OHIO VALLEY EDUCATIONAL COOPERATIVE

Education Technology

Education technology is deeply embedded in the framework of the delivery of education services. From the Kentucky Legislative Commission Research Report #363, the following was noted as a definition of education technology: "Education technology encompasses not only computers but also software, peripherals, routers and servers, communications equipment, audiovisual equipment, and technology-enabling aspects of facilities. It also involves libraries and information services, security and privacy issues, user support, professional development and training, institutional knowledge, and the policies and practices for planning and managing technology."

Kentucky Statutes and Regulations:

In 1990 as part of the Kentucky Education Reform Act (KERA), the Kentucky General Assembly enacted KRS 156.670, Development of master plan for Education Technology. As one of the KERA strands, the legislation provided a five-year implementation plan and cycle approved by the Kentucky Board of Education (KBE) and the Legislative Research Commission. According to the statute, the five-year plans focus on the following objectives:

- Improve learning and teaching and the ability to meet individual student's needs to increase student achievement
- Improve curriculum delivery to help meet the needs for educational equity across the state
- Improve delivery of professional development
- Improve the efficiency and productivity of administrators
- Encourage development by the private sector and acquisition by districts of technologies and applications appropriate for education

At about the same time, KRS 157.615 governing the School Facilities Construction Commission (SFCC) was modified by the Kentucky General Assembly to include definitions of the "Kentucky Educational Technology System", "Technology master plan", and the "Unmet technology need". Financial offers of assistance were provided to public school districts each biennium (on a pro-rata basis) to reach a baseline technology adequacy level.

In 1992 the Kentucky General Assembly enacted KRS 156.671, Strategic plan for Distance Learning, where the Kentucky Department of Education (KDE) collaborated with Kentucky Educational Television (KET) to develop implementation strategies for statewide distance learning delivery systems. KET's new telecommunication center (funded in 1987, and opened in

1989) provided infrastructure with four satellite classrooms and enhanced production, editing, and studio facilities throughout KET to anticipate and help implement the 1992 legislation.

Initial actions by the Kentucky General Assembly included developing a technology "facility model" with a six-to-one student-to-computer ratio, with voice, video, and data for all students. This was a massive undertaking which included the modification of public school facilities for power and data wiring, classroom telephones and video systems, computer labs, as well as computer stations, furniture, televisions, and software. Staff training was also included to integrate technology into the delivery of education services.

In 1992 the Kentucky Board of Education (KBE) promulgated 702 KAR 1:001, the Kentucky School Facilities Planning Manual that included building infrastructure for the technology model, and established technology building infrastructure as a top capital construction priority. The new, local district, four-year capital plans, enabled districts to access financial resources from SFCC to help build new technology infrastructure through their SFCC building offers, as well as through their technology offers. Establishing technology as a building priority also meant that capital construction funds from Capital Outlay (KRS 157.420) and the Facility Support Program of Kentucky (KRS 157.440) could be accessed for the school building power wiring and infrastructure for voice video and data systems. The establishment of technology infrastructure as a top facility capital construction priority helped to speed the implementation of technology through the school facilities program.

In 1994 the KBE promulgated 702 KAR 4:170, Architectural criteria for public schools, to include building infrastructure to support the education technology model. Building wiring standards were established by the Kentucky Educational Technology System (KETS) and coordinated by KDE through the Division of Facilities Management (DFM). Classroom standards including additional areas for computer stations, computer labs, and voice video and data criteria, were formally established. This meant that all new public school projects, and renovation of existing school facilities, would be equipped with appropriate technology infrastructure to support the educational initiatives in the technology master plan.

By 2000, after a comprehensive facility capital planning and construction effort (over several state budget cycles), multiple technology offers of assistance, and local matching technology funds, the initial 1990 technology model was in place for all schools. Many districts had improved models that included lower computer-to-student ratios and resources not envisioned in 1990. Old models including computer labs, were sometimes abandoned and replaced by better classroom technology so that students no longer had to leave their classroom to have computer access.

By this time, the use of technology and computers was completely entrenched in our businesses, industry, and way of life, and was now required for the most basic operations. The exponential development of technology systems changed business models. The use of computers and technology systems for decision-making, procurement and financial information, housing data, and general operations, brought forth new needs and continual reassessment of how technology should be used. It was (and is) a great challenge to put the right systems in place, maintain and

sustain the capacity of staff (through professional development), and have some accountability (through research) for the effectiveness of how technology is helping us accomplish our goals. The tools are changing so rapidly, that they are driving how we do our work.

Impact of School Facilities on Learning Link:
https://buildhealth.uoregon.edu/2022/12/07/the-impact-of-school-facilities-on-student-learning-engagement/

Scottsville Intermediate School, Allen County Kentucky:
In 2003 the Division of Facilities Management visited the new Sayre private school in Lexington, Kentucky at an open house sponsored by the East Kentucky Chapter of the American Institute of Architects. The visit was intentional and among other chapter-related purposes was to review a new school whose institution was known for its exemplary student performance, to see if there were innovative concepts appropriate for public school design and construction. Most of the design concepts were similar to public construction models, except for the implementation of education technology. Sayre featured a wireless interactive classroom technology system with electronic whiteboards and student-hand-held wireless devices in every classroom. Voice, video, and data systems were completely integrated. What sometimes today is referred to as a "21st-century classroom" technology system provides video streaming and distance learning (from the internet) without expensive video retrieval. The strategy had a seamless graphic interface (including the use of digital cameras and microscopes), immediate student assessment, and real-time data for teachers. It was suitable for diverse learning styles and differentiated instruction including resources for students with special needs and early childhood development. It also provided teachers with an endless supply of information, strategies, and resources for teaching core concepts. The system utilized the latest technology and seemed more flexible, more dynamic, and ultimately more equitable than the 1990 model established by KERA, (now 13 years old).

A couple of months later, the superintendent of Allen County contacted DFM and asked for some recommendations for a new proposed Allen County Intermediate School. Among other things, DFM recommended the district consider a technology model similar to Sayre School. The concept was studied and developed by the Allen County staff, from its impact on students and staff to its financial feasibility. Some cost transfers were proposed, and a general concept was presented to KETS and DFM for approval. Interactive "whiteboards" were traded for conventional overhead projection screens and televisions. The overall additional cost was well within normal parameters for new schools and was approved by KDE. While under construction the local district worked on staff development for the implementation of the new tools.

The new Scottsville Intermediate School was opened in the fall of 2005 with wireless whiteboard technology in all classrooms and the media center. The model was seen as a huge success by the local board, school leaders, and community. The Commissioner of Education visited the school shortly after the school opening. The model was immediately embraced by the Commissioner as a model that should be considered "for every classroom in Kentucky". Allen County school leaders were gracious to share their model with visiting districts. It was not long before word spread about the technology system at Scottsville. Large neighboring districts like Warren

County, moved 21st century technology projects that included over 800 classrooms. Many others soon followed with similar solutions.

Interactive Whiteboard Technology Link:
https://www.nibs.org/

2009 LRC Report:
In October 2009 the Office of Education Accountability presented a "Review of Education Technology Initiatives" (LRC Research Report #363) to the Education Assessment and Accountability Review Subcommittee. In the report the following was noted: "Research suggests that technology is most effective for teaching and learning when it:

- directly supports content standards; is used in conjunction with other learning methods
- is an integral part of school improvement planning; not only imparts specific content knowledge but also builds higher-order thinking and problem-solving
- teaches students to use such workplace applications such as word processors, spreadsheets, computer-aided drawing, Web site development, and Internet browsing."

Funding:
Since 1990, more than $1 billion has been invested in Kentucky's education technology. Of the $140 million spent in fiscal year 2008, approximately 64 percent came from state funds, 24 percent from federal sources, and 12 percent from local sources.

Accomplishments:
Increased Opportunities. As a result of Kentucky's investments in education technology, courses, professional development, and other educational resources are available online using secure high-speed networks throughout the state. Students and teachers work on modern desktop and laptop computers. Intelligent classrooms provide new capabilities such as large screens for multimedia presentations, instant polling of students' knowledge, and Internet access to learning opportunities across the globe. Many schools conduct periodic online formative assessments. Remediation for struggling students is provided with the help of instructional software. Teachers, administrators, and policymakers can analyze the integrated longitudinal data in the Kentucky Instructional Data System for decision-making and for tailoring services to students' needs. Students can use their learning plans to plan for careers, in collaboration with their parents, teachers, guidance counselors, and others.

Access. In fiscal years 2007 and 2008, approximately 100,000 desktop and laptop computers were purchased, reducing the percentage of outdated school workstations from about 75 percent to 25 percent. As a result of Kentucky's emphasis on equity, high-poverty districts have the same student-to-computer ratio as those in low-poverty districts, in contrast to poverty gaps found in other parts of the U.S.

Evaluation of Impact of Technology Initiatives:
Kentucky, like many states, relies too much on anecdotal evidence of program benefits. Teachers and administrators are often urged to use research-based methods but are not always given specific examples. Kentucky's progress toward meeting its stated goals and objectives should be

evaluated with systematic, quantitative indicators. In addition to the need to evaluate the broad impact of technology on student achievement, the following specific questions have yet to be answered:

- How proficient are students in touch-typing and other specific technology skills?
- Are teachers proficient and comfortable enough with technology to be effective at teaching it?
- Is technology strategically integrated into teaching and learning for maximum impact?
- Does technology increase the productivity and efficiency of teachers, administrators, and staff? If so, in what ways?
- Is technology encouraging data-driven decision-making

KDE's response agreed with this observation and recommendation. Perhaps before we look ahead to the future of education technology, by the LRC recommendations and KDE's acknowledgment, the priority is to carefully review our progress and find measurable results that demonstrate what we believe is truly happening.

The Future:

"Speakers at a recent education technology industry summit had a key piece of advice for the company executives who make and sell products for schools: Go mobile." An example was given at the summit: in North Carolina, Project K-Nect used mobile phones to help teach algebra. In the project, "At-risk ninth graders have access to specially created mobile applications that help explain algebraic principles. In addition, they can text or IM their peers for advice when they get stuck. According to early studies of the program's efficacy, students taking part in this project outscored their peers (who did not have access to mobile phones) by an average of over 30% in algebra proficiency. "If you read closely the state and national goals, it is clear that mobile devices (probably faster and smarter) will (and are) playing a significant role in current and future technology systems. What is more subtle (and maybe a question instead of a conclusion), is that more than ever, future learning may occur more and more outside of the classroom, and in a collaborative student-to-student and virtual social context. School buildings, teachers, resources, and the entire education delivery are being changed by technology.

In the "Teacher's Net Gazette, July 2011, Steven McClard writes in an article", "The future of Educational technology-The New Toolbox:" "Imagine a world where every child has a tablet computer with ready access to the App of virtual photographic memory (internet). Further, imagine that every student can access all the knowledge of humankind freely at any moment in time. Continue to imagine a world where a misspelled word brings up a spelling challenge application instead of an auto-correction. Try to contemplate what it would mean for a teacher to have a database of every misspelled word, every misunderstood concept, or every missed equation for each of their students. Try to envision a teacher with the ability to customize the experience of the individual "user" with minimal effort. Imagine the curriculum being automatically targeted to the user through an intuitive educational platform that knows every strength and each unique weakness."

He suggests that students will not "receive an education" but rather "develop an education". Students will not be just "passengers" along for the ride, but be "users" or active participants.

Our job will be to teach them how to be “users”. This may mean that educators have a greater focus on understanding and creating an environment where students can learn, both inside and outside the classroom, and in the real and virtual world. This environment is connected 24/7 to technological resources that will more than cover content and information and may someday have Apps that can teach them individually away from class according to their strengths and weaknesses.