Collaborative Research to Inform, Influence and Implement UDL Practice in Education

Kong Chen
University of Northern Iowa
Cedar Falls, IA
ceakay@uni.edu

Amy J. Petersen
University of Northern Iowa
Cedar Falls, IA
amy.petersen@uni.edu

Christina M. Curran
University of Northern Iowa
Cedar Falls, IA
christina.curran@uni.edu

Abstract

Universal design for learning (UDL) is recognized as a best-practice framework in designing instruction for all students. Incorporating technology options in UDL enhances the flexibility of learning experiences. School districts are increasingly adopting 1:1 technology programs. However, little research exists on the efficacy of these programs across stakeholders and student groups. This session examines current practices in 1:1 technology programs, UDL and accessibility technologies in K-12 education and examines the implications for the implementation of UDL practices in K-12 and teacher education.

Keywords

UDL, 1:1 Technology Programs, Assistive Technology

INTRODUCTION

The rapid growth of technology innovation, increasing implementation of school-wide 1:1 and other technology programs, the application of evidence-based universal design for learning (UDL), and established mandates for accessible instructional materials (AIM) and assistive technology (AT) considerations for students with disabilities presents a landscape of inclusive and personalized learning opportunities for all learners. Industry development, district and school technology practices, school-based curricular practices, and individualized student needs necessitate that education professionals, researchers, policy-makers and community members fuse distinct sources of information and research in promoting and evaluating learning in schools. Against this backdrop the question emerges: *How do various stakeholders collaborate, drawing together their distinct perspectives and expertise, to promote, facilitate and evaluate the integration of UDL and technology in schools for all students?*

UDL, AT, AIM, AND 1:1 TECHNOLOGIES

UDL - Universal Design for Learning

UDL is a best practice framework for addressing learner variability and curriculum barriers in order to provide challenging, relevant, and accessible content for all learners, including those with varied strengths, talents, abilities, interests, and linguistic and cultural backgrounds (Center for Applied Special Technology [CAST], 2011). UDL curriculum practices have resulted in improved academic, as well as social and behavioral outcomes for students with and without disabilities (Basham, Israel, Graden, Poth & Winston, 2010; Rao, Ok, & Bryant, 2014). While technology is not necessarily synonymous with UDL, it can have an instrumental role in providing flexibility in the design and delivery of curricular goals, methods, materials and assessments for all students (CAST, 2014). "School and systems-wide practices such as Response to Intervention (RTI) and Multi-tiered Systems of Support (MTSS) integrate a continuum of system-wide resources, strategies, structures, and practices" to address student learning barriers (Averill & Rinaldi, 2011, p. 2). UDL is situated within this continuum of system-wide practices (Basham, et al), requiring an alignment of curriculum, technology, and policies by varied stakeholders including state and district administrators, general and special educators, education specialists and coaches, other education providers, students and families.

AT - Assistive Technology

Federal law mandates the consideration of assistive technology (AT) for all K-12 students with disabilities and the use of accessible instructional materials (AIM) for qualifying students through the requirements of The Individuals with Disabilities Education Improvement Act (IDEIA) of 2004. AT includes those technologies that improve the functional skills of students, giving them the ability to do something they otherwise would have accomplished ineffectively, with great difficulty, or not at all. Both types of technologies target barriers. AT is applied on behalf of individuals and UDL at the systems wide level within the curriculum and environment (Rose, Hasselbring, Stahl, & Zabala, 2005). Rose and colleagues underscore the complementary and reciprocal nature of UDL and AT which together improve educational success for students with disabilities. AT may be used by students across educational environments, content, and services, in extracurricular activities, and at home and in the community. Stakeholders involved with AT include students and families, specialists with AT expertise, special and general educators, technology personnel, administrators, and others.

AIM - Accessible Instructional Materials

When print materials are a barrier to accessing the general education curriculum AIM provide an avenue to access. Specialized formats including braille, large print, audio and digital text must be provided to qualifying students with a "print disability" under the requirements of IDEIA. Print instructional materials are "designed or converted in a way that makes them usable across the widest range of student variability regardless of format (print, digital, graphic, audio, video) (National Center on Accessible Instructional Material, 2014, para 1). Stakeholders must have an in-

formed knowledge of specific individualized student needs, ongoing awareness of general education curriculum materials and goals, resources for creating or accessing print alternatives within the school technology infrastructure, and means to assess the effectiveness and appropriateness of AIM for individual students.

Technology Programs

There is increasing interest in the use and implementation of 1:1 technology programs using laptops and/or mobile devices in schools (Bebell & Kay, 2010; West, 2013). 1:1 technology programs typically involve the use of 1 digital device for each student in a school. New mainstream technologies which may be used in 1:1 programs increasingly incorporate universal accessibility features in their design and applications (e.g., word prediction, touch screen interfaces, magnification, text to speech) to support a wide variety of user needs and preferences (Curran, in press).

1:1 programs have an array of purposes (e.g. improved student achievement, engagement, motivation, technology literacy) and outcomes (e.g. enhanced technology use, increased engagement, improvement in literacy, achievement gains) (Bebell & Kay, 2010; Donovan et al., 2007; Sauers & McLeod, 2011). Yet, variables in their implementation, training, and support impact possible outcomes for students (Holcomb, 2009).

Research on practices and student learning on these newer technology practices is emerging (West, 2013). For example, a number of variable outcomes of initial 1:1 technology initiatives have been reported, including: decreased disciplinary actions; increased student engagement or motivation; provision of more student centered classrooms (Bebell & Kay, 2010); increased student and teacher technology use (Bebell & O'Dwyer, 2010); modest gains in student achievement (Bebell & O'Dwyer, 2010); and improvement in literacy and writing skills (Sauers & McLeod, 2011). In STEM education, Brann and colleagues (2010) describe research supporting improved learning for students who struggle with accessible and assistive technology.

Variables in implementation, training, and support mitigate outcomes (Holcomb, 2009). Strong administrative and technological support, adequate technology infrastructure, and ongoing and differentiated professional development play a critical role in the outcomes of these programs (Clausen, et al., 2008). Stakeholders are varied and may include district-level administrative leaders and staff, and staff responsible for curriculum, technology integration, network infrastructure, assistive technology, and specialized student services or supports. Building or school level stakeholders may include administrators, technology leaders, media specialists, general and special educators, other school staff, and of course students and parents.

Given the array of collaborators and contributors to policies and practices in UDL, AT, AIM, and 1:1 Technology programs, we sought to better understand influences and practices to better inform our teacher education practices, increase understanding of inclusive school-based technology practice, and enhance our collaborative interactions with our K-12 education partners. We designed a two-phase study to address research questions including:

- What is the rationale for 1:1 programs across the state? Does this differ/change for early adopters (e.g. three or more years) or emerging adopters (two or less years)?
- What factors influence the design, adoption and implementation of 1:1 programs?
- What are the impacts of the implementation of 1:1 programs on teachers and students? General educators and students? Special educators and students? Administrators?
- What factors influence a school's decision-making of the integration of UDL and/or AT in the planning/implementation of 1:1 programs?
- What supports and professional development are available and utilized effectively to support the integration and instructional use technologies in 1:1 programs with diverse groups of students?

EXPLORING DISTRICT TECHNOLOGY PRACTICES AND INFLUENCES

An online survey was created to investigate how school districts plan and implement their 1:1 technology programs. The survey was designed to address areas of interest in technology goals and infrastructure, stakeholder involvement in technology plan development, obstacles in 1:1 implementation, success factors in 1:1 implementation, professional development for technology, and specific uses of 1:1 technology.

Superintendents statewide were invited to complete the survey. Sixteen responses were received. Ten of the respondents expressed interest in participating in a follow-up case study.

Of the 13 districts that had a technology plan, seven had updated the technology plan in the current year. Only two districts identified the consideration of students with special needs as a priority goals for technology plan: One indicated the priority goal was to "meet the curricular needs of all learners" while the other identified "having all rooms converted to Integrated Learning Classrooms" as a priority.

Integrating UDL with technology supports for core curriculum success was among the least successful types of interventions identified by the districts. Insufficient support on how to use technology in classroom and teachers' willingness to adopt technology were the highest ranked obstacles in making more effective use of technology.

Roughly one third (n = 5) indicated the purpose for the 1:1 technology program within the district was to increase student test scores while the majority were focused on other aspects such as learning, engagement, motivation, and 21st century skills. 1:1 districts expressed an increasing interest in offering AT professional development to various staff during different phases of 1:1 implementation.

SCHOOL CASE STUDIES OF INCLUSIVE 1:1 TECHNOLOGY PRACTICE

Beginning in the fall of 2014, qualitative case studies were initiated with three school districts to examine the above research questions. School districts included an early adopter, an emerging adopter, and a new adopter. Interviews and focus groups with administrators, technology directors and related personnel and educators were carried out. In addition, the research team observed and collected field notes in multiple classrooms from 5th to 8th grades.

Preliminary results revealed a number of interesting features within and across districts. First, the impetus for 1:1 technology adoption differed district to district and impacted how districts defined, implemented and evaluated 1:1 technology. Second, implementation of 1:1 technology differed among educators. It ranged from an emphasis on technology as simply another classroom tool, like a pencil, to technology as a means to create, support, and facilitate greater curriculum access and instructional engagement. Lastly, districts differed in their approach to professional development. However, the majority of educators agreed additional planning, identification of a common language, common policies, and coordinated and purposeful opportunities to learn how to implement 1:1 technologies were needed.

IMPLICATIONS AND APPLICATIONS IN TEACHER EDUCATION

How 1:1 technology is successfully implemented to support the learning of all students remains a question for further exploration. At the district level, stakeholder involvement in planning and policies involving technology decisions and programs is variable. Instructional equity and opportunity for students with special needs may be increased with the support of assistive technology and accessibility experts to implement more inclusive technology within 1:1 programs. Emerging from the primary results of this research study is the extent to which additional professional development is needed for administrators and educators to understand how 1:1 technology can support curricular access and engagement for all students. This research also points to the need for general and special education teacher preparation programs to prepare future teachers in the use of 1:1 technology. Beginning with the concepts and practices of UDL, future educators need preparation in how UDL, in conjunction with AT and 1:1 technologies can be used to create and facilitate curricular and instructional access leading to improved outcomes for all students.

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