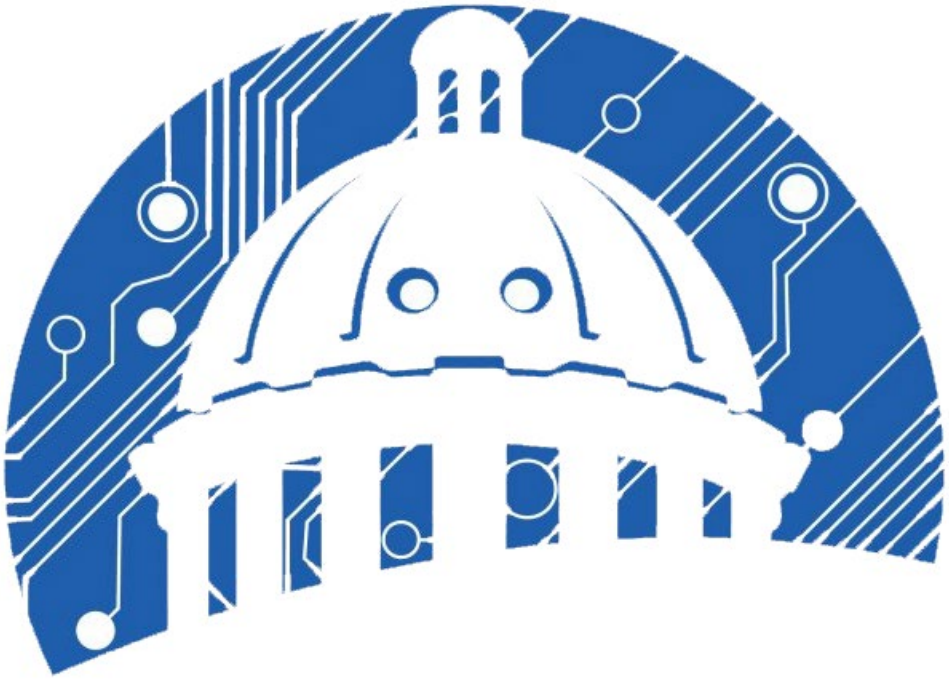


Making the state of Oklahoma a leader in Telepresence and Virtual Presence

OKLAHOMANS VIRTUALLY EVERYWHERE ACT

January 2020

Contents

Executive Summary

The Oklahomans Virtually Everywhere Act of 2019 (House Bill 1921) created a statewide initiative to make Oklahoma a leader in telepresence and virtual presence by allowing Oklahomans to provide their expertise, knowledge and instruction throughout the world without leaving their communities.

Sponsored by Representative Derrel Fincher and Senator Julie Daniels, House Bill 1921 facilitated the creation of the Virtually Everywhere Act. The Oklahoma State Regents for Higher Education led the proposal in conjunction with OneNet, the Oklahoma Department of Career and Technology Education, the State Department of Education, the Oklahoma Department of Libraries, the Oklahoma Department of Commerce and the Office of Management and Enterprise Services. These agencies worked diligently to identify key partnerships, both public and private within the state of Oklahoma, which will create and foster a robust technological structure that not only promotes telepresence, but also expands collaboration.

The goal of telepresence and virtual presence is to make the interactions between individuals and groups virtually present in meetings, conferences, office work and social contexts indistinguishable from those who are physically present. Next-generation virtual presence differs from telepresence in that it goes beyond interaction to giving the individual the impression of being in the actual, remote environment. When implemented successfully, virtual presence is both immersive and ubiquitous, and provides a true perception that a person is physically present. Oklahoma and its citizens are now positioned to become innovative leaders and take the unique opportunity to direct the development of a comprehensive network exclusively designed for telepresence and virtual presence.

A statewide telepresence network, along with a host of comprehensive stakeholders, offers expanded opportunities for impactful education and public outreach. Teaching frequently takes place in locations of aesthetic or cultural interest; such sites are often highly engaging and represent ideal opportunities for educators, public representatives and industry leaders to capitalize on public interest. However, the absence of an infrastructure network and competing priorities often curtail these activities or compromise objectives.

Access to reliable telepresence technologies, infrastructure and services should not be a privilege in the 21st century and should not depend on where you live in the state of Oklahoma. Defining organizations, resources and/or access will assist specific efforts in expanding critical service to the state and those who need it most.

This is why a telepresence statewide network and subsequent technologies pertaining to telepresence and virtual presence are so vital. In the era of hypersensitive concerns of pandemic threats, the development of a statewide network to allow key staff to work from home through telepresence is vital to delivering state services to citizens. Rapid two-way information transfer is poised to dramatically change the quality, rate and reach of knowledge and communication; limitations of time, space and data processing can be minimized, and a broader group of educators, scientists, state policymakers, industry innovators and the global public can be involved. But these initiatives can only be realized through strong partnerships.

Representatives from the participating agencies created this report to provide legislative and community leaders information on the status of telepresence and the need for a dedicated network in Oklahoma, in addition to the saliency of emerging technologies that will make Oklahoma a leader in telepresence and virtual presence. The report also outlines a pilot program for expanding an adult education program virtually everywhere.

The participating agencies' plan is to build upon this report to create initiatives that expand telepresence and virtual presence in education, business, government and rural communities.

Next steps for the Virtually Everywhere working agencies include:

- Obtain funding and launch the pilot program initiative.
- Create telepresence and virtual presence collaboration opportunities among agencies.
- Identify gaps in services that can be filled by partner agencies.
- Determine how the state can support new telepresence and virtual presence initiatives.
- Develop a plan for technology selection and implementation.
- Design additional pilot projects that can be replicated across agencies.
- Develop a plan for the deployment of technology hubs throughout rural Oklahoma.

The vision of the Oklahomans Virtually Everywhere Act is to empower Oklahomans to provide their expertise throughout the world without leaving their communities. This report is the first step in advancing that vision to citizens across the state.

A Roadmap for the Virtually Everywhere Vision

Oklahoma is enhancing the success of its citizens through greater access to high-quality instruction, technology and curriculum, as well as career exploration and educational exposure to the world. These disciplines and associated skills are the building blocks of Oklahoma's current and future economy. Unquestionably, technology and the growing expansion of telepresence and virtual presence will play a major role in fostering a statewide strategy which will provide consistent and equitable access to all Oklahomans.

Telepresence and virtual presence refers to a set of technologies that allow a person to feel as if they were present, to give the appearance of being present or to have an effect of place other than their true location. Rather than traveling great distances in order to have a face-to-face meeting, it is now commonplace to use telepresence and virtual systems, such as videoconferencing and virtual reality, instead. This brings enormous time and cost benefits and greatly enhances communications, allowing for perceptions of superior connectivity.

A state with a robust connectivity and communicative capacity means its citizens are at an extreme advantage. Economic development, educational, public health and safety services depend upon the ability to interconnect and communicate effectively not only locally but with the world. Creating access to basic services through technology means Oklahomans in the most remote areas of the state can be in contact with public service providers and employers, can access distant learning and health care services, and can communicate with their government and one another more readily.

The Oklahomans Virtually Everywhere Act will create a roadmap to coordinate efforts in the deployment of telepresence and virtual connectivity so that all Oklahomans, whether they live in an urban or rural area, have access to education, health care, economic growth and expansion.

Oklahomans Virtually Everywhere Act of 2019

The Oklahomans Virtually Everywhere Act (House Bill 1921) created a statewide initiative to allow Oklahomans to provide their expertise throughout the world without leaving their communities by Oklahoma becoming the leader in telepresence and virtual presence.

Representative Derrel Fincher and Senator Julie Daniels sponsored the bill creating the act. The Oklahoma State Regents for Higher Education led the initiative in conjunction with OneNet, the State Board of Career and Technology Education, the State Department of Education, the Oklahoma Department of Libraries, the Oklahoma Department of Commerce and the Office of Management and Enterprise Services.

Representatives from these agencies created this report to provide the Legislature and community leaders information on the status of telepresence in Oklahoma and emerging technologies that will make Oklahoma a leader in telepresence and virtual presence. This report focuses on implementing telepresence in education. The Oklahomans Virtually Everywhere Act provides an opportunity to build a teaching and training network that gives Oklahomans the ability to access educational initiatives through virtual and telepresence. Future reports will expand this initiative into business, government and rural communities.

For this report, the State Regents and OneNet led the effort to develop the Virtually Everywhere proposal by participating with both state agencies and private entities to create two working groups—an administrative group and a technology group. Each group met and collaborated on developing parts of the report. The groups also engaged with educational professionals from higher education and other organizations to learn about technology initiatives that support education, training and professional development.

The agencies participated in a survey to collect information on the current state of telepresence and the expectations for further implementation. The technology group completed an inventory of equipment and systems, facilities space, people skills and connectivity that supports current videoconferencing services. The administrative group provided background on telepresence initiatives at each of their agencies. Finally, the group of educational professionals provided emerging technology initiatives that can be built upon to create a Virtually Everywhere educational network.

Virtually Everywhere Participating Organizations

Oklahoma State Regents for Higher Education & OneNet
Chancellor Glen Johnson and Vonley Royal

The State Regents and OneNet led the effort to develop the Virtually Everywhere proposal. A group of administrative, communications and technical staff partnered with the other agencies to assess needs and write this first proposal. Staff who participated include Kylie Smith, Tony Hutchison, LeeAnna McNally, Angela Caddell, April Goode, Brian Burkhart, Sky Pettett, Ricky Steele, Thomas Alford, Kevin Blake, Rebecca Richardson and Arturo Berrios.

Oklahoma Department of Commerce
Jon Chiappe and Bryan Boone

Oklahoma State Department of Education
Carolyn Thompson, Tiffany Neill, Karen Leonard and Gary Hurst

State Board of Career and Technology Education
Justin Lockwood and Kerri Watkins

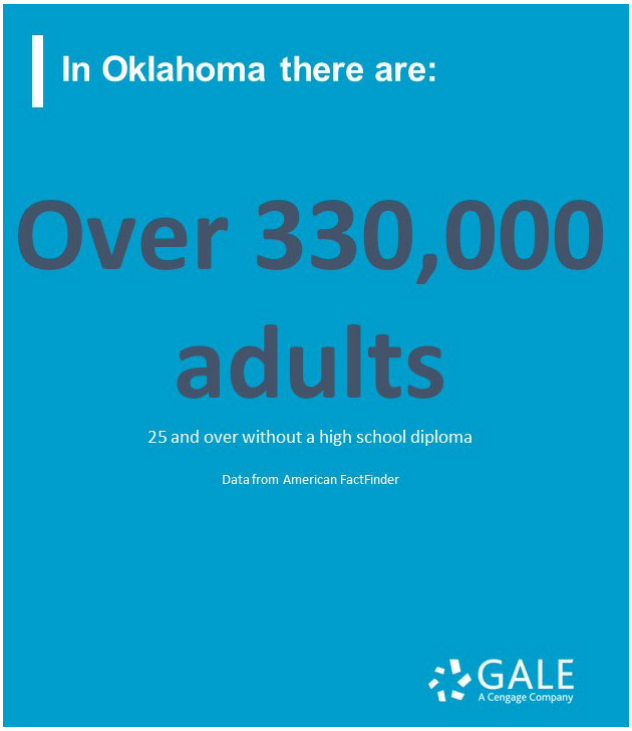
Oklahoma Department of Libraries
Melody Kellogg and Cathy Van Hoy

Office of Management and Enterprise Services
Dustin Crossfield and Amy Spehar

Department of Libraries Virtually Everywhere Program Proposal

One of the requirements of the Virtually Everywhere Act is to provide a proposal and budget component to expand telepresence and virtual presence across the state. The Oklahoma Department of Libraries has led the Virtually Everywhere workgroup in developing a pilot program focusing on adult education. This program will increase the number of Oklahomans with a high school diploma and will make the required course work available virtually everywhere.

According to Oklahoma Works, a program coordinated by the Governor's Council for Workforce and Economic Development, 92% of the critical occupations in Oklahoma for 2018-2020 require a high school diploma or higher.[1] Over 330,000 Oklahoma adults age 25 and over do not have a high school diploma according to the 2010 census.



**Statistics courtesy of Gale*

High School Drop-outs

- **$10K** less earned annually than those with a high school diploma
- **$30K** less earned annually than those with a bachelor's degree
- **4%** higher unemployment rate than national average
- **$292K** cost to the tax payers over the course of their lives
- **80%** of incarcerate population are high school drop-outs

The pilot program proposes a statewide license to utilize Gale Career Online High School (COHS) (https://www.gale.com/cohs). Through the pilot program, five library system sites will help adult learners earn a diploma from an accredited online high school. Students will take courses in language arts, social studies, mathematics and science. Unlike a GED, the curriculum

[1] Oklahoma Works. 2018-2020 Critical Occupations (n.d.). Retrieved at https://oklahomaworks.gov/oklahoma-workforce-data/critical-occupations/.

emphasizes workforce readiness by having students create a resume and cover letter, develop job skills and earn a career certificate in a high-demand/growth field. Career certificates offered include certified protection officer, child care and education, commercial driving, food and hospitality, general career preparation, homeland security, office management and retail customer service.

Gale COHS provides a totally online experience with one–on-one academic coaching from accredited teachers that allow busy adult learners to participate according to their own work/life commitments. This online experience and coaching enable Oklahomans to learn and obtain a high school diploma virtually everywhere. Unlike other high school completion programs, the school's unique methodology addresses three key factors proven to contribute to the dropout rate—lack of real-world application, fear of failure and absence of support.

Thanks to the federal Erate and Oklahoma Corporation Commission's Oklahoma Universal Service Fund program, 97% of Oklahoma's public libraries have broadband internet access. This public high-speed internet access makes libraries the clear choice to offer this service to meet Oklahoma's critical workforce needs.

The budget for the pilot program includes the statewide Gale COHS license and scholarships for 25 students to participate (five students at each of the five pilot sites). The pilot program will provide a DTEN Smartboard and an Oculus virtual reality headset for each library site. The program will also provide a Wi-Fi hot spot, ISP service and a Chromebook for each of the students. The Oklahoma Department of Libraries will hire a part-time staff coordinator to assist the library sites with the program.

Budget for Statewide Pilot Program with Five Libraries

Statewide Gale COHS student recruitment portal – one-year license	$35,000
Scholarships for 25 students at $1,295 (5 per site)	$32,375
25 Wi-Fi hot spots ($75 each) with one-year of ISP service ($20 per month each)	$7,875
25 Chromebooks ($300 each)	$7,500
5 DTEN Smartboards (one per site)	$25,000
5 Oculus virtual reality headsets (one per site)	$1,500
Salary for part-time staff coordinator at 20 hours per week for 52 weeks	$32,406
Total	**$141,656**

Pilot Sites

Five Oklahoma public library systems serving rural populations are proposed as pilot sites. These five systems have the staff resources to promote and implement this project with the assistance of a dedicated temporary skilled coordinator. Based on the percentage of adults 25 and over that do not have a high school diploma in Oklahoma (according to the 2010 census), these rural systems will serve a potential population of 585,621 at 47 public libraries in 24 counties.

1. Western Plains Library System – Clinton
    a. 4 counties serving a population of 48,713 with 7 public libraries
    b. 6%-17% of adults 25 and over do not have a high school diploma

2. Southern Oklahoma Library System – Ardmore
    a. 5 counties serving a population of 97,051 with 8 libraries
    b. 14%-26% of adults 25 and over do not have a high school diploma

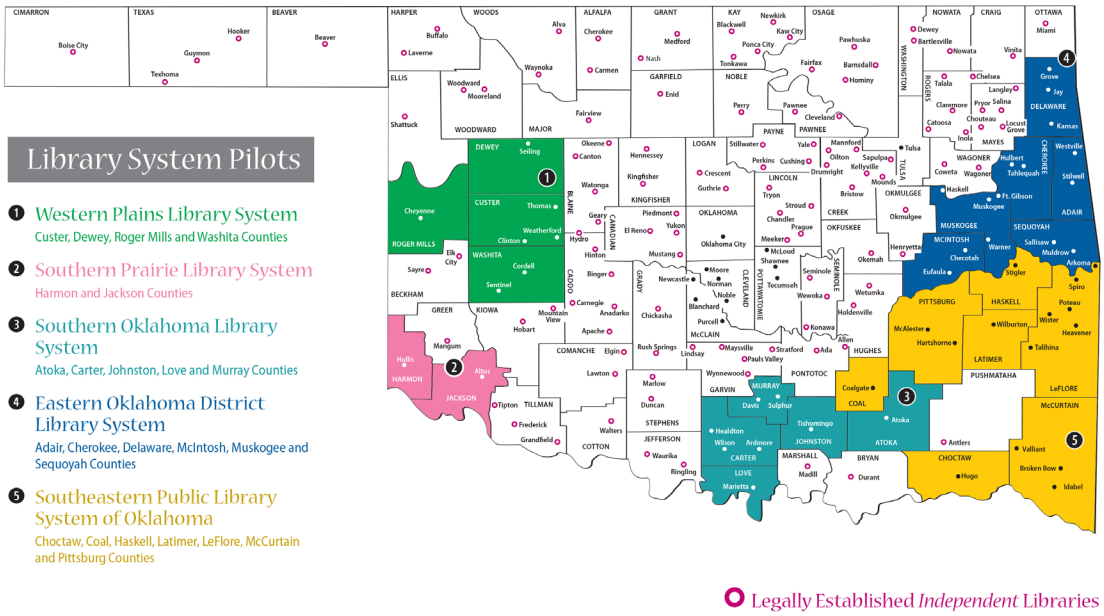
3. Southeastern Public Library System of Oklahoma – McAlester
    a. 7 counties serving a population of 169,398 with 15 libraries
    b. 13%-24% of adults 25 and over do not have a high school diploma

4. Southern Prairie Library System – Altus
    a. 2 counties serving a population of 27,613 with 2 libraries
    b. 14%-25% of adults 25 and over do not have a high school diploma

5. Eastern Oklahoma District Library System – Muskogee
    a. 6 counties serving a population of 242,846 with 15 libraries
    b. 12%-25% of adults 25 and over do not have a high school diploma

Career Online High School Pilot Sites

5 Library System Pilots



Program Benefits

- With a statewide license, all public libraries can participate.
    - Libraries that are not part of the pilot program will need to provide their own scholarships.
    - Libraries can partner with community businesses to provide scholarships.
- Program is scalable to individual library community based on resources available.
- Initial pilot program will provide valuable lessons learned for future implementation.
- Gale COHS emphasizes workforce development and career readiness.
    - Graduates will complete a professional resume, cover letter and earn a career certificate.
- Program completion opens more post-secondary educational opportunities for graduates.
- Program will improve Oklahoma's workforce and economy.
- Graduates will have a better quality of life.

Program Considerations

This program does not compete with Oklahoma public schools. According to the State Department of Education and state statute, once an individual is over the age of 21, they are no longer able to attend high school and earn a diploma. Gale COHS is a great option for adults who are looking for a flexible online program that provides academic and community library support.

Gale COHS is fully accredited as an online high school district by the AdvancED Accreditation Commission, the national commission that confers the Southern Association of Colleges and Schools Council on Accreditation and School Improvement. AdvancED provides nationally recognized accreditation for 32,000 public and private schools and districts across the United States and in 70 countries worldwide. This means that Gale COHS is recognized across the nation as a quality school system, delivering an accredited online high school diploma.

Community Technology Hubs

In addition to the Gale COHS program, the Virtually Everywhere working agencies will develop telepresence hubs in rural communities via an upgrade to technology infrastructure, which is included in the proposed budget. The items include a Zoom-enhanced Smartboard and virtual reality headsets. These are basic components for developing a telepresence hub.

The concept of technology or telepresence hub is shared by other technology initiatives within the state, including the Digital Inclusion initiative and the Oklahoma State Broadband Plan.

Oklahoma State Broadband Initiatives

Department of Commerce Offers Broadband Expansion Incentive

High-speed broadband availability is key to successfully implementing telepresence and virtual presence across the state. The Business Expansion Incentive Program, sponsored through the Oklahoma Department of Commerce and the Oklahoma Development Finance Authority, is addressing broadband availability for communities. The program assists Oklahoma companies making major capital investments in essential items like buildings, equipment and infrastructure development, such as fiber broadband networking. This incentive is available to Oklahoma's public entities when partnering with existing Oklahoma businesses that plan to expand infrastructure that would benefit the community and businesses in the area.

The incentive is designed to make annual cash payment awards to help companies grow and boost business expansion investment in Oklahoma by facilitating an annual rebate of employee Oklahoma state income tax withholdings paid to the public entity. Strategic drivers of a municipal project under consideration for the award are potential infrastructure investment, private sector capital investment, retained jobs, new jobs, wages and how the infrastructure development would promote competitive businesses in the region.

Business Expansion Incentive Program Key Points

- Created for bonding to local governments issued through the Oklahoma Department of Commerce and the Oklahoma Development Finance Authority.
- The Business Expansion Incentive Program shall be used for infrastructure projects in the state benefiting the private sector and where the infrastructure is owned by a public entity.
- The incentive amount must be used for infrastructure development such as:
    - Broadband fiber network infrastructure
    - Water treatment facilities
    - Country/municipal roads and bridges
    - Other infrastructure assets owned by the local government
- Obligations issued from the Business Expansion Incentive Program are financed or repaid from withholding taxes at the for-profit entities potentially benefiting from the infrastructure investment.

The Oklahoma Development Finance Authority administers the program and the Oklahoma Department of Commerce scores the applications and performs the assessment of the size of the incentive to ensure it is net benefit neutral to the state. The program provides an opportunity to minimize public spending while maximizing public utility. With the proper safeguards in place, these incentives are a great tool for municipality infrastructure development.

Oklahoma State Broadband Plan

High-speed broadband will be imperative to implementing quality telepresence and virtual presence initiatives through the Oklahomans Virtually Everywhere Act. Addressing rural broadband availability is key to successfully connecting Oklahomans through next-generation technologies. Oklahoma state and local government leaders can positively impact the state broadband environment by encouraging adoption and empowering local communities to act. By updating laws and policies, providing in-depth broadband data, educating local communities and designing procedures to incentivize adoption in municipalities, lawmakers can foster both local districts and state agencies for quality broadband. This is why the Oklahoma State Broadband Plan has been created.

The Oklahoma State Broadband Plan addresses:

- Educating and engaging potential communities where coverage is unavailable to form more equitable partnerships with local and state internet service providers (ISPs).
- Informing communities about deployment costs by better leveraging existing infrastructure, easing access to rights of way and poles to facilitate path creation, and making investments in next-generation infrastructure.
- Leveraging federal, state and private loans and grants that offer untapped funding for infrastructure, planning and adoption initiatives.
- Educating the public about the value of broadband connectivity.
- Assisting with demand through community-based adoption and utilization programs.
- Exploring avenues for making broadband affordable for the citizens of Oklahoma.
- Partnering with local municipalities and increasing awareness of opportunities, education initiatives and capital ventures within local sectors.

An example of a local community working closely with state agencies is the city of Ponca City and the Oklahoma Community Anchor Network (OCAN). Ponca City, Oklahoma, is considered a micropolitan area—a city with a population more than 25,000 in a county with a population less than 50,000. The community lacked access to adequate broadband connectivity, making it difficult for residents and businesses to participate in the digital age. In response, the city began looking for a broadband solution that would advance its technology initiatives and improve the quality of life for their citizens.

Community leaders partnered with OCAN to develop and install a fiber to the home initiative across Ponca City. Operated and maintained by OneNet, OCAN is a system of high-speed fiber optic cable that spans 1,005 miles and connects 35 Oklahoma counties. The expansive network ensures that affordable high-speed internet options are made available to Oklahoma's unserved and underserved communities.

Working together, OCAN and Ponca City installed a citywide, all-optic fiber network that will provide residents and businesses with the high-speed internet access needed in today's fast-paced digital landscape.

Projects such as this one, in conjunction with state reform of updated broadband policies, is why the Oklahoma State Broadband Plan has been created. In the coming years, broadband access will become increasingly more important. Economic development, career training and advances in education and health care rely not only on broadband infrastructure, but on the knowledge and tools to leverage that infrastructure. To continue this effort, the Oklahoma State Broadband Plan will encourage state representatives to engage in a more targeted approach to coordinate with local and regional planning groups to develop strategies to increase availability and adoption in both rural and urban communities.

While much work has been done, there is still much work to do as state agencies coordinate to ensure that Oklahoma remains a leader in extending affordable, reliable broadband services.

Oklahoma Digital Inclusion Alliance

The Oklahoma Digital Inclusion Alliance is a unified organization, comprised of various nonprofit entities and local state agencies, dedicated to the assistance of home broadband access, public broadband access, personal devices, and local technology training and support programs. The alliance works collaboratively to craft, identify and disseminate financial and operational resources for digital inclusion programs while serving as a bridge to policymakers and the general public.

Digital inclusion is a priority in Oklahoma. High-speed broadband enables citizens to use the network in new ways, expands access to health services and education, increases the productivity of businesses and drives innovation throughout the digital ecosystem. More than half of Oklahomans are still disconnected from high-speed broadband internet service in addition to insufficient equipment, which means that a broad and coordinated effort is needed to address this statewide challenge. Expanding high-speed broadband through digital inclusion initiatives will also support telepresence and virtual presence projects across the state, creating opportunities in education, business, health care and rural development.

Today, the Oklahoma Digital Inclusion Alliance is working to address this gap in low-income communities across the state. For the last few years, the alliance has helped low-income people connect to the network and use the content and services found there to make their lives better. More recently, citywide and regional digital inclusion initiatives have emerged throughout

Oklahoma to connect local efforts to broader policy initiatives at the local and state levels. Experimentation, cost reduction, reuse and extensibility are hallmarks of this program, leading to innovative work that have scaled to enhance scholarly research, teaching and public programming throughout various Oklahoma state institutions and organizations.

Digital inclusion combines grassroots community engagement with technical knowledge, research and coalition building to advocate on behalf of people working in their communities for digital equity.

The key activities of the Oklahoma Digital Inclusion Alliance are necessary for assisting low-income individuals, families and organizations adopt connectivity in ways that are most appropriate to their needs and requirements:

- Support on-the-ground digital inclusion practitioners and advocates.
- Advocate for local, state and federal policies to promote digital equity and support local digital inclusion strategies.
- Educate policymakers, the media and potential partners about the need for digital equity and the work of local digital inclusion programs.
- Conduct, support and promote data-gathering and research that can inform public understanding, public policy and community strategies related to digital inclusion and equity.

The partnerships that make up the Oklahoma Digital Inclusion Alliance originate from a wide array of nonprofit and state agencies. These include the United Way, Salvation Army, the Oklahoma Department of Libraries, the Oklahoma Department of Commerce, Federal Reserve Bank, CareerTech, AARP and Goodwill.

Along with these essential partnerships, the Oklahoma Digital Inclusion Alliance see themselves and their activities as being aligned with the goals of other community-based and social service organizations. Whether it is education, health care, workforce development or social presence, digital inclusion will embrace Oklahoma's social layer and move toward articulating the mission not as simply a digital literacy or computer refurbishing organizations, but rather as a social service-oriented organization whose vision includes promoting broader policy goals focused on social and economic development for the citizens of Oklahoma.

Telepresence Use Cases at Participating Agencies

The participating agencies have implemented telepresence for both internal and external initiatives. Each agency also offers customers, constituents or the general public opportunities for connecting regionally or globally, especially for education and training programs. These use cases describe the current telepresence activities within the agencies and identify future opportunities for expanding telepresence across the state.

State Regents and OneNet Expand Telepresence Through Zoom

The Oklahoma State Regents for Higher Education (OSRHE) has a long history in distance learning, beginning in the 1970s with the Talkback Television System. With the launch of OneNet in 1996, videoconferencing expanded for higher education, K-12 schools, government, and rural hospitals and clinics. In 2000, OneNet anticipated carrying more than 200,000 distance learning sessions that year.

Until the last two years, videoconferencing services were primarily delivered via H.323 technology with conferencing units. Service delivery changed as web-conferencing services became more widely available. In 2018, OneNet began offering Zoom, a video communications software service that combines videoconferencing, online meetings, chat and mobile collaboration. Individuals can connect to Zoom through a laptop, monitor or smartboard.

OneNet and Zoom partnered to develop a statewide purchasing program to benefit public institutions throughout Oklahoma. This new arrangement offers significant cost savings on videoconferencing services for OneNet clients. Through Zoom implementation, OneNet has transitioned H.323 users to the new software-based platform.

Currently, OneNet manages Zoom licenses for more than 12,500 users, along with 59 Zoom rooms. Zoom users work in higher education, career tech, libraries, state agencies, nonprofits and research affiliates. The largest user is Oral Roberts University, with Northeastern State University and Northwestern Oklahoma State University as the next two largest users.

In addition to providing Zoom for clients, OSRHE and OneNet now utilize Zoom extensively for agency activities. OSRHE and OneNet have more than 100 staff using Zoom. Zoom saves both time and money for various OSRHE programs. OSRHE and OneNet are also developing a plan to utilize Zoom, in combination with other technologies, to maintain services in the case of a pandemic. Telepresence technologies will allow key staff to work from home to ensure citizens have access to vital state services. The following use case demonstrates how one program utilized Zoom for training and education, delivering vital services and cutting travel time and cost.

Zoom Facilitates Trainings for OKcollegestart

OKcollegestart.org is Oklahoma's official website for college planning provided by the Oklahoma State Regents for Higher Education (OSRHE) and the Oklahoma College Assistance Program (OCAP). This free, comprehensive site provides a one-stop shop for students, parents, adult learners and educators. It features information and tools that make planning and paying for college easier for students and their families. Students create a lifelong portfolio for college and career planning that contains secure records of academic progress, activities and achievements throughout high school. Educators can customize the site for their students, including Individual Career Academic Plan (ICAP) tools, and utilize the free Electronic Transcript Exchange to send official transcripts to high schools, colleges, career technology centers, the NCAA eligibility center and Oklahoma's Promise.

The student portal coordinator for OKcollegestart has successfully implemented Zoom videoconferencing to provide online trainings on how to utilize the OKcollegestart website for high schools. Zoom allows the coordinator to customize the training session for each school. The coordinator and high school counselor are both able to share their computer screens, so the coordinator can ensure the counselor is able to customize all areas of the website.

In the last academic year, the coordinator utilized Zoom for 11 training sessions. Without Zoom, the coordinator would have traveled from Oklahoma City to Owasso, Caney, Tulsa, Millwood, Muskogee, Sapulpa, Tishomingo, Yukon and Cement. Utilizing Zoom created the following savings for the State Regents:

- 35 hours of travel time
- 2,176 miles of travel
- $1,088 in mileage costs

The OKcollegestart coordinator expects to utilize Zoom more frequently as Individual Career Academic Plans are implemented at all high schools. Beginning with the freshman class for fall 2019, every student attending public high school in Oklahoma is required to complete an ICAP as a graduation requirement. Through the ICAP process, students will explore career paths and build a plan for life after high school. OKcollegestart.org is one of the free online platforms school districts can use to facilitate ICAP efforts for their students. Zoom will enable the student portal coordinator to meet with high school counselors to customize the ICAP feature for their students and meet with groups of teachers who are working directly with students. With Zoom, the coordinator will guide teachers through the OKcollegestart Professional Center, demonstrating how to review student portfolios, run reports and access OKcollegestart resources. Zoom will be a key tool in reaching more schools with these free resources as the coordinator balances a limited travel time and budget.

Oklahoma Department of Libraries Offers Telepresence Resources to Communities

Since the initiation of federal library funding in the 1950s, the Oklahoma Department of Libraries has worked to improve access to information and library services in communities across the state. Beyond assisting libraries with collection development, library programing and the continuing education of local library staff, much of this effort has been historically focused in three areas: establishing libraries and library systems, establishing information sharing services, and assisting with telecommunications infrastructure and providing hardware/software to connect Oklahomans with online information and services.

Establishing Libraries
Early library development and advocacy activities accomplished the goal of having at least one legally established public library in every county. Today, to receive state aid grants, public libraries must serve anyone who lives in the county. There are 116 municipally funded library sites in 48 of the state's counties.

A new Oklahoma library code passed in 1967, coupled with federally funded library demonstration projects, led to the establishment of eight library systems in the state, funded with local ad valorem taxes. These systems have larger budgets and more dependable funding, and today they serve more than 2.4 million Oklahomans (61% of the population) through 102 locations in 29 counties.

With both municipal and system libraries, there are 218 public library sites around the state that could serve as an access point for telepresence and virtual presence technology and participation. These libraries are trusted centers of their communities and are open and welcoming to all. Libraries could host training workshops on using virtual conferencing technology, host virtual meetings, help people connect with others via public access computers and bridge the digital divide for those without personal internet access.

Establishing Information Sharing
Federal dollars were also used to establish an extensive interlibrary loan service among all of the state's libraries that evolved from a request service via teletype in the 1960s to an online service at the dawn of the World Wide Web. In addition to continuing the interlibrary service, which lets libraries share books and other materials for their customers, ODL also used federal funds to purchase statewide licenses to powerful online resources—millions of full-text magazine and journal articles, up-to-date reference sources, health and business databases, and much more—which are available to every library, school and Oklahoman regardless of their location.

The universality of these resources across the state, which are accessed via geolocation, means they can also be used online during virtual meetings and referenced with links in follow-up communications. This electronic library (known as Digital Prairie) would be available at everyone's fingertips during and following meetings. This could be especially beneficial in virtual classroom environments. For individuals with access to an internet connection, these resources are already virtually everywhere in Oklahoma.

Assisting with Telecommunications

Use of federal funds to improve information technology in public libraries began with the basics for many of the state's smaller libraries. These dollars assured all public libraries had photocopiers and fax machines, then, in the 1990s, computers for public use. As the online world expanded and ODL continued to use federal dollars to help libraries improve their technology, the agency also helped local libraries take advantage of two very powerful opportunities: the federal E-Rate program and the Oklahoma Universal Services Fund.

ODL, unlike many of the nation's state libraries, focused on assisting Oklahoma's public libraries to qualify for E-Rate and OUSF reimbursements, which helped these libraries upgrade their bandwidth and pay for telecommunications costs. Due to this and related efforts, Oklahoma was one of the first states to report that all of its public libraries offered wireless internet access. In many Oklahoma communities, the library has the fastest internet in town.

A Federal Broadband Technology Opportunity Program (BTOP) grant in 2010 and a companion grant from the Bill and Melinda Gates Foundation helped ODL boost broadband speeds and establish videoconferencing capabilities at 44 public libraries.

ODL's leadership in helping public libraries with connectivity led to the agency's participation in a Gates Foundation initiative to develop a tool to help public libraries assess their public access technology services and plan improvements. The resulting tool, known as EDGE, has been used at least once by 90% of Oklahoma's public libraries. ODL has used the results of the assessments to target additional federal grants to help boost broadband speeds and provide computers and other equipment to public libraries.

Funding has been essential, but the success of improving telecommunications capabilities in Oklahoma's public libraries is also a testament to the working relationship ODL has with the state's libraries. ODL leadership expects that relationship would benefit any project to bring virtual presence technology to libraries and their communities.

Oklahoma CareerTech Delivers Programs Via Telepresence

For more than 100 years, Oklahoma's system of career and technology education has focused on improving Oklahoma's economy by offering individuals the training and skills necessary to be successful in the workplace and providing companies with the workforce necessary to compete globally. Oklahoma's CareerTech system significantly contributes to the state's economic development and quality of life.

Oklahoma CareerTech is often used as a model for programs across the United States and around the world. The Oklahoma Department of Career and Technology Education (ODCTE) provides leadership and resources and assures standards of excellence for a comprehensive statewide system of career and technology education. The system offers programs and services in 29 technology center districts operating on 58 campuses, 394 K-12 school districts, 16 Skills Centers campuses that include three juvenile facilities and 32 Adult Basic Education service providers.

Each technology center works closely with advisers from local industries to ensure students learn the skills needed to be valued members of the workforce.

CareerTech reports 558,000 individuals are served annually through classes and events. CareerTech provides nationally recognized competency-based curriculum, education and training for myriad specialized and customized courses and training opportunities.

Programs Delivered Via Telepresence
Several technology centers deliver or receive services via a telepresence platform. Examples include:

- Kiamichi Technology Center delivers an EMT training program to Pontotoc Technology Center via distance learning.
- Caddo Kiowa Technology Center and Western Technology Center deliver programs to their partner K-12 schools using telepresence.
- Tri County Technology Center and Western Technology Center deliver dental hygienist programs from the University of Oklahoma via telepresence.
- Several technology centers partner with K-12 schools to deliver online learning for credit recovery.

In the future, ODCTE will expand telepresence use for its programs. ODCTE is working with partners to develop a Career Tech ECHO® for those needing to receive additional certifications via telepresence.

State Department of Education: Telepresence for Telework, Meetings and Learning

Telework and Virtual Meetings

The Oklahoma State Department of Education (OSDE) utilizes virtual meeting platforms for various purposes with and among OSDE staff and external stakeholders.

To remain competitive with other states, OSDE is exploring the potential of telework for its staff members. As with other state agencies, OSDE often struggles to recruit the talent necessary to meet its mission. Due to the geography of the state of Oklahoma, the location of the OSDE office does not allow for experts living in remote areas of the state to easily access employment at the OSDE. If they do, they are forced into either long commutes or expensive moving costs. To resolve these issues, the option to work virtually could be a recruiting incentive for OSDE, especially when it is not able to be competitive with the market value of a particular position. Currently, only OSDE's regionally based staff are permitted to telework.

OSDE leverages virtual meetings through the Zoom and WebEx platforms to conduct professional development and technical assistance, facilitate collaboration around resources that are disseminated for statewide use, and gain stakeholder input. Several departments at OSDE utilize these platforms to follow up with educators once they have attended in-person professional development opportunities. The follow-up sessions consist of opportunities for educators to share how they may be implementing strategies they learned about during in-person trainings and how to overcome any barriers they may have had with implementing the new strategies they explored. Additionally, the follow-up virtual sessions provide educators with an opportunity to expand upon the topic they learned about in person.

OSDE provides many statewide and point-to-point webinars via WebEx. Professional development and technical assistance can be provided at the desktop of the end user. OSDE started moving from H.323 video conferences to WebEx several years ago and currently uses WebEx and Zoom. In 2017-18, there were 124 events and almost 6,000 guests.

The Zoom platform, in particular, is also utilized by various departments within OSDE to facilitate collaboration among teachers from across the state who work to develop instructional resources that can be utilized by all educators in the state. Most recently, Zoom's virtual meeting space has been leveraged to develop the Oklahoma curriculum frameworks and mathematics competencies.

The Zoom platform is also utilized by OSDE staff to conduct advisory groups with stakeholders across the state. Advisory groups include representatives from school districts, career technology facilities, institutions of higher education, business and industry, and community organizations. Advisory groups support OSDE staff in identifying much needed resources and programs aimed at improving education for Oklahoma students.

It is clear, however, the experience of working remotely or meeting virtually is not the same as the experience of being together in the same location. When all parties to a meeting are conversing remotely, all parties have the same experience. However, when some parties are present physically and some remotely, the experience is not the same. This is true for both work between agency staff members and work with outside stakeholders.

Solutions proposed by the Virtually Everywhere taskforce would greatly benefit the OSDE's ability to recruit and retain new talent.

Professional Development
OSDE has implemented the OklahomaEdge platform, which allows for greater e-learning opportunities across Oklahoma. This ADA-compliant platform has been created using NextThought's Oklahoma-built learning management system and provides learners with opportunities for interactive and self-paced learning experiences that can occur anytime, day or night. The OklahomaEdge platform allows for communication and collaboration between participants as well as content assessment in the form of discussion boards and quizzes. This form of e-learning provides Oklahomans with increased opportunities for professional development or general employee training, for not only those in the field of education, but also for businesses and other entities across the state.

The OklahomaEdge platform also provides educators and opportunities to participate in virtual communities of practice allowing them to share instructional strategies and collaborate on shared efforts to improve learning opportunities for students in Oklahoma.

Considerations or Challenges
One of the challenges for the OSDE is meeting accessibility requirements such as closed captioning. Doing so is possible, but it is labor intensive after a webinar is completed. Using YouTube, much of the work is done by the platform but it can take several staff hours to make sure the captions are correct. Captioning while live can be expensive and complicated. The OSDE is contracting with a company to help with captioning of recorded events.

Another challenge is how participants listen to webinars. If the phone rings or a guest appears, the learning is interrupted, and vital information may be missed.

Interaction in a webinar or meeting is difficult when the group is large. Ensuring guests mute microphones when not talking even after repeated notices are provided can make the virtual meeting challenging for all participants. Chat is used to receive questions – a workable solution—but does not create the same experience as a live meeting.

Virtual Learning, Bandwidth and E-Rate
With the continuous increase in technology production and usage, schools are now able to provide alternative forms of instruction. Virtual learning opportunities can enhance traditional classroom instruction and reach students unable to be in the physical classroom. Instructional opportunities no longer need to occur only in a classroom during normal school hours. Students

and teachers can explore virtual learning when school is inaccessible. This can benefit students who are unable to attend class due to health issues and other external factors.

Another example of a viable virtual learning opportunity is when schools are unable to open due to inclement weather. Instead of making up missed school days at the end of the school year, schools can plan for ways to maximize the virtual instructional experience with teachers available for online office hours to students as needed. As traditional schools explore this form of instruction, it is important to implement virtual learning experiences only as needed to enhance or extend classroom instruction. The relationships that occur between students and between students and teachers in traditional face-to-face classrooms are vital in developing personal communication skills and should be valued.

To ensure schools had enough bandwidth to enable digital learning to occur, the Federal Communications Commission (FCC) set a 2014 bandwidth goal of 100Kbps per student. Currently, 99% of Oklahoma students are enrolled in schools that meet this goal. Reaching this goal helps students access digital learning opportunities. Teachers can transform learning through the inclusion of digital content and can use online materials to obtain instantaneous feedback regarding student learning processes. Students are also more able to control their own pace of learning as well as participate in greater numbers of technology-enabled experiences, including those of project-based learning.

There are only five Oklahoma school districts that did not meet the 100Kbps per student goal, and these five districts are part of only 98 districts in the entire country (750,000 students total) that failed to meet the 2014 FCC goal. The same five school districts still need the fiber connections necessary to meet the frequently growing bandwidth needs related to digital learning. (The goal for fiber was also set by the FCC for 2014.) The remaining 99.6% of all schools are connected via fiber. This success is due in part to the Oklahoma Universal Service Fund program's forward thinking in changing the Oklahoma Corporation Commission rules in 2016 to require schools to request up to the minimum bandwidth recommended by the State Education Technology Directors Association. This change drove up bandwidth while driving down costs.

As technology changes, schools must also change to provide students access to learning opportunities. The FCC believes that as well and updated the bandwidth goals for 2018 to 1 Mbps per student. Oklahoma schools have not done as well in meeting this goal. Only 32% of students in Oklahoma are enrolled in schools that meet the current FCC's recommendation of 1 Mbps of connectivity per student. There are currently 89 Oklahoma school districts with bandwidth contracts expiring soon. Without increasing the cost to the district, all of these schools have the opportunity to be upgraded to meet the 1 Mbps per student bandwidth goal.

Even when a school district meets the goals the FCC sets for connectivity, they cannot stop planning for the future. As schools continue to use more technology, there will be greater demand for an increase in the school's bandwidth capabilities. Without support from

policymakers, such change cannot occur. Governor Stitt was one of 18 U.S. governors who in 2019 committed to closing the classroom connectivity gap.

Consideration and Challenges

While it is of critical concern that every child is provided the same levels of access and opportunity for expanded, virtual learning, OSDE recognizes that such efforts may also have unintended consequences. As learning experiences shift to be virtually everywhere, concerns arise that many students do not have access to the hardware and connectivity in their home environment that would enable the virtual learning experiences to be inequitably available. Stories of students who visit the local fast food restaurant in order to access free internet necessary to complete virtual homework assignments brings into focus the impact of such a disparity.

Even the popular "flipped classroom" model, where students watch virtual lectures on their own time in order to create more time for discourse in the classroom, has limited scalability across the school day. For example, if six or seven teachers each assign 15 minutes of homework for a single school day in the form of virtual learning, students may very well spend 1 ½ hours of each evening in a passive, though tech-enhanced, experience. Such a demand on student time may encroach into time usually devoted to extracurricular, community, family and personal activities.

As educators gain greater clarity into the recommendations and concerns for screen time and sedentary lifestyles for youth, yet another issue arises. A number of organizations have recently made clear the recommendation that children under the age of 6 engage in minimal screen time, while older students should engage with media that does not "take the place of adequate sleep, physical activity and other behaviors essential to health" (AAP 2016, WHO 2019). [2]

[2] American Academy of Pediatrics. American Academy of Pediatrics announces new recommendations for children's media use (October 2016). Retrieved at https://aap.org/en-us/about-the-aap/aap- press-room/Pages/American-Academy-of-Pediatrics-Announces- New-Recommendations-for-Childrens-Media-Use.aspx.

World Health Organization. New WHO guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age (April 2019). Retrieved at https://who.int/news-room/detail/24-04-2019 -to-grow-up-healthy-children-need-to-sit-less-and-play-more.

Office of Management and Enterprise Services Implements Collaborative Technologies

The Office of Management and Enterprise Services met the challenging task of aligning 700 information technology team members to work together quickly and efficiently.

Part of its mission to become a technology leader for Oklahoma was to transform its role as regulator to one of trusted adviser. To do this OMES challenged its staff to:

- Add value to every interaction with agencies and affiliates.
- Quickly adapt to the needs of partners.
- Provide quality, innovative and secure solutions.
- Communicate meaningfully with partners.

A cultural shift began to occur, but OMES needed a collaborative space to empower employees to interact, improve trust and create a sense of common urgency.

To do this, OMES borrowed an approach from the book, *Team of Teams,* by retired U.S. Army General Stanley McChrystal. OMES implemented daily video teleconferences accessible across the entire organization. Typically running 20-40 minutes, the calls focus on current issues, identifying what needs to be accomplished and what new intelligence has been uncovered.[3] This tool has allowed OMES to become more efficient while maintaining, and in many cases improving, resolution.

"Teams has helped the OMES service desk be more successful in their jobs and more efficient. I am proud to see its increased level of efficiency and collaboration with other teams, especially when working on the front line, where a customer's emergency is our emergency." — Leea Mote, director of client experience, OMES

The Technology Behind the O&I

Once OMES had tested and securely launched Microsoft's Skype for Business, the updated technology allowed for an online collaborative meeting where all of OMES employees could participate from their desk or laptops in real time. Known by many OMES employees as the Operations and Intelligence Briefing (O&I), the tool also provides recording capability for later reference use, such as instructional demos or security updates. Using Microsoft's Skype for Business as an efficient, cost-saving and collaborative tool got Microsoft's attention. The O&I received national recognition through a Microsoft feature story on OMES.

Microsoft Teams

OMES transferred its email services into the Microsoft Office 365 enterprise platform. With 22,000 state employees and access to a platform via mobile phone, desktop or laptop, OMES is moving toward a mobile government workforce. In September 2018, OMES launched Microsoft

[3] For more information about the O&I meetings watch the "Digital Transformation: Operations & Intelligence Brief" at https://youtu.be/qqEXZaen2GU.

Teams, which integrates chat capability, online webinar meetings, meeting scheduling and document storage.

Chat-Based Workspace
Microsoft Teams is a chat-based workspace that leverages Office 365 Groups membership and Office 365 collaboration features. Teams is designed for communicating with the people individuals work with regularly through an instant messaging mode and is enhanced with emoticons and animated GIFs to ensure communication is casual. Team members can chime in on a topic and continue to chat and collaborate in a speedy fashion.

Here are some additional features of Teams:

- Information sharing, all in one location: Team members can collaborate and co-author via a central location where all files are stored.
- Find what's needed, easily: Save time looking for files that may have been received.
- Flexible messaging and meeting setup: Team conversations are visible to all members, prompting quick responses and collaboration. It includes chat, voice or video communications with one or multiple team members through a scheduled or unscheduled meeting.
- Scheduled or unscheduled meeting capability: Launch a meeting via a single click. For instance, an idea raised in chat can be followed up with a handful of team members via voice or video calls or a formal Teams meeting can be scheduled via a calendar invite.

Secure Information
Before using Teams, many state employees worried their information was viewable or not secure. When a Teams group is created, it can either public or private. When a private team is created, the content is only viewable to employees added to the team. This option allows for more security.

The O365 platform and its associated applications include powerful device management capabilities, such as the option to remove a user's access to sensitive data while a device is missing. This way, no matter where a missing device ends up, sensitive data remains secure.

OMES Service Desk Uses Teams to Improve Case Response

The OMES service desk processes on average 340,000 cases a year. Before Teams, the OMES service desk used Skype where they had one chat for the Information Technology Operations Command Center and one chat for the OMES service desk. Working together in the chat room was difficult because it was an endless chat stream with no extra visibility. It was hard to keep track of what had and had not been read or responded to.

With the Teams interface, if an individual steps away, it holds their place. When they return, they know which team conversations they need to catch up on. Conversations are grouped together, which allows multiple users to update in the same location.

When there is a technology service disruption, such as an outage due to an electrical failure, the OMES service desk can post all of the reports for that outage in a Teams chat and connect them all to the parent case.

Teams also has a search feature and several of the team members can use the search option to quickly find the case data they need. Teams has improved the OMES service desk's capability to provide front-line services more efficiently.

Current State of Telepresence Technology at Participating Agencies

Survey of Participating Agencies

The Virtually Everywhere working group conducted a survey of the participating agencies to collect information on the current state of telepresence and the expectations for further implementation. OSRHE/OneNet, OSDE, ODCTE, OMES, ODL and ODOC responded to the survey.

All of the agencies are currently using videoconferencing technology ranging from monthly for ODOC to weekly for ODL and ODCTE and daily for OSRHE/OneNet, OSDE and OMES. All of the agencies except ODOC have a staff person who is very familiar with the technology. ODOC responded that it has a staff person fairly familiar with the technology.

Types of Technology

A wide variety of hardware and web-based videoconferencing services are being utilized across the agencies. Polycom, Cisco and Lifesize hardware is utilized. Zoom, Microsoft Teams, Skype, UberConference, WebEx and GoToMeeting web-based services are all being used at the various agencies. While these technologies are working well for videoconferencing, they are not considered next-generation virtual presence technologies, because they are neither ubiquitous or fully immersive. There is still a palpable difference in the experience between those who are physically together and those who are remote.

ODCTE, ODOC and OSDE reported that videoconferencing is comparable to alternatives in most cases. OMES, ODL and OSRHE/OneNet reported that it is comparable most of the time, but there are instances in which the alternative is necessary.

Limitations to Implementing Technology

The agencies identified the most significant limitation to implementing/expanding telepresence technology. ODCTE and OMES reported the cost of implementing technology (hardware, software, installation) as a limitation. ODCTE, OMES and ODL reported difficulty implementing technology (setting up technology, time required to train staff). ODCTE, ODL and OSDE reported limitations of technology (no physical interaction, poor internet connection) as a challenge. ODCTE, ODL, ODOC and OSDE reported lack of technical support as another challenge. ODCTE also reported that program and monitoring visits must be conducted on-site, and ODL reported a challenge with their clients' poor internet connections. OSRHE/OneNet reported using telepresence broadly as the first option considered.

Telepresence Utilization and Features

The agencies would utilize telepresence for a variety of purposes. All six identified training and education as options for utilizing telepresence, and five identified job interviews and client meetings. Four agencies each chose internal meetings and customer services. Two reported off-site management of equipment and resources as a purpose for telepresence. ODL would also use telepresence for professional organization meetings and collaboration.

The six agencies chose the telepresence features that are most important. Five chose video webinar, application/file sharing, and cloud and local recording as the most important feature. Three chose group collaborations and multimedia content sharing. Two chose premium audio/visual, and one identified integrated scheduling as important. OSDE also added ease of use and dependability to the list.

When asked how important is it that the experience be as seamless as possible, ODCTE, ODL and OSDE reported 'very important'—the more similar it is to an in-person meeting, the better. OMES and OSRHE/OneNet reported it to be moderately important—it helps, but isn't essential.

Budgets and Expected Savings

All of the agencies reported saving both time and money as advantages of using videoconferencing technology. Agency budgets for videoconferencing technology vary. The agencies reported the following budgets for videoconferencing technology:

- ODCTE – Less than $500
- OSDE – $1,000 to $5,000
- ODL – $5,000 - $10,000
- OMES and OSRHE/OneNet – Over $10,000

The survey asked about spending for business travel, and the agencies responded with the following annual travel expenses:

- ODL – $10,000 to $50,000
- OMES, OSDE and OSRHE/OneNet – $25,000 to $50,000
- ODCTE – More than $100,000

Telepresence could eliminate the following percentages of business travel for the agencies:

- ODCTE, ODL, OSDE and OSRHE/OneNet – 0-20% of business travel
- OMES – 40-60% of business travel

Implementing telepresence is expected to save the agencies the following:

- OMES – $25,000 to $50,000
- OSDE and OSRHE/OneNet – $10,000 to $25,000
- ODCTE and ODL – $10,000 or less

Videoconferencing Competencies

The survey asked for the percentage of staff who know how to utilize telepresence technology and the percentage of staff who can train others to utilize the technology. The agencies reported the following.

Percentage of agency staff who know how to utilize the technology:

- ODL and ODOC – 0-25%
- OSRHE/OneNet – 24-50%
- ODCTE, OSDE and OMES – 50-75%

Percentage of agency staff who can train others to utilize the technology:

- ODL, ODOC and OSRHE/OneNet – 0-25%
- ODCTE, OSDE and OMES – 24-50%

Additional Needs

Some of the agencies identified additional concerns and needs related to telepresence. ODCTE reported that not being allowed to use Google Docs creates a problem in using the technology. ODL needs network support and reported that security rules do not support videoconferencing and nonstate organization collaboration tools. OSDE needs technology support and reports an issue with being allowed to experiment with new technologies.

Summary

Based on the survey results and follow-up from partnering agencies, the data reflects non-uniform usage of both hardware and web-based videoconferencing services. With the level of activity varying across agencies, it is recommended that a standard telepresence and virtual presence policy be established for all agencies for greater efficiencies and cost savings.

Telehealth Initiatives

Telehealth is an area where the Oklahomans Virtually Everywhere Act provides an opportunity to better serve those Oklahomans who are most vulnerable and in need of top-notch medical care. Telehealth programs utilize virtual infrastructure to deliver patient care services, as well as the delivery of health education using telecommunications technologies. The practice of telehealth medicine encompasses a variety of technologies to deliver virtual medical, health and education services. Telehealth is not a specific service, but a system of services used to enhance health care and education delivery. The following programs are utilizing telehealth technologies to reach the state's citizens right where they live. Expanding these and similar programs through the Virtually Everywhere Act will ensure every Oklahoman has access to the care they need, where and when they need it.

OU Medicine's New Telehealth Platform

OU Medicine has introduced an exciting new telehealth platform that has the potential to propel Oklahoma as a leader in the area of virtual health services. Telehealth programs utilize virtual infrastructure to deliver patient care services, as well as deliver health education using telecommunications technologies. In the summer of 2019, OU Medicine went live with this virtual care service utilizing the American Well platform. The new service offering is named OU Medicine Health Connect. The service began with a pilot program at the OU Physicians Pain Management Clinic. The initial results from the pilot program have proven to be very successful and generated a lot of interest.

The OU Physicians Pain Management Clinic pilot program, led by Dr. Gretchen Wienecke, provides care for patients who either have limited resources for transportation to the clinic or live in a rural area of the state, which, along with their treatments and conditions, makes the long commute very difficult. The clinic provider and participating patients have provided positive feedback on the program. The clinic now averages approximately four to six telehealth patients per week. This type of treatment program creates multiple benefits for patients, including reducing stress and saving money on travel costs.

Following the pilot program, OU Medicine implemented telehealth in other areas. At OU Physicians General Surgery, surgeons sought a way to see their patients for post-op appointments that allows the patients to convalesce in the comfort of their own homes. These visits allow the surgeons to inspect the patient's surgery site and assess how they are doing. The patient does not have to endure the painful car ride to and from the clinic.

Neurologists at OU Physicians Neurology are providing care for a set of patients who either have transportation issues due to their condition (i.e., post stroke) and/or live in a rural area.

Their patients expressed interest in the program, and these physicians believe patients will greatly benefit from this service line. Providers at OU Physicians Tulsa Behavior Health provide behavior health care to patients via telemedicine from the Tulsa facility. They specifically target patients in rural areas, as well as patients who have immediate urgent appointment needs.

OU Children's Hospital currently has a successful TeleNICU program that partners with the community hospital in Lawton, which is led by Dr. Abishek Makkar. The hospital plans to expand to other rural areas of Oklahoma, as well as expand services to tele-resuscitation, with the ultimate aim of addressing the high infant mortality rate in the state.

Telehealth will soon be implemented at OU Medicine Care Management. The School of Nursing has teamed with OU Medicine to reduce readmission rates for patients. The nurses identify patients with diagnoses that make them prone to readmission and provide an inpatient visit before discharge. They set up a telemedicine account for the patient and explain the process. Once the patient is discharged, the nurse provides in-home care via telemedicine in order to help the patient identify symptoms that may lead to a readmission. The nurse also communicates with the patient's provider to avoid readmission. Not only does this lower readmission rates, but also lowers nurses' travel time, allowing them to help more patients.

Telehealth services are in development at three other clinics. The Stephenson Cancer Center plans to utilize telemedicine to provide oral chemotherapy training to their patients. Providers will utilize it within the cancer center, as well as when patients have questions at home. The team at Stephenson Cancer Palliative Care also wants to implement virtual care for cancer patients who have issues with transportation and ambulation and have progressed in their disease process to a point where traveling to appointments has become difficult and painful.

Finally, providers at the Stephenson Cancer Center Tumor Board have an interest in including patients' primary care and referring providers in tumor board conversations, remotely via the telemedicine platform. Tumor board is a multidisciplinary discussion that covers each patient, their disease, treatment and research options. Including the primary care and referring providers will increase the providers' communication and education, which ultimately will provide the best care for these patients.

OU Medicine has identified the use of virtual care programs to be vital in health care delivery to all Oklahomans, especially in rural areas. The benefits of telehealth services are twofold. Telehealth reduces travel time for not only patients, but also for providers, allowing them to care for even more patients. These services also reduce costs for patients and providers, creating additional efficiencies. Through the advancements of technology, telehealth within the state of Oklahoma is seeing a digital transformation. With external support and additional resources, Oklahoma can be a leader in telehealth initiatives.

OSU Project Echo Connects Rural Physicians

A strong support community is essential to success in any profession. This is particularly true for physicians in Oklahoma who are meeting the health care needs of rural patients. Rural physicians are often the only health care worker for an entire city or region, which makes their job critical. It also means they encounter a wide array of medical situations.

When a primary care physician encounters a unique situation, he or she will often recommend that patient visit a specialist. However, rural patients often lack the resources to meet with a specialist quickly, or a specialist might have a long waiting list. The longer an Oklahoman waits to see the specialist, the longer their health needs go unmet.

Oklahoma State University Center for Health Sciences (OSUCHS) is seeking innovative ways to meet the health care needs of rural Oklahomans and to improve Oklahoma's health status. The mission of OSUCHS is to train health care professionals for rural and underserved Oklahoma.

OSUCHS advances this mission by recruiting medical students from rural Oklahoma and training them in rural settings, so they will be prepared to meet the demands of these communities and will return to the underserved communities that need primary care most. In a digital age, equipping these doctors often involves utilizing technology.

To best help rural doctors, leaders at OSUCHS adopted the project "Extension for Community Health Care Outcomes." Known as Project ECHO, these sessions utilize video teleconferencing to connect rural health care workers with a multidisciplinary specialist panel at OSUCHS.

A Project ECHO session is held during a two-hour lunch. A team of doctors, pharmacists, nurses and social service experts at OSUCHS initiate a video teleconference session with health care workers across the state, creating a knowledge-sharing community. The OSUCHS specialist team conducts a short educational lecture. Afterwards, the participants in the session present specific patient cases to the knowledge-sharing community and gain assistance and recommendations on ways to treat a particular condition or a method to identify a medical problem, all without leaving their office or home. This video teleconference session is especially effective because it involves little time and travel costs for the participants but still allows rural health care workers across the state to gain specialty knowledge needed to treat complex medical conditions.

Project ECHO sessions have proven effective in developing a health care community for rural doctors and health care workers, which improves the livelihood of Oklahomans.

An example of a successful session provided care for a female patient who exhibited mental health issues and was also pregnant. An ECHO session enabled the rural primary care physician to navigate the unique situation through the input of his peers so the mother was treated effectively, and the child was born healthy. Rare cases like this can be addressed quickly in the rural physician's office while the patient is waiting to meet with a specialist. This saves valuable time and improves patient outcomes.

OneNet plays a vital role in Project ECHO's success. As Oklahoma's only statewide educational internet network, OneNet is uniquely positioned to support the Project ECHO sessions. OneNet provides OSUCHS, as well as many health care facilities across the state, with reliable, secure connections that allow these professionals to change the face of modern care.

As Project ECHO sessions become integrated into the rural health care system, leaders at OSUCHS are continuing to identify new ways to best serve our state through technology.

GLMHC is Transforming Mental Health Services Through Telehealth Technology

Grand Lake Mental Health Inc. (GLMHC) is a private, nonprofit 501c3 organization, contracted with Oklahoma Department of Mental Health and Substance Abuse Services and the Oklahoma Health Care Authority to operate in 12 counties in northern Oklahoma. The agency operates as a Certified Community Behavioral Health Center in Craig, Delaware, Kay, Mayes, Noble, Nowata, Osage, Ottawa, Pawnee, Payne, Rogers and Washington counties. GLMHC provides mental health/integrated health services and substance abuse services. GLMHC has state and national accreditation and is audited for compliance under the Commission on Accreditation of Rehabilitation Facilities (CARF).

Until 2016, GLMHC technology consisted of fiber optics that allowed any staff to use and access electronic medical records (EMR) at any site location. It also allowed for telemedicine to be used by a provider who could remotely prescribe psychiatric medications. These advances were very helpful in documenting services provided and ensuring clients had access to psychiatric providers who could access EMR from anywhere.

Utilizing Technology to Serve and Meet the Needs of Individuals with a Mental Illness
GLMHC started with a belief that individuals with medical conditions that are identified as mental illness have a brain disease, similar to a person having a disease like cancer. Just like cancer, treating mental illness has many spokes in the wheel to support the hub. Each spoke in the wheel is supported by the other spoke. Treating mental illness includes an augmentation of services, including therapy, medications and support groups.

The basic belief of the GLMHC team is that individuals with this disease need professional assistance when moving past a crisis or traumatic experience. In many cases, if the individual does not receive assistance, the crisis will only continue to escalate. The longer it takes a client to access professional services, the longer it takes an individual with a mental health issue to recover from that particular crisis or traumatic experience. This is where GLMHC focused the use of technology.

GLMHC partnered with MyCare Integration Software Solutions (MISS) and began working on a collaborated effort to create a software application that would allow law enforcement to connect an individual in crisis or having a traumatic experience to a licensed medical health professional (LMHP). The police officers in rural Oklahoma are the first responders to these types of crises. With the current technology, a police officer could have access to a LMHP within their own squad car.

The MyCare partnership started by developing the software application to be used to by the police officers and clients in the most timely and efficient manner. Before the software application, this type of engagement could take up to 12 hours. With the software interface,

this engagement sometimes only takes 15 minutes for the client to receive the least restrictive treatment for their current crisis. This concept was in line with GLMHC's belief system that the clients it serves should be able to receive the best quality of care technology has to offer. The GLMHC model has evolved to allow clients to receive services where and when they are needed. No more appointments, no more waiting in line.

While the software application was being developed, GLMHC also revised its business model, by creating and expanding hours of its outpatient clinic in Vinita from 8 a.m. to 5 p.m., Monday through Friday, to 24/7 service, so individuals experiencing a mental health crisis would have a place to be treated when they needed treatment.

In 2016, the outpatient clinic was open 24/7, and the software was available in police officers' cars in early 2017. GLMHC saw amazing outcomes. Inpatient services dropped by 75%, and police officers' time in emergency rooms (sometimes as long as 18 hours for a patient) was eliminated. GLMHC continued to improve this model and, as of 2020, has reduced the need for inpatient services by 98%. Individuals are recovering from a crisis in a matter of hours versus days or weeks. This proved that GLMHC was on the right track and reinforced the belief that people can start recovery quicker from a crisis if a mental health professional is involved. The quicker the involvement, the quicker the recovery.

The next step was to make sure the individual had access to the MyCare app on a device, so they could receive services when and where they needed them. This hardware technology, along with the data plan, made it possible for individuals to receive mental health services in their homes. All individuals brought to the GLMHC 24/7 outpatient clinic left with the same technology the police officers had in their patrol cars.

Today, with the continued development of the MyCare app, every adult client served by GLMHC is receiving the hardware, software and data plan. Development continues on the MyCare app, so GLMHC consumers can receive video calls from clinicians, have access to their scheduled appointments on the hardware device, and can call their mental health team and leave a message. Every option is at the clients' finger-tips. In an emergency, they can push the crisis button. They can even push a button to talk to an assigned team member.

This system will only improve as data plans in rural Oklahoma are able to reach a client anywhere they may need a mental health professional. Access is the first step to success when it comes to treating the medical brain condition called mental illness.

Learn more about MyCare at https://mycareapp.online or call (405) 605-0546.

OSU Telehealth Initiatives in Veterinary Medicine

Veterinary medicine broadly encompasses health care delivery, including public health response, diagnosis, consultation, treatment and transfer of medical data, and exchange of medical education information. There is tremendous opportunity to benefit Oklahoma's citizens by means of interactive audio, video and data communications to deliver these services and information. Together, application of telehealth promises to expand the capabilities and greatly extend the range of veterinary health care delivery. Veterinarians provide critical services to public health through food safety, disease surveillance, and care and well-being of our livestock and companion animals. The term zoonotic disease describes a disease transmitted from animals to humans, or more generally, transmitted across species. Notable examples are rabies, influenza and respiratory coronaviruses. More than 70% of emerging diseases worldwide are zoonotic. Veterinarians are often the first health professionals to see and report new diseases as they appear in animal populations.

There is a shortage of veterinarians in Oklahoma, where there are approximately 2,000 licensed veterinarians. Three-quarters of these professionals are located in the Oklahoma City and Tulsa metropolitan areas. As a result, the shortage is most acutely felt in rural areas where there is a lack of veterinarians in large and mixed animal practice. However, even in the metropolitan areas, there is a shortage of veterinary professionals (<1 per 1,000 persons) delivering care to companion animal populations and a critical shortage in certain specialties including pathology, dermatology, cardiology, radiology and oncology (cancer diagnosis and treatment).

The current rural veterinarian shortage in some Oklahoma communities exists due to multifactorial problems such as growing student debt, long hours and fewer graduates wanting to live away from larger population centers. However, without veterinarians, our farmers, public health and the food supply are more vulnerable to potential disease outbreaks and other sources of economic loss. Thirty-four percent of Oklahoma counties have a recognized shortage of food supply veterinary practitioners in rural areas and all Oklahoma counties have a shortage of public practice veterinarians[4]. In particular, there are not enough veterinarians to service Oklahoma's 52,000 cattle operations[5]. The current shortage will likely increase without a path to stabilize rural veterinary practices, especially during times when beef production experiences

[4] National Institute of Food Agriculture. Veterinary Services Shortage Situations (n.d). Retrieved at https://nifa.usda.gov/vmlrp-map.

[5] National Agricultural Statistics Service. Census of Agriculture (n.d.). Retrieved at https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/Oklahoma/.

a dip and as older veterinarians retire. Approximately 40% of the veterinary workforce was eligible for retirement starting in 2016[6].

The Oklahoma State University College of Veterinary Medicine (OSUCVM) sees rural veterinary care shifting from the traditional farm calls and medical interventions to value-added services, including diagnostics and consultation in areas such as designing, monitoring and analyzing performance and health data, facility evaluation, and nutrition services affecting the overall productivity of the farming/ranching enterprise. Advances in new knowledge and technology in all aspects of veterinary practice require constant updates. There is a critical need to develop training programs and other services for practitioners in Oklahoma and the surrounding region. Without mitigation, the veterinarian shortage will continue to increase, potentially resulting in greater opportunity for disease outbreaks, economic instability and food insecurity. The OSUCVM seeks to support veterinary practices across the state by expanding their skills and service offerings related to public health, herd health and production performance analysis, food animal nutrition, disease control, reproductive management, and business management practices.

A veterinary telehealth system based on rural telehealth models would utilize the internet to securely encrypt and transmit data between sites and point-to-point connections or by using OSU videoconferencing to facilitate virtual rooms to consult, diagnose, treat and provide continuing education. Current network providers for similar systems include AT&T, Verizon, OneNet, and Spacenet, which support local video and bandwidth needs to accommodate transmissions regardless of media source. This would involve supported transmissions over fiber, copper, cellular and satellite communications. This effort provides an excellent opportunity to establish and promote utilization of telehealth systems to help address the practitioner shortage.

OSU has extensive experience developing and administering extension and education programming across the state. The university has an extension office in every county and strong relationships with practitioners, governmental agencies and professional bodies. Zoom videoconferencing offerings and trainings are regularly used for extension efforts. Services and activities specific to the OSUCVM include offering continuing education (CE) programs for producers and veterinary professionals, hosting in-person CE conferences, and co-sponsoring summer seminars with the Oklahoma Veterinary Medical Association.

According to the American Pet Products Association, millennials are now the largest pet-owning demographic in the U.S. This group has grown up with Google, Facebook and Amazon and has come to expect rapid service and immediate answers. For them, technology is not the obstacle. Progressive practice owners can differentiate themselves by leveraging telehealth platforms to stay in touch with clients. Digital consultation and diagnostic capability are the logical

[6] American Veterinary Medical Association. 2013 U.S. Veterinary Workforce Study: Modeling Capacity Utilization (April 16, 2013).

progressions in this trend, greatly speeding the diagnostic loop for waiting clients, helping to improve retention and standard of care.

Digital technologies for image transfer and analysis applied to radiography, cardiology, dermatology and pathology, coupled with videoconferencing platforms for consultation, can change how veterinarians practice medicine and creates a whole new paradigm for accessing veterinary expertise. Many major veterinary labs now scan histological sections for remote pathologist review. Both veterinary and human studies have found strong correlation and agreement between pathologist interpretations of glass slides and digital slide images.

Transferring images from the referring veterinarians to the consulting specialists include:

1. Attaching images to an email
2. Uploading images to a website for online review through a digital portal or shared weblink.
3. File transfer protocol to a custom server network, from which the digital images could be reviewed.
4. Using a smartphone application to transfer images from smartphone to smartphone.

Clinical history and other pertinent data can be made available in some fashion along with the digital images, and consulting specialists could leave comments for other reviewers prior to finalizing the diagnosis. International telepathology consultation services with digital whole-slide image capabilities have been established at several academic medical centers, including the University of Pittsburgh Medical Center, the University of California at Los Angeles and the University of Utah.

Capturing slide images with a smartphone is a fast and convenient option. Smartphone camera resolution now rivals that of high-end digital cameras, so anyone can create crisp, clear images. Stabilizing a smartphone to frame and focus images can be accomplished with a bit of practice or with the aid of a commercially available smartphone holder that attaches directly to the microscope. Alternatively, microscopes are often trinocular and camera-compatible, and many practices have an existing digital camera setup. This remains an easy and relatively affordable option.

Smartphone apps can provide convenient means to transmit information between practitioners and diagnostic personnel, including descriptions of testing methods, specimens needed, how to package and ship specimens, pricing, schedules and turnaround times. In addition, digital submissions could be facilitated with tools for submission of microscopic images captured with a smartphone's camera, rapid interpretation within a short time of submission, easy submission processes to allow for fast submission of each new sample, and quick results allow for rapid clinical intervention and treatment.

With the recognition that online CE provides opportunity for the OSUCVM to broaden reach and engage with veterinarians on a larger scale, OSUCVM has efforts currently underway to

develop the needed content and delivery platforms. The potential exists to share the talented expertise of OSUCVM faculty globally. Online CE pathways and networking would enable the OSUCVM to respond to Oklahoma health emergencies quickly and provide needed information to veterinarians statewide.

Online education provides needed CE to practitioners at a time and location that is convenient to the practitioners. Oklahoma practitioners, including those from surprising demographics, frequently ask about online CE and look to our land-grant institution to provide leadership in this area. Younger veterinarians have grown up with digital and online technology in education and other fields, and expect high-quality CE opportunities to round out professional interests and requirements. A brief survey of schools reveals that several (including Kansas State University), as well as industry and the American Veterinary Medical Association, have CE offerings online. However, the expertise of faculty and the availability of resources at OSU provide a unique combination to deliver high-quality, one-of-a-kind resources nationwide.

A variety of online activities, including CE courses, online consultation, diagnostics, creation of knowledge-sharing communities and other regular interactions, and development of related resources, would improve the professional capabilities and expand the reach of veterinary medicine in the state of Oklahoma. This will translate to improved public health, as well as the well-being and performance of companion animals and livestock, and the ability of the veterinary profession to engage across the state with other veterinarians, students and the public.

Emerging Technology Programs

Education is no longer a purely localized effort. As technology advances, learning has become more global in nature. Students can access learning opportunities regardless of their location or their teacher's location. Professionals are also accessing global training for professional development and skills acquisition. The Oklahomans Virtually Everywhere Act provides an opportunity to build a teaching and training network that gives Oklahomans the ability to access educational initiatives that bring real-world experiences to them through virtual and telepresence. The following programs are utilizing emerging technologies to create immersive learning experiences. Expanding these and similar programs through the Virtually Everywhere Act will open doors for all Oklahomans to learn and grow virtually everywhere. As the Virtually Everywhere initiative advances, technology and programs such as these will also be applied to business, government and rural communities.

Oklahoma State University Introduces Mursion Virtual Reality Simulation

In 2015, Oklahoma State University's Professional Education Unit adopted the use of Mursion. This mixed reality simulation uses a blend of artificial intelligence and live actors to simulate different interactive settings (corporate, education, health care and defense). Through improvisation from a live actor providing voice and movement for the avatars behind the scenes, OSU's pre-service teachers have opportunities to experience real-time teaching and parent-teacher conferences with a facilitator there to provide just-in-time coaching. The facilitator also has the ability to set the challenge level of the scenario based on the readiness of the pre-service teacher.

This technology has enabled OSU's pre-service teachers to teach lessons, manage the classroom and practice the skills of teaching with these avatars before entering the field and working with real children. Each candidate is able to reset the program and start over at will, and he or she can teach the same lesson again and again until confident the lesson has gone well. The avatars respond in real time, can "see" the candidate, and converse on current events, new movies, books and video games just as real children in a classroom would.

The image shows a pre-service teacher interacting with a classroom of avatars.

Recent research OSU has conducted details the impact this mixed-reality simulation has on participants.[7]

OSU has been using only the education segment of Mursion, but the platform also serves business, health care and defense. More information on these segments can be found on Mursion's website. Mursion technology is platform-agnostic and can be experienced in 2D or 3D.

Mursion offers two delivery and distribution models:

- Managed Services – outsourced trained specialists provided by Mursion that coordinate and facilitate simulation sessions using their content or the organization's content.
- Software License – Saas subscription to deliver personalized simulations with specialists trained in-house on an annual basis.

The managed services option has worked well for OSU's implementation with pre-service teachers, but OSU envisions supporting the state of Oklahoma with opportunities for corporate, health care, education and defense training. To do this, the state would need to consider alternatives. The overview below was provided by Mursion for consideration of running a pilot for the Oklahomans Virtually Everywhere Act.

Overview
Mursion can empower content experts to amplify their impact by supporting and deploying their expertise via rigorous training simulations to learners across the state, nation and globe. Through these scaled simulations, Mursion's platform can deliver cost-effective human skills training that will also position Oklahoma as a pioneer in leadership development, teacher education, sales enablement, customer service, diversity and inclusivity initiatives, and much more.

Powered by a blend of artificial intelligence and live human interaction, Mursion provides immersive virtual reality training for essential skills in the workplace. By using trained professionals who orchestrate the interactions between learners and avatar-based characters,

[7] Dalinger, T.; Thomas, K.T.; Stansberry, S.L.; & Xiu, Y. A mixed-reality simulation offers strategic practice for pre-service teachers. Computers & Education, 144 (January 2020), 103696. More information available at https://doi.org/10.1016/j.compedu.2019.103696.

Mursion simulations achieve the realism needed to deliver measurable, high-impact results. Drawing upon research in domains such as learning science, artificial intelligence and psychology, Mursion harnesses the best in technology and human interaction to deliver outcomes for both learners and organizations.

For the Oklahoman's Virtually Everywhere Act of 2019, Mursion proposes a learning program that provides immersive practice, targeting a pilot group of content experts in delivery. The customized scenarios would be aligned to expert's curriculum. Each simulation will be accompanied by a video recording of the session for self-reflection and supervisory feedback. Mursion and State of Oklahoma will engage in two phases of work:

1. Custom Pilot: Mursion will design and test custom scenarios using Mursion avatars and environments and deliver simulations to approximately 100 learners (four specific scenarios).
2. In-Source, At-Scale: The state of Oklahoma will license the Mursion software, including all Mursion avatars and environments to design and deliver simulations.

For more information, please see the Mursion website at http://mursion.com.

OSU's Tele-ED: 21st Century Professional Development for Oklahoma Rural Educators

Oklahoma State University's Educational Leadership (EDLE) Department is collaborating with Project ECHO® in a rural professional development project referred to as Tele-ED. Tele-ED is a newly created subsystem of Project ECHO®, a guided practice model used by OSU's Center of Health Sciences (CHS) to offer health care assistance to rural areas in Oklahoma. The EDLE faculty is partnering with CHS to use the same ECHO processes, technologies and infrastructure to deliver needed and pertinent professional development to rural Oklahoma educators.

In addition to enhancing rural educational development, other project goals include collaborating to:

- Generate a rural school, professional development database for EDLE and to deepen EDLE's emerging line of inquiry.
- Search for pertinent external agencies that have a record of funding similar projects.
- Write and submit collaborative grant proposals to procure funding from selected external agencies.

Problem and Project Background
Oklahoma rural schools face difficult challenges including inadequate and inequitable financing, teacher shortages, inaccessible or unaffordable services for children and families, and especially, inadequate opportunities for professional development close to their communities to help them address these issues. Despite these challenges, rural schools are expected to provide the same services and meet the same educational outcome goals as their urban or

suburban counterparts even though they often lack the resources that are available in municipal settings.

Additionally, leaders in rural districts are often isolated, either by job position or district location, and staff assume multiple roles beyond their immediate job responsibilities. These inequities are especially concerning given the fact that novice administrators are often hired for administrative positions in rural districts.

Project ECHO® is an established, innovative. guided practice model developed by Dr. Sanjeev Arora at the University of New Mexico. In Oklahoma, Project ECHO® activities are coordinated through OSUCHS to improve health outcomes while reducing geographic barriers and decreasing the cost of care through a multidisciplinary team-based approach. The heart of the ECHO model is knowledge-sharing networks that are led by expert teams using multipoint videoconferencing to conduct virtual training. Like Project ECHO®, Tele-ED will fill the knowledge gap between rural and urban educators, develop a professional learning network for rural educators to seek out additional professional advice and allow rural schools to enhance their contributions to their communities.

The ECHO Model Applied to Rural Educational Leaders and Educators
Distance educational development, or Tele-ED, can dramatically improve both capacity and equitable access to professional development and professional networking opportunities for rural and underserved school districts. This low-cost, high-impact intervention is accomplished by linking expert interdisciplinary specialist teams with rural school leaders through Tele-ED hubs. Regularly scheduled Tele-ED sessions virtually connect expert interdisciplinary specialists such as veteran superintendents, counselors, curriculum specialists and/or university faculty with rural school administrators using web-based videoconferencing technology.

How Will Tele-ED Benefit Oklahoma Rural Administrators and Educators?
Currently, rural school administrators have several options for professional networking and professional growth. These include statewide organizations, regional superintendent consortiums and professional development provided through the State Department of Education and the Cooperative Council for Oklahoma School Administration. However, all of these options either require the rural school administrator to travel, sometimes long distances, away from the district or payment out of already diminished school budgets. Many conferences and workshops for administrators are held in urban centers and cost $100 or more for registration and require additional funding for mileage, hotel and per diem. For these reasons, although the opportunities are available, not all rural school administrators can take advantage of them. Tele-ED addresses the shortcomings of current networking and professional development options and has the potential to impact over 300 rural school leaders.

Tele-ED also provides the following benefits:

- Case-based educational leadership development designed to address “real” problems in “real” contexts.

- Sharing of best practices for enhanced student outcomes between educational experts and a network of rural administrators.
- Free and community-based continuing education credits for administrators.
- Access to a multidisciplinary team of specialists including consultation with experienced educational leaders.

Associated Research
The Tele-ED team has identified several research projects that are guiding research activities.

- Social Network Analysis – The team plans to use the methods of social network analysis to create visual representations of the relational networks of rural administrators before and after participation in Tele-ED to explore the creation of networks and the influence the networks may have on the motivation, self-efficacy and learning of the administrator.
- Cultural Assessments – The project has the potential for enhancing morale and persistence of rural district leaders by helping them solve some of the most challenging and complex problems facing public education in the state of Oklahoma. With current superintendent tenure averaging 3.2 years in the state[8], this project can provide much needed support for retention of emerging leaders.
- Qualitative, Experimental Design and Longitudinal Studies – Data collected will include quantitative data of academic optimism, administrator grit and administrator self-efficacy before and after implementation of the project. Qualitative data will include innate processes and administrator perceptions of the influence of the Tele-ED platform on their effectiveness as an organizational leader. Longitudinal data will include superintendent and principal tenure in these rural districts after participation in Project ECHO® for school leaders.

Summary
The Tele-ED project builds on the success of the Project ECHO® model currently implemented in several states to meet the needs of rural health providers. Rural educators, particularly administrators, face many of the same challenges as these health providers: lack of resources, isolation and limited access to low-cost, yet effective, professional growth opportunities. Tele-ED proposes to meet the needs of these educators by providing virtual connections between an interdisciplinary team of educational experts with rural school administrators through this virtual platform, providing authentic, pertinent support for rural administrators on topics of local interest and need. The implementation of Tele-ED will result in a number of research studies contributing to the field of educational leadership and is a project that aligns with the funding priorities of several federal and state competitive grant programs. The incorporation of Project ECHO's platform and infrastructure in providing professional development to rural schools not only complements OSU's land grant mission, but it also provides an illustration of a 21st century application of that mission.

[8] Felder, Ben. School superintendent turnover, in long run, shorts students, experts say. The Oklahoman (May 2, 2016).

University of Oklahoma's K20 Center Project PRIME Model Course Proposal

Google, a company known for innovation, now uses the term moonshot to describe its most pioneering projects. Google defines a moonshot as a project or proposal that, "1. Addresses a huge problem, 2. Proposes a radical solution, 3. Uses breakthrough technology."[9]

With the passing of the Oklahomans Virtually Everywhere Act of 2019, Oklahoma is an ideal place to consider a moonshot to address a persistent educational challenge—equitable student access to high-quality high school mathematics instruction. This moonshot would have far-reaching implications for students and move the state of Oklahoma closer to Governor Stitt's goal of becoming a top 10 state. The University of Oklahoma's K20 Center is poised to lead a collaborative effort in pursuing this moonshot and transforming mathematics education through its Project PRIME (Promoting Readiness in Mathematics Earlier) proposal.

The Huge Problem

Using data from national databases, the Oklahoma State Department of Education and the Oklahoma State Regents for Higher Education, the following student outcomes and math performance in Oklahoma is notable.

- Oklahoma is below average in the graduation rate of high school seniors. According to the National Center for Education Statistics (2019), Oklahoma's graduation rate of 82.6% lags behind the U.S. average of 84.6% and ranks Oklahoma 34th in the country.
- Over 25% of Oklahoma's high school seniors were placed in remedial math upon entering postsecondary education. According to OSRHE (2019), 27.7% of graduated high school seniors were placed in remedial math. This is compared to 0.5% in science and 17.1% in English.
- Oklahoma's ACT average is below the regional average. In 2019, Oklahoma's average ACT score on the mathematics subtest was 18.8 (ACT, 2019). This is below the national average of 20.7 and below the surrounding states (e.g., Texas, 20.7 and Kansas 21.3). Oklahoma's ACT average for the mathematics subtest ranks 47th nationally.

The Radical Solution

The Project PRIME proposal attempts to assemble the most innovative and promising components of modern learning, mathematical pedagogical approaches and technology-based solutions to revolutionize how students learn mathematics. The proposed project reimagines the traditional Algebra I course into a student-centered, experiential learning event. To accomplish this goal, the course will integrate a wide array of technologies, interactive applications and telecommunication structures that will support teachers in more effectively differentiating learning for students of varying abilities, needs and learning preferences.

[9] Rouse, Margaret. Moonshot (April 2014). Retrieved at https://whatis.techtarget.com/definition/moonshot.

Breakthrough Technology

The K20 Center proposed project's breakthrough technology seeks to integrate technology to develop, organize, curate and deliver digital resources to teachers and students in support of high-quality, student-centered instruction. Highlights from the full proposal include the following:

- Open Educational Resources – The content and resources developed for the Algebra I course will be free and open to teachers across the nation. These open educational resources will be in the form of teachable units aligned with Oklahoma Academic Standards, supplemental content to support learning and all additional materials needed for teachers and students to fully implement the PRIME curriculum.
- PRIME Curriculum – The proposed Algebra I course will include 185 hours of instruction. Each unit will include game-based learning or virtual reality experiences. Included in each unit will be several learning modules with video assets, web-based tools and student collaboration toolsets as well as extensions to connect mathematics to real-world applications.
- Game-Based Learning – Game-based learning will be integrated throughout the units in the Algebra I course. Hosted on the learning management system (LMS), the teacher can assign vignettes (parts of the math games) to students that correspond with the knowledge and skills learned. Game-based learning is an engaging way to provide additional practice on math skills.
- Career Connections – Using online platforms such as Zoom, teachers can connect students to professionals across the world. Professionals will share education requirements, work experiences and the application of mathematical concepts on the job.
- Problem-Based Learning – The PRIME curriculum will challenge students to solve real-world problems using mathematical concepts learned during class. In small groups, students will collaborate to define the problem, brainstorm proposed solutions and apply and evaluate the best solution to be tested.
- Virtual Reality/Augmented Reality – Students in the Algebra I course will have the opportunity to experience learning through VR/AR systems and develop their own videos for use by other students. VR and AR provide immersive learning experiences that engage students and compliment the knowledge and skills learned in each unit.

In the PRIME proposal, The OU's K20 Center respectfully proposes a three-year development cycle to plan, design, develop and deploy Project PRIME. This ambitious project will utilize the K20 Center's experience in instructional and game-based learning design and draw from research and best practices in mathematics education to develop a meaningful, technology-mediated Algebra I course that seeks to adapt modern learning theory to improve both student engagement and knowledge acquisition in mathematics.

Social Work Students Practice Skills With Virtual Reality Lab

Northwestern Oklahoma State University (NWOSU) is utilizing virtual reality to give social work students real-life experience. Students are able to travel virtually everywhere for educational experiences that prepare them for work in the field.

NWOSU's social work program received a $40,000 grant from the Child Welfare Professional Enhancement Program Student Payback Fund Grants to construct a social work virtual reality lab and resource center on the Enid campus.

In the state-of-the-art virtual reality lab, social work students wear a headset or goggles, transporting them into various virtual environments to learn professional practice skills. The virtual reality curriculum centers upon experience such as home visits, assessing child risk, social worker safety, interviewing skills, courtroom testimony, cultural awareness and disaster response.

Simulation training is a well-established feature in most professional practice programs. The virtual reality lab enables the department of social work to provide a safe environment for students to practice skills in an accelerated format, better preparing them for the field experience and real-world social work practice.

The virtual reality curriculum centers on developing core competencies, building empathy and gaining cultural awareness. The technology provides educational experiences such as walking with a homeless man living in the streets of San Francisco, hearing the inner thoughts of a 16-year-old with autism as she attends a birthday party, and attending a home health visit where suspected child abuse has occurred.

According to Dr. Kylene Rehder, chair of the department of social work and program director, the lab provides students with an immersive learning experience combining visual, auditory and kinesthetic learning modalities. She believes the integration of this technology will transform learning experiences for students and will result in more qualified and professionally skilled social workers in the field.

Oral Roberts University's Global Learning Center Expands Education Virtually Everywhere

Oral Roberts University's Global Learning Center is making Spirit-empowered, whole-person education a global reality, whether it's being used by on-campus students or is virtually welcoming students from any nation. ORU is the only university in the world harnessing virtual reality and augmented reality technologies to provide students with an unmatched learning experience, regardless of their location—all available through a simple smartphone.

ORU received $8.5 million to develop the Global Learning Center, which opened in January 2017. Of the $8.5 million that went into the construction of the center, approximately $2.5 million was spent on technology, with $1.1 million specifically spent on augmented and virtual reality. During the planning and development of the center, the university developed the term "GeoVision Technology" to describe how students can gain access to everything and intelligence can be passed around the world.

The Global Learning Center includes classrooms for global learning and teleportation, virtual reality, global innovation collaboration, instructional class for disabilities, a studio, high-performance computing research, a distance education lab, and faculty excellence and learning.

Technology at the center is expansive, including 700,000 VR and AR learning environments, a Mursion Avatar screen creator, 3D printers, 3D video screens and projectors, a full immersion VR cube, six teleportation classrooms, and the largest video recording studio in Tulsa.

One technology that enables ORU to reach students virtually everywhere is GEO robots. ORU began using the robots to meet the needs of students who could not attend college in a traditional sense, such as students coping with medical issues. Students who are unable to attend class physically can attend virtually with a robot.

Students connect to the robot using their phones or computers and are able to move the robot around campus and within a classroom setting using controls from their home or wherever they are. Once students maneuver the robot into the classroom, they can utilize live two-way audio and video to ask questions and interact with professors and other students in the classroom.

GEO opens up immense possibilities for the future of higher education by connecting remote students to campus life and has even helped students graduate using the robot. According to the U.S. Department of Education, nearly half of students who begin a bachelor's degree do not finish it. Many encounter life obstacles that force them to take a break or halt their education completely. Partnerships between universities and technology like that of GEO and ORU are changing the landscape of education by allowing greater flexibility in traditional education.

Telepresence Technology Service Providers

Higher education institutions have the historical designation of being pioneers in distance learning initiatives within Oklahoma. As part of higher education's ongoing leadership efforts to expand online learning capabilities, institutions are partnering with technology companies to improve educational experiences through technology. Oklahoma's vibrant technology industry is creating educational experiences and employment opportunities never before seen that open doors for citizens in urban and rural communities. The following companies are collaborating with higher education through public-private engagements that will continue to propel Oklahoma forward in areas of research and development.

Trifecta Communications

Trifecta began working in the AR/VR space five years ago, applying the technology to marketing and advertising clients. The firm has worked with entities including Bob Moore Auto Group, Norman Regional Health System, the University of Oklahoma and many others using the Trifecta AR app. Trifecta has also pushed on-site AR implementation through their Folk Secrets AR history app, allowing participants to experience Oklahoma the way it might have been 100 years ago. In collaboration with Frontier City theme park, they converted the Silver Bullet roller coaster into an outer space experience. Riders wore VR headsets on the coaster, synched to a virtual environment, allowing them to experience space travel right in Oklahoma City.

Today, Trifecta is using AR technology with organizations like Moore Norman Technology Center and Ponca City Development Authority for workforce development applications. Trifecta has also launched a spinoff company called Viribus VR Labs, developing virtual reality therapy tools for children with cerebral palsy. In addition, Trifecta is collaborating with Loveworks Leadership (a Norman nonprofit focused on entrepreneurialism skills with middle school students). The collaboration is helping 10 students launch their own technology company, Wristworld, by developing a line of augmented reality wristband toys (using Trifecta's technology and mentorship). The students have since contracted with Oklahoma-based OnCue to sell AR wristbands throughout the state.

Through these projects, Trifecta has established strong connections with Oklahoma institutions including Oklahoma Christian University and Oklahoma City University, which both offer gaming and animation degree programs. Through the years, Trifecta has provided paid internship opportunities for numerous students

and hired a number of them as employees. The company is doing its part to build a technology ecosystem in Oklahoma and looks forward to expanding those pioneering opportunities into the future.

Folk Secrets – Augmented Reality for History Education

Trifecta's Folk Secrets project is an Oklahoma-history augmented reality (AR) app that is engaging the public in local history, while serving as a proof-of-concept for potential implementation of AR in history education.

Concept

Folk Secrets was an Oklahoma history-based treasure hunt, presented as a show on Facebook. But unlike most TV shows, viewers actually participated by hunting for the treasure with a time-traveling Folk Secrets Codex app (Apple or Android). The hunt spanned three seasons beginning in June 2017 and culminated in July 2018. Each week, thousands of viewers watched the latest episode of Folk Secrets on Facebook then hunted for clues to find the treasure. Along the way, they scanned signs, markers and landmarks with the Codex app to reveal AR clues and open time portals, where their knowledge of Oklahoma history was necessary to make progress.

Technology

Folk Secrets implemented cutting-edge AR technology, allowing participants to feel as if they stepped back in time at various locations throughout the metro. When participants aimed their device at the correct sign, statue or object, a virtual doorway opened. Using their phone, they could physically walk into the doorway and look around. Each doorway led to that exact physical location, but from another era. Imagine standing inside the 21C Hotel Museum, activating a virtual doorway with the app, physically walking through that doorway and entering that exact spot…80 years earlier. You would see a Ford automobile factory and have an opportunity to explore a 360-degree virtual experience by moving your phone in all directions. You stepped back in time…and that's where the clues were.

This experience was replicated in different communities throughout the metro through the course of the hunt, allowing participants to experience those communities as they were in the past and learn about their associated history.

Implementation

To accomplish all of this, Trifecta's team researched historical information for each location via the Oklahoma History Center. Utilizing written documentation and historical photographs, each location was recreated using 3D modeling techniques. These were added into the Folk Secrets app, using a SLAM AR system, allowing the user's phone to scan the ground and attach a virtual doorway they could walk into and explore, complete with touch-screen interaction. All of this was connected via geotargeting. When a participant was in the right location in the metro, the app sent a push notification to their phone, letting them know they could open a time portal.

Future Application
Folk Secrets was ultimately paid for through business sponsorships including AT&T, Cox Communications, Norman Regional Health System and others. Trifecta commissioned the project as a way to demonstrate the viability of AR as a teaching tool for history education. Trifecta's ultimate desire is to implement the technology and AR techniques into Oklahoma history curriculum. In addition to learning about Oklahoma history via a textbook, students could also "walk into" history, right in their classroom via an iPad. Trifecta believes this is the future of history…and education.

More information about this project can be found at the following links:

- https://FolkSecrets.com
- https://kfor.com/2018/06/08/a-time-machine-on-your-phone-folk-secrets-is-the-next-best-thing
- https://oklahoman.com/article/5596658/app-allows-users-to-look-back-in-oklahoma-history-and-win-money

Clevyr

Clevyr is a custom software development company based in Oklahoma City. For the past 10 years, Clevyr has researched, developed, tested and deployed software for over 100 clients. In 2009, CEO Matt Williamson, CTO Jason Post and COO Tim Nix founded Clevyr with the mission to create elegant software that makes lives better. Together, the founding partners have grown the company to a team of nearly 40 developers, designers, and operations and administrative staff.

The company's experience includes developing websites, web applications, enterprise software for major multinational corporations, mobile applications, API integrations, custom dashboards and more.

Beginning in 2016, Clevyr invested in staff and equipment to expand their specialties to include the ability to create custom virtual and augmented reality (VR/AR) experiences for enterprise clients. Clevyr's initial list of clients include the Oklahoma City Thunder, Kimray, Story & Heart, as well as new enterprise startups utilizing virtual reality technology.

Ocupath

Ocupath is an Oklahoma-based small business that is redefining the way organizations train, recruit and retain the next-generation worker. Ocupath creates virtual reality content that provides VR workplace training for employers. What sets Ocupath apart from other VR companies is its focus on learning theory.

Virtual reality offers companies a training option that is as effective as live training at a fraction of the cost. According to research, learners are more likely to retain what they are taught through "learning by doing" as opposed to just learning by reading or listening to a presentation. Immersive technology provides hands-on experiences that allow for better learning outcomes.

In November 2019, Ocupath was selected out of several hundred technology companies across the country to receive a contract with the U.S. Air Force. Ocupath will create virtual reality-based training for Air Force aircraft maintenance personnel.

Taking a "Byte" Out of Cybercrime Through Education

Cybertechnology has changed how individuals live and conduct business in ways that could have never predicted just 10 years ago. Indeed, collective and individual cyber experience influences the way individuals express themselves creatively, socially, politically and economically. As a result, everyone is directly or indirectly impacted by the larger societal dependency of online technologies.

As entrepreneurial innovation continues to evolve with these online mediums, citizens and the economy are increasingly dependent on the integrity of these connected systems. Yet, as critical as these systems are to growth and stability, they are ever vulnerable to the corruption and exploitation of a host of bad actors including lone criminals, sophisticated criminal enterprises, hostile state actors and terrorist organizations.

Cybercrime alone is by all accounts a scourge on the economy, accounting for an estimated profit loss of nearly 1% of the global gross domestic product. The personal impact of cybercrime can be equally problematic to the individual Oklahoman. According to a report released in February 2017 by the Center for Strategic and International Studies (CSIS), "64% of Americans have become victims of fraudulent charges or loss of personal information."[10]

In response to this scourge, the Oklahoma Council for Cyber Learning (OCCL) calls for increased private-to-public collaboration to address this complex, multifaceted issue. Areas of particular interest for collaboration are cyberthreat awareness and cybersecurity education and training. The intent is to engage with the state of Oklahoma in continued dialogue and development of a broad cyber education program designed to defend the cyber interests of Oklahoma and its citizens while promoting and advancing workforce development for a strong, diverse economy.

Educating Oklahomans to Fill In-Demand, High-Paying, Cybersecurity Jobs

In mounting a strong defense of cyberinterests, a well-educated staff of cyber professionals should be employed and developed. As sound as this logic may be, it is not always that simple. "Cybersecurity ranks as the No. 1 area where organizations have a problematic shortage of skilled staff."[11] To compound this serious deficiency in cyberdefense ranks, cybercrime is on the rise and becoming more sophisticated by the day. As a result, "Demand for cybersecurity professionals is expected to grow by 37% per year at least through 2022."[12]

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[10] Center for Strategic and International Studies. Economic impact of cybercrime–no slowing down (February 2017). Retrieved at https://www.csis.org/analysis/economic-impact-cybercrime.

[11] CISO Collective. Business-academic collaboration to solve the cybersecurity skills shortage (Oct. 16, 2018).

[12] Oltsik, Jon. Research suggests cybersecurity skills shortage is getting worse. CSO Online (Jan. 11, 2018).

As such, Fortinet and its industry partners within the Oklahoma Council for Cyber Learning (OCCL) want to collaborate with the state of Oklahoma in addressing this problematic void of local, national and worldwide cyber talent. As co-founders of the Cyber Threat Alliance, Fortinet is a strong advocate of sharing cyberthreat intelligence and believes that educating the public to mount a strong cyberdefense is in everyone's best interest. It is in this spirit that Fortinet has organized this group of local and national private sector companies to give input and resources in development of a cyberawareness program and cybersecurity curriculum for Oklahoma's public sector.

Benefits of Supporting Cybersecurity Education

- National Leadership – Oklahoma will serve as a powerhouse in the field of cyber workforce development.

- Jobs – There is a shortage of qualified cybersecurity professionals. Presently, between 3-4 million cyber jobs go unfilled worldwide. Given the urgency of combating cyberthreats and the lack of a qualified workforce, companies often employ remote workers to fill these in-demand positions. Educating Oklahomans to fill these remote jobs will boost the local digital economy.

- Improved Wages – The average entry-level cybersecurity professional can expect a salary of $65,000 per year. Professionals with advanced cybertraining and/or education can earn $150,000-$250,000 per year or more.

- Economic Development – Oklahoma companies need qualified professionals to defend their cyberbusiness interests. Local companies depend on these professionals to maintain, grow and defend their businesses. Equally important, outside investors require a skilled workforce when considering investing in new cities. For these reasons and more, a skilled cybersecurity workforce plays a crucial role in local business growth and attracting new business investment.

- Skills Flight – The cybersecurity professionals that are developed in state are in high-demand and are often lured away to larger cities. Consulting with the local private sector about public policy to promote skills development and to stem the skills flight is imperative.

- Public Sector Cyberdefense – Public sector data assets are among the most highly valued targets of cybercriminals. To maintain the integrity and privacy of these assets, the public sector workforce's proficiency in cyberthreat awareness and cybersecurity practices must be continually developed. The public sector IT workforce (city, local, state

and K-12) require advanced education and continuing education to mount credible cyberdefenses to the evolving threat landscape.

- Digital Transformation – A cyber education program aligns with the governor's digital transformation vision. Digital transformation is security transformation. To successfully execute on the governor's vision, the workforce must be educated to securely operate in the new digital government.

Statewide Accessibility of Cyber Education Via Distance Learning
Presently, Oklahoma is home to a number of world-class private and public higher education cyber degree programs, including Oklahoma City Community College, Oklahoma State University Institute of Technology, Rose State College and The University of Tulsa. These programs are recognized for their contribution to cyber academics and their innovation in the field. OCCL recognizes their importance and wants to build upon their success.

To supplement these important cyber degree programs and to meet existing workforce needs, OCCL recommends introducing cyber education in Oklahoma high schools to inspire and prepare the next generation of cyberwarriors. OCCL also recommends developing and delivering a robust cyber education program at Oklahoma career technology centers and community colleges to empower nondegree-seeking students and the existing workforce to obtain industry certifications.

In support of these recommendations, the OCCL has developed a proposed partnership with the state to aid in the development of the cyber education and training programs. The proposed distance learning platform is an ideal medium for distributing this vital cyber education and training to Oklahomans regardless of their proximity to an instructor. The proposed virtual presence system will give broader access to game-changing cyber education content by granting access to cyber curriculum virtually everywhere within the state of Oklahoma.

Ally Dog Depot

The creators of Ally Dog Depot, an Oklahoma-based business, believe that every moment is a potential learning moment with a child. Being intentional about creating opportunities to learn is the No. 1 goal. AllyDogDepot.com is designed to meet families where they are through telepresence and virtual presence with weekly, live Zoom, teacher-facilitated online classes; Emmy-winning content learning videos; and offline downloadable activities. The Ally Dog Depot program is a STEM-based, online program for children ages 3-6 years old and uses the power of music and story to prepare children for learning success. Using the latest technology, Ally Dog Depot reaches children and families virtually everywhere.

- All concepts are based on the published national learning standards of math and music.
- Instruction is 100% aligned with Head Start performance standards, evaluated federally.
- Program includes weekly live online classes through Zoom.
- Short two-minute math and music videos setup the learning experience.
- Each video includes both online and offline learning.
- Online program to help pre-K/K children form positive concepts in general problem-solving, STEM-based challenges and musical concepts—not just singing along, but research-supported success with concept formation.

Independent research shows students gain multiple higher-order thinking skills such as the ability to infer answers from given information, discuss the process of arriving at arithmetic answers—not just one correct answer—compare and contrast two ideas. and show significant examples of multiple problem-solving strategies.

Student outcomes:

- Students can evaluate the worth of a solution to a problem.
- There is evidence of students making both deductive and inductive conclusions.
- Students make use of analogy in their reasoning.
- Students identify problems before they solve them.
- There is evidence of both structured and unstructured problem-solving.
- Students make use of multiple problem-solving strategies.
- Students are consistently asked to explain their reasoning as they solve problems.
- Students are challenged to put things together in new ways and evaluate the value of the new creation.

Transformative Next Steps

Access to reliable telepresence technologies and services should not be a privilege in the 21st century and should not depend on where you live in the state of Oklahoma. Defining organizations, resources and/or access will assist specific efforts in expanding critical service to the state and those that need it most.

As mentioned previously, the transformative benefits of live video, rapid data communication, virtual reality and distributed manipulative control of deployed instrumentation have likely not yet been fully envisaged. As with any new capability, pragmatic applications are underdeveloped, and telepresence technology will likely open doors to new types of research, education and economic development that are not fully conceptualized at this time.

Telepresence is a potentially transformative tool, and now is a critical period to think deeply about its relevance to the citizens of Oklahoma. Early adopters of any new technology play a formative role in shaping broader community use, and it is important to initiate a discussion of best telepresence practices among a diverse community of economic representatives, technologists, education experts and policymakers. Doing so effectively will aid citizens in tackling the technical challenges, immense scope and pressing urgency of an ever-changing world, while accelerating the pace of discovery.

Next Steps

The Virtually Everywhere working groups plan to build upon this initial report to create initiatives that expand telepresence and virtual presence in education, business, government and rural communities. Next steps for the working groups include:

- Obtain funding and launch the pilot program initiative.
- Create telepresence and virtual presence collaboration opportunities among agencies.
- Identify gaps in services that can be filled by partner agencies.
- Determine how the state can support new telepresence and virtual presence initiatives.
- Develop a plan for technology selection and implementation.
- Design additional pilot projects that can be replicated across agencies.
- Develop a plan for the deployment of technology hubs throughout rural Oklahoma.

Oklahoma state policymakers, educators, private sector and community leaders will continue to work together to address the telepresence technology gaps that remain in our state. Ongoing collaboration among state agencies, private sector representatives, educational institutions and community leaders is essential if we are to see continued progress in this initiative. The Oklahomans Virtually Everywhere plan can be a conduit for pursuing a cooperative resolution.

Appendix

Telepresence Definitions

Augmented Reality – An interactive experience that superimposes a computer-generated image on the individual's view of a real-world environment, enhancing visual and auditory senses.

Immersive – An illusory environment that surrounds an individual in a way that they feel they are a part of the environment.

Next-Generation Virtual Presence – The interactions between individuals and groups virtually present in meetings, conferences, office work and social contexts are indistinguishable from those who are physically present. Next-generation virtual presence differs from telepresence in that it goes beyond interaction to giving the individual the impression of being in the actual, remote environment. When implemented successfully, virtual presence is both immersive and ubiquitous, and provides a true perception that a person is physically present.

Telepresence – The ability of people who are not physically present with each other to collaborate and interact with others in meetings, conferences, office work and other contexts as though they were physically present.

Ubiquitous – Technology, services and processes evolved and integrated to such a degree as to be perceived as a natural, normal part or extension of the workspace or environment.

Virtual Reality – An interactive experience that creates a computer-generated environment that immerses an individual in a virtual world.

Technology Options

Telepresence and virtual presence connectivity are provided by several different technologies. These technologies basically provide access to a host of resources that the network has to offer. While the various applications and uses take different forms, it is translated at the endpoints into the unique features usable by all end-user devices. Technologies that are used to deliver telepresence experiences currently are:

- **Interactive Display Technology** (Trutouch, Smartboard and DTEN) – Interactive display technology features an interactive screen with touch capability (either finger or stylus) that is driven by a computer. While the features vary from device to device, these options range from just giving users a digital whiteboard to easily draw, save and share the board to having nearly full PC functionality, including videoconferencing, web browsing, document editing, etc.

- **Meeting Owl** - The Meeting Owl is a device for videoconferencing that is placed in the center of the meeting table and provides a 360-degree camera view that sections off the video to feature the current speaker in the meeting. This provides a view that feels more collaborative as well as allows remote participants an easier way to track who is speaking.

- **Mursion** - Mursion is a virtual reality training platform. Users engage with customized scenarios designed to simulate real-life challenges. Scenarios adapt based on users' actions and responses using AI and human interaction.

- **Swivl** - Swivl is a tool that allows users/educators to easily capture, review and share video. Swivl uses a separate camera (phone, tablet or DSLR camera) and a microphone. Swivl tracks and rotates to follow the presenter as they move through the room.

- **Telepresence Robot** (Double Robotics and Suitable) – Telepresence robots enable users to interact with environments remotely. These wheeled robots provide video and audio as they move throughout an environment. Some have video and audio capabilities through a smartphone or tablet, while others have built-in cameras, speakers and microphones.

- **Videoconferencing Software** (Zoom, Skype, Cisco Webex, GoToMeeting, Microsoft Teams, Jabber, Google Hangouts Meet, BueJeans and join.me) – Videoconferencing software enables online communication for meetings, whether it is audio, video or seminars. Most options have features for screen sharing, chat, recording, whiteboarding, etc.

House Bill No. 1921

An Act

ENROLLED HOUSE
BILL NO. 1921

By: Fincher of the House

and

Daniels of the Senate

An Act relating to virtual presence; creating the Oklahomans Virtually Everywhere Act of 2019; defining terms; directing agencies to develop certain proposals; providing for information contained in proposals; and providing for codification.

SUBJECT: Virtual presence

BE IT ENACTED BY THE PEOPLE OF THE STATE OF OKLAHOMA:

SECTION 1. NEW LAW A new section of law to be codified in the Oklahoma Statutes as Section 36.1 of Title 62, unless there is created a duplication in numbering, reads as follows:

A. This act shall be known and may be cited as the "Oklahomans Virtually Everywhere Act of 2019". The Oklahomans Virtually Everywhere Act creates a statewide initiative that allows Oklahomans to provide their expertise throughout the world without leaving their communities by Oklahoma becoming the leader in telepresence and virtual presence.

B. For purposes of this section:

1. "Telepresence" means the ability of people who are not physically present with each other to collaborate and interact with others in meetings, conferences, office work and other contexts as though they were physically present; and

2. "Virtual presence" means that the interactions between individuals and groups virtually present in meetings, conferences,

office work and other social contexts are indistinguishable between those who are physically present and those who are not.

C. The Oklahoma State Regents for Higher Education shall lead an effort in conjunction with OneNet, the State Board of Career and Technology Education, State Department of Education, Oklahoma Department of Libraries, Oklahoma Department of Commerce and the Office of Management and Enterprise Services on behalf of all state agencies to create a research and development proposal to make Oklahoma a leader in telepresence, with the ultimate goal of being a leader in virtual presence as the technology matures. The proposal shall include a proposed budget and be prepared for the legislative session following the effective date of this act. Each agency in this subsection shall designate a liaison for this effort.

D. The proposal shall:

1. Include a proposed budget and be prepared for the budget hearings of the legislative session;

2. Be created in consultation with businesses and state agencies;

3. Include a strategy for training Oklahoma organizations to use existing technology for telepresence and virtual presence; and

4. Include an overview of the current state of telepresence in Oklahoma education, government and business, with the following:

a. research and actions necessary to become a leader in telepresence in education,

b. research and actions necessary to become a leader in telepresence in government,

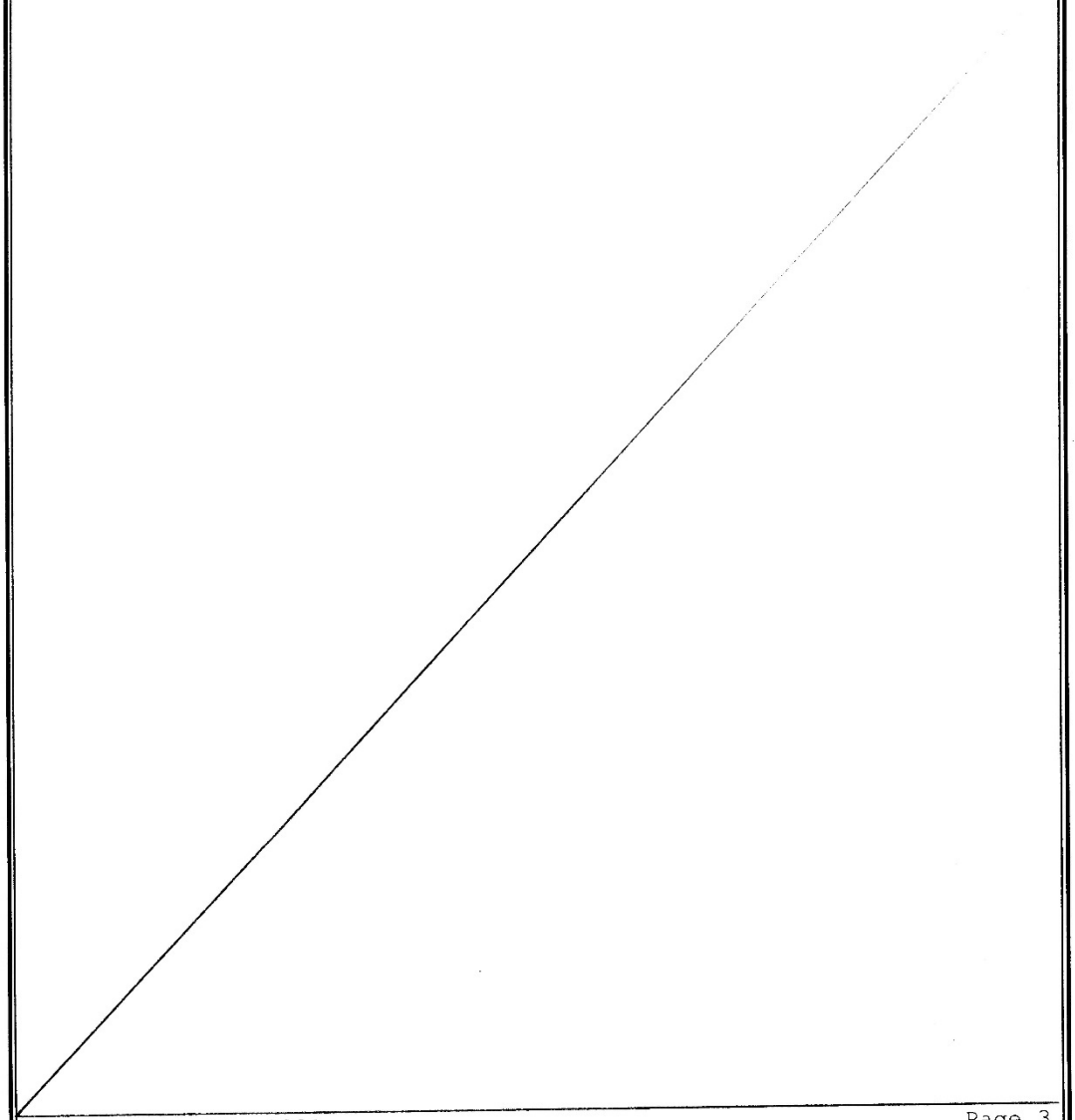
c. research and actions necessary to become a leader in telepresence in business,

d. research and actions necessary to become a leader in telepresence in Oklahoma rural communities,

e. identification of potential partners and sources of matching or other funds,

f. strategy for training Oklahoma organizations to use existing technology for telepresence and virtual presence, and

g. any additional information deemed necessary by the participants.



Passed the House of Representatives the 12th day of March, 2019.

Presiding Officer of the House of Representatives

Passed the Senate the 16th day of April, 2019.

Presiding Officer of the Senate

OFFICE OF THE GOVERNOR

Received by the Office of the Governor this 17th day of April, 20 19, at 4:17 o'clock p. M.

By: Summer Cuns

Approved by the Governor of the State of Oklahoma this 22 day of April, 20 19, at 8:01 o'clock p. M.

Governor of the State of Oklahoma

OFFICE OF THE SECRETARY OF STATE

Received by the Office of the Secretary of State this 22nd day of April, 20 19, at 2:56 o'clock P. M.

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