Combining Multimedia Slidecasts and Video-Analysis to Influence the Implementation of Evidence-Based Practices

Jason P. Davis and Kevin Oh

Abstract

The last 20 years of federal legislation have seen a growth in the requirement that evidence-based practices be used to ensure improved student outcomes. The Individuals with Disabilities Education Act (2004) and No Child Left Behind (2001) each require educators to research, develop, and implement new practices aimed at meeting this expectation. The Every Student Succeeds Act, which replaced NCLB in 2015, further emphasizes the requirement to use evidence-based practices and the urgency of this issue. While there is ample research identifying evidence-based practices, these strategies are not making their way into classrooms. This qualitative study examines the research-to-practice gap and strategies to overcome this transference failure. Using multimedia slidecasts and video-analysis, twelve teachers provided detailed reflections and descriptions of their experience. The results of this study support the use of video as a superior tool to memory for self-reflection, the use of multimedia slidecasts as a tool to transfer evidence-based practices, and the Levels of Learning Theory to describe novice teacher development.

Keywords: Evidence-based Practice, research-to-practice gap, special education, multimedia, video-analysis, self-reflection, teacher preparation

Jason P. Davis, Ed.D. is an Assistant Professor in the department of Early, Middle and Exceptional Education at Millersville University. He can be reached at Jason.davis@millersville.edu

Kevin Oh, Ph.D. is an Associate Professor in the Learning and Instruction department at the University of San Francisco. He can be reached at koh2@usfca.edu

For more than a century researchers and practitioners have grappled with identifying effective teaching methods and how to implement them in classrooms (Korthagen, 2010b). This concern has again come to the forefront of education research and practice with the passage of federal legislation such as IDEA 2004 and ESSA 2015 and their mandate to use scientifically based research in the classroom. While the past decade has seen an increase in our understanding and identification of evidence-based practices, little evidence suggests that these new strategies are making their way into today's teacher practice. Having nuanced differences, this gap between what researchers know to be best practice and what is being implemented in the field has been referred to as the research-to-practice gap, research-based instruction, and evidence-based practices (Test, Kemp-Inman, Diegelmann, Hitt, & Bethune, 2015).

Researchers and educators have long sought to understand how to reduce the gap between research findings and teacher practice. Researchers in the field of special education have developed many evidence-based practices to meet the challenges of a variety of disabilities and concerns (Cook & Schirmer, 2003; McLesky & Billingsley, 2008). In the area of learning disabilities alone, research has concluded the efficacy of scaffolding for task difficulty as well as the use of grouping, direct instruction, progress monitoring, and others (Vaughn & Linan-Thompson, 2003). These advances in research and the development of evidence-based practices have not, however, transferred to the classroom. Research suggests that special education teachers are not implementing these strategies (Cook & Schirmer, 2003; McLesky & Billingsley, 2008; Vaughn & Linan-Thompson, 2003). This divide between what is known to be best practice and the work performed by teachers in the field continues to be an area of great concern.

A number of causes for the gap have been put forth. According to Korthagen (2010a), obstacles present themselves in many ways. Teachers, even those interested in implementing

evidence-based practices, are often socialized into their school setting causing them to assimilate to the teaching beliefs and approaches used in that environment. The complexity inherent in teaching, the prior knowledge, stage of development of the teacher, and disconnect between the research and practitioner communities, have all been stated as obstacles (Korthagen, 2010a; Robinson, 1998). Perhaps the most powerful explanation for this reluctance of individuals to use research in their practice, however, is the perceived lack of usefulness or relevance of the research (Carnine, 1997; Korthagen, 2010a). Teachers' limited time and need for specific and concrete solutions (Eraut, 1995) stands at odds to the abstract approach taken by teacher educators (Tom, 1997) and the traditional methods of research dissemination (Cook, Cook, & Lundrum, 2013).

To meet the need for high quality professionals and the mandate for scientifically proven approaches, teacher education programs are tasked with finding strategies and tools that not only provide the knowledge of evidence-based practices, but also effectively engage teachers in transferring these strategies into practice. Traditional approaches, such as journal articles and professional conferences, have demonstrated an inability to disseminate research-based interventions to practitioners (Cook, Cook & Landrum, 2013). These efforts, described as passive dissemination of work (Dearing & Kreuter, 2010), fail due to the reliance on the practitioners to find and use the strategies identified by researchers. Advances in modern technology may offer improved opportunities to embed research into practice and overcome obstacles traditional methods have failed to hurdle. Having created new avenues for the dissemination of current research and tools to improve the analysis of one's own practice, new technology has the potential to not only increase the accessibility and usefulness of recent findings, but also enable practitioners to better situate this information into real-world concrete

examples.

The internet provides multiple platforms to share research findings. Whether designed to provide access to organized databases of current findings or tutorials that synthesize research, online resources have become a common tool in teacher preparation and professional development. As such, recent research has begun to focus on how to best utilize this technology, whether it is effective, and the quality of the research presented (Test et al., 2015; Reagan & Michaud, 2011). While this research is new and limited by the number of studies, the results of Test et al. (2015) provide reason for concern. In examining online sites claiming to disseminate research-based or evidence-based practices, Test et al. found that 43% of the sites claiming to share high quality strategies lacked any explicit or implicit evidence of quality, suggesting that these sites are not to be trusted by practitioners.

Video-Analysis in Teacher Education

Improving accessibility and avenues for dissemination is an important first step in addressing this issue. Transferring the knowledge of research into practice, however, requires an understanding of the cognitive processes involved in pre-service and in-service teachers learning from experience (Calandra, Sun, & Puvirajah, 2014). Advances in video technology have demonstrated the potential to successfully bridge the gap between knowledge gained at the university and its application in practice (Blomberg, Renkl, Sherin, Borko, & Seidel, 2013; Calandra et al., 2014). With the ability to capture concrete examples of one's own teaching, video might be used to deepen an individual's understandings and reflections, disseminate and provide examples of evidence-based practices, and create a cognitive link needed to inspire change.

Video has become a common tool for aiding in teacher reflection and has shown to impact teachers' ability to learn from their experience (Calandra et al., 2014; Kolb 1984; Putnam & Borko, 2000; Sparks-Langer & Colton, 1991). According to Wubbles, Korthagen, and Broekman (1991), this impact is due to the manner in which reflection impacts mental structures and suggests that "effective reflection is a process where participants reflect on their lived experience, and then interpret and generalize this experience using existing mental structures to either form new mental structures or add to the existing ones" (Calandra et al., 2014, p.104). In this way, using video to identify specific, concrete experiences, an individual can reevaluate an event and create a new schema. This is similar to what Mayer (1997) referred to as the generative theory of multimedia. "Meaningful learning occurs when learners select relevant information from what is presented, organize the pieces of information into a coherent mental representation, and integrate the newly constructed representation with others" (p. 4).

Delivering Evidence-Based Practices using Multimedia Slidecasts

Online tools, designed as tutorials using a multimedia approach, are showing results and great promise. By synthesizing the research into user-friendly tutorials, these tools may support the use of evidence-based practices by making them more easily accessible. One such project, being developed at the University of Virginia, combines the need for accessible delivery of evidence-based practices with recognized methods of instructional impact. Content Acquisition Podcasts are a collection of over 320 online modules based on "Mayer's (2008, 2009) cognitive theory of multimedia learning and validated instructional design principles" (Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014, p. 73). Developed by Michael Kennedy, Content Acquisition Podcasts are available in a number of content areas supporting multiple evidence-based practices in special education and hold potential to fill the need for accessible high-quality tools that

deliver usable practices. With many new teachers using online resources as their primary source for finding instructional strategies (Jones, 2009; Test et al., 2015), tools such as podcasts may hold the key to providing accessible and trustworthy methods of delivery.

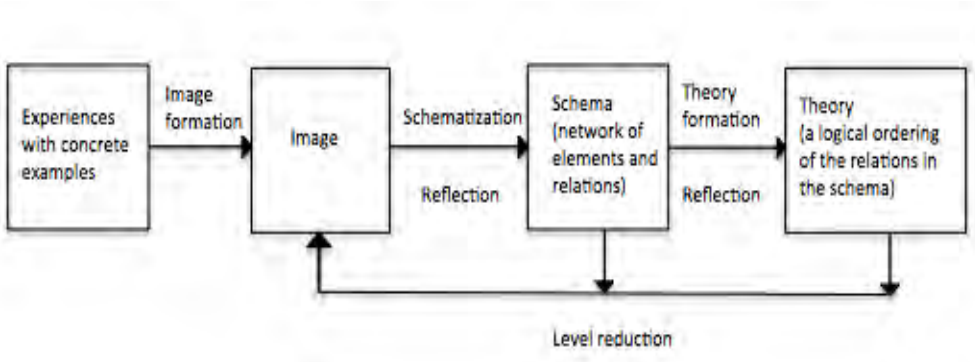
Tools based on multimedia theory, such as Kennedy's Content Acquisition Podcasts, have shown to be effective at teaching content to pre-service teachers. Video-analysis, reviewing a recording of one's own teaching, has demonstrated the ability to enhance reflection on practice and impact the mental structures needed for change. The purpose of this study, therefore, is to evaluate the potential for combining these processes in an effort to deliver content knowledge that will transfer to classroom practice, successfully bridging the gap between research and practice.

Theoretical Foundation

The conceptual framework supporting this project stems from the schema-based three-level model of teacher learning developed by Korthagen and Lagerwerf (1995). This theory, presented in Figure 1, argues that for teachers to learn or change their practice they must reflect on specific examples, understand their prior knowledge or instinctive reactions, apply new knowledge, and after additional reflection develop a new theory or create an alternative schematic response.

Figure 1

The three-level model of teacher learning and the accompanying learning processes



By utilizing digital video technology, we can provide accurate and specific examples of their own teaching and ask them to reflect on this experience and the prior knowledge that was brought to the experience. Multimedia slidecasts can then serve to provide high quality new content. Then, after reflecting on both the video and slidecast, a new schema can develop.

Method

Participants

Twelve graduate students seeking special education teacher credentials at a west coast university were selected for this study. Together, the authors incorporated and facilitated this six-week treatment into a curriculum and instruction course. The convenience sample of students enrolled in this course came from a variety of backgrounds. The participants varied in age (20-over 40) and classroom teaching assignments (8 elementary, 2 middle schools, and 2 high schools). To address this diversity and potential limitation, a Background Survey was developed and used in analyzing results.

Procedure

In an initial session, participants were introduced to the project and provided instruction on the tools and documents needed to successfully complete the activities. Participants provided background information in the form of an online survey as well as completed a concept map to provide their current level of understanding.

The Background questionnaire provided information in the areas of personal experience and current placement. Participants were asked three questions related to their prior experience; personal education experience, age, and past experience working with students. This was collected to understand any impact life experience may have on management technique and what prior knowledge participants bring to the project. As teaching assignments vary greatly,

participants were asked to provide their current job description including grade level and special education classifications.

The participants were then instructed on the process of creating a concept map. Concept maps are visual depictions of an individual's content knowledge and organization of an issue or topic (Nietfeld, 2002). This technique has shown to be an effective assessment tool that can be used to demonstrate an individual's understanding of a concept (Francis, 2006). By asking individuals to create a pictorial representation, we can see the primary, secondary, and tertiary ideas a participant holds about a topic (Davies, 2011).

Concept maps are typically constructed using circles (called nodes) and lines (links) to create a visual representation of knowledge. The participants are presented with a document consisting of only a center circle, a word or phrase that represents the overarching concept or idea, and nothing else on the page. There is no other information provided on the document. All instructions for completing the map using nodes and links are provided orally.

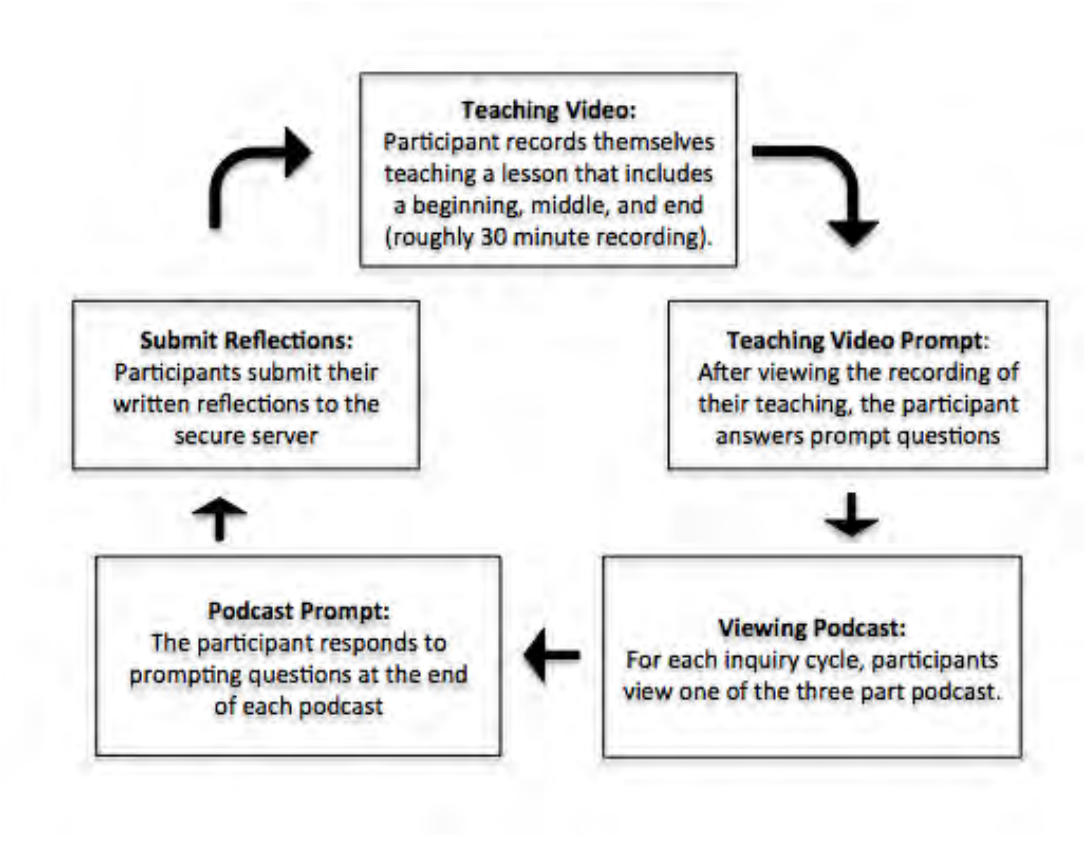
For this study, the center node was provided to the participants with the term "Classroom Management". The instructional content of classroom management was selected as the topic for this study as it was determined to be a vital content area needed for early career teachers. The participants used their prior knowledge to create a pattern or structure of their understanding. Using nodes and links to represent the relationships between ideas, the participant creates levels of understanding.

Concept maps were administered as both a pretest and posttest for the purposes of quantitative analysis. The leveled nature within the concept map procedures allow for the results to be evaluated. A participant's pre and post maps can be compared in order to identify the depth and breadth of an individual's understanding.

The intervention for this study was divided into three parts, referred to as inquiry cycles. Each of these cycles required participants to follow specific steps to engage in the reflection of their own classroom practices. Using a video recording of themselves teaching a lesson, the participants reflected on the strengths and weaknesses of the lesson. In this way, they used concrete examples and did not rely on memory to create an accurate image of their experience. They then compared this experience with the content in one of the Content Acquisition Podcasts. By viewing the podcast and reflecting on its content as it relates to their practice, the individual begins to alter their initial image. This process was completed three times using a three-part podcast series on classroom management shown in Figure 2.

Figure 2

Inquiry Cycle



Novice teachers were prompted to write two written reflections per inquiry cycle. The first prompt asked the participants to reflect on the strengths and challenges of their teaching and address any changes they might make in the future. This prompt was completed online and participants had as much time as necessary. A recommendation of at least one paragraph to answer each of the questions was suggested during the workshop presentation. The additional prompts asked the participant to compare what they learned or saw in the podcast with their own Teaching Video.

Upon completion of the three inquiry cycles, interns were asked to participate in individual interviews to provide feedback on the podcast-aided video-analysis process and its impact on their teaching practice. Each interview was conducted either face-to-face or via telephone and took between 10-15 minutes. Using a semi-structured interview technique with guiding questions to focus on predetermined themes while leaving the conversation open enough to changes (Kvale, 1996), discussions focused on four basic questions each with possible follow-ups.

Following a pattern from broad to narrow focused questions, interns were asked to describe their teaching practice as it relates to classroom management. Follow-up questions aided in focusing on changes over the course of the semester. To understand the participants personal experience with the technology and process, questions two and three asked for feedback on the use of the Teaching Videos and Podcasts to influence their practice as well as the benefits and obstacles using these processes. Finally, teachers were asked if they would continue using the strategies of video-analysis or podcast delivered content in the future. Steering the semi-structured interviews in this way provided data to better understand the impact the intervention

had on teacher change in order to address the research questions. In addition, this data may inform future changes and improvements to the podcast-aided video-analysis process.

Data analysis

The data was evaluated to answer the research questions and better understand the use of technology to address teacher needs. Qualitative data collected from the concept maps, individual reflections, and interviews helped to answer the question: *To what extent does the intervention impact novice special education teachers' schema of evidence-based classroom management practices?* The second question: *To what extent do participants report change in their implementation of evidence-based classroom management practices?* was evidenced by changes found between the thematic coding of the initial individual reflections and the reflections on the third cycle of inquiry. In addition, interview data also indicated a shift in teacher implementation. To understand the individual's change in concept, knowledge of classroom management, and to answer the question: *To what extent does the intervention impact novice special education teachers' schema of evidence-based classroom management practices,* the concept maps were quantitatively evaluated.

Results

To address this research question, the Teaching Video Reflection Prompt asked participants to "Describe the classroom management strategies used in this lesson." This description, prior to the podcast intervention, provides the base level of classroom management being implemented by each participant. Using this same question from the final Teaching Video Reflection Prompt, any change in evidence-based strategies can be detected.

The Evidence-based Podcast Content Guide was developed from the specific content from the enhanced podcast series. Each of the three podcasts were viewed and reviewed to

establish clear coding descriptors. In addition to the researcher, two colleagues knowledgeable in the field of special education viewed the podcasts and the Evidence-based Podcast Content Guide to provide support and clarity for the coding structure. Eleven main strategies with supporting details were identified and used to code the participants responses.

The responses to the reflection prompt were written in paragraph form. Each reflection was analyzed using the coding structure to highlight terms and concepts. Table 1 provides the results of this analysis. During the first reflection, the range of participant reference to each practice spanned from 0-3. In the third reflection prompt, this range shifted slightly to 0-4.

Table 1

Reported Evidence-based Practices Implemented

	First Reflection (Range)	Third Reflection (Range)	Difference
Means	1.08 (0-3)	2.00 (0-4)	0.91
Standard Deviation	0.99	1.28	1.38

The statistical analysis of the written reflections demonstrates a mean difference between the initial reflection and the final Teaching Video Reflection. The first reflection mean being 1.08 (SD 0.99) and the final reflection mean equaling 2.00 (SD 1.28) results in a difference of 0.91 (SD 1.38). This suggests an increase in novice teacher reported implementation of the evidence-based practices presented in the enhanced podcast intervention.

Interview

To better understand the experiences of novice special education teachers and their attempts

to implement evidence-based practices, all participants were asked a series of questions in semi-structured interviews. These interviews were recorded and the recordings transcribed for analysis.

Content analysis was conducted to identify themes in the teacher responses. The transcripts went through numerous readings until common ideas emerged. In addition to the identified common themes, outliers that provided contradictory evidence or suggestions for future changes were also included in the data set.

Table 2

Number of Participants Reporting Using Each Practice

Evidence-based Practice	Implemented
Behavior specific praise	6
Explicitly teach expectations	3
Reinforcement systems	3
Decreasing unwanted behavior	2
Explicit instruction	2
Routines	2
Active supervision	1
Environment	0
Opportunities to respond	0
Performance feedback	0
Prompting desirable behaviors	0

In each case, participants could identify at least one example of an evidence-based practice

learned from the podcast that they then implemented in their classroom. The most commonly referred to strategy, described as both helpful and implemented, was the use of behavior specific praise. Table 2 shows each of the strategies provided by the podcast and the number of participants stating that they attempted to implement the strategy. In this table, the eleven strategies are organized by the most to least reported as implemented by the participants.

Many participants commented that the strategy of providing behavior specific praise was "the most useful." Six out of the twelve participants found that going beyond the simple statements of "nice job" or "good work" associated with general praise and making one's comment specific to the behavior being exhibited was a most memorable strategy. One participant described the podcast on specific praise with, "That was one of the Aha moments." After implementing this strategy, another participant stated "(My) comments become more relevant. There's less of them but they mean more, hopefully."

Participants also reported success in implementing proximity, a decreasing unwanted behavior practice, and moving around the classroom, an active supervision practice. Establishing an environment where the teacher is able to visibly monitor students as well as move about easily was described in the first part of the podcast series. Upon implementing this technique, one participant stated, "travelling around the room and just making sure the students know that I'm here, I'm watching them. I'm with them making sure they're on task. I thought it was pretty helpful." Using a similar practice from the final podcast, another participant said, "just being close. It really became a big thing that I was like I should be doing this it makes sense."

Two participants attempted to implement a new token economy. Using tickets as a reward that can then be used to purchase items from a school store or as raffle tickets for larger items is the foundation for a token economy. A number of teachers in this study started the school year

off with such a reward system. One of the participants who made a comment during the interview stated that she was working on a plan to change her token economy based on the content learned from the intervention. The second teacher implementing the new token economy stated, "That is one thing that I am implementing and it's pretty good because they (her students) are bought into having the points."

A number of evidence-based practices were not reported as implemented during the final interview. The practice of setting the environment, opportunities to respond, performance feedback, and prompting desirable behavior were not mentioned by participants. This may be due to the timing of the interviews. These four practices were discussed in the first half of the podcast series and may not have been fresh on the minds of participants.

Whether the practice improves the level of praise and reward or increases a teacher's supervision of students, participants attempted to implement the ideas gained from the podcast and at times reported seeing benefits. After watching himself on his final video, one teacher stated, "It feels good to often see the strategies that we're using and we're implementing and were working as well."

While every participant stated finding content that was useful, one participant thought the podcast was not well designed for his context. A participant working at the high school level commented, "Most was aimed for a younger audience." This same teacher went on to suggest that the content did not take into consideration the diversity of students:

> A lot of my kids are immigrants, or kids of immigrants, or don't have both parents at home and they're just less conditioned to respond to those like, 'Way to go, Chuck, you get a star.' Those are pretty summer-campy. I think they would work for kids who have grown up in those environments, but throwing stars at 16-year olds who've never gotten a

> star is not going to do -- It could work but I think it just feels corny to them, and they know it's corny… I do embrace corny stuff but in general the material was for a younger audience. Not only that, a whiter audience.

The comments made by this participant reflect the need to address the intersection between students with special needs and those from diverse cultures. This intersection was not a focus of this research, however, is highly regarded as an important element when designing classroom management procedures.

The podcasts presented practices that are proven effective for all grade levels. The examples they used and the general nature of the content, however, could be seen as not relevant to some grade levels, cultures, or contexts. In each podcast, the vignettes and images used were of classrooms and students at the elementary level. This participant comments suggest that future projects may need to be more focused on specific grade levels and perhaps school contexts. Additional research is also needed and alternative podcasts created that view context from multiple lenses to address the needs of the diverse communities being served.

Research Question 2: Schema Development

To address the second research question, "To what extent does the intervention impact novice special education teachers' schema of evidence-based classroom management practices?" The pre and post concept maps were analyzed. Each map was given a score based on the number of branches stemming from each node. This score provides an understanding of the breadth of knowledge the individual has on the selected topic. Next, the concept maps were scored by calculating the average length of each branch. This score provides the depth of a person's knowledge. By comparing the resulting scores of each map, a clearer picture of any change in schema can be revealed.

Using participant number 6, Figure 3 provides an example of the scoring procedure. For each circle (or node) the number of branches stemming from that node were counted. Note that from the center node labeled Classroom Management there are five branches leading to additional nodes. The Classroom Management node is therefore scored with the number 5, a box was placed around the number 5 above the node for visual clarity. Continuing with the remaining nodes that are not terminal, nodes without continuing branches, how wide an individual's understanding can be calculated. Adding the numbers in boxes, 5+2+4+3=14, gives participant number 6 a pretest breadth score of 14 that can be used to compare to their post test results.

To identify the depth of understanding the individual has on the content, the average length of each branch is calculated. By starting at each terminal node and counting the number of branches required to reach that node, the length is determined. Represented with a T followed by a number, Figure 3 also provides an example of the scoring for depth. Note that the node with the term "Practice" is scored with a T2 because there are two branches between it and the center node. The term "Most Important" is labeled with a T1 as it is only one branch from the center. By adding the T numbers together and dividing by the number of scores, the average branch length can be established to determine the depth of understanding. For participant 6, there were nine labeled T2 and two labeled T1. This can then be scored as: (9x2) + (2x1) = 20/11 =1.82 or an average branch length of 1.82.

Figure 3

Concept map breadth scoring procedure

Looking first at the comparison between the number of branches (breadth of knowledge) in each map, the raw data was converted to provide the mean and standard deviation for both the pre and post assessment and presented in table 3. The pretest concept map number of branches ranged from14 to 29 with a mean of 23.5 and a standard deviation of 7.21. The posttest had a range of 13 to 32, a mean of 19.58, and a standard deviation of 5.48. Mean difference between assessments was also calculated with a mean of -3.75 (SD 4.27) and presented in table 3.

Table 3

Number of Branches

	Pretest	Post Test	Difference
Mean	23.5	19.58	-3.75
Standard Deviation	7.21	5.48	4.27

The maps were next scored to determine the average branch length (depth of knowledge), shown in table 4. This score provides an understanding of the depths of understanding an individual has of a particular concept.

Table 4

Average Branch length

	Pretest	Post Test	Difference
Mean	2.24	2.16	-0.08
Standard Deviation	0.35	0.23	0.18

With a range from 1.75 to 2.82, the results of the average branch length for the pretest were a mean of 2.24 (SD 0.35) and the posttest, with a range from 1.70 to 2.55, had a mean of 2.16 (SD 0.23). The mean difference was -0.08 (SD 0.18).

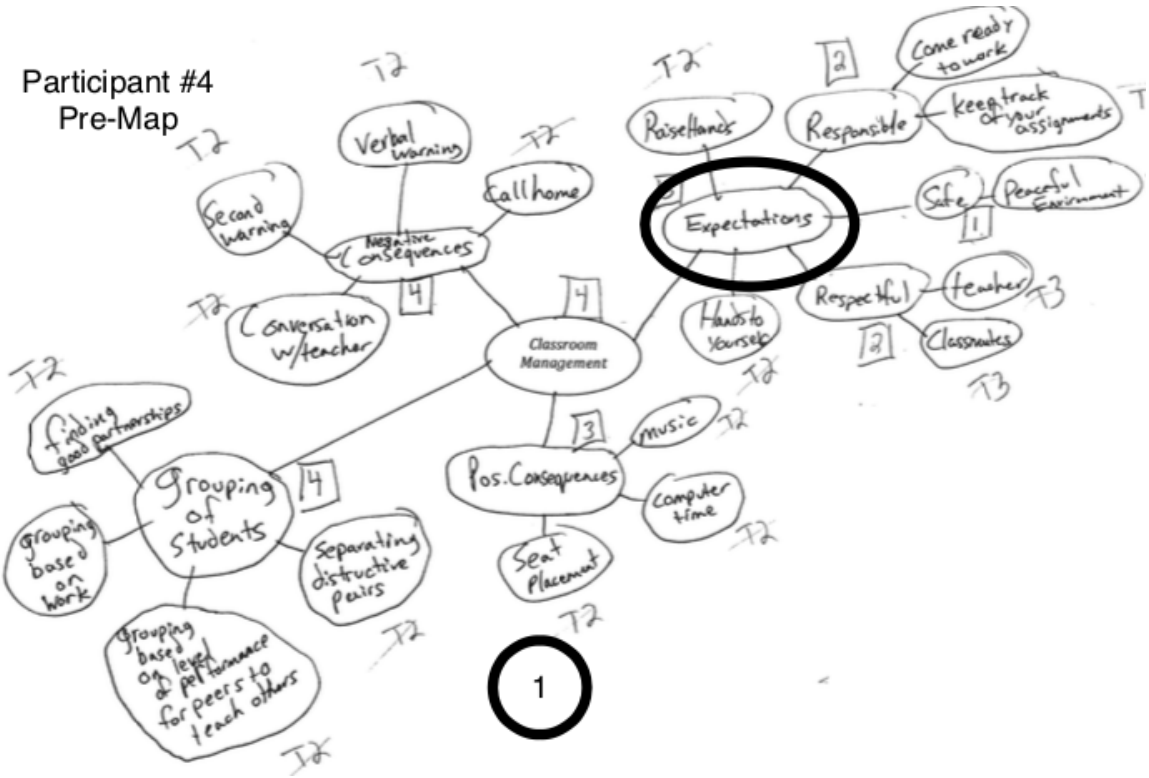
Identifying the depth and breadth of understanding does not, however, provide information on the content of that understanding. To identify any growth or shift in the content knowledge, the maps were next analyzed to examine the words and ideas expressed. Using the Evidence-based Podcast Content Guide, the concept maps were re-evaluated by the researcher and two colleagues, both with content knowledge and experience in the field of using evidence-

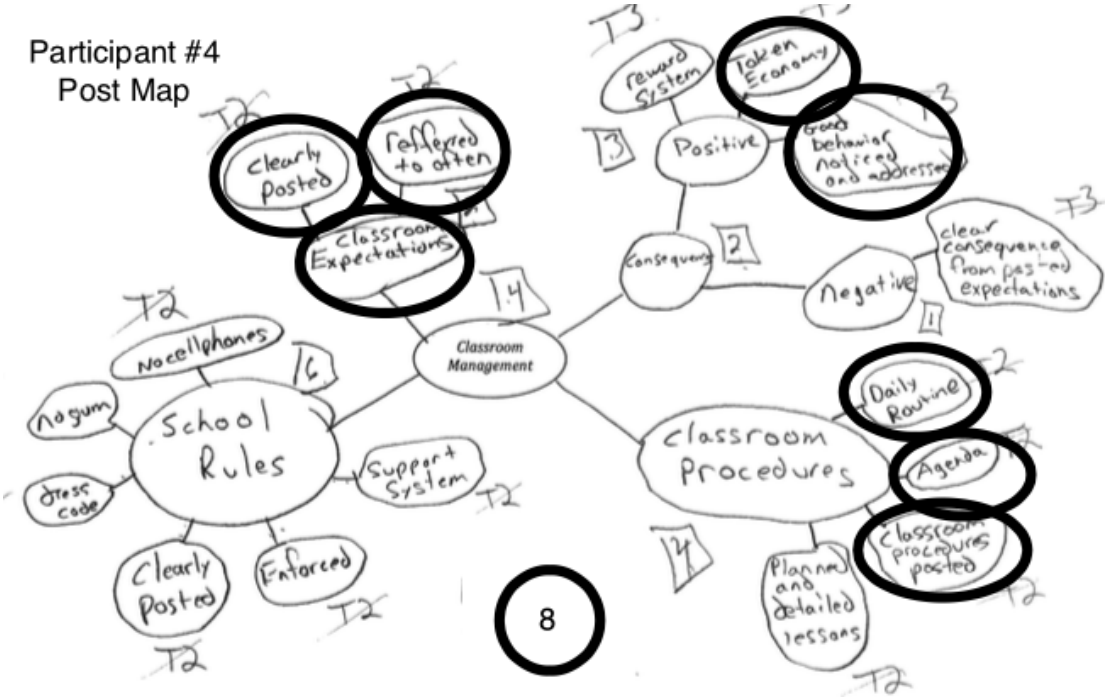
based practices in special education.

After viewing the podcasts and the Evidence-based Podcast Content Guide, each scorer circled the number of times a map referenced one of the eleven strategies. Figure 4 provides a pre and post map illustration of this scoring process.

Figure 4

Sample scored pre and post map





After completing the evaluation of each map and conferring over differences, the results identified by the three scorers were used to establish a table of frequency. Table 5 provides the frequency with which individuals reference each of the eleven strategies presented in the three podcasts. The table is organized by the order in which the strategies were presented to participants.

The initial concept maps referenced the evidence-based practices taught in the intervention, 34 times. The follow-up concept map produced after the intervention had a frequency of 61 references to the intervention concepts. These results suggest that while there was little change in the depth and breadth of the maps, the content change dramatically with a doubling of the references from the intervention content.

Table 5

Frequency of References to Evidence-based Practice

Intervention Content	Concept map 1 Pretest	Concept map 2 Posttest
Environment	1	1
Routines	14	13
Explicitly teach expectations	9	15
Prompting desirable behaviors	0	0
Active supervision	0	0
Opportunities to respond	0	1
Explicit instruction	0	2
Behavior specific praise	0	5
Reinforcement systems	9	17
Decreasing unwanted behavior	0	2
Performance feedback	1	5
Total	34	61

Finally, the concept maps were sorted using the three-level background code and assessed for mean differences to understand any differences that may be associated with prior experience. The results of the background level sort suggest that no matter what the prior background experience, the intervention has a similar impact as all participants increased their occurrence of evidence-based practices referenced by a mean of 2.43.

The concept maps provided data suggesting that the podcast-aided video-analysis intervention altered the schema of each of the participants.

Framework Supports

This study is grounded in the idea that by providing an individual with concrete examples from their classroom they will be able to relate their own experiences with the concepts introduced via the enhanced podcasts. By making these connections, the teacher will connect with the content knowledge gained from the university rather than simply using their prior experience as a student or teacher.

A recurring comment during the interview process was the podcast inspiring the participant to think back to content learned in the summer course or previous university classwork. Two individuals specifically mentioned a connection to the work completed during their summer course, "I remembered sort of one of some topics that we had learned about in our classes during the summer, just some of those classroom management strategies worked for me" and "We talked about this summer as well but it was a good reminder to myself."
One individual made reference to their undergraduate training saying, "It brought me back to what I was taught in my undergrad."

In addition to the ability to connect to prior university instruction, teachers reported benefit from the relationship between the Teaching Video and the podcast.

> "I didn't only reflect on the podcast but also on my video at the same time so there was a link between the two of them. It was relevant to my situation."
>
> "I looked at what I had done and then I looked at what the lady had done on the podcast. Then I said, 'I probably could have done that strategy here, or probably could have done it here in the different areas of teaching.' At the time, you never thought of it until you

watch the podcast, and you're like, 'Okay, yes. That's what good teachers do, but I forgot to do that.'"

"I think you absolutely needed to watch a video about yourself before you're work in a podcast because I don't think it would've brought to light some of the things that you were doing while you were teaching. I think that it ended up having you focused on how you were delivering the instructions because you had-- then you're focusing on how she was delivering her instructions and her priorities with the math or whatever it was or the behavior."

These comments support the design of this study and the combination of these two technology driven strategies to support teacher development.

Discussion

Overall, the 12 special education intern teachers were able to implement evidence-based practices learned from the podcast and demonstrated a shift in their schema of classroom management. Although one participant commented that the podcast seemed to be designed for teachers of younger students, the placement factors of grade levels taught and type of classroom setting did not appear to influence these results.

Analyzing the reflection prompts and the final interviews provided evidence to demonstrate the implementation of evidence-based practices by each participant. The mean increase of reference to evidence-based practices from 1.08 on the initial reflections to 2.00 on the final reflection supports this finding. Further, interview responses provided greater detail as to the implementation and success of strategies attempted.

The pre and post concept maps were a vital tool in evaluating the changes in participant schema of classroom management. The size of the concept maps decreased from a mean of 23.50

for the pre-assessment to a mean of 19.58 for the follow-up map. The average length of the branches changed little from a mean of 2.24 to a mean of 2.16. These minor changes suggest that the depth and breadth of the schemas expressed in maps 1 and 2 are similar. While the data suggests maps of similar depth, important in this study is the change in content from 44 mentions of evidence-based strategies to 88 references. The results suggest that the size of the participant's schema was not altered, but the content of the schema was changed to reflect the content provided by the intervention.

Limitations

The intervention had a number of limitations. The composition and size of the convenient sampling limits the ability of this study to generalize to other populations. Asking teachers to view themselves on video created another limitation in both comfort with technology as well as seeing oneself on film. While results were coded by participant number and efforts were made to maintain confidentiality, the format of this study required the participants to identify themselves. This too creates a limitation in this study. Finally, the enhanced podcasts used in this study focused on evidenced-based practices without regard for diverse teachers or student populations.

Despite these limitations, the results of this study provide additional data and support for the continued use of, and research on, video-based reflection and multimedia podcasts as a tool for addressing the gap between research and practice.

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