Transcending Boundaries with Technology
Curriculum in Context
Transcending Boundaries with Technology

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Washington Educators’ Conference
Helping Educators Navigate New Heights and Challenges & Governor Inslee’s Call for Graduation Attainment

October 27–28, 2014
DoubleTree Hotel Seattle Airport

The second annual Washington Educators’ Conference, hosted by WASA, AWSP, OSPI, and WSASCD will be held October 27–28, at the DoubleTree Hotel Seattle Airport.

Continuing our focus on reforms implementation, the conference theme is “Helping Educators Navigate New Heights and Challenges and Governor Inslee’s Call for Graduation Attainment.” Hot issues in education in Washington will be highlighted by national keynote speakers and in best practice concurrent sessions.

This two-day event is for all educators in Washington State—superintendents, central office administrators, principals and assistant principals, other building-level administrators, teachers, and teacher-leaders.

Conference info and registration link

Publisher

Washington State Association for Supervision and Curriculum Development
825 Fifth Avenue SE, Olympia, WA 98501

WSASCD publications do not necessarily reflect ASCD views and are not official publications of ASCD.

Curriculum in Context is published twice a year. Manuscripts should be addressed to David Denton, Seattle Pacific University, e-mail: dentod@spu.edu.

The editorial committee seeks articles that provide perspectives, research and practical information about the issues of and ways to improve learning and teaching in Washington State. ISSN 2165-7882

Cover photo credit: Thinkstock photo 486894859 by Grassetto
The theme for this edition of Curriculum in Context is Transcending Boundaries with Technology and this is indeed what technology helps educators do. While there may be varying degrees of commitment and enthusiasm around technology for teaching and learning, there is no denying that the promise of technology for making work easier, effective, and more efficient has captured the hearts and minds of many educational leaders. This is why various sets of standards and regulations include technology outcomes. The Danielson Framework for Teaching, the Marzano Teacher Evaluation Model, AWSP Leadership Framework, and the Marzano School Leadership Evaluation Plan all include criteria or evidence describing effective use of technology. One authoritative source for articulating these outcomes and elevating their importance is Washington Administrative Code, specifically chapter 181-78A and 79A, which require new and practicing teachers integrate technology as part of instruction and assessment. Surely, similar legal code may be found in the descriptions of other states where teacher knowledge and skill is established. Faith in teaching with technology is nationwide. The Interstate Teacher Assessment and Support Consortium and Common Core literacy and mathematics standards include technology outcomes. There is even an Office of Educational Technology (OET), which is a branch of the United States Department of Education. The mission of OET “is to provide leadership for transforming education through the power of technology.”

The power and promise of technology for transforming teaching and learning seems interwoven across evaluation systems, legal codes, and policy statements. However, one of the great challenges, or opportunities, is knowing how to use technology for bringing about real change. Using technology for more than novelty requires careful planning and significant resources. This is true for any educational innovation, digital or otherwise. The key to success is selecting the right technology for transforming teaching and learning, implementing it well, and ensuring sustainability. This edition of Curriculum in Context provides some bridges for closing the gap between the power and promise of technology and practical how-to.

Jeff Utecht opens the edition by describing steps for teaching Internet search skills, while Richard Kassissieh and Jeff Tillinghast discuss the intersection between technology, formative assessment, and differentiated instruction. David Wicks predicts the trajectory of technology in education through the lens of Massive Open Online Courses, and Julie Olsen reminds us that while digital technologies for teaching are amazing, they mean little without passion and motivation. Shelby Reynolds explores different ways technology overcomes boundaries, and Hannah Gbenro provides some tips for improving professional development around technology.

The editorial staff of Curriculum in Context hopes you will discover several new ideas and approaches as you read this edition and consider improvements to your own instructional practice for transcending boundaries with technology.

David W. Denton, Ed.D., is an Assistant Professor at Seattle Pacific University. Before joining Seattle Pacific, David taught middle school students, in a variety of disciplines, for ten years. In 2005, David earned National Board Certification in early adolescent mathematics.
Learning and Leading with Technology

Effective educators constantly seek new and better approaches or additional resources to improve student achievement. Indeed, the core work of educators everywhere is to enable all students to reach their full potential. One of the areas of focus that must be addressed in order to do this is technology – or the tools that enhance students’ cognitive abilities. Some might even suggest that technology, both for teaching and learning, is a primary concern for preparing students for the 21st century. In light of an uncertain job market, demands of globalization, limited resources, and necessity for sustainable human activity in every sector, technology is indispensable and necessary for solving problems and creating opportunities.

For those of us who have been in education for more than a decade, the emergence of technology for teaching and learning seems slow, perhaps even plodding. The days of the floppy disk, Apple II, Commodore 64, and other relics are long gone (though these artifacts surely inspire fond memories for many). The days of wireless Internet access, smart phones, and one-to-one computing are here and these tools are widespread. The rapid adoption of technology is surely outpacing requisite knowledge and skills for managing information. There are more sources for content than ever before, but I speculate that too few educators have considered the need to teach knowledge and skills associated with information management, such as determining the veracity of sources or digital citizenship. The demand for educators ready and willing to embrace technology for equipping students for living and working in the 21st century is clear.

Yet, one obstacle is that education is inherently conventional – a large portion of our work is retaining and transmitting the knowledge and skills handed down from one generation to the next. Although, effective educators preserve what has been valued over time, they also operate on the periphery of new ways of thinking and doing. Technology bridges gaps between the past and future, but it also confounds them – serving to show that what has been done before is perhaps no longer important, or necessary – and this can be unsettling. Nevertheless, there is an abiding confidence in technology. People believe it can solve problems, probably more in Washington than many other places in the country, given the rich history of innovation interwoven into the fabric of our state.

But, there are few educators who claim technology unleashed would do great things in the classroom. It requires expertise and supervision, a careful plan with a purpose so students are empowered, yielding positive gains. There seems no shortage of software and hardware for empowering students, but whether these tools can actually deliver what is promised is a question thoughtful educators need to contend with every day.

It is insufficient to adopt the latest hardware or app. There needs to be significant thought about what the technology achieves; whether it enhances student abilities, or is perhaps a novelty with fleeting results. At the same time, we use various technologies at nearly every point in the educational process (think desktop computer and office applications). Perhaps the greatest potential for impact is simply making better use of these conventional tools. For example, teaching students the full capabilities of a spreadsheet would likely surpass usefulness of high-end graphing calculators. Or, having students use cloud computing for writing greatly expands peer feedback possibilities in comparison to paper and pencil. However, transitions take time.

In one of the schools I work with, we make a concerted effort to use technology as part of classroom instruction, but we also analyze results as we go. The primary concern is whether instructional technology impacts student achievement. Resources are needed since every alteration from the status quo has a cost. Even though technology is a part of our everyday conversation, we purposefully devote two late start meetings a month to analyze the effects of specific instructional technologies and associated strategies. Our target remains unchanged – impact on student achievement. Our operating principles persist as well. Teachers experiment, model, support, and collaborate. They share successes and failures and they anticipate obstacles with winsome optimism – and everyone learns from the process. This approach has permitted careful selection of digital tools to improve student outcomes, but there is still much to do.

We are excited by the idea of one-to-one learning and bring your own device – but we contend with implementation. We are hopeful about eliminating technology gaps for students with limited access – but we deal with finite resources. We embrace the potential for technology to support exceptional learners, including second language students – but we wonder about the details for how to do this. Yet, we recognize the potential for technology to improve teaching and learning and we persist in exploring ways it can make a difference.

As you read this edition of Curriculum in Context, I invite you to imagine ways you can explore the use of technology to help all students reach their potential.
Making Sense of the Chaos: 
The Importance of Teaching Internet Search Skills

I have fond memories of library time in elementary school. It is where I learned more than anything why alphabetical order mattered. If you want to look something up in a dictionary or an encyclopedia then order matters. Want to find something in the index of a book? Order matters. Using the card catalog to find that book on volcanos? Order matters.

I am grateful for my time in the library. That hour a week of instruction I received from my librarian through the years paid dividends during my college career, since even microfiche was kept in alphabetical order in the university’s library.

Yes….in the mid 1980’s alphabetical order might just have been the most important skill librarians could have taught their students. However, in 2014, I am not so sure that is the skill that is most important today. I am not saying that alphabetical order isn’t important, just not as important as it once was. Now, when I want to look up the meaning of a word, I go to Google.com. I type in “define:alphabetical” and instantly get the definition. If more information is required, I go to wikipedia.org and search for it there. No alphabetizing skills required, just knowledge of using search engines. Even the book search software used in school libraries today doesn’t require alphabetical order knowledge, no…what you need is search.

Today the most important skill we can give students is the skill of search. After all, microfiche is dead, the card catalog is dead, in fact the whole way that we used to order things is dead. Anyone still teaching the Dewey Decimal system? In a digital world there is no order, there is chaos and the skill needed most today by our students, teachers, parents, and community is making sense of all the available information.

Knowing how to make sense of the chaos that is the digital information landscape, is the most important skill we can give anyone today. It doesn’t matter if you are searching Google, Bing, your library catalog, or the databases that a school subscribes to. At the end of the day, they all require search skills.

I believe there is a difference between “finding stuff” and “research”. Both are searching but they are two different skills. “Finding Stuff” is easy, that’s where you go to Google.com, type in “how much does an elephant weigh” and it spits back the answer to you. “Research” is looking for information, piecing knowledge together, and then coming to your own conclusion. For example researching a hotel for your upcoming summer holiday. Where do you go? Who do you trust? You might start at Google, but soon you’ll probably end up at Tripadvisor.com. Once there, do you know how to read the webpage? What reviews do you trust? Do you trust reviews at all? What weight do you give reviews done by people who have stayed at the hotel verses, say, Expedia’s star rating? These kinds of activities are aligned with the American Association of School Librarians (AASL) first standard, which requires students inquire, think critically, and gain knowledge. While these are the things we all want to teach students, it may seem unusual that they can be practiced by researching and comparing vacation scenarios, as described previously.

Consider another set of knowledge and skills related to search, specifically literacy. Reading for understanding is the foundation of most informational text standards today, yet I’m not sure we are applying that to the Internet. Do we teach students how to read and understand web pages? The fact is, no matter how many books you read today, I would bet you still read more web pages than you do book pages. Now apply your own use of the Internet to a 3rd grade student, an 8th grade student, or perhaps a senior who is headed off to university. How many book pages will they read verses web pages in a lifetime, especially when it comes to informational text? The skill of reading for understanding is the same but the context has changed.

Some questions that every educator should consider for reconciling literacy skills with technology skills include the following:

- Can students read and understand an index page in comparison to a search results page?
- Similarly, do students know how to interpret the results from a search?
- Lastly, do students know what to do next after securing and interpreting results?

I think about how many search result pages educators and students see on a
daily basis and yet very few who I talk to understand what this information is and how to use it. This is why I created lesson plans for K-12 educators on this topic, to help students learn necessary Internet skills by providing resources to educators (http://www.thethinkingstick.com/start-the-year-by-teaching-search).

Other resources that I love to use with students include A Google A Day (agoogleaday.com). This website is created by educators and it has new questions students use for practicing Internet search skills. The website itself is a great resource. However, the engaging dialog that revolves around questions and results during a class session is what I enjoy most. For example, students are presented with questions such as

- “What was your search term?”
- “What information was important?”
- “Where did you start?”
- “How do you know your information is correct?”

I use this website in many of my trainings with educators, not only to expose them to a fabulous resource, but to get them thinking about how they can create their own questions based on various content areas or specific topics. In fact Google's own Search Education site (http://www.google.com/insidesearch/searcheducation/index.html) has many more resources for educators to use for teaching Internet search. This site also enables users to examine past A Google A Day challenges to see how other educators are framing questions that get students to go beyond “finding stuff” and to legitimate research based on Internet-based inquiry.

Surely, educators and students everywhere are grateful for the Internet and all that it enables us to do. We take advantage of search every day in our daily lives and in our classrooms. It has changed our culture and work for the better (and of course, also in some ways that are not helpful). But with all these changes, both in our classrooms and within the world at large, there is a new skill set that we need to ensure we are not neglecting: a skill set that once mastered opens up an entirely new world of information, knowledge and possibilities.

Jeff Utecht is an educational technology consultant, educator and author. He holds a Master’s degree in Curriculum and Instruction with a focus in Technology as well as administrative credentials. Jeff began his career as a teacher in a public elementary classroom in Washington. In 2001, he received the Technology Leadership Program grant sponsored by the Bill and Melinda Gates Foundation. This marked the beginning of his journey with technology and learning. You can learn more about Jeff’s work at http://www.jeffutecht.com/

### Professional Development

#### Building Teachers’ Capacity for Success

**Date:** Thursday, November 20, 2014  
**Time:** 8 a.m.–3 p.m.  
**Location:** Tacoma Professional Development Center  
6501 N. 23rd Street, Tacoma, WA 98406  
**Target Audience:** Administrators, Instructional Coaches, School and District Leaders, Teacher-Leaders.

How do we increase student achievement? The research is clear that teacher effectiveness is the #1 determinant of student success and every teacher, like every child, is unique and has strengths, weaknesses, goals, ambitions, gaps, and special qualities. Learn from award-winning principal and author, Pete Hall, on how to support teachers’ growth as reflective practitioners through individualized motivation, personalized feedback, customized coaching, and differentiated supervision. Participants will discuss the application of a strengths-based approach (via the Continuum of Self-Reflection) and get practical tools for drawing the most out of every teacher, one teacher at a time. This session is related to Pete’s book, “Building Teachers’ Capacity for Success” (ASCD, 2008).

**For registration info, visit** [www.wsascd.org](http://www.wsascd.org)

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**Speaker: Pete Hall**

Prior to becoming a full time consultant, Pete Hall was the principal of Shaw Middle School, a Title I school in Spokane Public Schools. After a teaching career that spanned three states and included primary, intermediate, and middle school positions, Hall served as principal of Anderson Elementary School in Reno, Nevada. When he took over Anderson Elementary in 2002, it was one of the only schools in Nevada to have failed to make “adequate yearly progress” for four consecutive years. Two short years later, it was the only Title I school in the state of Nevada to earn a “high-achieving” designation.

His leadership works include more than a dozen articles on leadership and three books: The First-Year Principal (Rowman Littlefield, 2004), Building Teachers’ Capacity for Success: A Collaborative Approach for Coaches and School Leaders (ASCD, 2008), and Lead On! Motivational Lessons for School Leaders (Eye on Education, 2011). For his tenacious and courageous leadership, Hall has been honored with ASCD’s Outstanding Young Educator Award (2004), Nevada’s Martin Luther King Jr. Award (2005), and Phi Delta Kappan’s Emerging Leaders Award (2009), among others. He was appointed to the Nevada Governor’s Commission on Excellence in Education in 2005 and was selected to sit on the National Education Association’s Great Public Schools Indicators Advisory Panel (2010).

Hall holds a national principal mentor certificate from the National Association of Elementary School Principals and serves as a trainer and coach for the association’s PALS mentoring program. He has worked as a personal consultant and motivational coach for professional athletes, weekend golfers, stand-up comedians, firefighters, business executives, custodians, and more.
Uses of Technology to Enhance Formative Assessment and Differentiated Instruction

How may the use of student computing devices speed up the cycle of formative assessment and differentiated instruction? School administrators Richard Kassissieh and Jeff Tillinghast describe the intersection of BYOD and education theory at University Prep, a grade 6-12 independent school in northeast Seattle.

In the past three years, University Prep has made wholesale changes to how technology supports instruction in the school curricula. The most visible of these changes has been the introduction of a 1:1 student device program, in which all students bring personal computing devices to school each day and use them in a variety of ways to support their studies. When designing this program, we had the benefit of learning from the experiences of schools that have been running student laptop programs for up to 14 years. Introducing devices would be only one piece of the change in our educational ecosystem, and arguably not the most important one. A clear theory of action for how device capabilities amplify and extend good education practice would be the most important quality of U Prep's technology initiative.

In brief, our theory of action includes 1) clear and frequent expression of the reasons for the initiative, 2) learning environment design grounded in education research, 3) horizontal and vertical alignment of school support for the change, 4) professional development linked to individual teacher improvement goals, and 5) design for student responsibility and leadership. A full explanation of these ideas exceeds the scope of this article, so we focus our discussion on one key aspect of the model: the strategic use of technology tools to enrich the cycle of formative assessment and differentiated instruction. Our teachers, in consultation with the authors, have adopted and continually develop and refine methods to provide students with timely feedback on their subject mastery and then direct them to further instruction in the areas where they need it most.

University Prep Mission, Vision, and Values

Mission
University Prep is committed to developing each student's potential to become an intellectually courageous, socially responsible citizen of the world.

Vision
University Prep shall be an inclusive community of learners that provides an outstanding education for each individual in a diverse student population.

Values
University Prep believes that integrity, respect, and responsibility are essential to accomplish its mission and to sustain its vision.

http://universityprep.org

Formative assessment is the evaluation of student mastery of knowledge and skills for the purpose of informing further instruction. In contrast to summative assessment, formative feedback occurs throughout, not after the learning process. It helps the student make further progress toward mastery, whereas summative assessment represents the final measurement of a student's proficiency on selected topics. At University Prep, we use the terms “formative” and “summative” with students in order to help them develop understanding and ownership of their learning process, and only summative assessments determine semester grades.

High quality formative assessment is timely, actionable, and specific (Black & William, 1998; Stiggins, 1997). The assessment occurs after students have engaged with learning activities for the topic, but before they move on to another topic, thus it is timely. Feedback focuses on observable qualities of the student work, not immutable characteristics of the student, and thus it is actionable. The assessment focuses on discrete learning objectives, whether concrete or abstract, and thus it is specific. Effective formative assessment therefore provides feedback to the student while the subject is memorable, focuses on what the student did, and specifies a small enough component of the overall work that the student can handle.

Timely, actionable, and specific feedback invites a response from the student, the ideal moment for a teacher to differentiate instruction and provide the specific next steps for that student to
improve mastery in identified areas. The variation of learning activities for individual student needs is one form of differentiation (Tomlinson, 1999). However, even the most skilled teacher cannot always provide an effective response to each student's learning needs on the spot. The effective teacher prepares in advance a diverse collection of learning activities designed to redress the typical obstacles encountered by students and is therefore ready to direct each student to the appropriate activity based on the results of his or her formative assessment. Ideally, students are not only repeating prior learning activities but also approaching the material in different ways that will allow them to learn what they did not master the first time through.

To a certain extent, formative assessment and differentiated instruction are both information problems. Teachers build and then distribute formative assessment instruments to students, collect the results, individually summarize the implications, and then direct each student to the subsequent, matching learning activity. It is therefore not surprising that technology tools have dramatically improved our ability to practice effective formative assessment and differentiated instruction. One teacher would find it next to impossible to individualize all of the information collection, analysis, and distribution required by a class of 20 (or 40) students. This may be why whole group instruction has been the dominant classroom methodology for decades, and effective formative assessment and differentiation has been less common. We have found information technologies very effective at speeding up the cycle of study \(\rightarrow\) formative assessment \(\rightarrow\) individualized study \(\rightarrow\) summative assessment. If a teacher expects to cover a number of units in each term, then efficiency and speed in these processes is necessary.

We classify the technology tools we use for formative assessment and differentiated instruction into two categories: general-purpose and subject-specific. General purpose tools such as Google Docs (or another collaborative document editor) and Schoology (or another learning management system) are designed to facilitate non-specific information flow. However, our teachers use these general-purpose apps in very specific ways. Subject-specific apps such as DuoLingo and DragonBox are very precise in their area of focus, providing feedback and practice for a discrete set of topics in languages and math.

**General Purpose Apps**

Common web-based tools can be applied in ways that match varied subjects, age levels and pedagogical techniques. Teachers take these tools, generalized in function, and use them in a variety of ways to support specific teaching objectives. Some examples of general purpose apps follow:

**Live progress reports.** Our sixth grade students, all new to the school, matriculate from 45 different public and private elementary schools. Thus, students’ prior preparation varies considerably both in terms of content and emphasis. However, our school does not track students based on documented problems associated with this tracking (Werblow, Urick, & Duesbery, 2013). Differentiated instruction is therefore an essential strategy to ensure that all students in heterogeneous groupings are appropriately challenged. Technology tools allow the teacher to accurately track formative assessment results and share them with students, so that appropriate instruction is provided for each individual.

Our sixth grade math teacher shares a Standards and Assignment Log with each student at the start of the year. Google Docs sharing settings allow the teacher to update the document after each assessment, and the student is then able to access the latest summary at any time. The document includes all of the learning objectives, with blank columns for assessment results, along with optional comments. Feedback is individualized for each student in a separate document. For each topic, the teacher first records formative assessment results, then directs the student to the appropriate leveled practice problems. After the student completes these differentiated exercises, then the student takes the summative assessment, and the teacher updates the student's level of mastery as needed. Using this document, the student can see what topics in the course he or she has mastered and which require more study. Figure 1 and 2 show sample digital documents used for organizing Standards and Assignment progress reporting.

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Evidence of Mastery</th>
<th>Evaluation</th>
<th>Comments and Interventions</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be able to find the prime factorization of a number.</td>
<td>Proficiency Evaluation: 11/14</td>
<td>5/5 E</td>
<td>Levelled Practice incomplete</td>
<td>Levelled HW incomplete</td>
</tr>
<tr>
<td>Students will be able to find the greatest common factor of two numbers using prime factors.</td>
<td>Proficiency Evaluation: 2/3 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students will be able to reduce fractions using the GCF.</td>
<td>Proficiency Evaluation: 2/3 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students will be able to find the least common multiple of two numbers using prime factors.</td>
<td>Proficiency Evaluation:</td>
<td>2/3 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students will be able to calculate a percentage of a number without a calculator.</td>
<td>Calculating Tax Proficiency Evaluation: 4/4</td>
<td>M</td>
<td>2/3</td>
<td></td>
</tr>
<tr>
<td>Students will be able to calculate percent of a whole when the context of word problems.</td>
<td>Proficiency Evaluation:</td>
<td>4/4 M</td>
<td>2/3</td>
<td></td>
</tr>
<tr>
<td>Students will be able to collect and analyze data.</td>
<td>UNIT PROJECT: WRITING ELEMENT: PRESENTATION:</td>
<td>M</td>
<td>excellent work on your section of the report. Well done</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1.** Individualized progress report for sixth grade math.
Performance feedback. The use of a web-based discussion thread, forum, or assignment dropbox offers opportunity for individual and group dialogue that moves beyond constraints of class meeting time or course size. Many classes use these tools as discussion vehicles for students to collaborate on homework or ask questions of each other outside of class. A music teacher uses it as a vehicle for individuals to submit examples of their performance and get individual feedback that is normally difficult to accomplish in a large ensemble setting. This allows for increased differentiation by support as the teacher can clearly identify which members of the ensemble are successfully performing the piece and which require additional instruction. In seventh grade English, students submit written assignments electronically to a digital dropbox. Both teacher and students retain access to all drafts and comments, and class time is not used for the distribution and collection of paper. In math classes, students create their own explanation videos and receive feedback on the quality of their presentations. Figure 3, 4, 5, and 6 show use of a digital dropbox for feedback, markup, record keeping, and student-crafted instructional videos.

Portfolio assessment. Use of web-based courseware such as a learning management systems or file-management cloud applications such as Google Drive or Dropbox allow teachers and students to collect electronic work in a central location which can be easily accessed for review and reflection at a later date. Reflective activities can ask students to review past work and comment upon it or revise it. In our middle school, students prepare student-led conferences where they present examples of their best work over the academic quarter to their families. Being able to access conference material several weeks after initial use gives students a wide range of work from which to choose. In addition, use of publishing platforms such as blogs provide students opportunities to select best work and present to a wider audience. In one of our courses, Advanced Topics in Math, students write about their independently-designed research projects on WordPress blogs and receive feedback from observers. Figure 7 shows an example WordPress blog post with student project.

Since they couldn’t see it they kept walking but Hope and I stayed. When we finally stopped watching the seal, my family was way ahead so I coughed and I started running to catch up. Since it was low tide the rocks were out of the water along with all the sea animals including very sharp barnacles all over the rocks. The rocks were as white as the clouds on a sunny day. I was running over the sharp rocks until I slipped and cut my leg. Blood started to drip from my legs onto the white barnacled covered rocks. My cousin had to run to get my mom when she finally caught up to them she told my mom what had happened and my mom came back to help me. My mom took me to the cab to get my legs cleaned. Since my cuts were pretty bad I had to put this yellow with orange spots cream on my leg twice a day, then I thought it was a special disinfectant cream. What had turned out at the beginning to be a great day quickly turned to an bad day. I learned that things don’t always go the way that you planned and that things can change quickly.

Figure 3. Orchestra students submit their practice recordings from home for feedback from the teacher as well as peers.

Figure 4. Digital markup of student work in English easily shared between teacher and students.

Figure 5. Assignment dropbox index of assignments for record keeping and reference.

Figure 6. Student-crafted explanation videos in mathematics.

Figure 7. Student blog documenting construction of an electric generator from 12th Grade Quantitative Physics Class. Additional examples at http://uprepanja.wordpress.com.
**Subject-Specific Apps**

Self-contained study and practice environments allow students to observe, think, try, receive feedback, and then study further. This “adaptive learning” method is designed to allow students to progress through material independently of a teacher. Critically, the feedback is immediate, as the computerized system evaluates the student response and indicates level of mastery right away. Assessment is typically atomized by topic, so that feedback suggests which topics students have mastered and which require further practice.

Equally important, these digital learning systems incorporate some aspects of differentiation. In mathematics systems such as Khan Academy, IXL, and DragonBox, the software requires students to demonstrate mastery of the current activity before proceeding to the next. As a form of pace differentiation, a student who needs more practice gets it, while the student who is ready to proceed moves on. Additionally, such systems typically moderate question difficulty based on student success, so that a student who answers the current question correctly gets a harder question next, whereas the student who answers the current question wrong sees a less challenging question next. The idea is that this keeps the student working at an appropriate level of challenge over a sequence of many questions.

New digital learning systems usually provide an individual dashboard for students to monitor their progress, and some provide a teacher dashboard to monitor the progress of all students. This is critical for the communication aspect of good teaching - both students and teachers know how much work has been completed, as well as where they have demonstrated understanding and where more practice, review, or elaboration is needed. Figures 8, 9, and 10 show examples of adaptive mathematics and literacy applications.

Such adaptive learning systems emphasize pace-based differentiation, rather than differentiation by instructional method or student interest. A student who needs more practice is encouraged to repeat more activities of the same kind, rather than approaching the material from a different perspective. Students using Khan Academy may re-watch the same whiteboard-based instructional videos or attempt more quiz questions of the same type. DragonBox provides “hints,” revealing an animation of the solution for students to watch before they re-attempt the same problem as before.

However, it may be noted these subject-specific apps rarely differentiate by modality, so students lack the opportunity to approach the material using a different set of thinking skills. As a result, our teachers do not feel that automated instructional systems can replace teachers in the educational process. Digital learning systems are useful but ultimately incomplete when meeting the diverse and complex learning goals of our students. Digital learning apps provide one more instructional tool to diversify a teacher’s skill set, along with face-to-face instruction, group work, paper-based exercises, physical manipulatives, and so on. We believe this hybrid approach has led to significant improvements in pedagogy at University Prep.

**Project-based learning.** Examination of apps like DragonBox may suggest neglect of constructivist learning theory, but this is not the case. At University Prep, teachers who practice project-based learning find technology very helpful. Project-based learning is inherently differentiated, as individual students or groups generate project questions, locate and analyze the necessary resources, and produce work that demonstrates new knowledge and skill. Since different students are working on different topics at their own pace, and the teacher may not have ready access to all of the required support materials, technology is an essential tool when working on projects. Students may independently search for relevant content, record and analyze data, share work with their partners, and communicate with experts in the field. The growing interest in engineering and design have created new opportunities for students to use technology to create prototypes, model systems, and conduct physical experiments as part of the inquiry process.

Use of formative assessment for the collection and management of feedback is not limited to those technologies or approaches already discussed. The ability to place one data point or performance in context of a student’s growth informs both teachers and students. Good teachers understand how one performance fits within a larger trend of overall mastery or areas of challenge. Likewise, use of portfolios, reflective writing, and self-assessment shows how educators everywhere have taken an interest in having students think metacognitively. Metacognition means thinking about one’s own thinking and it is manifest when learners identify strengths and weaknesses, and resources for getting help to close performance gaps. Instructional technology can aid this process by providing an easy way for teachers and students to archive materials over time (including over an entire school year or longer). Figure 11 shows a sample index of student performance evidence.

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**Figure 8.** DragonBox teaches algebra with visual, exploratory exercises.

**Figure 9.** Unit progress and mastery visualized in DragonBox.

**Figure 10.** Immediate feedback in Duolingo.

**Figure 11.** Students access past work over the year in preparation for student-led conferences.
This data collection over time allows students and teachers to make informed decisions about the next relevant and meaningful instructional steps in a student’s learning. Providing methods for students to demonstrate their achievement relies on having enough evidence to make accurate evaluations of differentiated processes and products.

Conclusion

Technology tools enhance the cycle of formative assessment and differentiated instruction at University Prep. Ubiquitous computing systems allow teachers and students to experiment with a variety of apps and techniques to assess mastery, provide feedback, and suggest appropriate subsequent activities. These techniques fall into two broad categories: general-purpose and subject specific. General-purpose tools provide sufficient flexibility for teachers to use them for formative assessment and differentiated instruction across a wide range of topics and teaching strategies. Subject-specific tools have formative assessment and differentiated instruction strategies built into them but typically only require a narrow range of approaches. Thus, subject-specific tools are most useful as an addition to the teacher toolkit, to provide greater differentiation in instruction, when incorporated into a diverse learning environment.

The landscape of digital tools for education is constantly evolving. The apps described in this article are substantially different than they were even just a year ago. What further enhancements might we see in the coming years, and which would be most helpful for learning? In the case of general-purpose tools, recent improvements have largely focused on usability and mobility. These systems have become progressively easier to use, so that less time is spent instructing teachers and students how to use them, and more time spent deploying them. The systems have also become more mobile, as cloud storage has removed the need for file management and made course content, student work, and teacher feedback available at all hours, from school and at home, and on any variety of handheld devices. Subject-specific tools now provide a greater variety of learning modalities and adaptations, allowing students to study and receive feedback independently of the teacher. However, the content of these systems remains somewhat static.

An ideal next step for education would be to blend the flexibility of general-purpose tools with the adaptive qualities of subject-specific tools. Surely, most educators would appreciate an adaptive testing system which permits entirely customizable content and learning pathways, like a combination of the best qualities of Khan Academy and CK-12. At University Prep, we will continue to look with interest upon the education technology landscape for opportunities to use more powerful and flexible techniques to enhance teaching and learning.

Summary of University Prep’s Approach to Digital Learning

One-to-one iPad use for middle school students
One-to-one laptop + tablet in upper grades
Schoology learning management system
Notability and OneNote for stylus input
Google Apps for Education
AirPlay-equipped projectors in classrooms

References


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Discussion about the purpose and value of technology in education is popular these days. From learning management systems, to one-to-one computing, advocates and pundits alike have plenty to say about the changing landscape of learning in the digital age. Although there are numerous push-button topics, one of the most current, and heated, is Massively Open Online Courses (MOOCs). MOOCs are perhaps more applicable to higher education, at least for now, but they are useful as a lens for understanding the way technology is shaping teaching and learning at all levels.

Publications such as the Chronicle of Higher Education and Inside Higher Ed have featured dozens of articles on MOOCs over the last few years. One example from Daly (2013) inquires whether MOOCs will supplement or supplant higher education all together. Another article questions whether higher education administrators are sufficiently concerned when MIT and Harvard invest more money in MOOCs than many institutions have in their endowments. Apparently they are not - since only 12 percent of higher education institutions are planning to offer MOOCs in the near future (Allen & Seaman, 2013). However, low overall adoption should not be equated to minimal impact since each MOOC can serve thousands of students. However, low completion rates are troubling, especially when many studies show less than 10 percent of students who enroll in a MOOC actually finish.

MOOCs for K-12 students appear to focus on Advanced Placement (AP) courses. This has been the case ever since edX (a MOOC vendor) announced the availability of 27 college preparatory courses (High School Initiative, 2014). Students can take these classes independently, through edX, or their teachers can use course content for instruction. Deploying MOOCs with secondary advanced placement students seems logical, since participants likely possess all the qualities needed for self-directed learning. However, if MOOC completion rates for post-secondary students are used for predicting success for high school students, then there may be some significant challenges to overcome.

Discussion of completion rates and implementation challenges aside, MOOCs are prompting new types of questions, and skepticism, about core beliefs for many educators. Post-secondary faculty are puzzled with colleagues who willingly teach online courses to thousands of students. Challenges such as tuition costs and competency-based credit have opened the door to alternative forms of education that may radically change schooling as we know it, perhaps beginning in post-secondary institutions, with trickle-down to primary and secondary schools. Nevertheless, while technology-driven changes are inevitable, it is less certain whether any benefits will outweigh costs of altering how educators currently ask students to construct knowledge and experience community in face-to-face or even conventional online courses.

Uncertainty is exacerbated by fleeting enthusiasm and indefinite notions of what things actually mean at the nexus of technology and learning. A brief analysis of research shows many educators are enamored with MOOCs, even though few agree on a definition. On the one hand, Cormier et al. (2010) generally describe MOOCs as a way to learn through an assortment of Internet-based technologies. For example, students can collaboratively construct knowledge by learning from others who are part of the same social network (e.g., Twitter, Google+). On the other hand, Downes (2012) differentiates xMOOCs and cMOOCs, indicating most of the MOOCs sponsored by universities are deployed through vendors such as Coursera and edX. Vendor MOOCs are xMOOCs and they are typically structured like conventional online courses (Siemens, 2012). Course materials such as syllabi, textbooks, and assignments are shared as the course begins, and students work through content more or less at their own pace with weekly deadlines to help promote accountability. Like conventional online courses, xMOOCs have specific start-stop dates, and integrate discussion forums or some other type of student-to-student interaction. Unlike online courses, MOOCs using social networks as the method for transmitting information, both student-to-student and instructor-to-student, are almost nonexistent because of the massive number of participants.

The other MOOCs, cMOOCs, are less popular, though they are more representa-
tive of the egalitarian ideals from which MOOCs were originally conceived. The “c” stands for connectivism, which alludes to a theory of learning through digital applications exemplified across Web 2.0 tools such as blogs, wikis and social media (Siemens, 2004). One common difference between x and cMOOCs is how they are facilitated. xMOOCs are typically hosted on vendor platforms such as Coursera or edX and taught by “all-star” professors from Ivy-league universities. CMOOCs tend to be led by less-known, but highly-qualified educators using a blog and student-chosen social networking tools. Table 1 shows some other similarities and differences between x and cMOOCs (Cormier, Siemens, Downs & Kop, 2010).

<table>
<thead>
<tr>
<th>xMOOC</th>
<th>cMOOC</th>
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<tbody>
<tr>
<td>Course</td>
<td>Community and course</td>
</tr>
<tr>
<td>Massive enrollment</td>
<td>Massive amounts of content</td>
</tr>
<tr>
<td>Open – no prerequisites</td>
<td>Open – everything (e.g. no password, no prerequisites, entirely open platform)</td>
</tr>
<tr>
<td>Asynchronous and synchronous</td>
<td>Asynchronous and synchronous</td>
</tr>
<tr>
<td>Focus on independent learning</td>
<td>Focus on collaboration</td>
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<tr>
<td>Example <a href="http://www.class-central.com/">www.class-central.com/</a></td>
<td>Example <a href="http://www.mooc.ca/courses.htm">www.mooc.ca/courses.htm</a></td>
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Table 1. Comparison of x and c MOOCs

In comparison to cMOOCs, xMOOCs are generating much more interest, probably because of their connection to high-profile schools, and snappy vendor platforms.

Nevertheless, Daly (2013) also suggests xMOOCs are more than just sophisticated combinations of celebrity instructors with high-tech software. One goal of xMOOC is to democratize education by permitting anyone to participate, or at least those with devices and an Internet connection. Were it not for survey research showing some actual outcomes hinting at accessibility, skeptics could dismiss claims of democratizing outright. Yet, a recent study concluded that over 74 percent of MOOC participants appear to reside outside the United States, which suggests some headway in terms of accessibility (Kolowich, 2012). Indeed, most of those enrolling in a MOOC live in Brazil, Great Britain, India or Russia (Kolowich).

Sharing superior content is another goal. In its most rudimentary form, this means video recording in-class sessions for sharing online. In other cases, the courses include expensive animations and edited videos. Edwards (2012) estimates that MOOCs from Coursera and Udacity cost $15,000 to $50,000 to produce, money that K-12 institutions could not match, even if they raided textbook budgets.

A third xMOOC goal, probably the most abhorrent to many educators, is to make money. Several MOOC vendors are for-profit companies. The trouble is, MOOC developers have yet to settle on a system for making a buck, at least for now. Moreover, the profit problem is contrary to the principles of access and opportunity. Even greater tensions emerge when looking for ways to link MOOCs with student achievement, much less using them to improve the social and moral dimensions of learning environments.

Every educational innovation addresses a problem, and surely, there are plenty of challenges to overcome. This is true things. And I think it would be interesting “if credentials could be earned based on what you know and not on where you acquired that knowledge)” (Mossberg, 2012).

Muddled is putting it mildly. Some suggest we are on the horizon of significant education change in terms of using digital technologies for teaching and learning. Those with experience in K-12 are already familiar with this, at least on the periphery of their work. New models for teacher and principal evaluation may incorporate collection of evidence using digital portfolio systems, such as eVal. Common Core tests, including Smarter Balanced, are computer adaptive. Many states, including Washington, are rolling out digital certification systems. Cynics may judge these changes with apprehension, although it is easy to understand why. These technologies are sure to facilitate more elaborate accountability measures, not the least of which will be linking student test scores to teachers, schools and districts.

Technology on the periphery tells about education policy, but MOOCs are a potential bellwether in terms of classroom pedagogy. While planning, assessment, instruction, and reflection will continue to serve as broad domains for understanding teaching, new points of emphasis are rapidly becoming part of the accepted landscape. Some ideas which have entered everyday educator vernacular include techniques for transitioning curricula into digital formats, blending face-to-face with online activities, facilitating interactions through social media, and sharing assessments and related outcomes for growth, among many others (Breslow et al., 2013).

Whether MOOCs persist has yet to be seen. They may disappear, like so many other teaching innovations. However, the questions they raise are sure to occupy the attention of many educators, both now, and in the future. P-20 teachers and administrators will answer these questions for themselves using a variety of approaches. Surely, whatever solutions are settled upon will be creative and multifaceted, and technically more complex than either cMOOCs or xMOOCs. While there is no crystal ball for predicting the future of technology in education, one thing is certain: Technology is an increasingly important facet of teaching and learning.
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Access and Facilitation for Inspiring Passion and Desire to Learn

In her TED Talk, Daphne Koller (2012) paints a powerful picture of the human desire to learn. She movingly describes how thousands of people stamped the gates at the University of Johannesburg in a desperate effort to secure spots at the school - and she points out that for the first time in human history, we have the means to provide access to education to the global community using digital technologies.

“Big breakthroughs happen when what is suddenly possible meets what is desperately necessary.”
- Thomas Friedman

Koller is one of the pioneers of Stanford’s Coursera, which some say is the greatest human rights effort of the early 21st century, since its purpose is to “give all citizens of the earth access to the best teachers, the best universities, and the best tools for learning: in short, Coursera aims to give global citizens, regardless of their social and economic status, access to an Ivy League education.” Koller goes on to insist that education is “a fundamental human right” and certainly, most educators agree with this. But whether models like Coursera are examples of great human rights efforts is yet to be determined.

Nevertheless, online education has significantly broadened global access to learning and we do well to acknowledge its potential, not just for adult learners in countries far and near, but for K-12 students right here in Washington. For every learner, the necessity of access to resources is obvious. What is less clear is how to ensure that the desire to learn will be nurtured in every student since desire is a fundamental component of motivation, engagement, and ultimately - achievement.

Human beings are curious: we need to learn in order to survive; we acquire new skills throughout our lifetimes in an effort to improve ourselves, our environments, and our circumstances. Learning comes naturally, but it also requires facilitation. This axiom is apparent to most, even when we do not explicitly say so. The most obvious examples of facilitation-for-learning are observed in schools. However, there are certainly other instances. Parents or guardians read to their children before bedtime and ensure homework is complete before boarding the bus. Grandparents take grandchildren on learning excursions. Librarians help select books and docents explain a piece of art. Girl Scout and Cub Scout leaders teach collaborative skills, and religious ministers share spiritual insights. The list goes on. Young and old alike are always learning from their surroundings, and most often the learning is facilitated by other people through socio-cultural interactions (Pressley & McCormick, 2007).

Koller (2012) points out - quite movingly - that one of the women who died in the stampede at Johannesburg was a mother striving “to secure a better future” for her son. Like so many children, this son had a parent who firmly believed in the power of education; its promise of greater prosperity, happiness, and fulfillment. The mother who died in Johannesburg for the sake of her son is the most extreme example of facilitation. The notion a parent or guardian would risk life and limb to ensure a better future through access to education is difficult to grasp, especially when we consider the tremendous opportunities provided through free and public education in the United States. Nevertheless, as educators and parents or guardians know, preserving and promoting opportunity takes sacrifice and a coherent understanding of how to inspire learners, not just technical acumen for delivering and managing subject-matter.

Similar to Koller’s (2012) emphasis on coupling technical aspects of learning with community and opportunity, Smith (2013) articulates the need for teachers to act as facilitators in the context of designing web-enhanced education for young students. Smith makes the point that web-enhanced and online education are less about promoting effective interactions for learners, and more about teacher facilitation – though technology is necessary as well. The requisite skills for supporting learning, whether face-to-face, web-enhanced, or online, takes on even more significance when parents or guardians are unable or unavailable to kindle a passion for learning. Yes, progressing through subject matter, performing well on assessments, and meeting learning objectives are tangible expressions of achievement, but something more is needed. Students need someone to come alongside, whether at a distance or face-to-face, and kindle a persistent desire to go farther, to persevere.
Most educators have experience with this idea, and know it to be true. A recent example of this principle happened as I observed a struggling reader initially resist Shakespeare, then after time, the same student embraced the text as I worked to cultivate interest. In another example which occurred simultaneously, I observed a student who confessed he felt lost for most of his academic career, stating that he believed studying Humanities was a complete waste of time. Surely, even the most cutting-edge technology would do little to penetrate and remediate such an attitude. In some cases, having access to “the best courses from the best instructors at the best schools” (Koller, 2012) is not going to be enough. As my examples infer and as every educator knows, facilitation is needed. Some researchers call this social presence, which Rourke, Anderson, Garrison, and Archer (2001) define as the projection of personality into course activities, resulting in more participation and feelings of competence. This is what Smith (2013) alludes to by facilitation, and what I mean by kindling passion in every learner. Yet, as Koller contends, without access, there is no possibility for facilitation, and social presence manifests itself in other ways that may not include the goals and promises that come with learning.

The temptation is to accept either access or facilitation as solutions independent of one another, often choosing the option that suits our personal bias or philosophy of teaching and learning. Digital wonders like Coursera help us see the potential for using technology to achieve greater levels of access, and perhaps equity. Although, a case can be made that open-access learning management systems, like Coursera, are wondrous, they also work best when learners are motivated. Indeed, as one Online High School Student (OHS) said “everyone at OHS has a deep and abiding passion for learning” (Madnomad, 2013). Whether everyone really has a deep and abiding passion for learning at OHS is hard to say. It is mostly agreed, however, that learners with requisite knowledge and skill, along with motivation, will mostly likely achieve the most. Arguably, technology can improve this process, but whether it serves as a source of inspiration is also hard to say. Certainly, student motivation is key, and some feelings associated with motivation are inspired by teacher facilitation — especially enabling students to believe they can achieve and be in control of their own destiny. We admire technological innovation. Online High School and Coursera are amazing — but without the presence of fundamental human elements, keyboards and monitors go left unattended.

A question related to access and facilitation is the primary currency educators use for engaging and motivating students. This question is relevant regardless of how the content is experienced, either first-hand or vicariously through digital bits and bytes. Perhaps the most prominent currency in education are grades. To many, they are a sign of more opportunity, more access, perhaps even more hope for a flourishing future. However, there are other currencies that can be discussed, especially in light of evolving technologies that provide more choices tailored to individual learners.

The question of currency was brought home in a recent experience at my current school. Experienced teachers were telling me that students attend class and participate because they are interested in the experience. It occurred to me that perhaps classroom experiences matter more to many students, rather than grades. After all, grades are reified signposts of what might be, not the reality of what actually is. It also occurred to me that our collective perceptions of teaching could change, even if just a little, if we explored new ways to use technology to nurture inquiry, discovery, and self-realization. Just how this is done is a question for current and future educators, and I imagine it has been a question past educators from every era have considered.

And yet, there are some practical considerations. Barbour et al. (2012) indicate that simply providing more Internet access is needed to close the digital divide. It is easy to imagine plenty of K-12 students who lack Internet access. For these students, access and facilitation in the context of digital learning may not mean much.

The efforts of educators like Koller (2012) and Smith (2013) are entirely admirable, and promising. Use of digital technologies to improve access, promote opportunity, and engage learners is the way forward for relevant 21st century learning. However, there is always the danger that innovation serves as a red herring, distracting our attention away from considering economic and social structures that exacerbate the digital divide, rather than span it. My optimistic side embraces technology and all that it may do for teaching and learning; my skeptical side wonders about all the questions that have yet to be answered, not the least of which are ensuring all learners have access to fundamental tools, like devises and Internet. Yet, I persist in believing that what matters most is meeting students where they are as a facilitator whether in an online, web-enhanced, or face-to-face format. Indeed, I am certain we can be educators who awaken a passion and desire to learn, regardless of our preferences for teaching format, instructional approach, or even use of technology.

References

Julie Olsen is a recent graduate from Seattle Pacific University’s Master of Arts in Teaching program. She has previous experience with Village Theatre, and also as a faculty member with Washington Academy of Performing Arts Conservatory. Julie currently teaches drama at Rainer Beach High School.
The mind is not a vessel to be filled, but a fire to be kindled ~ Plutarch

This quote nicely captures some of the ideas I have been knitting together as I think about the boundaries we can break through the use of technology. What fun it has been to brainstorm lists of digital tools that can (and have) revolutionized our classroom traditions and stimulated new approaches to teaching and learning. But while there is joy in thinking about LMSes and CMSes and BYOD initiatives, a vast litany of technology acronyms means little unless we consider the needs of our students and what structures accompany these initiatives to allow students to flourish. To kindle students’ fires, as Plutarch suggests.

Learners excel and they struggle. They come to school motivated, and sometimes discouraged. The have many cultures and they speak many languages. They come from families with strong traditions and they have interests and skills that transcend school walls. They need us to be creative in helping them to access content in ways that some other students do naturally or without accommodations. We are compelled to find a way to provide opportunities for learning and success for each and every one of our unique students.

There are formal and informal structures that schools use to meet the needs of all learners. Some of these include Response to Intervention, Data-Driven Instruction, Professional Learning Communities, and Instructional Frameworks such as “The Gradual Release of Responsibility.” Within those structures, we must leverage tools and resources to extend our ability to meet the needs of a diverse range of students. Technology empowers us to foster success for our learners that our hands and minds alone might not otherwise be able to do.

In their position statement on the Common Core State Standards, the International Society for Technology in Education (ISTE, 2014) states “technology, used effectively, can help all students meet and exceed the rigorous learning goals embedded in the Common Core State Standards by providing access to tools and resources that personalize instruction and by creating rich, engaging and relevant learning environments.” Use of effective technology creates opportunity to overcome boundaries that challenge us in our teaching practice: boundaries set by time, space, attitudes about the role of teachers and learners, content, and even culture. Breaking through these boundaries is a critical step in the effort to reach all students and support their progress toward self-actualization and self-fulfillment.

Overcoming Time Boundaries

Ask any teacher “What resource do you lack the most?” and “time” is quite often the answer. Time is the manna of our profession - time with students, time to collaborate, time to plan, time to communicate with parents. Time is measured carefully in our field: seat time, minutes of instruction, contract hours, block schedules, snow days, zero periods, and so on.

Not long ago, the vast majority of us expected learners to follow a prescribed pattern of receiving content at school and practicing skills at home. Web-enabled and cloud-based technologies challenge this paradigm. These tools allow us to leverage easily published digital content to replace the traditional lesson or lecture with more classroom activity, whether for enrichment or remediation.

An example of the way educators are thinking differently about time through technology is flipped learning. Flipped learning is an approach in which “direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into
a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter” (Flipped Learning Network, 2014). Although this definition does not distinctly imply the use of technology, there are many tools that make this not only possible, but a rich and engaging experience for students.

Khan Academy (khanacademy.org) is another flipped learning tool, with a specific focus on direct instruction videos. Khan Academy enables students to access tutorials, interactive challenges, and assessments, all from web-connected devices. Topics range from early elementary math to test prep for AP Art History. Teachers, or as Khan Academy refers to them – Coaches, can set up accounts and classrooms and prescribe specific content to students based on particular needs.

As the model of Khan Academy suggests, two of the tools required for effective flipping are screen capture and a learning management systems (LMS). On the one hand, screen capture enables creation of instructional videos. On the other, a LMS enables organization of content. Screen capture applications, such as Camtasia, enable users to make their own video lessons and distribute them through YouTube or Screencast.com. Once lessons are constructed, a LMS helps organize content, such as documents, self-assessment quizzes, and discussion boards. Two popular LMSes for K-12 educators include Moodle (moodle.org) and Edmodo (edmodo.com).

Despite these amazing technological innovations and formats, flipped learning may not translate to more time for either students or educators. What it does accomplish is the affordance of more meaningful time for teachers to facilitate rich learning experiences with the limited time that is available. For example, less time required for whole group instruction infers there will be more time for differentiation, extending student thinking, or to support individual students with interventions.

**Challenging Space Boundaries**

The tools we use for the flipped classroom also push boundaries of physical space. Online content provides a way for students to learn concepts outside of the formal setting we typically associate with a brick-and-mortar environment. Khan Academy, Curriki (curriki.org), and CK12 (ck12.org) allow students access to online content that they may not have otherwise. Moreover, limitations on expertise in teaching staff or course offerings in remote locations can be overcome with the litany of online learning options available to students.

An example of the way educators are overcoming space boundaries is with tools like CK-12, which provides open-source content and applications to help teachers provide learning opportunities for students, regardless of location. Platforms like CK-12 are free, geared toward multiple modalities and learning, and customizable. These qualities encourage experimentation and innovation and stretch space boundaries, as well as boundaries associated with pedagogy.

An effort similar to CK-12 is the Office of Superintendent of Public Instruction Digital Learning Department (http://digitallearning.k12.wa.us/oer/). One initiative of the Department is to assess the quality of online content and make it accessible to educators in Washington. A notable feature of OSPi’s Online and Alternative Learning activities is the explicit effort to connect content to Common Core standards, as well as to supplement existing state and district programs for learners with specific needs.

Another boundary breaking technology are digital textbooks, or eBooks (ebooks.com), which are making their way into mainstream classroom environments. Use of digital textbooks appear to be accelerating with the proliferation of mobile devices and participation of large publishing companies. For example, Pearson recently partnered with Overdrive to supply e-versions of their textbooks using a subscription process, making the physical textbooks somewhat obsolete – at least for those with devices able to access eBooks. Another advantage of eBooks is many local public libraries stock digital copies for patron checkout, which likely increases convenience and access for most.

**Massive Open Online Courses (MOOCs)** are yet another approach to breaking space boundaries. One vendor of MOOCs is Coursera (coursera.org), which offers online courses from top university partners through an Internet interface, making content open to all learners, regardless of physical location, background, or level of previous knowledge.

Another intriguing development are apps such as iBooks Author (apple.com/ibooks-author/), which enables anyone to publish their own content. iBooks are not just for text, however, since users may include video, images, and other interactive tools. Access to these kinds of applications is exerting pressure on publishers like Pearson and Houghton Mifflin to include similar interactive features in their textbooks, rather than just a static PDF for eBook reading. Self-publishing continues to stretch space boundaries by changing the hierarchy of who controls information. In a world where my 8-year old daughter can produce her own story, picture book, or video tutorial, it is easy to see that the relationship between expert and pupil is shifting.

**Dismantling Culture and Language Boundaries**

Barriers between learners of different languages and culture are also changing. One indication of this is the various educational content that can be accessed via the Internet, in multiple modalities. Consider one example, YouTube. My older daughter spends a lot of time on YouTube. I recall watching funny cat videos with her, until her interests changed. She began watching educational videos. Several channels she now follows are published by educators from other countries. On more than one occasion I have observed her watching science experiments conducted by someone from Russia, or China, with English subtitles. We live in a constantly shrinking world, where language and cultural boundaries are fragmenting. The personal anecdote of my daughter and her interest in educational videos is one example, among many.

The connection to schools is apparent. Educators across the country are experiencing increases in English language learner enrollments in almost every state. Economic improvements are contributing to changing demographics. This diversity manifests in our classrooms where students have contact with people of other cultures and languages. Nevertheless, in less diverse classrooms, technology enables cultural and language enrichment through various Internet applications.

One way to transcend cultural and language boundaries is by having a face-to-face conversation. Along with Skype, Google Hangouts includes video chat, and conversations can be recorded and shared on YouTube. Google Helpouts (helpouts.google.com) is another application that enables face-to-face interactions over the
Helpouts facilitates getting help from an expert via video chat. Topics and audiences vary, and include teachers, counselors, doctors, home repair specialists, personal trainers, hobby enthusiasts, and more. Searching on the topic of “culture” produces dozens of results, including sessions for learning Russian and Chinese.

While digital technologies breakdown language barriers, they also facilitate inter-cultural exchange, such as learning a new language. Indeed, there are a plethora of technology-based ways to learn a new language on all kinds of devices, mobile or otherwise. Duolingo (duolingo.com) is one that incorporates gamification to make learning a language motivating and engaging. One independent study showed that 34 hours of Duolingo as equivalent to 11 weeks of traditional course instruction (Vesselinov & Grego, 2012). Although these results are very preliminary and have yet to be reproduced or published in a peer reviewed journal, they are intriguing.

A final example of dismantling culture and language boundaries is by promoting alternative perspectives. Perspective-taking comes in all forms and sometimes understanding and empathy results from new knowledge of other people and places. Perspective, through the lens of geography, is an example and the app that comes to mind for promoting alternative viewpoints is Google Earth. Google Earth provides high quality images that students can process to understand geography and how environment shapes culture. Making observations through Google Earth may be especially powerful for those students who remain close to home, and travel little outside of their regular communities.

**Conclusion**

Technology overcomes, challenges, and dismantles existing boundaries of time, space, and culture. Technology tools are forcing us to question whether these boundaries even exist. Some may suggest that perceived limits to a subject area or sphere of activity binds what students learn, how students learn, and where students learn. However, the elegant and informative chaos of the Internet is either broadening or invalidating these limits. The learning tools that are available have tremendous potential to connect students to expert knowledge wherever and whenever it may be needed. What will classrooms look like when more educators embrace the notion of boundless learning experiences for all? We are already seeing the impact on libraries, where books still exist, but digital material is curated for students at a scale most librarians likely had not anticipated even a few years ago. The sky seems to be the limit as various innovations emerge, not the least of which include wearable devices, home-based 3D printing, assistive technology, and new formats for using these inventions such as bring your own device, flipped learning, and adaptive computer-based instruction. The potential for these tools to narrow learning gaps for many students seems promising. At the same time, something more important is occurring. These innovations and ideas are breaking-down boundaries.

**References**


Shelby Reynolds is Manager for Instructional Technology and Library Services for the Northshore School District, where she supervises technology professional development, digital presentation systems, web services, and computing resources. Shelby has served on several statewide committees, including a task force to implement online learning initiatives for the state of Washington. She also oversees the Library, Information, and Technology program to support teacher-librarians. Shelby recently earned Certified Educational Technology Leader credentials through the Consortium for School Networking.
What should I know when participating in a Twitter chat?

• Twitter chats involve a moderator who will ask several questions within an hour. The moderator’s Tweet will likely start with a “Q” and a number. For example, “Q1- How does your school or district support the use of new and emerging technology? #WaEdChat”

• Your answer to the question should start with an “A” and the number of the question you’re answering. For example, “A1- Our school is taking a STEM approach to support students with technology. #WaEdChat”

• Most Twitter chats have six to eight questions, so it’s important to include the number of the question you’re responding to. All responses must include the hashtag #WaEdChat so other participants can view them.

• Common shorthand for educational Twitter chats include “Ss” for students and “Ts” for teachers. Your Tweet can have a maximum of 140 characters, including the chat’s hashtag #WaEdChat.

• If someone else’s answer resonates with you, use the star to “favourite” the Tweet. You can also retweet what others have written.

How do I get started?

• The extent to which you’re involved in the chat is up to you. If you don’t have a Twitter account, you can still follow the chat by searching #WaEdChat at search.twitter.com and refreshing the screen every few minutes.

• To learn how hashtags organize and connect Tweets, watch these instructions https://www.youtube.com/watch?v=jGbLWQYlj6M

• If you think you might want to participate in the chat, set up a Twitter account ahead of time. Keep in mind that a Twitter account is public and anything you Tweet can be viewed by the others. Your Tweets, retweets, and favourites are available to whoever might want to read them.

• Do you feel overwhelmed by the thought of setting up a Twitter account? Go to YouTube and search for a “Twitter tutorial.” You’ll find numerous videos to help.

Have you ever wanted to connect with fellow leaders around Washington State from the comfort of your living room? Now’s your chance!

What
Twitter chat using the hashtag #WaEdChat

When
1st Sunday of the month
at 7 pm

Where
Twitter.com

Why
By participating in a Twitter Chat, users can follow a discussion around a single theme and learn from others, while sharing their own experiences.

Come Learn at #WaEdChat

Come and learn with WSASCD and AWSP the 1st Sunday of the month at 7 pm by visiting search.twitter.com and searching for #WaEdChat.
Leaders plan PD based on results and feedback. Taking a backward approach produces cohesion and focus on making decisions according to data. One tip for leaders is to spend time each year aligning instructional technology PD for supporting school and district goals. The backward design approach requires both a broad central focus, and also individual PD lesson objectives. And, similar to effective teaching practice, leaders spend time reflecting and revising plans and objectives based on feedback and data.

As one of many educators with a keen interest in technology for improving student learning, I find it easy to be excited and passionate. Like others, my expectation is that technology will improve our work through efficiency and focus. Selecting PD to enhance school and district initiatives can make a difference, and hopefully these tips provide some ideas as you continue your leadership journey.

Hannah Gbenro is a middle school assistant principal in Tacoma School District and a doctoral candidate at Seattle University. Hannah has served as an elementary dean/principal designee, K-12 district instructional technology specialist, high school teacher, and one-on-one para professional. In 2011, Hannah received the Association for Supervision and Curriculum Development’s Emerging Leader award.
A message from the executive director

Executive Directions

This edition of Curriculum in Context would be remiss without taking time to recognize the contributions of Kathy Clayton, our recently retired Executive Director of Washington State ASCD. Kathy is the quintessence of this organization, which she has faithfully led for many years. Her leadership and her knowledge of teaching and learning, clearly distinguish her as a front-runner among educators. Her work at WSASCD evidences this.

Kathy has exemplified the mission of WSASCD: *Learn, Teach, and Lead*. Her expert efforts to do all three as Executive Director have been sourced from deep affection and loyalty for students, teachers, and administrators across our state. I most recently experienced this as she partnered with me in the transition of her responsibilities. Her unassuming, humble, and ‘behind-the-scenes-service’ qualities have enabled her to positively influence the entire spectrum of WSASCD activities.

Her technical and organizational skills are matched with a refreshing vision that has sustained the organization through challenging times. Her assumption of the role of Executive Director eight years ago was destined to span a difficult era. The Great Recession has taken a toll on resources allocated for professional development across the state. Districts have been reeling and professional organizations at every level are struggling. Attendance at conferences has plummeted and memberships have suffered. The effects of accountability reform have reshaped the focus of professional development, sometimes in ways that are coherent, and other times scattered. Nevertheless, Kathy has remained steadfast to the mission of WSASCD. She held fast to her tenets to improve teaching and learning while adapting to current circumstances. Above all, she has been unwavering in her belief in our teachers and educational leaders.

Under Kathy’s leadership, WSASCD has thrived. The organization provides timely professional development and publications. It is led by a broad array of volunteer teachers and administrators who adopt best practices and are themselves best practitioners. The focus of our work remains “The Whole Child” while we provide timely, relevant professional development opportunities to educators seeking possible solutions. For instance, publications such as *Curriculum in Context*, and *Critical Questions* provide information about the ways educators are improving student achievement. In addition, WSASCD’s website facilitates sharing resources and professional networks, serving as a venue for educational leaders to explore problems and new ideas related to all facets of curricula. The organization also remains a strong voice for education without succumbing to partisan politics. As a result, WSASCD serves a broad membership of teachers, principals, superintendents, and others across the spectrum of educational professionals who labor to improve our craft. The strength of WSASCD is truly an indicator of Kathy’s leadership.

We are now positioned to forge ahead because of the legacy left by Kathy Clayton. However, we also recognize we live in an era when some have grown skeptical or disenchanted with the promises of public education. If we are to build upon Kathy’s success we must redouble efforts to recognize, support, and share the excellent work educators are doing around the State. Additionally, the very heart of our work, professional development, has also changed. It may not require a meeting time or place, and it can be done in many new ways -- not the least of which is online. It is certainly an understatement to say educators face challenges requiring innovative thinking – and that includes our organization. We too must discover new ways to meet the needs of our members.

Kathy, you set the standard and we hope to fulfill your dreams in the years ahead. We believe the theme of this current issue reflects your legacy: *Transcending Boundaries*. Thank You.
Consulting, Coaching, and Collaborating: Professional Development Worth Doing

Professional development is more complex in comparison to a few years ago. New evaluation systems and accountability measures place more importance on effective, timely, and focused professional development. Educators across Washington are breaking away from long-standing approaches to professional growth, toward something new and responsive. The next theme of Curriculum in Context is Consulting, Coaching, and Collaborating: Professional Development Worth Doing. How do you consult, coach, and collaborate with other educators? What model has your school embraced for improving professional development? What tools and strategies has your district employed for helping teachers and administrators improve? These are some of the questions under consideration in the next issue of Curriculum in Context.

The editorial staff invites you to submit a manuscript on this topic by March 16th to David Denton (dentod@spu.edu). Final manuscripts are typically 850-2500 words and citations are written in APA format.

SUBMISSION DEADLINE
March 16, 2015