Improving instruction of future teachers: A multimedia approach that supports implementation of evidence-based vocabulary practices

Emily Ely [a], [*], Michael J. Kennedy [b], Paige C. Pullen [c], Mira Cole Williams [d], [1], Shanna Eisner Hirsch [b]

[a] Mary Baldwin College, College of Education, Staunton, VA 24402, USA
[b] University of Virginia, 417 Emmet Street South, P.O. Box 400273, Charlottesville, VA 22904, USA
[c] University of Virginia, 405 Emmet Street South, P.O. Box 400273, USA
[d] James Madison University, Memorial Hall, Harrisonburg, VA 22807, USA

HIGHLIGHTS

- We designed and examined a multimedia tool to improve teaching ability.
- We describe a multimedia tool, which follows theoretical and empirical frameworks.
- Video can be paired with Content Acquisition Podcasts for use in teacher preparation.
- Video plus CAP can promote effective use of evidence-based vocabulary practices.

ARTICLE INFO

ABSTRACT

Teacher education efforts must prepare future teachers to implement evidence-based practices that are effective for all students. A strand of practices necessary for reading competence is vocabulary instruction; however, teachers spend less time teaching vocabulary as opposed to other literacy skills. In this experimental study, researchers investigated a multimedia-based intervention, which pairs video with a Content Acquisition Podcast (i.e., video plus CAP) to teach preservice teachers ($N = 49$) to implement vocabulary practices with struggling students. Those who watched the video plus CAP used significantly more teaching behaviors associated with an evidence-based vocabulary practice during instruction than the comparison group.

Published by Elsevier Ltd.

1. Introduction

Vocabulary is recognized internationally as a fundamental component of reading directly related to reading comprehension, the ultimate goal of learning to read (Aram, 2005, Israel; Graves, 2006, United States; Scull, Nolan, & Raban, 2013, Australia; Zhang et al., 2013, China). Without strong vocabulary competencies, students will likely struggle when reading different types of texts (e.g., narrative, expository), learning during lectures, and during discourse with different peer groups (National Reading Panel, 2000). Many children, especially those from underprivileged backgrounds, begin formal schooling with severe deficits in oral vocabulary (Biemiller, 2001; Coyne, Simmons, Kame'enui, & Stoolmiller, 2004; Hart & Risley, 1995). However, any student can experience challenges with vocabulary performance if they do not receive high quality instruction (Baumann, Kame'enui, & Ash, 2003). Struggles that arise from limited vocabulary knowledge are difficult to remediate and frequently snowball into larger reading deficits (Biemiller, 2001).

On average, teachers in the United States spend less time explicitly teaching vocabulary compared to other literacy skills such as phonological and phonemic awareness (Maynard, Pullen, & Coyne, 2010; National Reading Panel, 2000). Other countries show similar trends: Kindergarten teachers in Israel reported spending

* Corresponding author. Tel.: +1 305 439 6537.
E-mail addresses: eely@mbc.edu (E. Ely), MKennedy@virginia.edu (M.J. Kennedy), pcp4k@virginia.edu (P.C. Pullen), willi9mc@jmu.edu (M.C. Williams), shanna.hirsch@virginia.edu (S.E. Hirsch).
[1] Tel.: +1 434 249 4791.

most of their instructional time on alphabetic skills (Sverdlov, Aram, & Levin, 2014), and teachers in Japan expressed difficulty conceiving how grammar instruction can be integrated into classroom activities (Underwood, 2012). A partial explanation is teacher candidates may lack knowledge necessary to teach the essential components of reading, including vocabulary (Ely, Pullen, Kennedy, Hirsch, & Williams, 2014; Moats, 1994; Washburn, Joshi, & Binks-Cantrell, 2011).

Even when teachers possess some knowledge related to reading instruction, they frequently lack *engaged* knowledge necessary to know how to operationalize content knowledge into practice (Brownell et al., 2009). Engaged knowledge is developed when teacher learners are able to situate knowledge in the task of teaching children (i.e., situate principles of reading acquisition in real-life classroom scenarios; Phelps & Schilling, 2004). However, many national and international teacher preparation programs provide limited opportunities to observe teachers' practice and practice teaching (Sahin, 2012). Thus, teacher educators are charged with the challenging responsibility of fostering situated knowledge and pedagogy for instruction to help teachers translate procedural knowledge into daily instruction (Brownell et al., 2009; Han, Eom, & Shin, 2013).

The field of teacher preparation needs programs of research that specify methods to develop engaged knowledge of vocabulary instruction and improve teacher use of effective vocabulary practices (Carlisle, Correnti, Phelps, & Zeng, 2009). With that said, moving effective practices out of researchers' laboratories and into teachers' daily repertoires has proven to be an exceedingly difficult mandate to fulfill (Desimone, 2009; Landrum, Cook, Tankersley, & Fitzgerald, 2007), as many teachers do not make sufficient use of evidence-based reading practices (Klingner, Urbach, Golos, Brownell, & Menon, 2010; Underwood, 2012).

Multimedia instruction is a promising approach for (a) improving preservice teacher knowledge (Kennedy, Thomas, Aronin, Newton, & Lloyd, 2014), (b) supporting teacher application of knowledge in the classroom (Seidel, Blomberg, & Renkl, 2013), and (c) encouraging teacher use of evidence-based vocabulary practices (e.g., Borko, Jacobs, Eiteljorg, & Pittman, 2008; Dieker et al., 2009; Friel & Carboni, 2000; Santagata, 2009). The current research examines multimedia tools as mechanisms to deliver instruction on evidence-based vocabulary practices and provide authentic models of teaching.

In the current study, researchers created and implemented a multimedia-based intervention consisting of a modeling video and Content Acquisition Podcast (i.e., video plus CAP) to teach vocabulary practices to future teachers. CAPs are a form of enhanced podcasting in which still images are paired with on-screen text and audio (Kennedy, Ely et al., 2012). In this study, CAPs are paired for the first time with a modeling video to teach a research-supported approach for vocabulary instruction called the Intensifying Vocabulary Intervention (IVI). IVI is an instructional approach intended to improve word learning of elementary students at risk for or with learning disabilities through storybook reading (Loftus, Coyne, McCoach, Zipoli, & Pullen, 2010). The CAP pre-teaches the procedural steps and instructional practices of a vocabulary intervention, and sets the stage for what the viewer will see in the video clip. The second part of the tool shows a teacher modeling effective vocabulary instruction.

1.1. Multimedia use in teacher education

National and international researchers are examining how new technologies affect teacher preparation and classroom instruction (Han et al., 2013; Masats & Dooly, 2011; Mitchem et al., 2009; Seidel et al., 2013). To illustrate, video, podcasting, video-conferencing, use of wikis and blogs, have respectively emerged as beneficial tools in preparing educators (O'Brien, Aguinaga, Hines, & Hartshorne, 2011). Technology can address the challenge of delivering an in-depth knowledge and skill base in teacher education by providing a practice-centered training (Gomez, Sherin, Griesdorn, & Finn, 2008). However, to ensure usefulness of technology and optimal use of academic time, teacher educators should utilize multimedia tools that have empirical backing to support learning (Clark, 2009). Preliminary research indicates that video models and podcasting hold promise to prepare teachers to learn and implement evidence-based practices (Dieker et al., 2009; Kennedy, Thomas et al., 2014).

1.1.1. Video use in teacher preparation

There is emerging, but limited literature on the effectiveness of videos to teach preservice teachers about teaching (Han et al., 2013; Santagata & Angelici, 2010). Video is widely used in several countries as a reflection tool to help teacher candidates (Admiraal, Hoeksma, van de Kamp, & van Duin, 2011; Capizzi, Wehby, & Sandmel, 2010; Dymond & Bentz, 2006; Etscheidt, Curran, & Sawyer, 2012; Santagata & Angelici, 2010; Sherin & van Es, 2009). In addition, video can support current teachers as they reflect upon and learn from teaching experiences (Borko et al., 2008; Friel & Carboni, 2000; Sherin & van Es, 2009). These studies support video as a tool to create instructional and student awareness, as well as ignite teacher change.

Video is suggested as a tool for encouraging preservice teachers to not only just learn about the theory and practice of teaching, but also develop capacity to implement practices based on evidence (Gomez et al., 2008). Videos that model teaching strategies can be used to (a) improve teaching (Ely et al., 2014; Dieker et al., 2009), (b) boost teacher confidence (Dymond & Bentz, 2006), and (c) improve teacher knowledge (Han et al., 2013; Mitchem et al., 2009; Santagata, 2009; Zhang, Lundeberg, McConnell, Koehler, & Eberhardt, 2010).

1.1.2. Podcast use in teacher preparation

Traditional audio-only podcasts are widely used in education (Saeed, Yang, & Sinnappan, 2009), yet scant empirical evidence exists to support the use of audio-only podcasts to promote measurable learning outcomes during higher education or PD activities (Heilson, 2010; Hew & Cheung, 2013). CAPs differ from traditional audio-only podcasts in that they promote understanding of various topics because they are created in alignment with valid principles of multimedia learning theory (Mayer's, 2009 Cognitive Theory of Multimedia Learning) to maximize retention of information. A sample CAP can be viewed at https://vimeo.com/89716786. To date, there are 10 studies that support the use of CAPs to improve teacher candidates' knowledge of content needed to teach students with exceptionalities (Driver et al., 2014; Ely et al., 2014; Ely, Pullen, Kennedy, & Williams, in press; Hart & More, 2013; Kennedy et al., 2011; Kennedy et al., 2013; Kennedy, Ely et al., 2012; Kennedy, Newton, Haines, Walther-Thomas, & Kellems, 2012; Kennedy & Thomas, 2012; Kennedy, Thomas et al., 2014). This program of research has to date only yielded one feasibility study that examined the combination of a CAP with video (Ely et al., 2014). Results show participating teachers ($N = 3$) used substantially more effective practices with their students after intervention.

1.2. Theoretical framework for video plus CAP

Critics of technology tools encourage use of multimedia that is shaped by solid theory (Clark, 2009) and experimental testing to confirm their function (Clark & Estes, 2008). The video plus CAP