Invited In

Measuring UDL in Online Learning

Sean J. Smith, Ph.D.

The Center on Online Learning and Students with Disabilities

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Center researchers and staff have made every effort to provide clear and accurate information. We recognize however, that despite our careful efforts some errors in accuracy and omission are unfortunately unavoidable.

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Section I

Measuring UDL in Online Learning

Online learning is growing at a rapid rate, reaching millions of K-12 learners. This growth is creating dramatic changes in the K-12 educational landscape. For students, K-12 online learning offers additional options and potential digital supports that are not always available in the traditional brick-and-mortar classroom.

For educators and administrators, this tremendous—often overwhelming—growth presents opportunities, and also creates the demand for identifying appropriate online content and instructional resources. School districts are continually seeking products that serve students across all content areas and grades (K-12) to meet the growing demands for online learning and to offer a variety of online learning options.

The Center on Online Learning for Students with Disabilities (the Center) was funded by the Office of Special Education Programs to research the changes taking place in K-12 online education for students with disabilities. This report focuses on the digital materials and delivery systems used nationwide by online students enrolled in blended and fully online K-12 learning. The focus is on better understanding the online products used by K-12 students, how these materials serve the unique needs of students with disabilities, and to determine how additional research may be conducted to assist developers of online content and school districts providing online options in their ongoing efforts to meet all students' learning needs.

Online Learning

According to the Keeping Pace with K-12 Digital Learning 2015 report, there are 50.1 million students enrolled in public schools in the U.S.,

2.9 million in charter schools, 4.9 million in private schools, and 1.8 million homeschooled students. Online enrollments by these millions of students continue to grow: Correlating with the onset of extensive usage of the World Wide Web, the oldest K-12 online programs are now between 10-15 years old. Using information from vendor surveys and the data from published reports and state databases (where available), Keeping Pace places supplemental online course enrollments at 4.5 million. A number of these students are enrolled in online courses that are offered as supplemental courses through a state virtual school.

Online Learning and the Potential for Personalization

The growth in K-12 online learning stems from many factors. For struggling learners and those with disabilities, the potential for online learning to offer a personalized learning experience is of particular importance. Educators and developers of K-12 learning content contend that the digital features and embedded interactive online supports offered by online learning products can address the specific needs of each individual student. Personalized learning promises a flexible instruction-al experience to support individual students in their unique approaches to learning. Theoretically, in combination with teacher support, technological innovation expands on the traditional brick-and-mortar classroom experience to offer an interactive and responsive digital learning environment.

A prominent feature of blended and fully online environments is the ability to present content and instruction in multiple ways, thus personalizing instruction for each student's unique learning needs. Additionally, in real-time, synchronous learning, teachers can continually monitor student progress with immediate access to performance data.

Online education products are often considered especially valuable in improving access to effective materials. Central to these products are the easy-to-administer formative and benchmark assessments that offer instructors and administrators timely data on student performance. Data-driven decision making is of particular importance, often highlighted as the vital tool in determining what each student needs. This data permits individualization of instruction for each student.

Personalized learning is sometimes referred to as a "choice-based model" where learning environments are flexible, allowing students to set their own pace and determine in what format they wish to learn. It is also viewed as competency-based, where a student's prior experience is factored into his or her learning plan, and instruction is based on concepts and educational outcomes relevant to the learner's needs.

For the struggling learner and those with disabilities, the personalized nature of K-12 online learning appears particularly attractive. If the nature of online learning truly offers flexibility and just-in-time learning, its benefits should extend to all students, especially those with disabilities. One purpose of this study is to better understand the personalized nature of K-12 online learning. To this end, Center researchers sought to examine the foundation of K-12 online learning, including the digital lessons and supplementary materials that form the heart of the K-12 online learning experience.

How is Online Instruction Developed and Delivered?

In both blended and fully online models, the online learning experience is predicated on the online lessons, digital materials, and other online resources with which students engage as the majority of their learning experience. To better understand K-12 online learning, one would want to further understand the nature of the online materials that are developed for K-12 students and their teachers. But what is known about the nature of these online lessons and materials, and how they are developed?

Nearly 90% of the K-12 blended and virtual experience is provided through vendor-based content and curriculum (Patrick, Kennedy, & Powell, 2013). The materials that students are provided, learn from, and in which they complete assessments are most likely developed by an outside vendor. These lessons serve as the cornerstone of online learning—teachers use them in directing the day-to-day online instruction. These materials are often developed by and purchased from external vendors because the development of on-line lessons, materials, and overall discipline-specific content takes times, expertise, and critical resources. Thus, the investment required on the part of the school district and the individual classroom teacher to create these online lessons is tremendous and often too expensive.

Districts that decide to develop their own materials must invest in a learning management system (LMS) (e.g., Blackboard) and work to ensure that the curriculum aligns with state and Common Core standards. Districts are then responsible for the adoption of and technical support for an assessment tool or tools used to collect data on informal and formal assessments specific to a grade, course, or across courses. Beyond collecting the data, administrators and classroom teachers need to consider how to manage the data, align the data to the next content lesson, and maximize the utilization of the data for both individual and large class decision making. This (significant) investment of time and resources is often out of reach for districts.

Other challenges that often prevent districts from developing their own online lessons (and entire courses) include navigating copyright issues, ensuring grouping across course sections (e.g., different teachers developing materials for multiple sections of one course), and time as well as budgetary limitations. Additionally, teachers may not only lack the necessary time, but also have limited resources and/or training to develop content on their own. With these demands in mind, a viable option for most K-12 districts is to purchase course content, structured digital lessons, and the overall LMS from an outside vendor(s).

Districts and schools use K-12 vendor online products much in the way that they have historically used textbook content, investing in pre-packaged materials that align with the grade level and content discipline requirements. Some vendors, in fact, are major suppliers of textbooks and other materials (e.g., Pearson) to brick-and-mortar schools, allowing them to design online content in tandem with printed textbooks. The next page offers a sampling of K-12 blended and fully online lesson and content developers.

Some online learning products are available for free, however, most are for-purchase products developed for sale to school districts. For the student, this means that the lessons that serve as the primary mode for their blended or fully online instruction are developed by an outside entity. For the teacher, this means that, regardless of the blended model they adopt, their students' digital experience will be with pre-packaged lessons and materials.

The ability of vendors to develop online K-12 content at a significant volume and reasonable cost allows districts and individual school buildings to provide online learning options to both small and large numbers of students. Vendors align course content to the Common Core as well as individual state standards, ensuring that district administration and classroom teachers offer appropriate lessons and learning content. The vendor's LMS provides a structured learning environment with the flexibility to use relevant media supports and to embed instructional features to foster student engagement.

How Personalized Is Personalized Learning?

If digital lessons and supplementary materials form the core of K-12 online learning, a further understanding of these resources is critical. If K-12 online learning offers a more personalized learning experience (especially for students with disabilities), the foundation of the personalized experience would be in the lessons and materials. Determining the appropriateness of the online content then would be a critical step in further understanding the unique elements of the personalized learning experience.

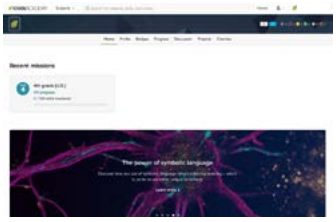
Traditionally, examining whether content, curriculum, or the instructional experience is appropriate for struggling learners, as well as those with disabilities, would typically include accessibility considerations. For example, in traditional brick-and-mortar classrooms, inquiries may

Examples of Online Content Providers

Brain Pop

www.brainpop.com

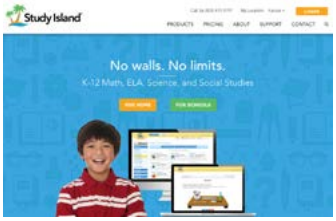
Brain Pop offers cartoon/video overviews. Each segment is aligned with a standard and content area and answers a specific question to help introduce students to a concept or idea. There is potential for UDL alignment in the way the videos, illustrations, audio, and scaffolded materials are presented.



Khan Academy

www.khanacademy.org

Khan offers lessons across numerous content areas and all grade levels. Video overviews provide audio and a visual description of the content being displayed. Videos are closed captioned. The video and audio features align with the basic principles of UDL.



Study Island

www.studyisland.com

Study Island is aligned to state standards and Common Core, and focuses on the four primary content areas. A strong focus is on practice and demonstration of critical concepts. Videos and interactive games help engage students. The visual and interactive capabilities provided appear to align well to the principles of UDL.

Gizmos

www.explorelearning.com

Gizmos is a highly interactive online resource offering labs, games, and interactive video simulations with content across grades K-12. Gizmos appears to be well aligned to the UDL.

OER Commons

www.oercommons.org

The Open Educational Resources Commons offers numerous resources aligned with the Common Core standards. OER identifies itself as a resource for varied learning, although the formats and supports vary. It is potentially aligned to UDL.

Thinkfinity

www.thinkfinity.org

Thinkfinity offers interactive games, student and teacher educational resource development tools, and other video and audio-based resources. Products are aligned to standards in science, math, and language arts. Principles of UDL alignment are noted through the resources, implying that the products are aligned.

be made about the accessibility of a building, a learning environment, or the instructional materials used. If something is deemed "accessible," it is often assumed that it will be appropriate for the educational needs of students with disabilities. Likewise, for the blended and fully online classroom, accessibility is currently at the forefront of the conversation on whether the ma-terials and delivery methods are appropriate for strug-gling learners and those with identified disabilities.

Yesilada, Brajnik, Vigo, & Harper (2012) have determined that two primary definitions have emerged in defining Web or digital accessibility:

1. Web accessibility means that people with disabilities can use the Web. More specifically, Web accessibility means that people with disabilities can perceive, understand, navigate and interact with the Web, and that they can contribute to the Web.
2. Technology is accessible if it can be used as effectively by people with disabilities as by those without.

From these definitions, various entities and government agencies have worked to develop standards and basic requirements regarding accessibility for individuals with disabilities. The Web Accessibility Initiative (WC3) created the Web Content Accessibility Guidelines (WCAG) 2.0. In 1998, the United States Congress revised the Rehabilitation Act of 1973, strengthening Section 508, which requires providing access to electronic and information technology. The International Digital Publishing Forum (IDPF) developed the EPUB content publication standards which offer accessibility parameters on e-books and other digital publications. For the blended and fully online K-12 classroom, these initiatives are often used in determining accessibility for students with an identified disability.

The table on this page offers a general overview of the three standards, illustrating similarities across the accessibility initiatives. The intent of these standards is to offer guidelines to assist developers, federal agencies, publishers, and similar entities in creating accessible digital materials. For school districts, these standards help determine what is accessible in digital information and content for students with disabilities. Districts looking to identify blended and fully online K-12 content appropriate for struggling learners and those with identified disabilities should be able to look to these standards as a guide.

To apply these standards, especially the Section 508 guidelines, a tool called the Volunteer Product Accessibility Template (VPAT) was developed. The VPAT helps determine how accessible a particular product is in accordance to the Section 508 standards, focusing on text, color, mark-up language, and other Web features to determine accessibility compliance. The VPAT examines if the user has access to the information, focusing on sensory and mobility features, but not necessarily cognitive and learning features and access. In an effort to better understand sensory and mobility access to common K-12 instructional materials, the Center employed the VPAT to review a variety of digital products (http://centerononlinelearning.org/resources/vpat/).

WCAG 2.0	Section 508 of the Rehabilitation Act	EPUB3
The WCAG 2.0 standards were developed by the World Wide Web Consortium (W3C), an international group that creates Web accessibility standards based on four principles of accessibility. WCAG standards state that all content must be made to be perceivable, operable, understandable, and robust for all students. The standards include guidance on how to ensure these principles are met. http://www.w3.org/TR/WCAG/	Section 508 of the Rehabilitation Act, enacted in 1998, requires that all technology used, developed, and purchased by federal agencies be accessible to people with disabilities. This includes all websites and other forms of technology. http://www.section508.gov/	The International Digital Publishing Forum (IDPF) released the EPUB 3.0.1 standard in 2014. EPUB 2 was initially standardized in 2007. EPUB provides guidelines for developers, including ways of simplifying the mapping of WCAG and WAI-ARIA (Accessible Rich Internet Applications) to EPUB production to ensure access for users with disabilities. http://www.idpf.org/accessibility/guidelines/