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Technology in Rural and Urban Schools: A Comparison Study

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ABSTRACT

This article examines the availability, use, and integration of technology in rural schools versus urban schools in Nebraska. Data were gathered through interviews with eleven schools in central and eastern Nebraska, seven rural and four urban. Representatives from schools were excited about implementing technology in the classroom but acknowledged a variety of problems ranging from insufficient funding to unwilling teachers. Though several significant differences were noted among availability and training opportunities, much of the data were similar between rural and urban schools. The key similarity found was the passion of educators, administrators, and specialists for the engagement and the individual learning that the implementation technology in the classroom creates.

INTRODUCTION

In an age where social reforms and political battles are fought and won over social media, the number of articles reflecting the nation's public school system in a negative light is staggering, such as, "The Failure of American Schools" by Joel Klein from The Atlantic (2011), "Public Schools Are Failing, and That's a Good Sign for Good Teachers" from Forbes (Sinquefield, 2013), "How Bad Are the Public Schools?" from PBS (Galston), and "Top 5 Reasons Why Public Schools are Failing Our Children" from education-portal.com (2007). People post and share these articles across various forums and outlets with catchy hashtags like #EducationalReform, #FixOurSchools, and #FixOurPublicSchools proclaiming to their friends and followers the need for an educational reform. Standardized tests, government policies, school administrations, and teachers are constantly criticized and demonized for every perceived flaw in the system. Parents and concerned citizens are calling for reform, touting the catchphrase of getting "back to basics" to whoever will listen.

This same catchphrase was recently encountered during a heated "debate" among myself, two current teachers, and a businesswoman. This token phrase was voiced by the business woman and was referring to the use of spellcheck in her son's class. "Reading, writing, and 'rithmetic need to be what our schools are focusing on. Let's get our system back to the basics. You teachers shouldn't be wasting so much class time with *technology*."

When did technology become a dirty word? The fact of the matter is that technology has actually become a "basic." Technology has become an integral and ever-growing part of the education system today, particularly in rural schools. As such, it is important to understand the ramifications as well as the extensive benefits it can offer.

As William J. Mathis, Ph.D. (2003) stated, "rural concerns have special and unique dimensions" (p. 121). In order to fully understand the importance of technology in the rural setting and to appreciate the unique circumstances being a small, rural district poses to a school, it is important to define what constitutes a school as being rural. The United States Census

Bureau (as cited in Khattri, Riley, & Kane, 1997) states that "if an area has a population of less than 2,500 people, it is defined as rural" (p. 80). This definition is further narrowed in a study done by Lippman, Burns, and McArthur (as cited in Khattri et al., 1997), who classify rural schools as being "located in a rural or farming community, a small city or town…that is not a suburb of a larger city" (p. 81). Studies and an ever-growing body of literature show that attending small and community schools has a positive outcome on learning achievement, yet rural schools remain underrepresented (Mathis, 2003, p. 121). Consolidation and low scores on mandatory standardized testing can give small districts a bad name, though a progressive attitude towards technology can help to remedy that for rural schools.

In order to understand how technology can help small school districts compensate for a myriad of disadvantages, one must look at what is being used in schools, both urban and rural, and how it is being implemented in the classroom. In this paper, I analyze previous findings regarding the unique problems rural schools face, the use of technology in both rural and urban schools, the way technology impacts classroom learning, and the importance of teacher preparation. I describe the methodology used in interviewing principals and technology specialists from 11 schools in central and eastern Nebraska, both rural and urban, and analyze the data and results received. Finally, I will discuss what was found through the study and consider how rural schools should proceed in order to continue to pursue equality through the progressive use of technology in the classrooms.

LITERATURE REVIEW

Progressive though some small districts may be when it comes to technology, it is incredibly difficult to know how much and exactly what types of technologies rural schools have available to them. The fact is, very small rural schools are often forgotten about even though they house a large portion of the nation's students. According to Mathis (2003), one sixth of the children in the United States live in a town with less than 2,500 citizens. However, because rural constituents only hold "political majorities" in five states, they receive little political consideration when it comes to whether their schools are being treated equally or adequately financially (p. 119). Mathis (2003) points out that while 80% of the United States' landmass is considered rural, higher-paying jobs draw more people to the cities, leaving rural communities struggling, and "[t]he result is that 244 of the 250 poorest counties in America are rural" (p. 119). Lawmakers and media focus on what needs to be done for the 16% of urban students who are poverty-stricken in the inner cities, yet turn a blind eye to the 20% of rural students who live in poverty (Mathis, 2003, p. 119). Consequently, according to Mathis (2003), rural schools spend, on average, approximately "$2,000 less per pupil than do schools in metropolitan areas" even though studies show that it costs more to educate students in a rural setting (p. 119).

Throughout the country, technology in the classroom has become commonplace, using everything from personal devices to satellites to televisions. Technology in the classroom is easily one of the biggest strides forward in education, and the ease of which information can be exchanged is especially beneficial to rural schools. As Frank P. Belcastro stated in his article *Electronic Technology and Its Use With Rural Gifted Students* (2002), "For rural schools,

electronic technology offers particular benefits from which the smallest and most isolated of them can potentially gain the most" (p. 14).
Using technology in the classroom can quite obviously benefit rural schools in a way previously impossible.

Rural schools are taking advantage of the vast opportunities technology offers them in the face of budget cuts which leave small districts questioning how they can sustain the technology they have in place in the face of reform and downsizing. Because of this, school administrators of rural districts are heavily and actively pursuing ways to aid and further opportunities created by technology, and according to a study done by the National Center for Education, (as cited in Hawkes, Halverson, & Brockmueller, 2002) they are doing so at a greater rate than larger schools. According to Mark Hawkes, Pamela Halverson, and Bradley Brockmueller (2002), rural schools are aggressively seeking and implementing wireless and video-based technology as a form of connectivity. They are also implementing technology on a "person-to-person basis" more frequently, with more intensity and more reliability "than their urban and suburban counterparts, according to recent findings by the NCES" (as cited in Hawkes, et al. 2002, p. 163). One reason that rural districts have taken such a leadership role when it comes to technology is because "rural schools have viewed technology as an equalizer to the abundance of experiences, resources, and options urban and suburban students receive over their rural counterparts" (as cited in Hawkes, et al. 2002, p. 162). Technology gives students access to resources from all over the world, leveling the playing field among students from all areas by creating cultural experiences in all disciplines.

One reason rural schools are so actively seeking technological opportunities for their students is because they are relatively cost efficient for what they can provide, as the hardware is a "one-time cost" (Hawkes et al., 2002, p. 162). There is also an abundance of state and federal programs, as well as outside benefactors, to help fund the cost of the equipment and teacher training. The main monetary concern rural districts are facing with financing technological tools is the cost of maintaining them, "especially in an era of severe population decline in rural communities that finds schools taking radical cost cutting measures to balance their budgets" (Hawkes et al., 2002, p. 162). Schools must be able to fix what they already have as well as be able to manage the network and install new programs and hardware.

In addition, districts face the challenging task of picking new forms of technology that are not only cost effective but also compatible with what they already have. It is not feasible for small school districts to pick entirely new programs every few years; rather, they must build upon what they already have while still implementing new tools that make "the best use of technology in schools…that meet[s] the learning goals of the curriculum" (Hawkes et al., 2002, p. 163). Keeping up with the ever-changing world of technology, much of which is marketed specifically for schools, can be exceptionally challenging when trying to keep within such restrictive parameters.

One form of technology which students of rural school districts are benefitting from is the use of telecommunicated distance learning classes, or IP (internet protocol) classes. According to

Parviz Partow-Navid and Ludwig Slusky (as cited in Belcastro, 2002), "Research comparing distance education to traditional classroom instruction shows that teaching at a distance can be as effective as traditional instruction when the method and technologies used are appropriate to the instructional tasks" (p. 14). Distance learning can come in a variety of different forms, one of the most popular of which is online classes. IP distance learning classes, however, are different than online classes and offer a much more personal quality. In IP classes, students can participate in discussions and activities as well as ask questions at any time it is called for.

According to Bruce Barker and Robert Hall (1994), "the use of telecommunicated distance learning has become increasingly popular in rural schools for providing curriculum equity to students" (p. 126). These types of classes have made schools more efficient by giving schools "the ability to provide advanced and low-enrollment courses through distance learning" (Mathis, 2003, p. 127). While large school districts frequently offer AP (Advanced Placement) classes, from which students can often receive college credits, many rural schools do not. Distance learning classes can even this playing field by offering duel-credit classes through colleges, both university and community, either local or remote. Through these, students can take courses such as college-level algebra or introductory writing classes. IP classes can also offer high school-level classes that the school may not otherwise be able to offer, such as foreign languages. These distance learning programs and telecommunicated classes are a popular way to match the classes offered to students at rural schools to those more readily available to their urban counterparts.

Another technological advancement in classrooms across America that has done wonders to level the field is the implementation of one-to-one devices. Initiatives for one-to-one computing or one-to-one devices put a portable device in the hands of every student in a particular school in particular grade levels. According to William J. Penuel (2006), "The decreasing costs, combined with the lighter weight of laptops and increasing availability of wireless connectivity, are all making such initiatives more feasible to implement on a broad scale" (p. 329). Large districts have been providing one-to-one laptops as well as digital content to entire high schools and even middle schools, and hundreds of schools have implemented 24/7 one-to-one access to both computers and Internet for more than a decade (Penuel, 2006, p. 329).

According to Penuel, there are three features that are found in most one-to-one initiatives that can be seen as "defining characteristics," and although the laptops used for one-to-one computing are what he is referring to, these characteristics can also apply to the one-to-one tablets and devices that are rapidly gaining popularity in classrooms across the country. These characteristics are first, providing the actual laptops to students and making sure they are equipped with appropriate, up-to-date software and programs; second, providing wireless internet to the students at school; and third, an effort and determination to utilize the laptops for schoolwork through tests, assignments, and projects, both in and out of class (Penuel, 2006, p. 331). Though not all schools permit students to take home their school-issued devices, particularly at the middle school or grade school levels, being able to take the device home to continue work on an assignment has been shown to promote and assist "students keeping their

work organized and makes the computer a more personal device" (Vahey & Crawford, 2002, as cited in Penuel, 2006, p. 332).

It can also be a challenge to keep teachers up-to-date and trained with the technology that is available to them. Effectively incorporating technology into a classroom is much more than simply using it and it is important that teachers are taught how to do so. As Hawkes et al. (2002) understood, "Fully integrating technology into a school system entails assistance to those applying the technology toward learning outcomes. In the absence of this kind of coordination and assistance, major impediments to the effective use of technology in schools invariably emerge" (Hawkes et al., 2002, p. 163). Technology can become a road-block to learning if teachers are not given proper training on how to correctly implement and manage the resources they are given. This applies especially to the implementation and usage of one-to-one computing and devices in schools. According to Becker and Anderson's findings (as cited in Penuel, 2006, p. 333), one of the most important factors in successfully integrating technology in schools and classroom settings is teacher attitudes. This includes the teachers' beliefs in the usefulness of the technology, their personal style of teaching, and the teachers' confidence in their own ability to use the provided technologies.

One thing that can improve teacher attitudes and beliefs in all three areas is to increase and improve teacher training. According to Penuel, teachers who spent as little as nine hours in educational technology professional development activities were more likely than teachers who did not to feel "well- or very well-prepared to use computers and Internet" for classroom purposes (2006, p. 333). It is not just showing teachers how to use the technology itself, however, though according to Anne Davies (as cited in Penuel, 2006, p. 338), that is the focus of the majority of teacher workshops. Teachers need better help learning how to actually integrate technology into their curriculum in new ways in order to get the most out of it. One form of professional development which Penuel found to be particularly important is a much more informal type than professional development workshops. It appears that one of the most effective ways for teachers to learn to better integrate technology into their classrooms is when they are teaching each other. According to Penuel, "a number of researchers reported that they observed teachers helping each other with technology problems or engaging in curriculum planning" (2006, p. 338). This is more preferable for teachers, more cost-effective for schools, and just as, if not more, effective at preparing teachers to use the technology given to them. Better prepared teachers can make implementing one-to-one devices more successful and, ultimately, more effective.

One problem that schools often face when integrating new technology is that because it is constantly evolving, teachers are often in a constant state of adaptation. This means that teachers are using technology as simply another mode of doing what they would already be doing rather than actually integrating it into the curriculum, such as typing a paper rather than writing it or taking notes in a Word document rather than a notebook. Though students are working more independently and becoming proficient in basic technology skills, they have not yet reached the student-based higher-level learning that one-to-one devices make possible. When students do

engage in higher-learning type projects, they are often using multiple mediums of technology to create videos, websites, and presentations (Penuel, 2006, p. 336). Students are only able to do these types of extended projects, however, when teachers are comfortable with the technology present and prepared to incorporate it into their curriculum in new and valuable ways.

Because it can be so problematic when teachers are ill-equipped for the technology they are given, schools are finding that the technical management and maintenance aspects of technology are much more than just another task for teachers to undertake. Adequate technical support is imperative for distance learning classes, internet-based classes, and one-to-one devices to be effective classroom aids. According to Penuel, "readily available technical support also appears to be important for …programs to succeed" (2006, p. 339). This is important so that teachers can feel comfortable trusting the technology and using it for their daily lesson planning. Instead of leaving these "facilitation" responsibilities to the self-taught teacher who shows the most interest in using computers in the classroom or to librarians and media specialists, administrators recently have "realized the effort involved in insuring good technology use and having employed teams of full and part-time staff to provide that technology support" (Hawkes et al., 2002, p. 163). Smaller school districts may share one technology support person, but according to Hawkes et al., (2002), "[m]ultiperson technology support teams are increasingly common in larger school districts" (p. 163). Often, these teams consist of three members. One person will act as a leader, overseeing the projects and the budget and collaborating with the school administrators, there is often a technical person who will do the maintenance and troubleshooting, and there will typically be a "technology curriculum specialist" to help staff use technology meaningfully and beneficially in their classes (Hawkes et al., 2002, p. 163). These multiperson teams have become more and more popular among large school districts, but many small rural districts find sustaining these teams to be too costly for their financial capabilities (Hawkes et al., 2002, p. 163).

Both IP classes and internet-based classes as well as one-to-one devices can be of particular educational value especially to gifted students in rural areas. Because of a variety of factors, ranging from inadequate teacher preparation to declining economic statuses of the schools, gifted students from rural school districts face distinct challenges. As professor of Education and Psychology Frank Belcastro (2002) acknowledges, "Although there are issues for all children in rural schools, the needs of rural gifted students are especially critical" (p. 14). The fact of the matter is, rural schools have not been able to offer the same services to their gifted students as wealthier school districts in urban and suburban areas. Their resources are simply too limited to provide the same opportunities to the especially gifted students. As Belcastro (2002) stated, however, "electronic technology can be used to overcome many of the restrictive factors or barriers to delivering services to rural schools, and it can expand the world of rural gifted students" (p. 14). Technology in the classroom, from personal devices to satellites to television, is easily one of the biggest strides forward in education and the ease of which information can be exchanged is especially beneficial to rural schools. As Belcastro explains (2002), "The intent of electronic technology is not to be an alternative to a high quality teacher and classroom; the

intent is to be an alternative to nothing, and that is what many gifted rural students are getting right now" (p. 14). As previously mentioned, technology serves to level the playing field for rural students, and this applies especially to the highly gifted ones. "As long as one has access to education, age, gender, socioeconomic, geographic, or population-density circumstances will not hinder access to information and this to knowledge" (Belcastro, 2002, p. 14).

METHODOLOGY

Purpose of Study

The purpose of this study is to compare the availability, implementation, and use of technology in both teaching practices and learning activities in several rural and urban schools in Nebraska. This research will attempt to answer the following sub-questions in participating rural and urban schools:

1. What technology is currently available and how is it being used?
2. How is professional development achieved at the participating schools?
3. How do teachers from these schools describe their experience using technology in teaching?

Research Design and Procedures

A qualitative approach was used for data collection and analysis. Once the school principal or superintendent agreed to participate, the person indicated for contact, either the principal or a faculty member familiar with the technology, was contacted to schedule an in-person interview. Prior to the interview, the researcher sent an e-mail note to the interviewee containing general information about the study including the purpose of the research, the importance of the study, and the format of data collection. The signed informed consent form was obtained at the time of the interview. Several participants signed, scanned and returned the informed consent electronically. Additionally, permission was requested to audio record the interviews.

Data Collection

Data were collected via in-person interviews as well as through an email questionnaire. Once approval was obtained by the Instituational Review Board, or IRB, data collection began immediately. The interviews were conducted with staff (principals, teachers, and technology specialists) from several urban and rural schools across Nebraska. The interviewees were indicated by either the school principal or the school superintendent. The interviews lasted about thirty minutes at a place and time chosen by the participants. The researcher audio recorded the interviews and took extensive notes. No interviews were conducted at the schools and the study was conducted during summertime.

Data Analysis

The data were obtained as recorded statements or responses and were transcribed into a Microsoft Word file for analysis, which was conducted according to the general strategies proposed by John Creswell (1998). The researcher reviewed participants' written responses to obtain the sense of overall data. After studying the recorded data, the researcher started the coding process. According to Robert E. Stake (1995) and Creswell (1998), coding can be defined

as the process of making a categorical aggregation of themes. An in vivo coding strategy was used. In vivo coding implies that each code comes from the exact words of the participants. Coding implies the process of grouping the evidence and labeling ideas. After coding was completed, the ideas were transformed into themes and sub-themes. The qualitative data are presented through visual graphs and findings were presented as an integral part of results and discussion as much as possible. After the study data were transcribed and analyzed, results are presented in the form of statements and tables.

Population and Sampling Procedures

The researchers used a non-probability voluntary sample. A voluntary sample is made up of people who self-select into the study. An e-mail invitation was sent to about thirty (N=30) rural and urban schools across the state of Nebraska chosen using a list of partner schools provided by the University of Nebraska at Kearney Teacher Education Program. Additional schools known by the researchers were also chosen to be contacted. Roughly eleven (n=11) schools agreed to participate.

Study Limitations

This research study is limited by the access to specific schools in the state of Nebraska for data collection. While every effort was made to recruit schools from a variety of locations across the state that was representative of the diversity of socio-economic and racial backgrounds, many of the schools were located in the central part of Nebraska. Data collection targets of schools from across the entire state were not met. The limited geographic diversity and small number of participant schools makes it difficult to generalize the findings to other states.

Ethical Considerations and IRB

Asking teachers and staff to discuss resources, professional development, and instructional procedures available at their schools could potentially raise ethical considerations such as protecting schools' identities. Data collection methods and procedures ensure protection of subjects and their schools' identity, anonymity of responses, and voluntarily participation. Data collection was conducted using strategies that ensured the anonymity of subjects and schools. Data presentation format ensured that subjects and their schools could not be identified.

DATA ANALYSIS

Table 1: Identification of Schools as Rural or Urban

School	*Rural*	*Urban*
A	×	
B	×	
C	×	
D	×	
E	×	
F	×	
G	×	
H		×
I		×

J	×
K	×

Table 2: Technologies Available as Reported by School Representative

Technologies	*Number of Rural Schools*	*Number of Urban Schools*
Laptops	7	2
MacBooks	2	2
Google Chromebooks	1	1
Mac/PC Desktop Computers	5	3
iPads/iPad Minis	6	3
PC Tablets	0	1
SmartBoard	5	1
AppleTV	3	0
Schoology	3	0
Mimeos	1	1
WiFi Printers	1	0
Elmo Projector/Document Cameras	2	2
Jot Pro	1	0
Digital Microscopes	1	0
e-Textbooks	1	1
Digital Graphing Calculators	1	0
Robotics	1	0
iPods	0	1
Clickers	0	2
Wireless Sound System	0	1
LCD Projector	0	3
Video Cameras	0	1

Table 3: Teachers' Reaction to Technology as Reported By School Representative

Reaction	*Number of Rural Schools*	*Number of Urban Schools*
1. Nervous	0	0
2. Somewhat Accepting	1	0
3. Accepting	2	2
4. Excited	3	2
5. Very Excited	1	0

Table 4: Level of Technology Integration as Reported By School Representative

Reaction	*Number of Rural Schools*	*Number of Urban Schools*
1. Very Behind	0	0
2. Behind	0	0
3. Getting There	2	1
4. In A Good Place	3	2
5. Cutting Edge	2	1

Table 5A: Methods of Teacher Training as Reported By School Representative

Method	*Number of Rural Schools*	*Number of Urban Schools*
ESU	7	0
In-Service Professional Development	3	3
Technology Specialist	3	1
Summer Workshops	2	1
Teaching Themselves	3	0
Teacher-to-Teacher Sharing	3	0
Regional/State Conventions/Conferences	3	0
NETA	2	0
Google Summit	1	0
Learning Coach	0	1
District Provided Training	0	1
Online Video Training Courses	0	1

Table 5B: Frequency of Teacher Training as Reported By School Representative

Frequency	*Number of Rural Schools*	*Number of Urban Schools*
Continually	0	1
Once A Week	1	0
Once A Month	1	1
Several Times A Semester	1	0
Whenever A New Device is Introduced	0	1
Not Often Enough	1	0
Didn't Say	3	1

Table 6: Challenges of Teacher Training as Reported By School Representative

Challenge	*Number of Rural Schools*	*Number of Urban Schools*
Finding Time/Scheduling	3	3
Relevancy to Curricular Area	2	1
Relevancy to All Grade Levels	2	1
Convincing Teachers of Benefits	2	1
Teacher Fear	1	1
Meeting All Skill Levels	0	2
Staying Current with Items	1	0
Staying Current with Practices	1	0
Insufficient Funds	1	0
Finding New and Beneficial Topics	1	0
Didn't Apply	1	0

Table 7: Challenges of Technology Integration as Reported By School Representative

Challenge	*Number of Rural Schools*	*Number of Urban Schools*
Staff Willingness	2	1
Student Behavior/Misuse	2	1
Monitoring/Restricting Device Usage	2	1
Parental Acceptance	2	1
Insufficient Funds	1	2
Adequate Infrastructure	1	1
Basic Care of Devices	2	0
Staff Preparedness	2	0
Allowing Students Equal Time/Access	0	1
No Challenges	1	0

Table 8: Technology "Wish List" of Schools over Next Two Years as Reported By School Representative

Desired Technologies	*Number of Rural Schools*	*Number of Urban Schools*
No "Wish List" Items	3	1
1:1 iPads/Devices	2	2
Additional iPads	3	0
e-Textbooks	1	1
More Mobile Labs	1	1

Filters for Devices	1	0
Flat Screen TVs	1	0
3D Opportunities	1	0
New Management System	1	0

Table 9: Emerging Themes from Interviews Data

Teacher Development	*Student Engagement*	*21st Century Learning Skills*	*Funding*
• *Willingness and enthusiasm depends on the age of the teacher* • *Not enough time* • *Scheduling for everyone is impossible* • *Patience and willingness to try and fail are important* • *Not enough funding available* • *Having devices available but not knowing how to integrate into curriculum effectively*	• *Individualized learning opportunities* • *Independent learning* • *Effective use of technology for learning* • *Differentiated instruction* • *Formative assessment* • *Increased student retention* • *Active learning*	• *Technology changes the way teachers assess creativity* • *Creativity* • *Independent assignments* • *Digital Citizenship* • *Students connecting and interacting globally* • *Collaboration opportunities* • *Communication skills* • *Critical thinking* • *Project-based learning*	• *Cannot afford updates in content management systems* • *Not enough funds for proper teacher development and training* • *Funds are too limited to be 1:1 school and/or 1:1 district*

RESULTS

During the interview process, the position held by the representative from each school interviewed varied from technology specialist to principal to teachers who are very tech-savvy at their school. These interviewees came from both very small, rural school districts to one of the largest districts in Nebraska, with anywhere from two to twenty-five years of experience at their current positions. Though the subjects varied greatly, their answers about technology often reflected common themes and sentiments with regards to providing the students of their school with the skills associated with and necessary for twenty-first century learning.

The days of wanting a “quiet and busy” classroom are long gone and the shift towards more involved learning is in part due to technology. Students of today are not only required to

focus on academics in school in order to become successful later in life, they must also become proficient at a new set of skills commonly referred to as "21st-Century Skills" (Boss, 2012, p. 2). According to the Partnership for 21st Century Skills (As cited in Boss, 2012, p. 2), there are four main competencies, or the "4C's" necessary for today's students to learn (2012, p.2). These are collaboration, creativity, communication, and critical thinking. According to Boss (2012), students today must be able to "work effectively with diverse groups and exercise flexibility" in order to work together and accomplish an end goal and be able to "generate and improve on original ideas" when working with others while incorporating creativity (p. 2). Students must also be able to "communicate effectively across multiple media and for various purposes" as well as know how to "analyze, evaluate, and understand complex systems" to strategically solve problems (Boss, 2012, p. 2).

When asked what excited them about technology in the school setting, many of the school representatives interviewed reflected the importance of the 4C's in their answers, a representative from School K even citing them specifically. As a representative from School J said, "As educators, we must meet the students where they are in today's world, and that is a technological world, or else we won't be able to make a meaningful connection and we've lost them." Principals, technology specialists, and teachers alike all echoed similar sentiments, from collaboration to engagement, which several school representatives reported as being "very exciting" to see. The heightened engagement in the work they are doing leads to a more personal connection with their work and the material. The principal of School G said that "Classroom discussions can be more meaningful when the students have ownership of the material being discussed."

Another common theme among representatives from specifically the rural schools was that technology allows students to "interact globally." A teacher from School B described how this is true at every age, detailing how elementary students take virtual fieldtrips in their social studies classes to places like New York and Texas. For rural students, technology "gives kids the opportunity to travel out into the world beyond them." The representative from School B also reported that one of the most exciting aspects of technology is the ability it gives kids to learn beyond what the book says.

Technology opens many extra opportunities for exceptional students to get more out of the class, according to the representative from School B. Technology can also be incredibly beneficial for students with disabilities. A technology specialist from School K found the most exciting thing about technology to be its ability to "level the playing field" for students with disabilities, particularly the use of iPads. Personal devices can be used to differentiate and individualize more than just according to a specific student's *wants*, it can be customized to his or her *needs*. Teachers can easily adapt a lesson with an iPad to meet an individual student's abilities.

Several representatives from both rural and urban schools reported that technology allows students to get a more individualized learning experience by allowing for endless possibilities and differentiated classes. It also lets students be more creative in their projects; one teacher

From School A said that because technology allowed her to assess the creativity of her students and play to it, technology, specifically 1:1 iPads, had completely changed the way she teaches. She reported frequently assigning open-ended projects in which the students can pick any number of outlets to demonstrate their knowledge, from Keynote presentations to podcasts to iMovies. The teacher from School A said that this approach makes assignments more real to the students and allows students to create something they care about and can take pride in.

Though not all of the schools interviewed reported having iPads available at their schools, many reported having them at a 1:1 ratio. According to the data, nine of the eleven schools reported having iPads but only five had 1:1 iPads at the high school level, five schools had 1:1 iPads at the junior high level, and two had iPads at a 1:1 ratio for upper elementary age students. One school reported being at a 1:1 ratio with Google Chromebooks at the high school level and another school reported having 1:1 laptops at both high school and junior high levels. Four schools reported not having 1:1 devices of any sort, two of which are urban and only one of which is rural. All of the schools reporting 1:1 iPads and laptops are rural except for one, while the school reporting 1:1 Chromebooks is urban. While many of the urban schools reported having a greater variety of technology, the large number of students, having several thousand students as opposed to several hundred students, makes having the saturation that 1:1 devices allow much more difficult.

One possible discrepancy in the data, particularly in relation to the data in Table 1, is the unintentional misrepresentation of available technology by some of the school representatives. When asked what technology tools were currently available at their schools, some representatives went into incredible detail about what they had available, mentioning tools like digital microscopes. Others, however, only mentioned their schools' 1:1 initiatives, forgetting to mention some of the "basics" such as desktop computers, of which only eight of the eleven reported having, or Smartboards, of which only six of the eleven reported having.

When asked how technology is currently being used in the classrooms at their schools, the representatives answered in several different veins. Several representatives discussed the incredible usefulness of certain programs and websites in managing the day-to-days of classroom life. The representative from School H detailed how helpful it has been to do grading entirely online, and how the use of GoogleDocs has increased the incorporation of the 4Cs into the curriculum, particularly collaboration among students and creativity in making presentations. Another representative from School A discussed using GoogleDocs for "literature circles" in which the students all post about the novels they are reading in class.

A representative from School B reported that using the content management system Schoology has made a world of difference in their school. One aspect that has been improved by Schoology has been that because the teachers can post everything they are doing on it during the day, it has completely taken care of the "I was gone, I didn't know" factor popular among students. In this aspect, according to the representative from School B, it has really helped to prepare students for the independence expected of them in college.

A representative from School I reported using technology primarily for testing at the younger ages and for writing papers at the middle and high school levels while representatives from Schools A, B, D, F, and G reported using technology in nearly all aspects of the classroom. Many representatives mentioned the countless apps available and utilized for everything from writing to science to math available for iPads and the various apps available for Smartboards, which teachers can also use their iPads on remotely. Teachers and students alike can also use AppleTVs to project whatever is on their Apple device onto the television in the room, which representatives from Schools B and D reported as being very useful and easy to integrate into the classroom.

Other representatives reported being innovative with the new devices that are available to them. A representative from School B reported using popular social media outlets both in and out of class for school, such as Twitter, Facebook, and YouTube. Another representative from School A, who happens to be a Language Arts teacher, discussed using the 1:1 iPads for a variety of projects. Specifically, the representative explained that the students make a lot of podcasts and videos in her class, using programs like GarageBand, TouchCast, and Tellagami. A representative from School D described the helpfulness of iPads in a junior high health class, during which students were required to submit questions for topics such as sex education. Using the iPads, students were able to submit questions without embarrassment and the teachers were able to filter out inappropriate questions.

Several other representatives were not nearly as happy with the way technology is currently being used in their schools. A representative from School E reported that technology use is not going very well at their school and that it is not yet "where it should be." According to a representative from School K, "Many staff are merely substituting paper/pencil activities on the iPad/computer erroneously believing they are using technology well." Teachers, though many are excited, still need to learn about the pedagogy of teaching with technology.

Though many teachers still have much to learn about the pedagogy of teaching with technology, for the most part they are feeling positive towards technology. When asked how they would rate the teachers' overall reaction to technology in the classroom on a scale of 1-5, no representatives answered at a 1, which is *Nervous*, and only one school representative answered at a 2 as *Somewhat Accepting*. Four school representatives reported being a 3 as *Accepting* and five school representatives answered that their schools were at a 4 feeling *Excited*. One school representative answered at a 5 being *Very Excited*.

The representatives answered with a number when pressed, but most felt that it all depended on the teacher. The overwhelming sentiment from the representatives was that the majority of teachers are accepting and excited about technology, some even very excited, while a small portion of teachers, often older, are very reluctant to incorporate technology into the classroom. A representative from School E reported that while some of the younger staff members are doing an excellent job of stepping forward, many of the older staff are struggling with allowing students the additional freedoms that come with technology, especially with 1:1 devices. Representatives from Schools A and D said that the most common problem with the

older teachers showing reluctance is fear in their own skills, because the students are already so far advanced in comparison. A representative from School F even said that one teacher quit because of all of the changes to the classroom setting with the implementation of 1:1 devices. Not all representatives reported such issues however; the representative from School B reported that many of the teachers have been energized by the new technology and have done a good job of jumping in and constantly seeking new ways to use it in the classroom.

When asked where they would place their school in terms of technology integration on a scale of 1-5, no representatives answered at a 1 being *Very Behind* or at a 2 being *Behind*. Three representatives answered that their school was at a 3, *Getting There*, and 5 representatives felt their school was at a 4, *In A Good Place*. Three school representatives answered that their school was at a 5, which is *Cutting Edge.* One aspect uniquely mentioned by several of the representatives of the rural schools was that they felt they were doing well comparatively. Many of the rural school representatives answered the question with a qualifier, saying they felt good compared to other schools their size.

When asked how teacher training was conducted at their schools and how often, representatives from the eleven schools answered with a wide variety of responses. The primary response from most rural schools was that they did most of their training at ESU (Educational Service Unit). This response was exclusive to rural schools, as none of the urban schools answered with the same response. Other forms of training mentioned only by representatives from rural schools are attending both regional and state conventions and conferences, such as NETA (Nebraska Educational Technology Association), which was mentioned by two specifically, and sharing teacher-to-teacher. Of those that mentioned teacher-to-teacher sharing, many found this to be very helpful and the representative from School B said this was one of their primary forms of training and one of the most effective. The representative from School F reported that at their weekly Friday morning meetings, teachers present apps that they have found to the other teachers. Both rural and urban school representatives reported using in-service professional development and summer workshops as well as having a Technology Specialist to help train staff members. Urban schools exclusively reported using a Learning Coach and using district provided training as well as online video training courses. Based on their responses, the urban schools tend to have a more formal procedure for conducting their teacher training while the rural counterparts have more informal procedures.

In response to how frequently the schools conduct teacher training with technology, one school representative said continually, one representative said once a week, two representatives reported once a month, and one representative said several times a semester. One school representative said whenever a new device is introduced, one representative said not often enough, and three representatives did not say how often teacher training is conducted at their schools.

The lack of steady, continual teacher training may be in part due to the lack of time and the difficulty of scheduling. When asked what challenges the school faced when it came to teacher training, six of the eleven school representatives answered that time was the biggest

obstacle. The representative from School H stated that because they had approximately one hundred teachers, including coaches, who all have different schedules, it is nearly impossible to find a time to do training that works for everyone. Timing and scheduling are not uniquely urban school problems, however, but of urban and rural alike. A representative from School E said that finding quality time for all of the teachers to complete training is a major struggle. With many of the teachers in a small school being involved in coaching a sport or another extracurricular activity, scheduling time after school can be very hard. The Representative from School B echoed the same statement, adding that because School B does not schedule technology time into their teacher in-service time, tech training is even harder to accomplish.

Making the technology training relevant to all grade levels and all curricular areas was also a common obstacle faced by schools. According to the representative from School G, "There are times when an initiative might be good for the high school or the elementary school and not the other. It can be challenging to convince all teachers that an initiative is beneficial for all ages."

Convincing the teachers of the benefits of technology training makes not only teacher training difficult, it can also make the integration of technology a struggle. When asked what the overall challenges of technology integration at their schools were, three school representatives cited teacher willingness as a major problem. The representative from School E reported that several teachers were "reticent to change" and others were unwilling to try new things for fear of failure.

Students' misuse of the devices as well as adequate monitoring and restrictions of devices were cited as other major problems, with three schools citing each issue. A representative from School B said that "getting kids to realize devices are used for educational purposes, not just entertainment" has been a major struggle, and that the school has been trying to find the appropriate balance between giving adequate freedom and having enough limitations and restrictions. The representative from School A said that monitoring the students has been a big problem there too, one the administration is not helping with. At school A, the administration is leaving all monitoring of what the students do on their devices up to the teachers. If a student is caught doing something inappropriate or prohibited, the teacher is held accountable, which is in turn making teachers less willing to use technology in their classrooms.

Having insufficient funds was also reported as an obstacle to technology integration by three schools, one rural and two urban schools. A representative from school C discussed the difficulty of creating equal opportunities for students with a lack of funds. A representative from School H also cited budget as a major hang-up in the process of technology integration, expressing a desire to become a 1:1 district but not being able to do so because of a lack of funding.

When asked what was on the school's "Wish List" for the next two years, four school representatives answered that they had no "Wish List" items. Four school representatives, two urban and two rural, reported a wish to be at a 1:1 ratio with iPads or another device. Three

school representatives are wishing for more iPads in their schools, of which both School D and School B want them for elementary students.

Representatives from all eleven schools were also asked if in a perfect world, were funding not an issue, how would the school look as far as technology availability and use in the classroom. Representatives answered in a variety of ways but with a very similar theme: representatives from all schools want their students to have equality when it comes to technology. They want every student to have a device and every student to have internet access "along with a sound understanding of how to use them appropriately to better themselves and those around them," as the representative from School C stated. The representative from School E also expressed a desire for students to use technology more appropriately, as well as a desire for parents, students, and staff to develop a better connection and communication level. The representative from School F stated that ideally, the learning taking place in the classrooms with the devices would not just stay in the classrooms but would expand to outside of the school's walls when the students take the devices home.

DISCUSSION

Though technology in the classroom is not a new phenomenon, the role it has taken in recent years is revolutionary. It is technology not as a tool to replace pen and paper, but as a doorway to an entirely new and increasingly effective way for students to learn. Technology has the power to "level the playing field," a phrase thrown around so often in conjunction with technology it is almost a cliché. Not only does technology close the distance gap for students but it provides rich opportunities otherwise unavailable. Technology allows special education students to participate at a level they may not have been able to engage in previously. It allows high-achieving students to learn and explore beyond the means of their school. It allows teachers to differentiate lessons according to the needs of their students in ways previously only dreamed of and it allows students to participate in their learning on a much deeper, more meaningful level of engagement.

Technology is not just the future of education, it is the now, and schools need to be able to respond accordingly. If schools are to prepare students for their futures as contributing, active members of an increasingly advanced and ever-evolving society, students need to be adept at their technology skills. They need to know how to use a device in order to produce creative results, in order to be able to collaborate with their peers, to think critically and use technology to effectively communicate with the world around them. These are the skills students need in order to be successful. The study has shown that technology is present everywhere, regardless of location. Rural and urban schools alike in Nebraska have technology present in the classroom, but it is not consistent.

The first difference the study has shown among technology in rural versus urban schools is the saturation of technology. Six out of the seven rural schools interviewed reported being at a ratio of 1:1 devices per students, while only two of the four urban schools reported the same ratio. While all of the urban schools most likely possess just as many devices, they are not to a

1:1 ratio due to the much larger number of students enrolled. In this respect, students of rural schools are at an advantage when it comes to available technology.

Where rural schools seem to be at a distinct disadvantage in regards to technology is with the maintenance and support of the technology. The urban schools discussed having not just one technology specialist but an entire team devoted to the technical side of maintaining a smoothly-running school. Many of the rural schools, however, reported having either only one technology specialist for the district, who was in several cases a teacher as well, or simply having a teacher or the principal in charge of the technical aspects. This leads to not only more pressure on whatever individual is in charge of all of the technology-related responsibilities but also to a school that is not run as smoothly and technology that is not able to be as effectively used.

Both general differences between rural schools and urban schools could be fixed by funding. As the representative from School C so accurately described it, "If all schools had adequate resources, on an equal scale, I am confident all schools would be able to offer the kind of education required for post-secondary success…However, as is often the case in Nebraska, some schools have more funding available to them while others have very little." Based on what the study showed, some schools simply are not given enough resources, both rural and urban. While this may not be an easy remedy, it is one that is much needed in order to achieve successful and equal learning environments for the students of Nebraska.

Aside from funding, teacher training seems to be what makes the biggest difference among school representatives' impressions of the technology in their respective schools. The representatives who described the most teacher training opportunities described environments where technology seemed to be thriving. All teachers need to be taught how to successfully integrate technology into their curriculum before a new device is introduced to the students in order to be fully successful with it, and they need to be better trained on how to use technology effectively rather than as a replacement for tasks already performed. In order for technology to make the desired impact that it is so capable of having on education, teachers need to be properly trained in order to get the absolute most out of what they are given.

It is imperative that the students of today are given every opportunity to acquire and build upon the skills they will need in order to excel in the technologically-driven world in which we live. It is the duty of educators to strive towards preparing students for the ever-changing future. It is the time for educators and administrators alike to be forward-thinkers, to pursue the future of technology in education and to not simply follow the trends. It may well be time to get "back to basics" as some are saying, but the basics of today have evolved. Society is changing, and education must change with it.

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