Technology and Special Education: Designing Effective Professional Development for Equitable and Inclusive Classrooms

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Abstract: This study designed, validated, and piloted a classroom observation protocol to measure the impact of a professional development intervention that was designed to help teachers use of Assistive Technology (AT) in their special education classrooms. The research used the complex mixed methods design to collect and analyze qualitative and quantitative data in understanding the use of AT and effective component of professional development for AT integration. Findings suggest that the classroom observation protocol is helpful in reflecting a sense of how AT can be used effectively in the inclusive classroom. Additionally, teachers made noticeable shifts in their consideration of the use of AT in designing curriculum after professional development intervention. The research has the potential to provide insight into how best to support teachers in their growing understanding of "best practice" uses of AT. These "best practices" are based on our growing understanding of the Learning Sciences regarding how children learn, as well as our growing understanding of the "wise use" of technology to reflect these best practices. Scholars from learning sciences, educational technology, and special education need to work together to continue to develop the most effective, inclusive, and equitable 21st-century classrooms.

Objective and purposes

To reflect the best practices of Learning Sciences, technology needs to be used "wisely" in ways that support emerging opportunities for students (Meier, 2018, Wenglinsky, 2005). The basic premise of this study is that technology has the potential to be a vehicle of educational reform and a catalyst to stimulate school change (Meier, 2015). Assistive Technology (AT) has been redefining the professional relationship between teachers and students, which creates the potential for students to act as knowledge-builders and teachers as designers in culturally and linguistically diverse communities (Meier, 2015; Scardamalia & Bereiter, 2014).

Relatively fewer instruments have been developed to formally measure the quality of instruction provided through the use of AT in the inclusive classroom (e.g., Crawford, Zucker, Williams, Bhavsar & Landry, 2013). The two commonly used instruments are Danielson's Framework for Teaching (FFT, Danielson, 2007) and the Classroom Assessment Scoring System (Pianta et al., 2008). To create an instrument, the study was guided by the Process Model, which adopted an argumentative-based validation process to examine "content-based, empirical, quantitative and qualitative" evidence (Chatterji, 2003, in press; Kane, 2006).

Finally, in recognizing the potential of AT, effective professional development offers an opportunity for the ongoing collaboration between learning scientists and special education professionals to redefine the high-quality, high-impact learning opportunities for teachers (Borko, Jacobs, & Koellner, 2010; Desimone, 2009).

Research questions

The study aims to explore major research questions to capture the ways teachers use AT in special education classrooms in supporting the best practices based on the learning science research.

- Research Question 1: How AT is currently being used in all the classroom(s)?
- Research Question 2: What are the major factors that contribute to AT use in the classroom(s)?

Research design

This was a complex mixed-methods study with three phases. Before the intervention, the study used the exploratory sequential core design to develop the instrument (e.g., classroom observation protocol) and understand how AT was being used in different subjects and classrooms. Also, teacher interviews and principal interviews were conducted to understand the factors that contribute to the use of AT in the classroom. During the intervention, the pilot study used the convergent mixed methods to understand to the extent that the *Innovating Instruction* model contributed to special education teachers integrating AT in curriculum planning and teaching. After the intervention, the pilot study used the explanatory mixed methods to understand the AT adoption process within the school environment. Both quantitative (e.g., classroom observation protocol) and qualitative data (e.g.,

teacher/principal interviews) explained the variation of AT adoption across each school. In total, 29 classrooms were visited across twelve schools.

Results

For instruments, the average content validity index (CVI) for the match of content was 0.95, which explained 95% of the content matched with the proposed measurement goals and indicators. Also, the CVI of relevancy was 0.89, which indicated that 89% of the items were relevant to proposed measurement goals. Overall, the findings reveal the complexity of using AT in inclusive classrooms. The classroom observation protocol reveals how AT is used in the context of best practices for the inclusive classroom. Teachers made noticeable shifts in considering the use of AT in designing curriculum after professional development intervention. For instance, some teachers started to use AT to conduct different forms of assessments during the classroom instrument time.

Discussion

In practice, there are multiple pathways to motivate teachers to rethink the value of AT, which may consequently shift teachers' thinking from teacher-centered to student-centered perspectives in professional practices. The challenges become how to leverage the digital power of technology (Meier, 2015), to prepare teachers to acquire professional competency in the use of AT, and to address the needs of students' special learning strengths and challenges. Extensive PD is needed to ensure that teachers can ideally provide *every* child who has special learning needs with relevant support or accommodation through the use of AT. Beyond teaching and PD, administrative support is critical in leveraging opportunities for students with special learning needs. Future studies should examine the extent to which administrators' support teachers in curriculum development, instructional materials, and pedagogy.

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