

The seal of the State of Wyoming is a circular emblem. It features a central figure of a woman holding a scale of justice, with a man standing to her right. The words "WYOMING" and "GREAT SEAL" are visible around the perimeter. The text "OF WYOMING" and "THE STATE" is also present. The text "EQUAL RIGHTS" is written across the top of the seal.

Wyoming Department of Education

Annual Report to the Legislature on the Status of the Statewide Educational Technology Plan

January 10, 2012

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Overview :

Defining educational technology is difficult while applying the concept in the present. The conception is comprised of new tools as well as innovative teaching techniques becoming a homogenized blend of discovery, engagement and cooperation. Applicable pedagogies integrating technology into the curriculum continues to evolve, although not as quickly, as does technology itself. Understanding how to implement technology into education at the classroom level, assessing its effectiveness and truly engaging all elementary and secondary students requires innovative and forward-thinking leaders. As a tool in education, technology becomes an artifact that helps improve student academic achievement; however, only in concert with a sustained and robust professional development program. Daily interactive uses include, but are not limited to: immediate assessments during class to annual assessments such as PAWS¹; individual Internet research to social networking applications; as well as, innovative digital presentations/communications to real-time/virtual collaborative experiences with subject-matter experts around the world. Programs, projects and initiatives such as The National Educational Technology Plan 2010², Teacher-2-Teacher and 3+8³, ISTE's NETS series⁴, SETDA's Class of 2020: *Action Plan for Education*⁵ and the Science, Technology, Engineering and Mathematics (STEM) are effective attempts to direct the use of technology within the classroom and across content areas.

“Computers are technology, but technology is more than computers: In the K-12 world, our tendency is to think of ‘technology’ and ‘computers’ as synonymous. While it is true that personal networked computers are powerful technologies, there are myriad other technologies of benefit to education. Some of these (e.g., telescopes) are high-tech marvels, and others (e.g., duct tape) are not. The point is that they are all technologies. It is essential, when thinking about the development of STEM skills, to be sure that ‘technology’ is not restricted to computers, but, in fact, expanded to include all kinds of devices, instruments, and tools that can be applied in both domains of science and engineering. We do a disservice to students by misusing the word technology, rather than exploring the amazing role of technologies in the history of science and engineering dating back thousands of years, and reaching far into the future.”⁶

¹ The Proficiency Assessment for Wyoming Students (PAWS) website is at:

http://edu.wyoming.gov/Programs/statewide_assessment_system/paws.aspx

² *Transforming American Education: Learning Powered by Technology*,

<http://www.ed.gov/sites/default/files/NETP-2010-exec-summary.pdf>, U.S. Department of Education

³ The link to the website is at: http://edu.wyoming.gov/Programs/Literacy/3_plus_8.aspx

⁴ The link to the International Society for Technology in Education's National Educational Technology Standards (ISTE NETS) is at: <http://www.iste.org/standards.aspx>

⁵ The State Educational Technology Directors Association's (SETDA) website is at:

<http://www.setda.org/web/guest/2020>

⁶ An excerpt from Page 5 of a paper from the Thornburg Center for Space Exploration: *Why STEM Topics are interrelated: The Importance of Interdisciplinary Studies in K-12 Education*, David D. Thornburg, PhD, Executive Director, Thornburg Center for Space Exploration. www.tcse-k12.org

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In light of future technology assimilation, some basic assumptions are made: “Technology at its basic understanding is the application of a tool in the completion of a task. It can be as simple as pencil on paper or as complex as multi-tiered computing systems applied to exploring enormous data banks. However, just as cellular phones and home computers revolutionized life 25 years ago, and as hand-held devices and social networking are changing the experience of our children today, we can state with certainty only that technology will continue to evolve. Nevertheless, it remains the statutory duty of the Superintendent of Public Instruction to anticipate and provide adequate tools for our children and to prepare students for a future of continued technological innovation. This is a duty shared with the Wyoming State Legislature.”⁷

Two key elements are forever modifying the educational technology landscape: innovation and accessibility. Innovation is in all strategies, not only in technology’s physical sense, but within the pedagogy. Accessibility also is a part of the technology integration formula equally represented in both the technology’s tool and the pedagogy. It is fair to say, accessibility to technology throughout the K-12 learning environment leads innovative pedagogies applied within the classroom across content areas.

The third leg supporting our technology stool is assessment. How well we are doing must evolve from quantitative data. Eighth grade technology literacy, as required by the Title II Part D, Enhancing Education Through Technology (EETT) portion of the No Child Left Behind (NCLB) Act, plus distance education usage through K-12 online courses as well as dual/concurrent enrollment classes involving high school juniors and seniors, plus equitable bandwidth consumption per student as well as the WDE’s overall bandwidth consumption within the future intrastate network are all elements providing information and data directly related to technology’s viability as a tool.

This annual report provides information on the status of the Wyoming Department of Education’s (WDE) Statewide Educational Technology Plan⁸. In accordance with Wyoming statutes, this report and the formulation of a new WDE Educational Technology Plan are compiled in “cooperation with the state board, the Wyoming community college commission, University of Wyoming, state telecommunication council, public service commission, department of transportation, department of administration and information, public libraries, school district board of trustees, classroom teachers and other appropriate groups identified by the superintendent.”

The report is summarized into three categories: **Staff Development (Professional Development), Curriculum Integration** and **Network Connectivity**.

⁷ From the *Report on Technological Requirements for Wyoming Students*, December 1, 2011, page 3-4. The link to the website is at: http://edu.wyoming.gov/default/11-12-01/Report_on_Technological_Requirements_for_Wyoming_Students.aspx

⁸ The 2004 (Revised in 2008) Wyoming Education Technology Plan is under revision.

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Staff Development (Professional Development):

The Title II Part D Enhancing Education Through Technology (EETT) program of the No Child Left Behind Act (NCLB) requires each recipient of the program's funding to set aside no less than 25% for professional development. This requirement continued with the EETT's portion of the American Recovery and Reinvestment Act (ARRA). Although both programs ran simultaneously, the Title II Part D EETT ARRA application's goal included building 21st Century classrooms. The annual EETT program, although greatly reduced in funding, concentrated heavily on professional development. Title II Part D EETT funding was not allocated for the 2011-2012 school year.

Title II Part D ARRA funding was 100% competitively awarded grant. The Ed Tech ARRA funds provided an unprecedented opportunity for eligible local educational agencies (LEAs), eligible local entities, and schools to implement 21st century classrooms using innovative strategies that enhance instruction, facilitate teaching and learning, and improve student achievement. These additional resources enabled local educational agencies (LEA) to provide new and emerging technologies, create state-of-the-art learning environments, and offer additional training and support for teachers to improve student academic achievement and acquire the skills needed to compete in a global economy. Four principles guide the distribution and use of Ed's (US Department of Education) ARRA funds: (1) spend funds quickly to save and create jobs; (2) improve student achievement through school improvement and reform; (3) ensure transparency, reporting, and accountability; and (4) invest one-time ARRA funds thoughtfully to minimize the funding cliff.

Twenty districts were awarded out of 29 applications. The project's timeline concluded on September 30, 2011 with a spending grace period for encumbered funds until December 31, 2011 for those projects concluding their expenditures on or before the closing date. Hot Springs County School District #1's *Digital Educator Leadership Team (DELTA)* program, for example from their application, used the awarded funds "in an effort to build a model professional learning community surrounding technology integration K-12, is interested in expanding the role and resources of our Digital Educator Leadership Team."

The Title II Part D EETT's 2010 funding was \$474,198 of that, \$229,841 was awarded in a formula grant and the same amount was awarded in a competitive grant. The purpose of the grant is to "provide grants to state education agencies (SEAs) to assist local education agencies (LEAs) for the implementation and support of a comprehensive system that effectively uses technology in elementary schools and secondary schools to improve student academic achievement." A key component of the EETT program includes professional development. No less than 25% of awarded funds must be expended toward professional development. If a waiver is requested, the LEA must demonstrate 25% of funds were expended toward professional development from other sources. Sheridan County School District #1, in conjunction with

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Johnson County School District #1 and Sheridan County School District #3, for example, comprised a program called *Title IID Comp 2011 – NETS-T* that concentrated on improving professional development in their area. The program, to date, has helped 43 teachers in 16 schools within the three districts improve their educational technology skills.

The Distance Education Grant (DEG) provides funding to Wyoming districts and community colleges for the development and maintenance of distance education programs. One of the top priorities of the DEG is to assist in the professional development opportunities for DE instructors. In the 2010-2011 school year, \$89,859.15 was awarded for professional development opportunities. For the current 2011-2012 DEG, \$88,427.97 was awarded for professional development opportunities.

Professional Development programs such as Coaches' Clinics, Sign Language and graduate level course work is available to Wyoming school district teachers and staff. The WEN Video system allows teachers and staff in very rural areas access to courses provided in more populated areas of the state. The WEN Video is an integral method for the communications and training of our Wyoming teachers and staff members.

In addition, a statewide initiative Teacher to Teacher (T2T) training program was instituted during the 2011 summer. The program began with a series of videos highlighting the process to incorporate the T2T concept into the classroom. Subsequent trainings have involved over 1000 volunteer teachers. T2T actively places reading training tools in the hands of teachers within the classroom. Videos elaborating on the program are on the WDE website at <http://edu.wyoming.gov>.

A recognized element of the next intra-state network proposal includes incorporating staff/professional development into the discussion. As more and more technology tools forge their way into the daily curriculum, teachers and students are learning how to best employ the devices and mediums into an engaging, relevant and vibrant learning experience that has real-world implications. Pedagogy skills change as more classroom time soaks in technology. The behind-the-scenes cost is a continuously growing consumption of bandwidth. The real-world survives by feeding bandwidth to technology that touches our everyday life. Education is no different; especially when industry leaders call for more technology-rich products from our education system. This year, the WDE took an active role by forming a committee to review education's immediate and future needs in face of the WEN's connectivity service contract with CenturyLink (formally QWEST) expiration on June 30, 2013 (after a one year extension). Partners from Administration and Information (A&I), the Community College Commission as well as representation from a few community colleges and staff from several school district to include technology directors, curriculum director and teacher/school principal met with WDE staff over several weeks. The end-product provides educational networking needs, maintenance

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and proposed bandwidth consumption over the life of the next generation of WEN/State connectivity.

Findings from the WEN v3⁹ concerning curriculum integration include --- “The WDE recognizes and understands the importance of pedagogical changes influenced by the advent of technology into the daily curriculum; therefore, in partnership with the districts, community college commission, community colleges and UW’s College of Education, WDE plans to institute a statewide professional development program conducive to the advancements deployed through technology and connectivity.” (pg 5) A press release¹⁰ was distributed on December 1, 2011.

Curriculum Integration:

Technology tools and applications are intricate parts within curriculum integration. According to *Digital Learning Now’s* Nation’s Digital Learning Report Card, “Wyoming has the opportunity to lead the nation in transforming education for the digital age. Wyoming offers multiple opportunities for digital learning throughout the state via the Wyoming Switchboard Network¹¹.” Online learning, for example, is a prevalent modality delivering education beyond the traditional face-to-face learning environment. If one were to Google *online learning*, the search result exceeds 94 million responses.

The Wyoming Switchboard Network (WSN)¹² was created in 2008 to facilitate and oversee Distance Education programs. It acts as the central collection of distance education online resources and as the catalogue of current course offerings available to Wyoming K-12 students, parents, instructors, school districts and Distance Education program providers. The WSN was created in accordance with Wyoming Statutes 21-2-202(a) (xxx), 21-13-330 and the 2008 House Enrolled Act 45 (Senate File 0070).

The WSN supports student achievement by offering an array of K-12 online courses. The WSN affords students in rural communities the opportunity to enroll in courses that otherwise would not have been offered within the traditional setting. In addition, through the local district and with the assistance of the Distance Education Grant (DEG) initiative, teachers are provided the opportunity to offer instruction across the state. Priority WSN courses include core courses, Hathaway Success Curriculum, dual enrollment, and Advanced Placement (AP) courses. The WSN is designed to operate in both the supplemental and full-time distance learning environments. Students may take a single online course or a full curriculum. A cornerstone

⁹ The third consecutive WEN contract – version 3 (v3)

¹⁰ The link to the press release located on the WDE website: http://edu.wyoming.gov/communications/11-12-01/Report_on_Technological_Requirements_for_Wyoming_Students.aspx

¹¹ *Digital Learning Now* 2011 report is at: <http://digitallearningnow.com/nations-report-card/#WY>

¹² The link to the WSN website is at: <http://wyomingswitchboard.net/Home.aspx>

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toward monitoring the K-12 online program is Milestones.¹³ Milestones are identified on the student's Distance Learning Plan (DLP). The completion record is reported on the WDE form 591 Distance Education Milestones Report.¹⁴

During the 2010-2011 school year, 1,553 Wyoming students participated in 9,096 distance education courses; 44% of all distance education courses (K-12) delivered were reported as Hathaway Success Curriculum¹⁵. The flexible delivery system of these course offerings allowed for a wider student population to be reached and more academic credit to be achieved.

Wyoming has assisted the districts by providing them with a definition for technology literacy and technology integration.¹⁶ Districts report technology related surveys via the WDE-584 District Technology Survey and the WDE-588 School Technology Survey collections. The broadband speeds between buildings and the number of eighth grade students considered technology literate is reported on the WDE-584. The Internet connectivity, hardware and professional development hours are captured on the WDE-588 collection.

Network Connectivity:

The Video Conferencing Enterprise (VCE), pursuant to the directive by the Governor, is assuming the state's videoconferencing efforts. The effort consolidates existing videoconferencing infrastructure management and service. In addition, a statewide endeavor to create an intrastate network by consolidating infrastructure elements from hardware to software to technical support infuses a collective effort that reduces cost and minimizes duplication. As for the WDE, all elements of bandwidth consumption, including but not limited to videoconferencing or data transference, are continuously demanding more each day.

The WEN Video is an element of the WEN and is a consumer of bandwidth. The following chart depicts the breakdown of usage. There was over 23,000 (23,426) hours of usage via the WEN Video hardware for the 2011 calendar year. Events included meetings, classes, trainings and ad-hoc conferences (connections not scheduled or built using the Tandberg Management Suite (TMS) bridging capability).

The following chart depicts videoconferencing events through November. A tally of December's events was not available at the time the report was written.

¹³ Milestones and the DLP are defined in the *WSN Resident District Handbook* at the following link:

<http://wyomingswitchboard.net/Docs/WSNRDHB.pdf>

¹⁴ The WDE Form 591 is located at:

<http://edu.wyoming.gov/DataInformationAndReporting/DataCollectionSuite.aspx>

¹⁵ The WDE link to the Hathaway Success Curriculum is at:

http://edu.wyoming.gov/Programs/hathaway/hathaway_success_curriculum.aspx

¹⁶ Defined on the *Instruction* link of the WDE Form 584:

<http://edu.wyoming.gov/DataInformationAndReporting/DataCollectionSuite.aspx> (definition is in the WDE 584 instructions page)

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2011 Calendar Year Events (Through November 2011)	Type	Description
1096 Events	Community College Class Sessions	WEN Video systems used to teach classes based from Wyoming Community Colleges for credit
652 Events	University Class Sessions	WEN Video systems used to teach University of Wyoming classes for credit in cooperation with the UW Outreach Video Network
1 Event	Virtual Field Trips	Classes participate with a distant location over video conferencing
355 Events	Meetings	Interactive meetings
100 Events	Trainings	Trainings presented over video
7 Events	Hearings	Rooms made available for public comment.
291 Events	K-12 Class Sessions	WEN Video units used to teach K-12 classes
1150+ Events	Ad-Hoc	Unscheduled user-dialed use of WEN Video endpoints

Trends and the Future:

Staff Development (Professional Development): Recognizing the impact staff/professional development has on integrating technology into the classroom, the next step is to employ the tool(s) available in the most effective manner. The Title II Part D EETT program required no less than 25% of the funding be used for professional development. All districts accepting the funding met this requirement, or produced a waiver describing how the districts meet the obligation through another venue. However, the EETT program is coming to an end. Funding was not allocated for the next school year and the direction of educational technology is in question. For the moment, states are left without a federally mandated educational technology program. The future may rest with the re-authorization of the NCLB Act, in particular, the proposed Achievement Through Technology and Innovation (ATTAIN) Act of 2011¹⁷. Nevertheless, the WDE's future role is to continue to support district administrators' endeavors to implement or improve staff/professional development concerning educational technology.

Curriculum Integration: Integrating technology into the curriculum will continue to evolve and pace itself as administrators, teachers and technical support gain confidence, devise best practices and garner support from citizens and infrastructure alike. "Continued and future requirements of Department of Education: To make best advantage of WEN v3 the WDE should be tasked and resourced to provide: instructional training of educators in current and developing

¹⁷ S.1178 – Achievement Through Technology and Innovation Reauthorization Act of 2011 is located at: <http://thomas.loc.gov/cgi-bin/query/z?c112:S.1178>: (copy and paste into the URL line)

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strategies for the use of technology in the classroom; continued evaluation and recommendation of content and tools available for student success; continued development of systems to further formative assessment of students and educational improvement; technological services in support of state-wide and local WEN systems; continuous monitoring of technology development and adequacy of the WEN in support of best pedagogical systems; and on-going instructive support within districts and in conjunction with the community colleges.¹⁸ It is fair to state that as technology becomes more comfortable within our classrooms, more innovative and engaging application for technology in the daily curriculum will follow. The International Society for Technology in Education (ISTE)¹⁹ approach is easily adaptable through their Nation Educational Technology Standards for Administrators (NETS-A), for Teachers (NETS-T) and for Students (NETS-S). This application provides examples and performance indicators designed to help integrate technology into the daily curriculum. The WDE continues to support the application of the ISTE NETS as a part of the growing educational technology process.

The State Library and the University of Wyoming have licensed statewide access to hundreds of electronic resources²⁰ exploitable to enhance curriculum integration through technology. In addition to providing this content, the State Library provides monthly training, primarily over the web, for teacher-librarians to increase their skills in using and teaching use of databases. Future discussions between the WDE, State Librarian and the Dean of Libraries at UW are forthcoming in hopes to expand each other's role/communication in integrating educational technologies.

Based upon the WEN v3 group's discovery, the WEN consumes a little more than 9Kbps per student; however, remains well below the private or commercial usage that is closer to 5Mbps per consumer²¹ (9Kbps is **less than half** of what dial-up use to be years ago and slower than today's cell phones). Classroom teachers incorporate more technology into their daily curriculum; more data is shared between users and consumers; and, assessments become digital. All of these lend to the dependence on bandwidth and the reliability of the infrastructure.

Currently, the Wyoming Switchboard Network hosts information on 616 distance education courses. All subject areas within the common core of knowledge are available at a distance with 36% of all current courses (K-12) identified as Hathaway Success Curriculum.

Including all seven community colleges, there are a total of 14 approved providers on the WSN with the capacity to serve students of all grade levels. School districts are demonstrating

¹⁸ From the *Report on Technology Requirements for Wyoming Students*, page 9. The link is at: http://edu.wyoming.gov/Libraries/WDE_Press_Releases/Press_Release_Report_on_Technology_Requirements_for_Wyoming_Students.sflb.ashx

¹⁹ The ISTE website is at: <http://www.iste.org/welcome.aspx> Click on STANDARDS for access to the NETS series.

²⁰ The link to *Wyoming's Portal to Knowledge & Learning* is at: <http://gowyld.net>

²¹ From the Executive Summary of the WENv3 report located at: http://edu.wyoming.gov/communications/11-12-01/Report_on_Technological_Requirements_for_Wyoming_Students.aspx

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increased interest in growing and offering blended learning²² programs to meet the needs of their own students. Current enrollment information indicates a continuous and steady growth in distance education programs.

The Wyoming Department of Education promotes the integration of web-enhanced classrooms and the use of collaborative technologies such as WEN Video, PASSport Events (virtual field trips), synchronous chat rooms, threaded discussions and blended classrooms. Instructional methods that utilize blended learning, both distance education and traditional face-to-face elements, are more effective than practices utilizing just one or the other.

Network Connectivity: Development of the WEN v3²³ document, as stated in the WDE's Press Release on December 1, 2011, "completed its study on the bandwidth requirements for the next generation of the Wyoming Equality Network (WEN v3). The report was the culmination of information gathered from students, parents, educators, administrators and experts in the Kindergarten through Grade12 (K-12) schools and from community colleges across Wyoming. It is expected that the report will become a component of the process by which the next WEN contract is bid and under which the services will be provided. That contract is expected to take effect July 1, 2013." The consumption of bandwidth alone permeates the needs each districts is experiencing: "The report recommends that as the next contract for bandwidth is negotiated, each student be supplied with One Megabit per second (1 Mb) of connectivity. Small remote schools are recommended to receive a minimum of Ten Megabits. It further recommends that additional bandwidth be available by local districts as requested and that the use and requirements of schools be continuously reviewed."

A limited **State Longitudinal Data System (SLDS)** is currently in place within the WEN's matrix. The flow of data, including the WISER ID protocols, continuously consumes bandwidth - especially during peak transfer times. The advantages of the SDLS protocols encompasses a person's educational progress from Pre-K into the workforce; thus, helping to develop a longitudinal study that administers to educational trends supporting Wyoming's decision makers for years to come. Districts use the existing WEN network to submit data vertically to the state and horizontally from district to district. As we look into the future of SLDS, it is prudent to plan for additional stakeholders from multiple agencies leveraging the system and consuming bandwidth. SLDS protocol devours bandwidth due to the amount of data transferred combined with accompanying packet transference conducive to needed high levels of security.

²² Within a course, blended learning refers to the combination of learning at a distance with the traditional face-to-face learning.

²³ Press Release and the WENv3 documents is located at: http://edu.wyoming.gov/communications/11-12-01/Report_on_Technological_Requirements_for_Wyoming_Students.aspx

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Conclusion:

To overcome technology's increasingly morphic abilities, administrator, teacher and student consumers yield to innovative, adaptive and future-thinking skills; thus, ebbing our insatiable rush into absorbing newer vs. practical tools. This is a trait savvy educational technology consumers employ in today's spending market. Staff/professional development concerning the integration of technology into the daily curriculum within each classroom is undoubtedly a key element for success, as demonstrated by Mr. London Jenks of Hot Springs County School District #1. His approach for integrating today's technology within his high school class is an excellent example highlighted by PC Magazine²⁴: "While other teachers are entrenched in a never-ending battle to get students to put away their smartphones and tablets, Jenks is putting them to use in his lesson plans. Upon entering Jenks's classroom, each student is handed an Apple iPad (made possible by grants from the Wyoming Department of Education and the Hot Springs School District). Students can personalize their iPads and, basically, have open access to the Web. With the devices, they complete assignments, collaborate with other students (even those in other classes), use science-based apps, and go on research scavenger hunts by scanning QR codes with clues to the next location. Jenks's physics, earth science, astronomy, and chemistry classrooms are largely paperless. They store assignments and other class documents in Google Docs."

Educational technology applications continue to grow in use and variety. The WDE is fortunate to work for a state that embraces technology not out of necessity, although the impressive sparseness between our communities is ample reason needing a technology rich environment, but based on a desire to provide the best opportunities for its citizenry young or old, new or established. The tool technology permeates our daily lives, sparks our imagination and feeds our need to commune. Kindergarten through twelfth grade citizens are just as affected.

²⁴ The article is located on PCMAG.com at: <http://www.pcmag.com/article2/0,2817,2397253,00.asp>