



Educating the Digital Generation

Summary of the
State Board of Education Learning Roundtable
November 17, 2015

Foreword

More and more students and teachers are using more and more technology in schools. While headlines in the popular press tend to focus on the technology – “A computer for every student!” – the important factor is how the technology is being used to help ensure students exit schools ready for college or prepared for a career. At the core of the teaching and learning experience are instructional materials of all kinds, instructional materials that increasingly are shifting to digital from the traditional textbook. In 2014, 41 percent of instructional materials ordered in Texas were digital, and in 2015, 87 percent were digital.

Citing these statistics, Texas State Board of Education Chair Donna Bahorich convened a State Board of Education Learning Roundtable entitled “Educating the Digital Generation” on November 17, 2015 at the Texas Capitol to examine crucial topics related to this shift toward digital instructional materials, including the cost, the challenges of digital content, the mutability of digital content, and the digital divide. To address these and other topics, Chair Bahorich assembled a rich array of presenters from universities and the technology and the publishing industries, as well as personnel from school districts representing administrators such as superintendents, curriculum directors, technology directors, and instructional materials administrators.

The Texas Computer Education Association (TCEA) commissioned this paper because we believe in the power of technology to engage and empower students and educators, thus preparing them not only for college and careers, but also citizenship in a participatory democracy. Just as technology has permeated and connected previously disparate segments of society and transformed many sectors of the economy, so too does it have the potential to do the same for education. This paper summarizing the remarks of every speaker at the Roundtable also includes concrete next steps for our state to take in order to fulfill the possibilities represented by the effective and efficient use of technology throughout the education enterprise.

Educating the Digital Generation was written by Dr. Geoffrey H. Fletcher, currently a private consultant, but no stranger to Texas. Dr. Fletcher served with the Texas Education Agency for eleven years, all associated with instructional technology. His last position at TEA was as Associate Commissioner with responsibility for curriculum, assessment, textbooks, technology, and professional development. Since that time, Dr. Fletcher served as executive director of TCEA, editor of T.H.E. Journal, and deputy executive director of the State Educational Technology Directors Association. He began his career in education as a middle school English and Futurology teacher.

TCEA is a member-based organization devoted to the use of technology in education. Our primary focus is on integrating technology into the PreK-12 environment and providing our members with state-of-the-art information through conferences, workshops, newsletters, the Internet, and collaborations with higher education and business. To learn more, please visit www.tcea.org.



Lori Gracey

Educating the Digital Generation

Summary of the State Board of Education Learning Roundtable

November 17, 2015

State Board of Education Chair Donna Bahorich opened the meeting by stating that the Board had a very full day to cover a broad topic with a lot of subjects. She noted that in 2014, 41 percent of instructional materials ordered in Texas were digital, and in 2015, 87 percent were digital. With digital content more than doubling over the year, this roundtable and its topic were very timely. The topic also has the attention of the Governor, Lieutenant Governor, Speaker of the House, and the Legislature, because the impact of technology in the classroom has both promise and possible pitfalls.

She noted that the goal of the day was to coalesce around some smart expectations they hope to set on how best to educate, support, engage, and protect the children of Texas. Topics would include

- The cost and effectiveness of digital content
- Some of the challenges of digital content, such as student and family privacy and who has access to what data
- The alignment of content in the classroom with standards, especially at a time when we can change content with the click of a button
- Recent reports that have addressed the possible distraction of students by technology, possibly taking away from their learning
- The digital divide

Everyone needs to find ways to ensure that all our children can learn in the most effective way for him or her as the Board seeks to find ways to prepare children for this increasingly complex and digital world. The hope is that they can get some answers today to help everyone move forward.

The Science of Learning

Dr. Chuck Weaver of Baylor University opened with remarks regarding the science of learning by citing research regarding various practices common in schools today, some of which can be effective and some much less so, or even counter-productive.

One key point was that educators should search for the point of desirable difficulty. In providing extensive study guides and other aides, teachers can make tasks too easy; instead, we need to introduce some tasks that are more difficult to challenge students.

Another was that spaced practice was much more effective than cramming and that students should study a variety of subjects each day instead of focusing on only one each day.

Dr. Weaver spent a good deal of time talking about the benefits of testing for learning as a teaching tool as opposed to testing for assessment. His definition of testing focused much more on informal testing, such as asking questions in class, using clickers for instant feedback, daily or weekly quizzes and other techniques to encourage students to frequently check their own learning. In fact, performing on “a test” is extremely important for learning and is the single most effective and valuable use of study time. We should assess often, in some cases daily, and we should always administer comprehensive exams, as research shows these practices positively affect learning.

Finally, the number one environmental impact on student learning is student reading. Students performing in the 90th percentile have 200 times more print exposure than students performing in the 10th percentile. This effect starts very early and the gap grows to where it may be impossible to close by college.

Infrastructure

Jon Wilkins, Managing Director at the Federal Communication Commission and Tony Swei, Co-founder of Education Superhighway, discussed infrastructure needs in the schools. Wilkins reviewed basic facts about the E-rate program and the recent modernization of the program. E-rate is the third largest federal education program and it is somewhat unique in that it is not subject to appropriations; thus its funding streams are consistent and dependable. Texas has received over \$4 billion cumulatively since the program began in 1997.

Because the early goal of the E-rate (to connect all schools to the Internet) had largely been accomplished and because the demand for bandwidth has doubled every two to three years, the FCC determined that the E-rate needed to be modernized. The result of that effort was that, within the last two years, the FCC expanded the size of the program by 60% -- from \$2.5 billion a year to \$3.9 billion a year – and increased a focus on Wi-Fi within the schools in an attempt to ensure each computer, not just each school, could reach the Internet. Mr. Wilkins also reviewed other aspects of the program, including efforts to make it more affordable and to make the applicant experience easier and more streamlined. He pointed out that North Carolina had gone through a central planning process and saved substantial money through aggregating demand and central purchasing. He also noted that in an effort to better serve rural areas, the FCC will match certain state and local expenditures to reach previously underserved areas.

Tony Swei of Education Superhighway reviewed goals loosely tied to the FCC goals for three levels of connectivity: 1 Mbps per student at a district level, fiber to every school from the district, and sufficient Wi-Fi to support a robust 1-student to-1-computing device ratio. He outlined some common economic and organizational roadblocks to full connectivity. The economic challenges include district budget shortfalls and service provider limitations regarding geography, lack of access in rural areas, and lack of service provider competition. The organizational challenges include lack of leadership to make broadband connectivity a priority; lack of technical expertise to understand challenges and opportunities; and the lack of planning to enable alternative, money saving approaches to purchasing bandwidth capability.

Research from the Education Superhighway shows that in Texas, 33 percent of schools have less than 100 Kbps per student and 98% of schools have less than 1 Mbps per student. 15 percent are not on fiber and 42 percent of schools have not accessed E-rate for Wi-Fi, thus only tapping into \$130 million of \$311 million available for Wi-Fi. Some districts may have recently installed Wi-Fi in their schools and thus will not tap into the Wi-Fi category of E-rate funding until three or four years in the future. Therefore, there is much work to do to ensure all students in Texas have full access to digital content and other learning tools.

Superintendents' Panel

Five district administrators (Dr. Steven Ebell, Clear Creek ISD, Dr. Deanna Lovesmith, Belton ISD, Randy Moczygemba, New Braunfels ISD, Dr. Scott Muri, Spring Branch ISD, and Dr. Karen Rue, Northwest ISD), spoke about their school districts' efforts in using technology and digital content to ensure their students are college and career ready. There were many lessons learned. Among them:

- Using “digital textbooks” can save money. Clear Creek estimates they have saved \$5 million by using digital textbooks and having classroom sets of printed textbooks. New Braunfels takes advantage of iTunes U and Open Educational Resources, as well as having their own teachers

create content. Spring Branch noted their desire for open content. Northwest ISD utilizes Moodle, Google docs, and other open resources.

- Professional learning is crucial to ensuring that digital content and technology resources are used effectively. Belton ISD spoke of their efforts with professional learning as they and Spring Branch both leverage the local knowledge and skills of their teachers to add to the credibility of the professional learning.
- Technology and digital content enable alternative approaches to environments for learning that are better suited to today's students. In one school, Spring Branch placed seven teachers and all their students in one room and created alternative learning stations with all the teachers cooperating in creating and implementing experiences for students. New Braunfels uses blended learning and encouraged the Board to consider competency instead of seat time for online course completion requirements. Belton spoke of flexible learning environments and a focus on communication, collaboration, critical thinking, and problem solving. Spring Branch mentioned personalized learning that could be enabled with technology and digital content. Just as important is the realization that there is no one approach that works for all students; flexibility is the key to success. And both Belton and New Braunfels spoke of an emphasis on project-based learning.

Yet school districts face many challenges in implementing digital content:

- Virtually every person on the panel alluded to problems in creating logins for their students to access digital content from publishers and managing those accounts. One Clear Creek staff person estimated an additional 1,000 hours of effort was caused by creating and implementing logins, with, for example, one publisher having a 16-digit code for each student. Making the problem worse is that there is little consistency in systems across publishers.
- In a related challenge, there is little interoperability among publishers' systems, so accessing and using digital content from a variety of publishers and syncing student data can cause multiple problems.

Administrators also had suggestions for publishers:

- As implied in the challenges, make the login systems standard and simple, and ensure interoperability across all publishers. This implies a strong standard for both.
- Create flexibility within your content. Spring Branch asked for powerful learning objects for teachers and learners that are not locked into a subscription model. The students of Northwest asked for ubiquitous access to content, content that is interactive, personalized, and adaptive, and more dynamic than a PDF, with the ability to manipulate and annotate the content.
- Provide digital content that is not a flat PDF, but instead is interactive, can be personalized, is accessible on any device, and is available far prior to the start of school.

Software and Information Industry Association (SIIA)

Brendan Desetti explained that SIIA is a trade association for the software and digital content industry that provides global services in government relations, business development, corporate education, and intellectual property protection to leading companies. Among the membership are approximately 200 technology providers for education. Desetti offered four broad recommendations:

- Provide an easier approval and adoption process that includes an approach for more modular materials. Florida statute has created a distinction between "electronic format" that is text-based or image-based and readable on digital devices (more flat like a PDF) and "digital format," which is content in a form that provides students with various interactive functions. This kind of distinction and others could be put into the proclamation.

- Provide a more holistic approach to keeping material and content fresh and up to date and a new look at how professional development is carried out. One example to consider is the iTech program in the proposed reauthorization of ESEA.
- Be aware of costs and investments that include dedicated support and funding for instructional materials. He stressed that the budget for instructional materials cannot be reduced as more digital content becomes available for schools. In addition, free materials and Open Educational Resources still cost money to create and maintain and care needs to be taken to ensure they are accessible to all students.
- Reduce barriers to access to technology. This includes ensuring all teachers and students have sufficient broadband and devices to access the material. Every district should take advantage of E-rate and look to other states such as New York that has a broadband expansion underway and Florida that is starting one as well.

Finally, Mr. Desetti addressed the crucial area of student data privacy by reiterating that everyone has a responsibility to guard the safety and integrity of student data. He reviewed the Student Privacy Pledge that more than 200 K-12 school service providers have signed to advance student data privacy protections. (<http://studentprivacypledge.org/>)

Publishers' Panel

Association of American Publishers (AAP)

Jay Diskey reviewed how policy and adoptions regarding instructional materials have changed over the past few years to adapt to the growth of digital content and that, among the 19 adoption states, there are a variety of approaches. Some require purchases off of a state-approved list while others use such a list as advisory. Florida, for example, requires 50 percent of materials to be purchased from the state list, but the other 50 percent of purchased materials can be non-adopted materials. And 50 percent of all instructional materials funds must be spent on digital content. In addition, some states are still recovering from the recession when budgets for instructional materials were slashed, for example, as much as 75 percent in North Carolina.

Representatives from Houghton Mifflin Harcourt (HMH), McGraw-Hill Education, Discovery Education, CEV Multimedia, and Pearson Learning Services addressed the Board with their visions for instructional materials and suggestions for the Board. While each representative had his own emphasis, there were a number of commonalities addressed:

- The world and students have changed dramatically and that demands different approaches to content that include content that is interactive, adaptive, portable, accessible, easy to use, efficient, current, relevant, and effective.
- Some publishers (HMH, McGraw-Hill Education) mentioned using open standards for content development and sharing, recognizing school districts' needs for interoperability.
- On the other hand, publishers are hindered by the plethora of learning management systems (Discovery noted 75 different ones) they have to integrate their content with. Some kind of standardization would help publishers and districts. They supported standards such as IMS, Caliper, LTI, and QTI.

Board members had a series of questions:

- In response to questions about the cost of digital versus print, Discovery noted that about a third of their costs are for professional development; HMH noted that print is a small part of their costs and like other publishers, a major cost is in the sale of the content; McGraw-Hill Education agreed and noted that there are inefficiencies throughout the system; Pearson noted that additional – and important – requirements such as student data privacy and data usage also have costs.

- In response to questions about the EMAT system and alternative approaches to purchasing such as bundling, publishers recommended allowing a la carte purchasing within EMAT to allow for school districts' desire for smaller "chunks" of content.
- The notion of dynamic, changeable content elicited questions regarding the distrust of digital among the public and how to review all the content that now comes in digital packages. There does not seem to be an easy answer in any of the state approaches across the country.
- There also were questions regarding professional development. Discovery, with their approach of including professional development as a component and cost of their materials, noted that it needed to be ongoing and asked how that can be sustained over time. HMH and others noted that they had program-specific training as well as professional development offerings on topics such as integrating technology throughout the curriculum.

Open Educational Resources (OER)

Geoff Fletcher of GH Fletcher Consulting provided a national overview of Open Educational Resources, materials that are in the public domain or introduced with an open license, meaning that anyone can legally and freely copy, use, adapt, and reshare the materials. Awareness of OER has grown substantially over the past five years. Dr. Fletcher reviewed developments in OER:

- The U. S. Department of Education launched its GoOpen initiative that included proposed rules that any new intellectual property developed with grant funding must have an open license; 10 districts have pledged to replace one traditional textbook with an openly-licensed one and six other districts have pledged to support districts desiring to move to OER; public and private sector support is growing to ensure their platforms can support OER and ongoing professional development in how to use OER.
- On a national level, ten states have come together under the moniker of the K-12 OER Collaborative with the intent to create OER content for K-12 in math and English Language Arts aligned with the Common Core. Thus far, they have sufficient funding for grade 6 math.
- Utah and Washington have created state initiatives around OER, with Utah focused on creating content and Washington on creating a "library" of open content and helping district personnel find and use OER.
- He also reviewed various efforts in Texas, including section 31.071 of the Texas Education Code and a rider in the most recent appropriations bill directing the Commissioner to set aside \$5 million each year of the biennium to issue an RFP for state-developed OER materials under TEC 31.071. The RFP should call for advanced secondary courses in Science, Technology, Engineering, and Mathematics.

Two providers of OER, Richard Baraniuk of OpenStax from Rice and Carl Blyth of the Center for Open Educational Resources and Language Learning (COERLL) from the University of Texas, spoke about their projects that are based in higher education and their implications for K-12 education. OpenStax develops textbooks that are developed and peer-reviewed by educators to ensure they are readable, accurate, and meet scope and sequence requirements. Many of their books are adaptable to K-12, especially their advanced placement books. In testimony to their effectiveness, Dr. Baraniuk cited a study showing that students using OpenStax tools in an engineering course scored 0.5 – 1.0 GPA points better than those using traditional books.

Dr. Blyth explained the genesis and purpose of COERLL. COERLL is funded by the U.S. Department of Education to improve the teaching and learning of foreign languages by producing resources that can be profitably employed in a variety of settings. They are about creating high quality but inexpensive OER for foreign language learning, promoting a participatory culture and building an infrastructure of sharing. They are concerned with applied linguistic, OER teaching materials and resources, assessment,

professional development, less commonly taught languages, K-12 initiatives, and outreach and dissemination. Their approach is to use modular content and embeddable media such as YouTube and editable formats such as Google docs, as well as multiple formats including print on demand and mobile. Dr. Blyth showed examples of “books” they have created.

Learning List

Jackie Lain of Learning List explained that Learning List was an independent review service for schools and districts. They provide verification of alignment of products to state standards and identify other products that are aligned to the remaining standards. They also provide educator ratings and reviews. They have found that many materials are not aligned to standards even when publishers claim they are. Their reviews complement the state adoption process by reviewing alignment of non-state-adopted materials and provide additional types of reviews, such as technology attributes, supplemental content, and advanced placement. Their research shows that more and more digital products are being purchased with more supplemental products among them.

ISD Technology Directors/Officers Panel

Four school district technology directors and officers (Scott Floyd of White Oak ISD, Karen Fuller of Klein ISD, Mary Kemper of Coppell ISD, and Lenny Schad of Houston ISD) shared what they are doing with technology and instructional materials in their districts and their plans for the future. They had much in common:

- All were in the process of implementing some form of 1-to-1 program.
- All spoke of the importance of professional development. Coppell in particular pointed out the various options they provide – clarifying standards, model practices, and sample resources at both the district and campus levels, as well as ongoing mentoring. Klein mentioned the importance of professional development for principals, and Houston placed professional development as one leg of a three-legged milk stool. Without that leg, the technology and the digital content will fall down.
- Many, especially Houston, emphasized the importance of collaboration with all the other units of the school district – curriculum, school leadership, technology, professional development, communications, Human Resources, and finance. All play an important role in fully implementing digital content and creating the appropriate environment and learning experiences for students.

The technology directors and officers also had a number of suggestions for the state, other districts, and publishers:

- The process for onboarding and maintaining publishers’ digital content needs to be simplified and streamlined.
- Digital content needs to be compatible with multiple types of devices, and accessibility and portability of content is very important, as is compatibility with single sign-on systems.
- Districts want “chunks” of materials in addition to full-year courses.
- The TEKS need to be delivered in a machine-readable form, not just a PDF.
- All content should contain metatags and content should adhere to common standards such as LTI, IMS, or common cartridge.

Instructional Materials Coordinators' Association of Texas Panel

Kellie Skarda of Goose Creek and Matt Tyner of Dallas ISD provided the perspective of the instructional materials coordinators during this time of changing instructional materials. Among the key points discussed were:

- Instructional materials coordinators were thrilled to have the IMA funds frontloaded. This provided the flexibility and fast access that many districts craved.
- Many coordinators would like to be able to purchase a la carte or “chunks” of materials, especially those districts that go straight to EMAT and not through the disbursement process, which can be daunting to some districts.
- Districts are facing a somewhat unique situation with Proclamation 2010 that is expiring this spring. With the contracts running out, districts will lose access to the free and consumable materials that were in the contract. This creates a hardship for districts.

Blended Learning

Heather Staker of Ready to Blend and Cat Alexander of Raise Your Hand Texas addressed blended learning and a special blended learning project in Texas. According to the Clayton Christensen Institute, blended learning has the following characteristics: it is online with student control, situated in a brick-and-mortar location such as school, modalities are connected to create an integrated learning experience, and students have some control over the time, place, and pace of learning.

Raise Your Hand Texas is a grant-based initiative for districts to design and potentially implement a pilot project in blended learning. Teams of educators from districts attended a workshop, the finished product of which was the beginnings of a business plan that they will turn into an application. The organization hopes to receive 75 applications that will be winnowed down to 10, and those 10 teams will attend another workshop in February. In the spring, the winners will be able to receive up to a half million dollars to implement their winning plan.

State Educational Technology Directors Association (SETDA)

Lan Neugent, acting executive director of SETDA, offered summarizing remarks. He noted that participants in the day's roundtable were evangelical in their zeal to improve student achievement. He noted that we still are early in the implementation of technology in that it is still noticed as a separate item, not fully integrated. He also warned, echoing others in the day, that technology also can create greater inequity in that some students, for example, may not have access to digital content at home. We also need to be careful to create a balance between protecting students' data and using that data to improve learning. Mr. Neugent went on to list different resources that SETDA had produced to help states and districts implement digital learning (www.setda.org). Finally, he challenged the Board to transform learning by considering competency-based learning and Individual Education Plans (IEPs) for all students.

Next Steps

The roundtable provided a rich mixture of presenters and ideas. The array of speakers – including representatives from universities, personnel from school districts representing administrators, technology directors, instructional materials administrators, and members of the private sector directly involved in creating, distributing and evaluating instructional materials – illustrates that the instructional materials responsibility can no longer be confined to a single silo. Rather, staff representing at least curriculum, professional development, technology, and assessment all should be involved in decisions regarding the selection, implementation and evaluation of instructional materials.

Even with the mix of presenters at the roundtable, there were a number of common issues that arose during the presentations and the question and answer periods after each panel. These common issues form a framework for possible next steps that could go a long way toward more efficient and effective use of instructional materials of all kinds, but especially digital content, and put Texas in the forefront of digital learning. These issues included better access to bandwidth and up-to-date devices to access digital content, enhanced professional learning for teachers and administrators, more flexible content and business models to utilize the content, addressing technical issues that would allow more efficient implementation and utilization of digital content, and providing necessary state leadership and vision.

Equitable Access

Testimony from Education Superhighway clearly showed that there was much work to do to bring Texas up to goals established by the FCC: 33 percent of schools have less than 100 Kbps per student and 98 percent of schools have less than 1 Mbps per student, the FCC goal. 15 percent are not on fiber for transport to every school. In addition, 42 percent of districts have not accessed the E-rate for Wi-Fi, leaving approximately \$180 million available Federal dollars untapped. (As noted above, some districts may not yet need E-rate dollars for Wi-Fi due to recent purchases.) In addition, because of the size of Texas and the vast number of rural areas, there are serious limitations regarding rural access and service provider competition. Within school districts, there is an ongoing challenge regarding technical expertise to leverage funding opportunities and acquire and maintain increasingly sophisticated networks.

While more students and parents own mobile devices and some districts are encouraging students to bring those devices to school for learning, anecdotal evidence from schools is that they continue to have difficulty providing sufficient devices to fully use digital content both in school and at home. The result is a growing concern regarding equity of access to the basic tools of learning. The technology allotment of \$30 per student began to flow funds in 1992 and it provided some support to school districts in acquiring and maintaining devices, and put Texas in a leading position among all states. Since the Technology Allotment was folded into the Instructional Materials Allotment in Senate Bill 6 in 2013, district budgets have been challenged to keep up with the increasing demand for devices, as well as keeping those devices up to date.

Next Steps

- Consider conducting an intense awareness and education campaign, beyond that which has already been provided, about the availability of E-rate funds and how to apply for them.
- Consider creating a cross-state-agency plan to ensure all school districts, regardless of zip code, meet the FCC goals for bandwidth in schools and libraries by 2018. In addition, consideration should be paid to the economic imperative that all rural areas of the state should have robust bandwidth to encourage business development. Such robust bandwidth would help to fill “the homework gap” (lack of access to broadband at home by students) that is limiting the use of digital content.
- Consider re-implementing some form of the technology allotment, possibly with a matching requirement from districts, that could be used to acquire devices, bandwidth, technology support, and professional learning.

Professional Learning

School district personnel and publishers both called for additional professional learning opportunities for administrators and teachers alike. While many districts use their own staff to provide professional learning, publishers offer some as well. There is a relatively clear distinction between training – learning the mechanics of how to operate a “program” – and professional learning – understanding how to use a “program” within a context of teaching and learning and how it affects pedagogy, classroom management, and other aspects of the educational process and then implementing that with fidelity.

Next Steps

- Consider augmenting Project Share or its successor with additional professional learning so that it includes a robust array of on demand, just-in-time, online professional learning.
- Consider a program to establish and maintain a series of interlocking online communities of practice for specific topics and or subject areas. Such communities should include campus and district communities of practice, regional communities of practice facilitated by ESCs, and a statewide community of practice to provide leadership and facilitation.
- Consider establishing and funding a Technology Academy similar to the acclaimed Reading and Math Academies of a few years ago. Such Academies should have segments for district staff, principals, and teachers, as well as encouraging districts to send cross-level teams.
- Consider funding, possibly through a district match, a cadre of “digital coaches.” Research has shown this method of on-site delivery of professional learning and support to be highly effective.

Flexible Content and Business Models

Virtually every panel had someone mention the desire for educators to have access to more flexible versions of digital content; that is, to have a full-year curriculum/content available, but also to have access to smaller “chunks” of content as well. This is not unlike the changes that have taken place in the music industry with iTunes and other approaches to acquiring and using music. Publishers have concerns about contracts with their authors and developers, complex licensing agreements, and whether or not “chunks” of content can be implemented with fidelity to the overall developed longer portion of curriculum. In addition, there are few business models for this approach, and some panelists noted that the EMAT system does not fully support this approach either. Finally, Open Educational Resources (OER) provide the capability for educators to acquire low- to no-cost content as well as the license to duplicate and remix and reuse content. Many districts are unfamiliar with this additional alternative to acquiring and using content.

Next Steps

- Consider emulating the Washington state model for OER in which the state provides professional learning about what OER is, how to find it, how to evaluate it, and the state publishes a fully vetted list of OER.
- Consider developing two policies regarding licensing of content developed with state or district funds: 1. All content developed with grant funds from the TEA should be licensed under a Creative Commons Attribution 3.0 license; and 2. Educators who develop content – from lesson plans to units to content used by students – should be encouraged to license that content with the same Creative Commons license. That will encourage the greater sharing of teacher work among school districts across the state.
- Consider examining two of Florida’s policies: 1. Distinguishing between electronic and digital content and then providing incentives for digital content; and 2. Requiring publishers providing instructional materials in a bundle to make the materials available as separate and unbundled items, each priced individually, and ensure that EMAT can facilitate the purchase of the unbundled items easily.
- Consider establishing an ad hoc working group made up of school business officials, instructional materials directors, technology directors, and members of the private sector to develop alternative business models that would take into consideration the desire for chunking of content and other approaches that ease the effective use of digital content. Consider also piloting a few of the models emerging from the working group.

Technical Issues

Educators were very concerned about the difficulties they had in implementing digital content. Onboarding of content, creating and maintaining login information and student accounts, and using multiple publishers' content within their own system – all were significant problems in implementing digital content in school districts. Publishers also have their technical concerns with implementing digital content, as one publisher noted that they have to deal with 75 different Learning Management Systems in Texas alone.

Next Steps

- Consider creating, with publishers' and school districts' input, standards for onboarding content, logins, passwords, and other similar start up and implementation processes. Such standards could be included in each proclamation. Care must be taken that specific technologies are not named, as they most likely will be out of date in a short period of time. Rather, common elements could be created, much like data definitions and data elements in PEIMS that are "technology agnostic."
- Consider creating, with publishers' and school districts' input, standards for interoperability so that multiple publishers' content can be easily used within a school district.
- Consider a requirement in the Proclamations that all content must contain metatagging that is consistent with the standards established by the Learning Resource Metatagging Initiative (<http://dublincore.org/dcx/lrmi-terms/1.1/>).

Leadership and Vision

Different panelists mentioned the importance of leadership within the school district to provide vision and direction for digital learning. Without that leadership and common vision regarding the use of technology, an environment of unequal access to and use of digital content and technology is likely to grow, as some teachers will gravitate to a teaching and learning environment that addresses the needs and interests of students growing up in a digital world and some will not. This need for leadership and vision is true at the state level as well. Ensuring equitable access to digital content across Texas is a complex endeavor, requiring a future focus, technical knowledge, and the ability to communicate and collaborate with superintendents and other educators, telecommunications service providers, publishers, and federal and state bureaucracies, to name but a few constituencies. It is a daunting yet critically important component for the students of Texas and, more broadly, the economic future of the state.

Next Steps

Consider creating a Chief Information Officer position for education that would provide vision, leadership, and direction for effective use of technology in PreK–12 education, including not only devices and bandwidth, but also professional learning and support.

For a list and information about the panelists who took part in the Texas State Board of Education Learning Roundtable please go to: <https://goo.gl/OxUUqX>

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