Literature Review – NewSchools Ignite English Language Learning Challenge

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Overview

Educational technology developers have an unprecedented opportunity to promote learning and address specific needs of teachers and students in English Language Learning (ELL). Addressing these needs using technology requires a combined understanding of both the best practices for instruction and learning in ELL education, and how technology can best be used to promote those best practices for students and teachers in ELL.

Research findings in learning and ELL education can greatly inform the efforts of edtech developers. From these findings, developers have a better understanding of evidence-based best practices in ELL education and how they can be promoted through the use of technology. Broadly, research indicates that classroom learning in all disciplines should be interactive, collaborative, intellectually rich, and scaffolded, as this accelerates and supports students' simultaneous content learning and language development. Additionally, culturally and linguistically responsive, caring, and critical teaching should be the norm in all classrooms, because this leads to students' academic engagement, academic achievement, and personal empowerment. And finally, districts should develop a vision for educating ELLs, implement ELL-focused policies, and invest heavily in ELL-focused professional learning because this leads to systemic and sustained improvement.

Key features of effective ELL edtech that support activities that research suggests are highly likely to promote student learning include: supporting multiple modes and contexts, enhancing motivation and confidence, providing feedback and active evaluation, utilizing mobile learning, supporting collaboration, enhancing motivation and confidence, building on previous experiences, learning in a social setting, and teaching with technology.

Education technology can support these activities by providing visual context through multimedia and multi-sensory capacity. Visual information can provide the necessary bridge or scaffold between everyday language and more difficult academic language. Technology can utilize collaborative communications through networked technology to support collaboration, enhance motivation and confidence, and promote learning in a social setting. Education technology enables formative assessment in the form of activities, polls and quizzes, allowing for teachers and peers to provide feedback and active evaluation. In terms of socioemotional factors, technology should allow learners to build on previous experiences and connect to their own learning through digital images, music, and multimedia. Lastly, teaching with technology can be supported by new models of connected teaching that foster communication, collaboration, social and learning networks, as well allowing teachers to access more information, improve their own pedagogy, individualize learning for their students and increase educational productivity.

Need

In the fall of 2014, for the first time, the overall number of Latino, African-American, and Asian students in public K-12 classrooms surpassed the number of non-Hispanic whites. As classrooms in the U.S. become more racially, socioeconomically, and culturally diverse, the diversity of native languages spoken by students and their families poses an increasingly imposing barrier to educational success. These English language learners (ELLs), students whose primary language is one other than English and are in the process of actively attaining English language

proficiency, continue to grow in numbers and require more and more attention to keep them from falling behind academically.

In the 2013-2014 school year, nearly five million students in the U.S. were considered English Language Learners – roughly 10 percent of the student population. This number is predicted to increase to as much as 25 percent of the student population within the next 10 years. As such, society cannot ignore the staggering achievement gap between ELL students and their peers. Performance disparities in academic achievement between ELLs and non-ELL students are thoroughly documented by the U.S. National Assessment of Educational Progress (NAEP). In 2015, the achievement gap between non-ELL and ELL students in mathematics was 25 points at grade 4 and 38 points at grade 8. At grade 4, this achievement gap was not measurably different from the gap observed in any assessment year since 1996. At grade 8, the achievement gap between non-ELL and ELL students narrowed from 46 points in 1996 and 41 points in 2013 to 38 points in 2015. For all available assessment years, the NAEP average reading scores for non-ELL 4th- and 8th-grade students were higher than the scores for their ELL peers. In 2015, the achievement gap between non-ELL and ELL students was 37 points at the 4th-grade level and 45 points at the 8th-grade level; these gaps were not measurably different from the achievement gaps observed in 2013 and 1998.

As the world becomes more technologically advanced, education technology can target the ELL achievement gap and better support ELLs' academic, social, and linguistic development. Language proficiency is one of the major gateways for access to education, citizenship, and economic success. Educators need access to instructional tools that will improve English language learning. Technology can support ELL students by making rigorous academic content accessible to students of all language levels, addressing social and emotional aspects of language learning, enabling language learning experiences that are more authentic and culturally relevant, and increasing opportunities for engagement with parents and families.

Technology tools must go beyond translation, vocabulary, and grammar to provide opportunities to apply language to authentic academic and social growth. They must operate within real-world classroom environments and provide value to a wide range of students. Rather than merely standardize or automate learning, technology must also empower ELL students to take ownership of their own learning. Education technology must be feasible for use within a range of classrooms and ELL program models and needs to support teachers through professional development and other instructional resources.

Technology holds the potential to support ELL students by enabling multiple linguistic pathways, scaffolding, or multimedia opportunities to engage with content in a home language. Edtech can also facilitate formative assessment and other diagnostic techniques to help teachers tailor instruction to individual ELL students' academic and language needs. Technology can also create new opportunities for students to practice reading, writing, speaking and listening – critical skills for collaborative learning. Building enhanced self-confidence and interpersonal skills can also play a pivotal role in encouraging student voice as well as strengthening relationships among students and teachers. Learning opportunities must encompass conversational skills as well as academic language, applied in context to support critical reasoning and argumentation.

There are also opportunities for tools that leverage ELL students' home languages and cultural backgrounds as assets that can contribute to classroom and school communities. Parents are

critical to the success of ELL students, who benefit academically and socially when parents and family members are engaged with their learning experiences. Educators are looking for tools that make it easier to build a strong school-home connections with ELL families, often across languages or cultural differences. Technology can also be helpful for engaging with community partners, helping schools build support networks that include access to resources like interpreters and cultural liaisons.

Best Practices in English Language Learning

Recent research has resulted in specific findings related to improving educational experiences and academic outcomes for English language learners. Specifically:

Finding #1: Classroom learning in all disciplines should be interactive, collaborative, intellectually rich, and scaffolded because this accelerates and supports students' simultaneous content learning and language development.
Finding #2: Culturally and linguistically responsive, caring, and critical teaching should be the norm in all classrooms because this leads to students' academic engagement, academic achievement, and personal empowerment.
Finding #3: Districts should develop a vision for educating ELs, implement EL-focused policies, and invest heavily in EL-focused professional learning because this leads to systemic and sustained improvement.

Finding #1: Classroom learning in all disciplines should be interactive, collaborative, intellectually rich, and scaffolded because this accelerates and supports students' simultaneous content learning and language development.

Engage students in high quality learning experiences: Content learning tasks that are interactive, collaborative, intellectually rich, and designed to stimulate thinking and curiosity provide students opportunities for deep disciplinary learning and authentic disciplinary language development.

Create abundant opportunities for students to talk and write: Collaborative conversations about academic concepts, complex texts, and how language makes meaning is necessary for learning disciplinary content and disciplinary language. These oral language experiences provide a "bridge" to writing. Using English authentically in the context of deep learning should be emphasized.

Ensure scaffolding is both planned and "just-in-time": Understanding what scaffolding is and isn't – and how both "designed in" and "interactional" scaffolding are necessary – is critical to accelerating learning and differentiating instruction

Integrate an explicit language focus in all disciplines: Teachers' awareness of how language works in their disciplines (the "hidden curriculum") and an explicit pedagogical focus on language in context supports both content and language learning.

Finding #2: Culturally and linguistically responsive, caring, and critical teaching should be the norm in all classrooms because this leads to students' academic engagement, academic achievement, and personal empowerment.

CA ELA-ELD Framework, Figure 9.11. Culturally and Linguistically Responsive Teaching
Culturally and linguistically responsive teaching can be defined as using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them. It teaches to and through the strengths of these students. It is culturally validating and affirming. Along with improving academic achievement, these approaches to teaching are committed to helping students of color maintain identity and connections with their ethnic groups and communities. It helps develop a sense of personal efficacy, building positive relationships and shared responsibility while they acquire an ethic of success that is compatible with cultural pride. Infusing the history and culture of the students into the curriculum is important for students to maintain personal perceptions of competence and positive school socialization (LAUSD EL Master Plan 2012).

Recognize that inequities exist and work to redress them: When teachers and administrators acknowledge that educational inequities exist and commit to actively working to redressing them, critically self-reflect about their own beliefs and dispositions, and strive to provide classroom instruction that is socially just, positive, and caring, students do better - both socioemotionally and academically

Adopt an asset-based, critical stance focused on student empowerment: When teachers respect and are resourceful about the cultural and linguistic assets students bring to school, actively reject deficit thinking and language, offer counter narratives to negative portrayals of people of color and immigrants, and provide opportunities for students to critically explore social justice issues, students are motivated and engaged and achieve academically. Examples include ethnic studies, community-school partnerships, using culturally relevant literature, youth popular culture (e.g., hip hop), and student-directed research projects.

Promote the development of bilingualism and biliteracy: Bilingual education - and students' continuing development of their primary/heritage language(s) in general - supports positive cognitive, linguistic, and academic outcomes; global competence; social and emotional learning; and a positive sense of self. Policy should therefore focus on the quality of instruction rather than on the language of instruction.

Finding #3: Districts should develop a vision for educating ELs, implement EL-focused policies, and invest heavily in EL-focused professional learning because this leads to systemic and sustained improvement.

Create (collaboratively with multiple stakeholders) a clear vision, policies, and implementation plan for educating ELs: Districts that are the most successful at fostering ELs' linguistic and academic progress develop a clear and shared vision about what they envision for ELs in all schools. They prioritize EL success and work collaboratively and

deliberately to ensure implementation of EL-focused policies, monitor the implementation of high-quality teaching and learning; and continuously evaluate progress and challenges.

Invest heavily in EL-focused teacher professional learning: Teacher professional learning that is intensive, sustained over time, includes coaching, and is focused on the specific content (i.e. EL-focused pedagogy) result in more confident and competent teachers and more successful students.

Applying Educational Technology to English Language Learning

Learning and instruction in ELL has benefitted from technology advances in other fields, which can then be applied to ELL. Most often these technologies target practices that are common to other disciplines, such as reading and writing, or mathematics and science. For example, both the Standards for Mathematical Practice in Common Core English language arts (ELA) and the Science and Engineering Practices in the Next Generation Science Standards (NGSS) call for students to obtain, synthesize, evaluate, and communicate information effectively. One way for supporting this is by using networked technologies. Another practice common to both Common Core and NGSS focuses on argumentation. Technologies that allow for collaboration and interactions with other students promote evidence-based argumentation in mathematics, English language arts, and science.

Formative assessment: In which the results of the assessment are used to modify instruction, can enhance instructional effectiveness. Educators recognize and understand the power of formative assessment, especially the conditions of use to strategically improve instructional practice and student learning. Without prompt feedback, learners may waste time practicing incorrect skills. Teachers who use education technologies receive student responses immediately and can adjust their instruction in the moment. Using interactive technologies empowers the teacher to leverage students' prior knowledge, assess conceptual understanding, and attend to student learning through questions and answers with immediate feedback.

Simulations: Technology can help ELL students in this latter process by making available multimedia, simulations, and modeling. For example, in science education, simulations have been harnessed to both represent dynamic systems "in action" and to allow active scientific investigations. Simulations can expand ways students show what they know by offering response formats, such as hot spots, drag and drop, drawing, operating sliders, and generating graphics, tables, and visualizations. These expanded modalities of representation and expression offer great promise for reducing language demands and increasing access for ELLs, since simulations can represent content in multiple forms, reducing language demand. Studies have demonstrated that ELL students fare better on simulation-based assessments than on traditional assessments, and performance gaps for ELLs compared to other students were reduced on these assessment, suggesting that more visual representations and less text may allow ELLs to better demonstrate their science content knowledge and particularly their science inquiry skills.

Building on previous experiences: Studies have found that teachers can use technology to link ELL students' prior experience with new learning, for example, by bringing their home culture, interests, and experiences into the classroom through digital images, music, and multimedia. The

result is that ELL teachers can use technology to create learning environments where students are able to construct their own knowledge as teachers scaffold students' learning with new content knowledge.

Learning in a social setting: In classroom assignments where students present and discuss their own work with other students, or become involved in class-wide activities, technology offers features that allow students to annotate, conceal, manipulate, move and zoom in on or focus on images, including text. Such interactive group-settings motivate students because the students' interactions within the context of these technology features make lessons more enjoyable and interesting, resulting in improved attention, engagement, and student behavior essential to the learning process.

Teaching with technology: Technology also has the power to transform ELL teaching by introducing new models of connected teaching. These technologies include a host of Web 2.0 online tools that foster communication, collaboration, social and learning networks, as well as accessing information. They also include interactive whiteboards, tablet PCs, projectors and other tools that allow schools to present information in ways that encourage discussion and collaboration. These models can link teachers to their students and to professional content, resources, and systems to help them improve their own pedagogy as well as to individualize learning for their students. Online educational resources and other technologies can also increase educational productivity, e.g., by accelerating the rate of learning.

Developing Educational Technology for English Language Learning

Technology use can be transformative to the way in which English language learning is conducted. Technology holds the promise of impacting almost every aspect of English language learning. Similarly, technology can have a profound impact on ELL teaching. Educational technology delivers fundamental innovative changes that can be integral to achieving significant improvements in teaching and student language proficiency. Technologies have caused a paradigm shift in education away from a one-way flow of information (the teacher as the sage on the stage) to a collaborative interactive traffic of information and teaching between students and the teacher. Supporting both teaching and learning, educational technology can infuse classrooms with digital learning tools, such as computers and hand held devices; expand experiences, and learning materials; build 21st century skills; increase student engagement and motivation; and accelerate student learning. It can also be used to expand both content and language learning opportunities and support language learning anywhere and anytime.

Multiple modes and contexts: One way that technology can promote student learning among diverse learners is by providing visual context through its multimedia and multi-sensory capacity. For example, research indicates that the capacity of technology to present a range of multimedia resources efficiently helps ELL students learn. This is not only because students have more information available to them. ELL students also benefit from access to a wider variety of information where they can explore their ideas and concepts within different contexts and thereby find new concepts easier to assimilate. Thus, teachers can more easily accommodate a wider range of student learning styles using technology when needed for particular students' needs.

Research indicates that it can take more than five years for the average student learning a new language to acquire the academic language necessary to succeed in school. Language proficiency requires two types of skills: basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP). BICS refers to social or conversational language, while CALP is the academic language needed to comprehend and analyze a textbook or understand a presentation by a teacher. This distinction explains why it often appears that some English language learners have a better grasp of English than they actually do.

Conversational fluency can be functionally acquired within two years of initial exposure to the second language, whereas at least five years is usually required to catch up to native speakers in academic aspects of the second language. By using multimedia technology to incorporate pictures or video into the lesson, the teacher can provide students with the necessary contextual cues to understand new concepts. Visual information can provide the necessary bridge or scaffold between everyday language and more difficult academic language. In addition, technology allows students to show what they have learned in multiple ways — offering a more accurate assessment of their growth.

One affordance of education technology is the use of highly graphic and interactive modes to promote more frequent integration of visual and verbal information during instruction. Multiple representations can enhance learning, particularly when students are actively engaged in processing and linking the representations. In particular, combining graphics with verbal descriptions increases learning, presumably because encoding of information is enhanced when information is processed simultaneously through visual and auditory sensory channels. Further, dynamic displays have been shown to increase student understanding of complex processes when they are used in conjunction with activities that support comprehension.

Feedback and active evaluation: Using technology-based tools, teachers can incorporate formative assessments into their lessons to measure how students are progressing through the learning process. Students' response to these formative assessments can occur in a number of ways using technology tools. At the simplest level, a student can provide a response directly through the technology interface. Technology tools can give students instant feedback to questions or the platform can store and analyze student responses to questions for teachers to review with students to identify opportunities for re-learning that leads to student success. With the advancement of speech synthesis and recognition technologies, ELL students can also carry on near natural conversations with digital tools around pre-selected and programmed.

Motivation and confidence: Finding a way to infuse technology into instruction not only helps English language learners acquire a second language, but also enhances motivation and confidence. Research suggests that, when communication occurs online, there is increased participation on the part of students, the teacher's role as the instructor shifts from disseminator of knowledge to a moderator, thus increasing student participation, participation is equalized among students when no one student dominates, and the quality of language generated by students is favorably impacted by using technology. Additional benefits of using technology in order to facilitate ELLs' language learning include increasing an ELL's access to comprehensible input, providing ELLs with opportunities for output production, and giving ELLs opportunities to negotiate meaning.

Collaborative communication: Technology that supports collaboration has been found to promote lively exchanges between native and non-native speakers in addition to fostering

scaffolding of ideas and grammar. More importantly, using technology to foster collaborative communication among students has been shown to foster proficiency in all language skill areas—speaking, writing, reading, and listening, including intercultural communication. For example, researchers investigated the computer-mediated communications between English and Chinese speakers using instant messaging. Their analyses found that the second language learners were strikingly creative in their use of spelling, word order, discourse, and sociocultural conventions—a clear indication that the use of instructional technologies for communicative purposes promotes language play, an important factor in second language development. Researchers noted the difference between the amount of students' language use in the playground compared with their use in the classroom.

Other research has made a distinction between public and private classroom communication and noticed that when ELLs knew they were not being monitored by the teacher, especially during networked computer-mediated communication activities, their language production increased substantially. This occurred because they were more focused on getting their message across rather than being caught up on trying to be communicatively accurate. There is a place for both types of communication in the classroom and the trick for teachers is to try to create technology-supported activities that foster both types of interaction—communicatively accurate interactions and communicatively effective interactions.

Project-based learning, thematic instruction, and cooperative grouping are examples of strategies that teachers use to engage students in such learning. These strategies give students opportunities to talk about shared learning experiences and to engage in hands-on, experiential learning experiences that promote learning of new material.

Mobile learning: Mobile learning has garnered considerable interests from the educational community and literature on mobile learning has identified such affordances as flexibility, accessibility, interactivity, and motivation and engagement. Implementing flash card learning, for example, found third-graders improved their multiplication skills using smartphones. Studies have shown Internet-enabled mobile devices can support cognitive learning; mathematics learning; language and literacy learning; and game-based learning. For ELL students, ready access to information technology is considered a critical factor. Smartphones can provide ELL students with access to learning resources for comprehensible input in language acquisition necessary for academic success. For example, using mobile devices for audio with trade books provided by the school teacher-librarian in collaboration with teachers, researchers found iPod shuffle devices to support reading and writing with ELL students. By adding audio support to their text reading and journal writing, the use of the iPod devices were also found to significantly increase student engagement and allow the students greater connection to the popular culture.

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