causal links and pathways resulting from a new policy initiative or service development. (Crowe, Cresswell, Robertson, 2011, para. 7)

Method

For this study, qualitative interviews were the primary method of collecting data. Interviewing is the best technique to use "to find out those things we cannot directly observe…feelings, thoughts, and intentions" (Merriam, 1998, p. 72) Qualitative researchers are

interested in understanding the meaning people have constructed, that is, how people make sense of their world and the experiences they have in the world (Merriam, 2009, p. 13). This study used an interviewing method where both the researcher and the interview questions were the instrumentation used.

> Researchers using this method will want to ensure enough detail is provided so that readers can assess the validity or credibility of the work. As a basic foundation to achieve this, novice researchers have a responsibility to ensure that: (a) the case study research question is clearly written, propositions (if appropriate to the case study type) are provided, and the question is substantiated. (Baxter & Jack, 2008, p. 556)

To ensure this, a pilot-study was conducted of managers at the district where the participant worked. The interview questions were administered to check that the items accurately addressed the purpose statements. This also helped to check the questions were clearly defined. The pilot-study also provided a measurement of the time it took to complete the questions. Attention was also given to body language, non-verbal responses, and the manner the questions were asked. This helped the researcher with interpersonal skills as well as gaining experience conducting interviews. Comments were taken into consideration and any errors were addressed. Memos were used to capture thoughts during and after each interview. The answers were recorded with an electronic device. The recording was then transferred to Zoom which allowed the interviews to be transcribed using the closed captioning feature. The transcripts were read while listening to the audio recording to ensure there were no errors.

The interview was semi-structured with open ended questions, though the participant was offered the flexibility to discuss their experiences in a way that they felt comfortable. The questions were asked and recorded in-person in a quiet, neutral location so the interviewee did not feel distracted or coerced in his answers. Questions were asked over several sessions, keeping in mind data saturation and fatigue of the participant. Researchers who design a qualitative research study come up against the dilemma of data saturation when interviewing study participants (O'Reilly & Parker, 2012; Walker, 2012). In particular, researchers must address the question of how many interviews are enough to reach data saturation (Guest, Bunce, & Johnson, 2006). Data saturation is reached when there is enough information to replicate the study (O'Reilly & Parker, 2012; Walker, 2012), when the ability to obtain additional new information has been attained, and when further coding is no longer feasible (Guest et al., 2006).

Questions were from general to specific. Interview techniques of probingwere used with such phrases as, "Could you tell me more about that?" The researcher used eye contact to encourage the participant to continue speaking. The researcher concluded the interview by asking if there were more questions or comments. Neither the researcher nor the participant had a direct relationship that would have represented a conflict of interest, such as a supervisory relationship, that may have imparted bias on the research study.

Analysis

The responses were reviewed using the inductive approach. This approach involves finding meaning and themes without any bias.

The purposes for using an inductive approach are to (a) condense raw textual

> data into a brief, summary format; (b) establish clear links between the evaluation or research objectives and the summary findings derived from the raw data; and (c) develop a framework of the underlying structure of experiences or processes that are evident in the raw data (Thomas, 2006, p. 237).

By using an inductive approach, themes can begin to emerge from the data which can be analyzed. This is known as thematic analysis. It is a method for, "identifying, analyzing, and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 78). Boyatzis defined a theme as "a pattern in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon" (Boyatzis, 1998, p. 161). The process involves the identification of themes through "careful reading and re-reading of the data" (Rice & Ezzy, 1999, p. 258). This was completed by using the transcripts of the interviews. Once themes had been identified, the next step was to separate the data using coding.

> Coding is the process by which raw data (e.g., transcripts from interviews and focus groups or field notes from observations) are gradually converted into usable data through the identification of themes, concepts, or ideas that have some connection with each other. It may be that certain words or phrases are used by different participants, and these can be drawn together to allow the researcher an opportunity to focus findings in a more meaningful manner. (Austin & Sutton, 2014, p. 439)

After the data was coded, the researcher then needed to identify relationships between the codes

> Once data has been reassembled through coding, the researcher is then able to extract excerpts from the data and view them in relation to and in the concert with each other. Doing so allows the researcher to begin to start focusing on interpreting what is going on within and across varied experiences, beliefs, and histories and thus begin to identify thematic patterns across the data. Themes capture an essence of the phenomenon under investigation in relation to your research question or purpose of the study. (Castleberry & Nolen, 2018, 812)

Summary

This chapter outlined the research method that was used to answer the research questions. The chapter outlined the specifics of how the case study was conducted, the participant of the study, the environment, and how the data was collected and reviewed. Chapter IV will now provide the study results and document that the methodology described in Chapter III was followed**.**

Chapter IV

Results of the Case Study

This chapter presents the research findings of the data collected from the case study. The main source of data is from the interview of the case study participant. The findings will be presented in relation to the research objectives.

The purpose of this research was to determine if the expectations and responsibilities of information technology leadership in a K-12 public school district teaching and learning environment has evolved from a role of fixing devices to contributing to the teaching and learning vision of the district. It was also to identify the qualifications needed to meet the contemporary expectations and responsibilities of leading technology in a K-12 public school district teaching and learning environment. The research was also to explore the impact and problems that exist when a K-12 public school district technology department is isolated from the modern teaching and learning vision of the district. Lastly, it was to illustrate the importance of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision.

To complete this research properly, it was necessary to analyze the data gathered through the research questions:

1. What do you see as the essential connection between the role of the technology department and the K-12 teaching and learning vision of the district?
2. What is the impact if a disconnect exists between the role and the vision?
3. How would you measure the health of the connection between the role and the vision?
    A. What would be the key indicators of the healthy connection?
    B. What would be the key indicators of the unhealthy connection?

4. What is the impact to the technology department when there is an unhealthy connection?
5. What is the potential impact to the K-12 teaching and learning environment and the stakeholders when there is an unhealthy connection with the technology department?
6. What could be done to overcome the unhealthy connection between the technology department and the K-12 teaching and learning vision?
7. What steps could support and protect the essential connection between the role of the technology department and the K-12 vision?
8. What role does the organizational structure play in supporting a healthy connection?
9. What is the profile/characteristics of the people who could lead and facilitate healthy connections between the technology department and the K-12 teaching and learning vision?
10. Is there anything that I did not ask you that I should know to better understand the connections between the technology department and the K-12 teaching and learning vision?

As already indicated in the preceding chapter, data is interpreted using an inductive approach. Qualitative research is concerned with trying to achieve a clear understanding of the problem. This methodology is used to get information about how people think, feel and act and what they know. This section of the research was conducted through a case study.

Sample

The participant for this study is from a school district in the Mid-Atlantic section of the United States. A pseudonym (Kevin) has been used to protect the identity of the participant. The participant is between 45 and 55 years old. Kevin works in the technology and curriculum

department. Kevin has been with the district for over twenty years in various level roles that include technician, manager, and supervisor. For part of that time, the technology department was its own entity, before becoming a sub department within the business department. At the time of the research, the technology department is partnered with the curriculum department. This department transition coupled with the participant's years of experience is why this school district and participant was chosen for the case study.

Data Collection

The research was conducted over the course of three interview sessions. The first session included questions one through five and ended with question 10. The second session included questions six through ten. A third session was used to ask if there was a research question the participant would like to revisit after having time to reflect on the answers in their first two sessions. After every interview, the interviews were coded manually and reviewed for emerging themes.

Analysis

The responses were reviewed using the inductive approach. This approach involves finding meaning and themes without any bias. By using an inductive approach, themes can begin to emerge from the data which can then be analyzed. This approach is known as thematic analysis. It is a method for, "identifying, analyzing, and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 78). Boyatzis (1998) defined a theme as "a pattern in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon" (p. 161). The process involves the identification of themes through "careful reading and re-reading of the data" (Rice & Ezzy, 1999, p. 258). This was completed for this study by using the transcripts of the interviews.

Once themes were identified, the researcher then separated the data using coding to identify relationships between the codes.

Connection Codes

Knowing the mission. Understanding the participant's perspective on where the connection exists between the role of the information technology department and the K-12 teaching and learning vision of the district is key to understanding the focus of a technology department. Kevin cited the district mission as the essential component.

> I see the mission, the district mission, as an essential component for that connection. If we don't follow the mission, I think we would find ourselves in many cases where we came from, which was you're just putting out fires. The actual mission will expose what's needed as a division going forward.

Kevin expanded on what he saw as a linear connection that exists between the mission, curriculum, and technology.

> The community sets the mission by way of the board and a superintendent in cabinet and administration…. Once they decide how they're going to… teach the person… then curriculum immediately follows thereafter… an expectation should be set by the curriculum department… These things have to be right [in technology] now we're just going to be trippy. There's going to be moments where things are not perfect and your response, this response, has to be immediate. But I think a teacher deserves, the students deserve, an environment with technology that is reliable.

Organizational structure. The participant's responses when talking about the connection between the role of the Technology Department and the K-12 teaching and learning

vision of the district described having an organizational structure that supports technology. The participant drew upon their experience from an older organizational structure when the technology department was a sub department within the business department. Kevin then compared that organizational structure to the current organizational structure where the technology department is partnered with the curriculum department.

> When the technology department was part of business [department], it was just about money, money, money, and resources to satisfy what's happening right now. It doesn't mean we were part of the long-term vision. There was a disconnect I think, there was maybe even a fracturing at times. So, I think the fact that we were actually tucked in the curriculum piece of it, I think that it's really easy to follow where the ebb and flow of how what happens in the classroom can be part of the actual details of design. The design will inevitably include technology, but how can that best seamlessly fit along the way when… we're reactionary? We're always going to be behind and there was a lot of frustration.

Kevin went on to share his perspective working in technology as a sub department in the organizational structure.

> We had an environment whereas if technology was some separate entity. It's not separate, it's an integrated entity, it's not separate… But if your organizational structure is set up as such where it's just top-down approach then you get what you get as a sub-department. We've seen what that looks like and …that gets devastating real fast within only a couple years...technology will then eventually become a siloed piece. Just a

> supplemental thing in a school district and that's quite unfortunate when it happens.

Respect. Kevin describes that the respect between departments is critical in successfully fulfilling the K-12 teaching and learning vision of a district. “But I can say that as long as all the departments are in line with the teaching and learning vision, the mission, then all timelines need to be respected. All departments' timelines need to be respected.”

These codes related to connecting to the mission, illustrate the importance of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision.

Resource Codes

Money. The participant shared when the technology follows the curriculum, the financial resources need to be available.

> If curriculum doesn’t acknowledge the technology piece, then financially as well, then potentially technology won’t be - it’ll be insufficient because the budget was insufficient that the curriculum was there, but you need to meet the curriculum with the technology and therefore the technology budget.

People. During the sessions, Kevin described having enough technicians to meet the current needs, expectations, and responsibilities of leading technology in a K-12 public school district teaching and learning environment.

> In school districts, when you have an issue or a need in a building, but you only- but you only have more buildings than technicians there is an immediate frustration within that building as having a problem. It may not be real, but the actual perception is real, and it's once again, we have a technology issue and that person, the technology support

> technician, is not in the building. That person is quote ‘at the other buildings, one of the other buildings’ and it becomes... You have food services, you have a nurse, these are essential people that need to be in the building live when the building's happening, and I think a technology support technician needs to be there as well and that is my stance.

Kevin describes how having human resources in the building can provide immediate feedback when a situation occurs.

> I would want them to know that we have resources, human resources, that are available to walk around and get a better idea of what's going on and assess the actual situation with, with no preconceived notion of what it actually is. Just let's go in and let's find out. Let's make this circumstance go away. The human resource tells me what that might look like.

Time. The participant discussed time as it related to people and projects. Kevin expanded from his perspective about having a technician at each building to include tiered support.

> The technicians have important things to do, but the technician is that help desk individual who's part of the core team will make assessments to a situation and then identify whether or not there is a need to call…. upon a core member and say, hey, you know, I've done what I'm supposed to do and what I can do. Can you handle or help out with this and so you got immediately within, if it's done right, within potentially 1/2 hour 30 minutes you have a site technician that's in the building, solve the problem, identified the problem, tried to take some action. The help desk, slash dispatch individual, and tried to work things out and deployed a core team member to actually do something

about it within 30 minutes. That is an extremely healthy, uh, response time.

Kevin shared that time is needed for technology to be able to plan and implement new initiatives:

> The better they [stakeholders] are at planning ahead because they realize that it's not just - a it's not like a, uh, a bundle of folks that are just trying to slow the process down… Rolling out of any type of project is going to take time and questions and conversation.

Healthy Connection Codes

Clear communication. To maintain a healthy connection between the role of the Technology Department and the K-12 teaching and learning vision, the participant shared the importance of clear communication, especially when troubleshooting issues.

> Full lines of communication and I think that's going to be an entire theme to this, this process that you're walking through. It's going to be communication. If this just we know it's fine in there, fine from the technology perspective, that, that's a deemed failure. That's going to be, it's going to be a failure in no time at all.

Ask questions. Kevin described how asking questions in the building is vital to understanding the issues a school building may be having with a new technology implementation.

> So, we would, we would need to ask those questions. We would need to say, OK, tell me more about that. Tell me what you know. Show me some people that, that you know would be totally adequate in capacity to actually accomplish these things, but just can't. Like you know, technology department

> perhaps rolled out a solution, a Microsoft Office package or something like that for you as an example, but never gave the training. Never explained what these things do. It's, here, you know, here's the newest version of Word and Excel and go have at it. So, the technology department can't ever make assumptions as to the capacity, the understanding of how to use those technologies. So that would be an example of asking questions starting with principal. Starting with the administration in the building. Definitely go to the office. Office personnel are always a tremendous resource.

Understand the building culture. The participant outlined that a culture exists that addressing issues in one building can help build a healthy connection in other buildings.

> The buildings talk to each other and that's a culture, that's a culture thing. So, if you're not showing any respect to the building that's struggling, then they're going to realize that, potentially realize, or believe, that they're on their own if things go south. And we don't want that either, it's just keep the culture good. We're, we're all here to help each other out and make it alright. So that's, that's the importance of technology, not just being successful in implementing technology, but actually being successful in actually being part of cultivating that culture that's required in, in a holistic manner.

Understanding of technology. Kevin described how when stakeholders understand technology, more collaborative projects can take place.

> If there's an understanding of how much something, how long something takes, how much time it takes if there was a good connection, there would have been - there would be potentially numerous projects that were worked on in collaboration and then there would be, become, a

better understanding. The more people understand about the technology department, the better.

Unhealthy Connection Codes

Selective communication. In questions that were looking for the perspective from the participant on how to identify an unhealthy connection, Kevin shared the lack of conversations.

> We do know what the problem is, it's selective communication…If there's disconnect, conversations… will definitely lack, and by the time there's a discussion, it's probably going to be beyond what the need of the initiator was hoping for. So, then it becomes a project that's late because of technology, and that really makes people upset. And they have something to blame, and that's unfortunate because it's, it wouldn't, it's not fair.

Lack of trust. The participant also outlined how a lack of trust is created. There becomes a lack of trust. That would be the impact, and when there's a lack of trust. There would, there would be a hesitancy to include technology in the conversations moving forward for any projects…we become less involved with the design, and now you're, now, now you're playing catch up... trust is not in play. We don't, uh, perspective perhaps by then would be, we don't need technology, or else, we only need this much technology, and we've, we'll, we'll handle whatever happens. And in the end, there's a fracturing and then in the end you have, you have people that, you have frustration and more reason to not trust.

Silos. The participant described a linear relationship in his description of unhealthy connections resulting from the selective communication to the lack of trust to then people working in silos.

> Because then you do have people working in silos and having technology or or a different department working in a silo and not including technology. To fulfill the mission that that's a, that's a recipe for disaster. Because technology will not even, the resources wouldn't be available, then you're playing catch up even with the resources, the money that you know, the timing for getting things, you know?

Kevin suggested that working in a silo leads to people avoiding technology.

> It just goes back to frustration like technology becomes avoided… It becomes a siloed environment where the teachers say that's it. I'm done. I'm going back to chalk. I'm going back to a whiteboard and some eraser, erasable markers and that would be a shame. It really would be a shame, but that is, and then, and then you have, and then you have a lot of technology, a lot of resources, a lot of money, a lot of investments. There's a depression. There's a technology depression that happens and it's like this stuff is making me depressed.

Lack of understanding. According to Kevin, another indicator of an unhealthy connection is a lack of understanding of the role of technology in the K-12 teaching and learning environment.

> If there's an unhealthy connection, I think at times there would be a lack of sight. A lack of understanding. The disconnect would actually not allow for an understanding of how much something, how long something takes.

The codes that emerged from the participant's responses explore the impact and problems that exist when a K-12 public school district technology department is isolated from

the modern teaching and learning vision of the district.

Evaluating the Connection Codes

Evaluations. The participant spoke about the importance of understanding how technology is meeting the needs by receiving feedback from building staff.

> Evaluations of, service evaluations, of an individual in a position, for example, where rubber meets the road. In elementary schools, we have a technician in the elementary school. We have needs that are identified by the principal in a direct form by the teachers in a direct way. Those teachers inevitably will, I would hope they would, they would give feedback to the principals on how the site technician is performing, you know where their shortfalls are, whatever, and so those evaluations would be a good starting point.

E-mail feedback. Kevin shared that e-mails can also provide insights into how the technology needs are being met. E-mails can also provide an insight into possible emerging issues.

> Unsolicited responses, unsolicited E-mail comments, Uhm, you know. Just so, you know, yesterday went great. It was awesome 'cause of these things. Jan, you know, did a great job with this such and such, you know. Or, Hey! Yesterday didn't go very well. These I think, those, sometimes when something bubbles up to the point where one or five people feel the need to send a message, I think it would be worth giving a listen to that.

Help Desk tickets. The participant shared how help desk tickets could be used to offer insight over a longer timeline and that the tickets could be reviewed internally, but from someone outside the department.

> Maybe the help desk, going in some of the tickets and in evaluating the certain things that have happened in the past year, past months and say OK, these responses seem like a positive response. Maybe a neutral response. Positive with neutrals. I think it was a positive, but positives and negatives then maybe a good evaluation. We would be having, maybe, not a third party, but someone outside the department to look at some of these tickets and say, hey, look, could you overall, would you overall see, get an idea of the overall tone, the actual tone of the everyday, and would you say that this particular building is doing well or at least, if you're getting a lot of, you know exclamation marks, everything is great. You know you guys are, you guys are the best - responses like that. I think means something over time. If it's just real cold and neutral or, or worse, I think those would have to be kept in into play as well.

Assess/observe/re-evaluate. Kevin described a cycle the department could use to self-reflect on the connection of the technology department to the vision.

> There's a cycle. It's very popular, but I think it would work. It's a cycle of Assess the need, what you need to do about it. These are steps. These would be plan, observe, I think it is. Observe and then, and then, Reevaluate. So, so there's a, there's a cycle.
>
> You're constantly cycling what you've put in place, to satisfy a need. But you need to constantly re-evaluate whether or not it was actually effective. Today, you did it last year. Is it right for this year? So, you guys constantly re-evaluate what it is you have been putting in and implemented. So, if I had steps, it would just, it would simply be what does curriculum need? For the students, what does, what does this community need from the technology?

Reliability. The participant looks to the reliability of the department as a way to confirm that the connection is healthy.

> If the mission is being fulfilled, the teacher should be able to have an idea what he or she wants to do tomorrow morning and show up and say kids were doing this and it happens to be technology today and whether or not Wi-Fi is working shouldn't be a question.

Leadership Codes

Humility and respect. The response from the participant when talking about the priorities in a person, or persons, who could lead a technology department were largely about humility.

> Humility goes a long way, recognizing that we don't have all the answers. I think a leader that doesn't ask questions suggests something to me. A leader that doesn't ask questions in many cases doesn't because they're afraid it would make them look weak or less than and I think that's a foolish endeavor.

In connection with humility, Kevin described how a leader, recognizing they do not have all the answers, should respect the knowledge of others.

> I think it is respecting other people's points of view, other people's understanding and knowledge and walking into a building. A classroom as a technology person walking in. Yes, I'm supposed to be the expert, but I am also supposed to respect that person to actually have understanding and knowledge in what they're doing in their world, and potentially I don't know a piece I'm missing, something. I'm not sure if I understand what you're talking about. Would be a great thing to

hear.

Actively pursue conversations. The participant emphasized the importance of a leader who is seeking conversations.

> The characteristics are the ones who are willing to actively pursue those conversations of what it would take to actually make something happen that requires technology and bring them in the fold during the process, you know if they're willing. If they're not, then maybe we would be worth us finding someone who would be able to accomplish those things, but getting everyone to, all the, all the stakeholders in conversations… Technology department needs to initiate those conversations up front, before the projects are even started from day one.

The leadership codes from Kevin's responses demonstrate that the contemporary expectations and responsibilities of technology leadership in a modern K-12 public school district teaching and learning environment has evolved from a role of fixing devices to contributing to the teaching and learning vision of the district.

Summary

In this chapter, findings were reported, in the form of themes, based on the research questions that drove the case study. There are several themes that occurred. One is identifying the connection that exists between the role of the technology department and the K- 12 teaching and learning vision. Another theme is that resources are needed to support the connection and implementation of the vision. Themes emerged that also provided insight into how to identify when a healthy connection exists and the impact it has on the K-12 teaching and learning vision. Conversely, the theme of how to identify when an unhealthy

connection exists and the impact it has on the K-12 teaching and learning vision. This theme relates back to the research questions, what is the impact when a disconnect exists between a public school district technology department and the contemporary K-12 teaching and learning vision of the district? Finally, a theme emerged that identified the characteristics of technology leaders who could support a healthy connection. The major themes uncovered in this case study were presented in relation to the research objectives.

A summary of the insights from Kevin related to the relationship between the Information Technology Department and the teaching and learning mission of the school district included:

- The district mission as the essential component
- A linear connection between the mission, curriculum, and technology
- The organizational structure should have the information technology department partnered with the curriculum department
- Respect between departments is critical in successfully fulfilling the K-12 teaching and learning vision of a district
- When the technology follows the curriculum, the financial resources need to be available
- There must be enough technicians available to meet the current needs, expectations, and responsibilities of leading technology in a K-12 public school district teaching and learning environment
- Human resources in a building can provide immediate feedback when a situation occurs
- Each building must have a tiered support system in which a technician is just one tier
- Time is needed to be able to plan and implement new technology initiatives
- The importance of clear communication, especially when troubleshooting issues

- Asking questions in a building is vital to understanding the issues a school building may be having with a new technology implementation
- A culture needs to exist so that addressing issues in one building can help build a healthy connection in other buildings
- When stakeholders understand technology, more collaborative projects can take place
- An unhealthy connection comes from the lack of conversations, a lack of trust, a lack of understanding, and people working in silos (a lack of community)
- There is an importance toward understanding how technology is meeting the needs by receiving feedback from building staff
- E-mails can provide insights into how the technology needs are being met.
- E-mails can also provide an insight into possible emerging issues
- Help desk tickets could be used to offer insight over a longer timeline and that the tickets could be reviewed internally, but from someone outside the department
- Information technology departments should use a cycle of Assess/Observe/Re-Evaluate to self-reflect on the connection of the technology department to the vision of the school district
- The reliability of the department is a way to confirm that the connection it has to the vision and mission of the school district is healthy
- The priorities in a person, or persons, who could lead a technology department deal largely with humility
- It is important for a leader in an information technology department to always seek conversations

Chapter V

Summary

The discussion sections of this chapter include a brief summarization of the problem of the study, its purpose, the literature review, the methodology used, the study's limitations, the research questions, and the results. The final sections of this chapter examine the conclusions, educational recommendations, as well as recommendations for future research. The conclusion section includes an interpretation of the data. The recommendation section discusses possible methods to establish and keep a healthy connection between the informational technology department and the contemporary K-12 teaching and learning vision of the district. The last section of this chapter discusses recommendations to consider for future studies of this nature.

Problem

The problem of this study was to determine the impact of a disconnect between a public school district technology department and the contemporary K-12 teaching and learning vision of the district.

Purpose

The purpose of this study was to identify and analyze how K-12 public school district information technology departments may be unintentionally separated, or isolated, from the teaching and learning vision. Another goal was to determine if the expectations and responsibilities of information technology leadership in a K-12 public school district teaching and learning environment has evolved from a role of fixing devices to contributing to the teaching and learning vision of the district. The research was also to identify the qualifications needed to meet the contemporary expectations and responsibilities of leading technology in a K-12 public school district teaching and learning environment. Lastly, it was

to illustrate the importance of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision.

Literature Review

The review of literature examined previous research and developments that have occurred in the areas of (a) evolution of learning devices in educational environments, specifically computers, (b) the significant growth in technology devices and IT support in education during remote learning in the pandemic, (c) the adoption of online applications that increased during the pandemic and the importance of protecting student data, and (d) how the growth of technology in education environments changed the contemporary expectations of Chief Technology Officers. After an in-depth review of the relevant literature, the researcher concluded that more qualitative research was needed on the connection between the information technology department and the contemporary K-12 teaching and learning vision of the school district. An important conclusion found in the literature review was that relevant qualitative research was sparse.

Review of Methodology

The scope of the conclusions is limited to one case study and one participant from a school district in the Mid-Atlantic section of the United States. As a result, these conclusions may lead to incorrect assumptions when applied to other environments. A pseudonym (Kevin) has been used to protect the identity of the participant. The participant is between 45 and 55 years old. Kevin works in the technology and curriculum department. Kevin has been with the district for over twenty years in various roles at levels that include technician, manager, and supervisor. For part of that time, the technology department was its own entity, before becoming a sub-department within the business department. At the time of the

research, the technology department is partnered with the curriculum department. This department transition, coupled with the participant's years of experience is why this school district and participant was chosen for the case study.

Limitations

Limitations of this study came from the research design of the study and real-world limitations of the setting and demographics of the study. Limitations included data that was filtered through the lens of the interviewee, the number and type of participants was limited, and only one school district was examined (Merriam, 1998).

The number of participants was limited. The small number of participants was justified because as Patton (2002) stated that there is no fixed number of participants needed for a case study. While the number of participants was limited, it was large enough to obtain rich information.

A final limitation of the current study was the method by which data was collected. By choosing to use qualitative interviews as the only method of data collection and by having only one individual conducting the research and analyzing the data, the researcher likely missed out on more diverse data points from a larger group of people. By using a mixed methods approach, a quantitative survey could have been added to the methodology that may have added additional perspectives and a larger sample to improve the generalizability of the conclusions.

Research Questions

To complete this research properly, it was necessary to analyze the data gathered through the research questions:

1. do you see as the essential connection between the role of the technology department and

the K-12 teaching and learning vision of the district?

2. What is the impact if a disconnect exists between the role and the vision?
3. How would you measure the health of the connection between the role and the vision?
    A. What would be the key indicators of the healthy connection?
    B. What would be the key indicators of the unhealthy connection?
4. What is the impact to the technology department when there is an unhealthy connection?
5. What is the potential impact to the K-12 teaching and learning environment and the stakeholders when there is an unhealthy connection with the technology department?
6. What could be done to overcome the unhealthy connection between the technology department and the K-12 teaching and learning vision?
7. What steps could support and protect the essential connection between the role of the technology department and the K-12 vision?
8. What role does the organizational structure play in supporting a healthy connection?
9. What is the profile/characteristics of the people who could lead and facilitate healthy connections between the technology department and the K-12 teaching and learning vision?
10. Is there anything that I did not ask you that I should know to better understand the connections between the technology department and the K-12 teaching and learning vision?

As already indicated in the preceding chapter, data was interpreted using an inductive approach. Qualitative research is concerned with trying to achieve a clear understanding of the problem. This methodology is used to get information about how people think, feel and act and

what they know. This section of the research was conducted through a case study.

The following findings are based on the research accomplished during the case study. The responses were reviewed using the inductive approach. This approach involves finding meaning and themes without any bias. By using an inductive approach, themes can begin to emerge from the data which can then be analyzed. This approach is known as thematic analysis. It is a method for, "identifying, analyzing, and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 78). Boyatzis (1998) defined a theme as "a pattern in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon" (p. 161). The process involves the identification of themes through "careful reading and re-reading of the data" (Rice & Ezzy, 1999, p. 258). This was completed for this study by using the transcripts of the interviews.

Once themes were identified, the researcher then separated the data using coding to identify relationships between the codes.

Results

There were five codes that emerged from the interviews. They were:

1. **Connection codes.** These codes related to connecting to the mission, illustrate the importance of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision. The district mission must be the essential component. A linear connection exists between the mission, curriculum, and technology. This connection could be supported by an organizational structure that has the information technology department partnered with the curriculum department. Respect between departments is critical in successfully fulfilling the K-12 teaching and

learning vision of a district.

2. **Resource codes.** These codes related to people, money, and time in being able to implement the teaching and learning vision. When the technology follows the curriculum, the financial resources need to be available. There must be enough technicians available to meet the current needs, expectations, and responsibilities of leading technology in a K-12 public school district teaching and learning environment. Human resources in a building can provide immediate feedback when a situation occurs. Each building must have a tiered support system in which a technician is just one tier. Time is needed to be able to plan and implement new technology initiatives
3. **Healthy connection codes.** These codes focused on how to recognize when a healthy connection exists between information technology and the teaching and learning vision. These codes focused on the importance of clear communication, especially when troubleshooting issues. Asking questions in a building is vital to understanding the issues a school building may be having with a new technology implementation. There is a need for a culture to exist so that addressing issues in one building can help build a healthy connection in other buildings. Educating stakeholders should be a priority because when stakeholders understand technology, more collaborative projects can take place.
4. **Unhealthy connection codes.** These codes focused on how to recognize when an unhealthy connection exists between information technology and the teaching and learning vision. An unhealthy connection comes from the lack of conversations, a lack of trust, a lack of understanding, and people working in silos (a lack of community).
5. **Evaluating the connection codes.** The evaluating codes outlined what measures could

be used to identify the type of connection that exists in an organization. There is an importance toward understanding how technology is meeting the needs by receiving feedback from building staff e-mails that can provide insights into how the technology needs are being met. E-mails can also provide an insight into possible emerging issues. Help desk tickets could be used to offer insight over a longer timeline and the tickets could be reviewed internally, but from someone outside the department. Information technology departments should use a cycle of Assess/Observe/Re-Evaluate to self-reflect on the connection of the technology department to the vision of the school district. The reliability of the department is a way to confirm that the connection it has to the vision and mission of the school district is healthy.

6. **Leadership codes.** The priorities in a person, or persons, who could lead a technology department deal largely with humility. It is important for a leader in an information technology department to always seek conversations in order to show respect and build trust among all stakeholders.

Conclusions

Several things can be explained and concluded from the case study. First, the connection codes outline that the district mission is the essential component that exists in the connection between all stakeholders in a contemporary K-12 public school district.

The participant in the case study outlined how a linear connection exists between the mission, curriculum, and technology. As a result, Kevin believes the organizational structure should have the information technology department partnered with the curriculum department to establish a connection to the K-12 teaching and learning vision.

Once the connection and organizational structure is established, Kevin noted that

resources need to be made available. Resource codes included financial resources, human resources, and time. Kevin noted when the information technology department follows the curriculum department, there needs to be a recognition that money is needed for the technology to support the approved curriculum. This may include equipment, support services or technicians. Kevin emphasized the importance of having one technician at each building who can provide a timely response and immediate feedback to issues. Without the essential connection to the district mission and a lack of resources, unhealthy connections begin to form.

An unhealthy connection can exist from not understanding the district mission or a lack of resources. Without the right resources, Kevin describes an environment in a "technology depression." This can exist when there is a lack of resources to support the modern K-12 teaching and learning vision. As a result, people may avoid using technology, begin to develop a mistrust of technology and decide to avoid conversations about issues. These can be considered the characteristics of people who decide to work in silos and lack a sense of community. This environment becomes self-perpetuating as people become more selective in their communication about their needs, may attempt to solve their own needs and become frustrated when the technology still fails to meet the vision. The case study outlines that it is up to information technology leaders to promote a healthy connection.

The leadership codes outline that the contemporary expectations and responsibilities of information technology leadership in a modern K-12 public school district teaching and learning environment have evolved. It goes beyond a role of fixing devices to contributing to the teaching and learning vision of the district.

Information technology leaders need to seek out conversations. Communication between members of the information technology department and all stakeholders is essential to keep a healthy connection between the technology department and the contemporary K-12 teaching and learning vision.

In addition to leaders seeking conversations, a culture needs to exist that promotes asking questions. By asking questions stakeholders can develop a better understanding of the vision and respect for each other. This can help promote collaboration, inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision. This culture also needs to share learned information, so that addressing issues in one building can help build a healthy connection in other buildings.

To identify the type of connection that exists in a modern K-12 public school district teaching and learning environment, e-mails can be used as feedback. E-mails that can provide insights into how the technology needs are being met and provide an insight into possible emerging issues. Recommendations for future research as well as recommendations for the school district are found below.

Educational Recommendations

Given the results of this research, the studied school district should consider the following:

1. The school district should review how new district employees, hired after the beginning of the school year orientation has been conducted, can learn about the district mission and their connection to it.
2. Information technology employees should understand their role in promoting healthy connections between the department and the modern K-12 teaching and learning

vision.

3. Information technology employees should learn how to evaluate feedback from E-mails and conversations to recognize the codes of a healthy and unhealthy connection.

Recommendations for Future Research

The current study provides a basis for future researchers to expand on the understandings gained here. One such way that the current study could be expanded upon is using a larger population. The population that was studied was a single participant from one school district. By expanding the research to several school districts, a more complete understanding of the expectations and responsibilities of information technology leadership in a K-12 public school district teaching and learning environment has evolved could be achieved.

Another way to add to the current study is to examine the information technology perspectives of school board members, administration, staff, and students. This could generate a more complete understanding of the importance of having inclusive practices and cross functional teams in the decision making of the K-12 teaching and learning vision.

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