CHALLENGES OF EDUCATIONAL TECHNOLOGY IN 21ST CENTURY

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Abstruct : For all the possibilities of technology-enabled learning, it also creates challenges we will face as we embrace the change necessary to realize its potential. With the proliferation of devices and applications, we should build all educators' understanding of and ability to serve as stewards of student data so that only those with lawful access to the data can access it. We also need to find new and creative ways to solve the problem of connectivity in learners' homes so that the learning made possible in connected schools does not end when students leave for the day.As we bridge the digital divide in schools and homes across the country, we also should build educator capacity to ask students to take part in new and transformational learning experiences with technology. This will require more than sharing tips in the faculty lounge or after-school professional development for educators. It also will require systemic change on the part of teacher preparation providers so their faculty and programming reflect more closely the standards and settings for which they are preparing teacher candidates.These partnerships between teacher preparation programs and school districts are emblematic of the types of partnerships we will need to build across all education groups if we hope to increase the use of technology in learning from an add-on to an integral and foundational component of our education system.

Keywords **:** Educational technology, challenges, proliferation, technologists, device, smart phone,i-pad, smart board.

Introduction : Educational technology is the considered implementation of appropriate tools, techniques, or processes that facilitate the application of senses, memory, and cognition to enhance teaching practices and improve learning outcomes.Educational technology has a multi-faceted nature comprising a cyclical process, an arsenal of tools (both physical and conceptual), and a multiple-node relationship between learners and facilitators of instruction, as well as between learners themselves. This nature makes it somewhat difficult to provide a specific definition based on particular technologies (despite that "technology" is embedded in the term) at any given point in time. The attempt to apply meaning to the term in this way was a primary flaw of earlier definitions of the field. Therefore, I have chosen to develop a broader definition that is not dependent upon any particular interpretation of technology--past, present, or future. The breadth of my definition allows the idea of "technology" to encompass processes, as well as objects and artifacts, and this is essential to ensure longevity (and, ultimately, meaning) to the definition. There are five key components of my own definition of educational technology that are meant to tie the multiple facets of the concept together. Key parts of the definition are implicit in the terms chosen, and I purposefully chose this somewhat "between-the-lines" approach in order to allow for future developments within the field.The components of my definition are listed below along with a brief discussion of each component.

1. Considered implementation. Any technology, whether physical or conceptual, has value--beyond the purely philosophical--when it is implemented and subsequently utilized by a population. Implementation is essential, especially when one understands that educational technology is about affecting particular outcomes. The idea that the implementation should be "considered" means additionally that there is an assessment loop built into the process; as outcomes are measured, effective use of technology is repeated, while ineffective use is either improved or abandoned. Indiscriminate implementation is a frivolous use of intellectual, capital, and temporal resources, and it is all too often found to be the methodology in education environments. Finally, the considered implementation speaks to the need for effective leadership. What methodologies will be adopted? What tools will be acquired? The strong leader in education will provide the guidance necessary to ensure the best use of resources.

2.

2. Appropriate tools, techniques, or processes. When thinking of educational technology, this segment of my definition is likely the piece that first comes to mind. Almost reflexively, the general public, as well as the seasoned

educator, looks for the silver bullet in addressing shortcomings in our system of education, and the physical trappings of technology are especially seductive. Certainly, these objects have demonstrable value; however, techniques and processes in teaching and learning are at least equally important. As educators--and, more generally, as members of a society--we have developed methodologies for accomplishing tasks and obtaining desired outcomes. These methodologies have been and continue to be refined over time, just as the latest advancements in computing technology continue to roll out unceasingly and with regularity. It is quite important to include the modifier of "appropriate" to this component, otherwise we see an ever-increasing use of technology that adds no value to education yet exacts a heavy price, again in multiple resource categories. The use of appropriate tools, techniques, or processes is much more likely to result in the outcomes that educators desire.

3. Facilitate the application of senses, memory, and cognition. It is in this component of my definition where I stepped the farthest away from the majority of existing definitions of the field. My intent here was to generalize the concept of learning both as a process of internalization as well as demonstration of ability. This formulation might serve as summary of Bloom's Taxonomy overlaid on learner, where learning outcomes in the form of know, do, and value are summarized by the combination of the human mind and body. But human capabilities are not wholly adequate to the demands of the modern teaching and learning enterprise, and this is where technology as facilitator has a role. The use of video to bring the depths of the universe to the learner's eyes; the use of the Internet to give the learner instant access to thoughts and observations of humanity's greatest thinkers--these are examples of technology facilitating the application of our own senses, memories, and cognitive abilities.

4. Enhance teaching practices. Learning in our formalized education context does not exist in a vacuum; that is, we do not simply provide learners with access to information and resources with the expectation that they will learn through discovery. In fact, our educational infrastructure is based largely on the idea that the learner will progress far more quickly under the mentorship of a skilled instructor--both knowledgeable in the subject matter and competent in instructional methodologies. In the previous component discussion I made my case for technology as a facilitator on the learner's side of education; likewise, technology should also provide assistance and support to instructors during the teaching and learning process. Demonstrations, illustrations, instruction across learning styles--all of these are areas in which technology may provide those teaching with more leverage over learner gaps in knowledge and understanding.

5. Improve learning outcomes. Finally, all else might turn out to be simply exercises with no point if we are unable to improve learning outcomes. If no improvements are made with the adoption of new technology, then there is no point to utilizing any technology except for the most basic required to obtain that unchanging level of learning. Therefore, to justify the continued experimentation with and exploration of new technologies: smart classrooms, use of podcasts, access to the Internet, laptops for every child, and on and on, we need to assess our outcomes, make incremental changes in our methodologies to address shortcomings, then assess again, closing the loop in order to evaluate the efficacy of our work. We succeed when we are able to show improved learning outcomes, and as long as our metrics accurately represent the entire cross-section of the learner's experience, we have a legitimate case for the continued use of technology in the teaching and learning endeavor.

Educational Technology: Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources.

Why We Need Educational Technology in the Classroom : Educational technology is a key talking point on just about every school campus these days—from colleges to grammar schools. But educational technology has evolved since then. Today, it includes electronic devices like laptops, smartphones, social media, whiteboards, tablets, learning apps, websites, and more. These tools provide numerous benefits to both students and teachers alike. Despite these benefits, educational technology still fights to find its way into some of today's classrooms. That's because many schools struggle with near-crippling budget cuts and teacher shortages. Plus, school boards, parents, and politicians want to see a tangible return on all they money invested in educational activities. Thanks to these circumstances, schools often need to make hard choices when it comes to how they spend their money. Too often, it's at the expense of educational technology.Below are ten reasons why we need it in our schools. The first five look at things from a teacher’s perspective, like making a teacher’s job easier. The second five looks at things from a student’s perspective, like how technology can boost learning.

1. Automates tedious tasks

2. Prepares students for digital future

3. Accommodate different learning styles

4. Improves retention of information

5. Helps cut education costs

6. Boosts the feeling of responsibility

7. Helps students stay engaged

8. Provide students access to the latest information

9. Makes a variety of courses available

10.Help Deepen Students Understanding

Put simply, educational technology not only makes a teacher's job easier and makes learning easier and more fun. It also reduces educational costs, increases productivity, and also boosts learning—all while cutting costs. With school boards, politicians, and parents looking for the highest return on investment possible, educational technology can be just what the doctored ordered for schools nearly crippled by budget cuts and teacher shortages.

6 Technology Challenges Facing Education: . Professional Development:
There is a lack of sufficient, continuing professional development for teachers who have to integrate new technologies into their classrooms but are unable due to a lack of preparedness or understanding of these technologies.
2. **Resistance to Change:** There is a "comfort with the status quo" which results in teachers and school leaders believing that learning about new technologies is outside of their job description.
3. **MOOCs and Other New Models for Schooling**: Massive Open Online Courses (MOOCs) are the new kids on the education block so to speak, and are encouraged as many higher education institutions have already embraced MOOCs and seen success. K-12 schools should be looking for ways to integrate this idea to make education more accessible.
4. **Delivering informal learning:** Much like number three above, lecture-and-test models of learning fail to challenge students to practice or take on informal learning.Informal learning is found more often in non-traditional classroom settings like flipped classrooms, which provide a combination of formal and informal learning and have much more non-traditional approach that embraces multimedia into its standard curriculum.
5. **Failures of Personalized Learning:** There is a gap between the idea of differentiated personalized instruction and the technologies available to make it happen. Even though K-12 teachers see the need for personalized learning,theydon't have the tools or time available to make it happen.
6. **Failure to use technology to deliver effective formative assessments:** Although testing has always been an important driver for educational practice and change, many teachers now "teach for the test." The curricula and skill sets have adapted to our society's needs, and in turn current testing methods have become an antiquated assessment. New technologies and our understanding of different learning patterns needs to play into the new way students are scored for the understanding of the topic. Despite increasing adoption of technologies for K-12, there seems to be a problem with widespread implementation. Older teachers seem to lack an understanding of how new technology works. This lack of an understanding is exasperated when an older teacher is trying to teach a student who grew up using that technology. We've all seen YouTube videos of toddlers using an iPad, we've also watched our grandparents struggle to understand what an iPad is, or what it can do. Older teachers also struggle with this sort of thing and that's when the problem with implementation comes up. Every parent wants their kid to be successful and have a better life than they did. Embracing new educational technologies is one way to do this.

A 21st-Century Technology Plan: A proper technology plan must be in place to help guideand assist anytech integration into the classroom. When designing your technology plan, make sure to include the opinions and ideas of KEY staff that will be using the technology most in your buildings. If you don't take into consideration how staff members will use the technology, how can they successfully implement the tech into their classes? Build a "Tech Committee" to brainstorm and communicate ideas so your tech plan can be planned successfully.

Examine Technology Budgets Frequently : A huge issue in education with technology is how much to spenon technology in the classroom. State budgets are shrinking and cuts are made to funding in schools. Will those cuts affect what could potentially be spent on technology purchases? Each and every month, newer and better-designed products are released on the market along with software that allows you to expand on just that one certain area (that every user must have of course!). Does your school really need the latest and greatest software or can the district use what they have and better develop their skill-set and "expertise" with that software? Budgets don't just fall on software. Districts should annually expect their budgets for hardware, software, professional development, and tech support to stay the same or increase each year. Having a properly planned budget with adequate funds can help so if something needs to be scaled back, you know what you have to work with funds wise for technology purchases.

Choosing Effective Tools and Devices for Use Each school and district won't use the same exact tools and devices for learning. Each situation and classroom is unique. Gathering data and viewing classroom interaction between students and teachers can open a new perspective on how technology is used in the classroom. What kinds of assignments and lessons will teachers present to students in their classrooms. Digital learning is at an all-time high due to blended learning and teaching. Finding ways to make teaching easier along with engaging for the student is the number one priority of any teacher and school administrator. Combined with technology budgets, effective tools and devices must be able to be purchased adequately

Resistance to Change Change in school classrooms is hard. "We've always done it this way" is one of the hardest obstacles to overcome. Justify the changes in product/devices with effective ways the technology will benefit the teacher and students. One of the best ways to help with this is to simply let the teachers experiment with the new products.

Professional Development As a technology director in education, this is one of the top concerns when implementing technology into classrooms. Teachers want professional development and they deserve it. One afternoon learning Google Apps for Education and Google Classroom isn't enough. Teachers need to be comfortable with the technology. If they aren't comfortable with the technology, how can we expect them to be able to effectively teach with the technology? In any technology integration into a classroom, teachers need to be given the tools and skill-set to effectively use and teach with the technology given to them in their classrooms.

Blended Learning Teaching in classrooms has evolved. Chalkboards have transitioned to SMART boards and Promethean boards. Students have gone from reading out of textbooks to reading "leveled readers" and other materials on devices such as laptops, tablets, and iPads. Learning has gone from paper and pencil to digital learning and teaching digital "citizenship". Some of the biggest pushes with blended learning is online classes and taking virtual classes. The use of online digital classes is rising in school districts and allows for students to gain advantages in the classroom both in high school and beyond. Allowing teachers to transition to blended learning has been made possible with resources like Google Classroom. The amazing advances in technology can help prepare students for their futures with 21st-century skills.

"Failures" of Technology Often I hear how the technology in the classroom isn't "adequate". How the technology and devices are used is a key component of any technology integration. If teachers and students are given the tool-set on how to work and develop skills with devices, how can they succeed? Many times I hear that devices are used as "baby-sitting" tools so students don't act up in class when their work is done.

I've also heard the now-false statement of "well those are state assessment compatible" as well. While implementing devices and technology that is capable of providing a stable environment for assessment testing and formative testing is important, understanding and preparing for failure is vital. Before you can succeed, you must first learn how to fail and to learn from your failures.

Always Be Prepared One of my biggest quotes I always take with me to work each day is "Expect the unexpected". By being on the ready, an educational technology director can perform any task and be able to conquer any challenges throw at them. By understanding educational challenges in technology implementations and integrations, schools can better prepare for the future in Ed-Tech.

Challenges Remain

For all the possibilities of technology-enabled learning, it also creates challenges we will face as we embrace the change necessary to realize its potential. With the proliferation of devices and applications, we should build all educators' understanding of and ability to serve as stewards of student data so that only those with lawful access to the data can access it. We also need to find new and creative ways to solve the problem of connectivity in learners' homes so that the learning made possible in connected schools does not end when students leave for the day.

As we bridge the digital divide in schools and homes across the country, we also should build educator capacity to ask students to take part in new and transformational learning experiences with technology. This will require more than sharing tips in the faculty lounge or after-school professional development for educators. It also will require systemic change on the part of teacher preparation providers so their faculty and programming reflect more closely the standards and settings for which they are preparing teacher candidates.These partnerships between teacher preparation programs and school districts are emblematic of the types of partnerships we will need to build across all education groups if we hope to increase the use of technology in learning from an add-on to an integral and foundational component of our education system.

We Already Have Begun as illustrated in the examples throughout this plan, there are schools, organizations, and partnerships across the country already engaged in the important work of shifting practices to serve students better through technology. Indeed, it never has been easier to share innovations and lessons learned and muster the resources necessary to catalyze learning with technology.

Recommendations

Section 1: Learning

States, districts, and post-secondary institutions should develop and implement learning resources that embody the flexibility and power of technology to create equitable and accessible learning ecosystems that make learning possible everywhere and all the time for all students

States, districts, and post-secondary institutions should develop and implement learning resources that use technology to embody design principles from the learning sciences

States, districts, and post-secondary institutions should take inventory of and align all learning technology resources to intended educational outcomes. Using this inventory, they should document all possible learner pathways to expertise, such as combinations of formal and informal learning, blended learning, and distance learning.

Education stakeholders should develop a born accessible standard of learning resource design to help educators select and evaluate learning resources for accessibility and equity of learning experience

Section 2: Teaching

Provide pre-service and in-service educators with professional learning experiences powered by technology to increase their digital literacy and enable them to create compelling learning activities that improve learning and teaching, assessment, and instructional practices.

Use technology to provide all learners with online access to effective teaching and better learning opportunities with options in places where they are not otherwise available.

Develop a teaching force skilled in online and blended instruction

Develop a common set of technology competency expectations for university professors and candidates exiting teacher preparation programs for teaching in technologically enabled schools and post-secondary education institutions

Section 3: Leadership

Establish clear strategic planning connections among all state, district, university, and school levels and how they relate to and are supported by technology to improve learning.

Set a vision for the use of technology to enable learning such that leaders bring all stakeholder groups to the table, including students, educators, families, technology professionals, community groups, cultural institutions, and other interested parties

Develop funding models and plans for sustainable technology purchases and leverage openly licensed content while paying special attention to eliminating those resources and tasks that can be made obsolete by technology.

Develop clear communities of practice for education leaders at all levels that act as a hub for setting vision, understanding research, and sharing practices

Section 4: Assessment

Revise practices, policies, and regulations to ensure privacy and information protection while enabling a model of assessment that includes ongoing gathering and sharing of data for continuous improvement of learning and teaching.

States, districts, and others should design, develop, and implement learning dashboards, response systems, and communication pathways that give students, educators, families, and other stakeholders timely and actionable feedback about student learning to improve achievement and instructional practices.

Create and validate an integrated system for designing and implementing valid, reliable, and cost-effective assessments of complex aspects of 21st century expertise and competencies across academic disciplines

Research and development should be conducted that explore how embedded assessment technologies such as simulations, collaboration environments, virtual worlds, games, and cognitive tutors can be used to engage and motivate learners while assessing complex

Section 5: Infrastructure

Ensure students and educators have broadband access to the Internet and adequate wireless connectivity, with a special focus on equity of access outside of school

Ensure that every student and educator has at least one Internet access device and appropriate software and resources for research, communication, multimedia content creation, and collaboration for use in and out of school

Support the development and use of openly licensed educational materials to promote innovative and creative opportunities for all learners and accelerate the development and adoption of new open technology–based learning tools and courses.

Draft sustainability plans for infrastructure concerns that include upgrades of wired and wireless access as well as device refresh plans and sustainable funding sources while ensuring the safety and protection of student data

Create a comprehensive map and database of connectivity, device access, use of openly licensed educational resources, and their uses across the country.

Conclusion

The timing has never been better for using technology to enable and improve learning at all levels, in all places, and for people of all backgrounds. From the modernization of E-rate to the proliferation and adoption of openly licensed educational resources, the key pieces necessary to realize best the transformations made possible by technology in education are in place.

Educators, policymakers, administrators, and teacher preparation and professional development programs now should embed these tools and resources into their practices. Working in collaboration with families, researchers, cultural institutions, and all other stakeholders, these groups can eliminate inefficiencies, reach beyond the walls of traditional classrooms, and form strong partnerships to support everywhere, all-the-time learning.

Although the presence of technology does not ensure equity and accessibility in learning, it has the power to lower barriers to both in ways previously impossible. No matter their perceived abilities or geographic locations, all learners can access resources, experiences, planning tools, and information that can set them on a path to acquiring expertise unimaginable a generation ago.

All of this can work to augment the knowledge, skills, and competencies of educators. Tools and data systems can be integrated seamlessly to provide information on student learning progress beyond the static and dated scores of traditional assessments. Learning dashboards and collaboration and communication tools can help connect teachers and families with instantaneous ease. This all is made more likely with the guidance of strong vision and leadership at all levels from teacher-leaders to school, district, and state administrators. For these roles, too, technology allows greater communication, resource sharing, and improved practice so that the vision is owned by all and dedicated to helping every individual in the system improve learning for students.It is a time of great possibility and progress for the use of technology to support learning.

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