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Opportunities and Challenges in Training Elementary School Teachers in Classroom Management: Initial Results from Classroom Management in Action, an Online Professional Development Program

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Classroom management remains a challenge for many teachers. The approach and delivery of professional development (PD) in classroom management may determine how well teachers are able to apply evidence-based approaches in their classrooms. We use existing literature to identify the key features that make in-service PD effective and present them as the defining features of a recently developed PD program, *Classroom Management in Action,* which blends online technology, evidence-based practice in positive behavior support, video modeling, self-paced/step-by-step activities, and tools for aiding and measuring fidelity and behavioral outcomes. We report results from studies documenting the program's

social validity, the psychometrics of its online behavioral assessment tool, and its effectiveness based on an initial pilot test using a randomized controlled field trial involving 101 classrooms. We offer recommendations for future research on PD in classroom management and implications for policy and practice.

Professional development (PD) in classroom management is often assumed to occur in the context of school-wide discipline trainings, such as school-wide positive behavior support (Sugai & Horner, 2002). Training delivered within this context tends to (a) be offered as full-day in-service trainings covering large amounts of content, (a) rely on "stand and deliver" presentations that lack the modeling and exemplars teachers need in order to put recommended strategies into action, and (c) be delivered in person at high cost (Birman, Desimone, Porter, & Garet, 2000; Darling-Hammond & Richardson, 2009; Joyce & Showers, 2002). For example, personnel in schools adopting school-wide behavior support approaches commonly attend a day-long training that often focuses on systemic components rather than specific classroom management practices (Barrett, Bradshaw, & Lewis-Palmer, 2008; Reinke, Herman, & Stormont, 2013), is usually delivered via PowerPoint presentations (Joyce & Showers, 2002), and can involve fairly high trainer and travel costs (Blonigen et al., 2008). The pervasiveness of this PD delivery format is unfortunate given that classroom management training that is delivered in small and easily digestible doses, focused on modeling and practice, and is easily accessible and affordable could potentially provide teachers with the knowledge necessary to create classrooms where students can succeed academically as well as behaviorally (Birman et al., 2000).

Effective classroom management has been identified as a key predictor of student success. Students in well-managed classrooms tend to be more academically engaged (Stronge, Ward, Tucker, & Hindman, 2007), have higher academic achievement (Anderson, Evertson, & Brophy, 1979; Good & Grouws, 1977), and have fewer behavioral problems (Stronge et al., 2007) compared to students in poorly managed classrooms. Most importantly, students in well-managed classrooms are less likely to lose valuable instructional time when excluded from the classroom due to behavioral problems (Skiba & Knesting, 2001; Skiba, Peterson, & Williams, 1997). Effective classroom management also has clear benefits for teachers. It has been identified as key in reducing teacher stress and burn-out (Brouwers & Tomic, 2000). In a recent study, teachers with little classroom manage-

ment training were more likely to report stress due to student inappropriate behavior than teachers who had received training (Alvarez, 2007). The reciprocal benefits of teacher fluency in classroom management and student outcomes have also been shown: Teachers' sense of self-efficacy in creating well-managed classrooms has been associated with greater student achievement (Ross, 1992; Woolfolk Hoy, Davis, & Pape, 2006).

Inappropriate student behavior resulting in chaotic classrooms remains a major challenge for teachers. A recent survey of high-performing teachers (i.e., teachers who had recently received or been nominated for a formal award) showed that 40% of respondents ranked students with behavioral challenges among the top three barriers to effective teaching (The New Teacher Project, 2013). Based on these data, it appears that much remains to be done to provide teachers with adequate training in classroom management to effectively respond to inappropriate student behavior in the classroom.

The key components of effective classroom management have been known for decades (Brophy, 2006; Emmer & Stough, 2001; Evertson, 1994; Gilbert & Lignugaris-Kraft, 1997; Jones & Jones, 1986; Sugai & Horner, 2002; Walker, Colvin, & Ramsey, 1995). Effective classroom management comprises the physical layout of the classroom (Colvin, 2002; Weinstein, Romano, & Mignano, 2010), and the teacher's ability to prevent and respond to student behaviors that interfere with instruction. The following evidence-based classroom management practices have been identified: (a) defining the rules and proactively teaching appropriate behavior (Flay & Allred, 2003; Greenberg et al., 2003; Greenwood, Kratochwill, & Clements, 2008; Sugai & Horner, 2002), (b) responding quickly and effectively to low-intensity inappropriate behavior with pre-correction or mild consequences (DePry & Sugai, 2002; Kern & Clemens, 2007), (c) delivering appropriate levels of behavioral support to students with varying support needs (Lane, 2007; Severson, Walker, Doolittle, Kratochwill, & Gresham, 2007), and (d) ongoing collection and use of screening and progress-monitoring data to assess students' support needs (Brown-Chidsey & Steege, 2005; Lane, Menzies, Oakes, & Kalberg, 2012; Shinn, 2008).

Unfortunately, this knowledge base of effective classroom management has yet to be transferred into actual classroom practice. Therefore, attention needs to focus on effective PD that achieves this transfer of knowledge into practice (Abbott, Walton, Tapia, & Greenwood, 1999; Carnine, 1997). Transfer of knowledge into practice occurs either through increasing the practitioner's awareness of an abstract principle and ability to access that awareness for problem-solving in actual situations, or through extensive

practice of specific behaviors so that those behaviors become automatic given specific environmental stimuli (Perkins & Salomon, 1989). The key components of effective PD for teachers have been identified in the literature and echo both of these mechanisms. First, the evidence-base from which the training content is derived needs to be presented to enhance awareness; second, the training should provide demonstrations of the content; third, teachers need to have the opportunity to practice and receive feedback to build automaticity in their responding; and fourth, teachers should receive coaching in the classroom to implement and sustain the learned practice (Birman et al., 2000; Darling-Hammond & Richardson, 2009; Joyce & Showers, 2002).

Critical of current delivery approaches commonly consisting of isolated and resource intensive (e.g., time, costs) workshops with lecture-type delivery of content, researchers point out that a change in practice is not an "event," but rather a process involving ongoing training, modeling, monitoring, practice, and feedback, which might be assisted by technology (Birman et al., 2000; Hall & Hord, 2001). This process can be facilitated through blended learning, which combines access to content with self-paced instruction and practice (Yeh, Huang, & Yeh, 2011).

Within this context, we first present the key components of *Classroom Management in Action*, an online PD program conceived to effectively translate research into practice. Second, we present outcomes from initial studies to evaluate the program's effectiveness on increasing teacher knowledge and use of classroom management strategies, as well as on changing student behavior. Finally, we contextualize our findings within a discussion of potential future directions for maximizing the effectiveness of online PD in classroom management.

DEVELOPMENT OF THE CLASSROOM MANAGEMENT IN ACTION PROGRAM

In response to the need to improve delivery of classroom management training, we developed an online teacher training program designed for elementary school teachers called *Classroom Management in Action* (*CMA*). Our primary goal in developing the *CMA* program was to bridge the research-to-practice gap by building on recommendations from the literature as well as formative research with the intended consumers of the program (i.e., teachers). Our studies focused on translational research conducted by a multidisciplinary team consisting of content experts, coaches, and media developers. Initial evaluation occurred in authentic settings to assess the extent to which research knowledge translates into practice.

Program Description

The *CMA* program consists of three modules: Module 1, *Classroom Management in Action*, Module 2, the *iris Progress Monitoring Tool (PMT)*, and Module 3, *How to Use the PMT and CMA*. These modules present information through video, an interactive on-line planning tool, and downloadable printed summaries of strategies and tip sheets.

Module 1, *Classroom Management in Action,* contains three sections that map onto the classroom management practices identified as evidence-based in the literature: (a) planning and organization, (b) proactive prevention of problem behavior, and (c) responding to problem behavior. Each of these sections has the following key components, *Coaches Corner*, *Skill Videos*, and *My Action Plan*. The *Coaches Corner* features narrative video segments that review classroom footage to identify a classroom management problem and suggest a practice most likely to alleviate it. The *Skill Videos* offer a three to five-minute "how-to" for 15 evidence-based practices derived from the literature (Colvin, 2002; Weinstein et al., 2010). The *My Action Plan* component provides teachers with an interactive template for transferring what they just learned into their own classroom practice.

Module 2, the *iris Progress Monitoring Tool (PMT)*, provides teachers with a tool to assess their students' responsiveness to the classroom management strategies they implement. The *PMT* allows teachers to screen their entire classrooms and progress monitor individual students in an efficient manner (Marquez et al., 2014; Marquez, Yeaton, & Vincent, 2013; Pennefather & Smolkowski, 2014). The measure housed in the *PMT* is the Elementary Social Behavior Assessment (ESBA), which was derived from decades of research focused on identifying observable and measurable behaviors that teachers associate with successful students, such as following teacher directions, making assistance needs known, and getting along with peers (Hersh & Walker, 1983; Walker, 1986; Walker & Rankin, 1983; Walker et al., 2015).

Module 3 of the *CMA* Program provides multi-media training to teachers on making data-based decisions. It focuses on applying the response-to-intervention (RtI) logic to classroom management: teacher efforts in classroom management need to be intensified or maintained based on student behavior. It also guides teachers to make decisions regarding the support needs of students with significant behavioral challenges who jeopardize the teacher's efforts to deliver instruction as well as their own and their peers' learning.

Formative Research During Development

To precisely tailor the content and delivery mode of Modules 1 and 2 to the needs of teachers, we conducted five focus groups. The first group consisted of nine elementary school educators from Oregon and was held early in the Module 1 and 2 development process to inform the content. The second group consisted of 29 elementary school educators from Oregon and was held during the Module 1 and 2 development process to inform the content and presentation. The third group consisted of nine elementary school educators from Oregon and was held later in the Module 1 and 2 development process to inform the content and presentation. The fourth group consisted of eight parent volunteers from Oregon to inform content and presentation for Module 1 and 2. And the fifth group was conducted via WebEx and consisted of four elementary school staff recruited nationally to inform Module 1 and 2 content and presentation. Focus group participants represented urban and rural school districts with 37.8% to 65.3% of students eligible for free or reduced lunch, and 20.7% to 32.3% minority enrollment, with Latino students representing the largest minority group.

Focus group discussions were driven by questions about the (a) significance of the program's goals, (b) appropriateness of the instructional procedures, (c) perceived effectiveness of the program, and (d) overall importance of the program. The moderators also gathered information about usability, specifically about the length, frequency and intensity of training components. Focus group participants provided ample feedback and context that guided the development of *CMA* Modules 1 and 2 and maximized their fit with teachers' authentic needs and work environments.

INITIAL EVALUATION OF CLASSROOM MANAGEMENT IN ACTION

Our initial evaluation of *CMA* consisted of three studies. Study one evaluated the social validity of *CMA*, study two examined the psychometric properties of the ESBA delivered via the PMT, and study three evaluated the effectiveness of *CMA* to improve teacher and student outcomes.

Study One: The Social Validity of CMA

We conducted a single condition pre-posttest study to evaluate the feasibility and acceptability of Module 1 of the *CMA* program, the core compo-

nent focused on engaging teachers in identifying deficiencies in classroom management through the *Coaches Corner* videos, providing models for effective classroom management practices in the *Skill Videos*, and encouraging teachers to translate newly acquired knowledge into practice through use of the *My Action Plan* template.

Sample. Thirty-seven elementary school teachers participated, 32 of whom were female. Most participants (35) taught at schools in the United States; two participants were English language teachers in Thailand. The average teaching experience of participants was 12.32 years.

Procedure. Data collection occurred via a secure website. After providing informed consent, participants completed the following pretest measures: A program specific 13-item Knowledge Test, The Teacher Sense of Efficacy Scale—Short Form (TSES; Tschannen-Moran & Woolfolk Hoy, 2001) and the Technology Acceptance Model questionnaire (TAM; Bagozzi, Davis, & Warshaw, 1992; Davis, Bagozzi, & Warshaw, 1989). The TSES is a 24-item 3-factor scale assessing teacher efficacy for student engagement, instructional practices, and classroom management on a 9-point scale. Internal reliability values for the subscales range from Cronbach's α = .86 to .90, and for the entire scale from Cronbach's α = .92 to .95. Construct validity based on correlations with similar measures has yielded values of r = .45 to .65 (Tschannen-Moran & Woolfolk Hoy, 2001). The TAM assesses respondents' likelihood to use a technology-based tool based on its perceived ease of use and usefulness. The TAM is a widely used measure of technology acceptance and intent to use; it has been empirically tested and found to be a valid instrument (Gefen & Straub, 2000; Venkatesh & Davis, 2000). After completion of the pretest measures, participants were given access to Module 1 of the *CMA* program via the irisEd.com website, and asked to complete the module within the following two weeks. At the end of the 2-week period, participants again completed the Knowledge Test, the TSES and a User Satisfaction Survey. Posttest measures were also completed online.

Results. We conducted paired t-tests to evaluate change in teacher self-efficacy and knowledge from pre to post. The change from the TSES pretest mean (M = 7.41) to posttest mean (M = 7.96) was statistically significant, $t(36) = 3.71$, $p < .001$ (Cohen's d = 0.62). Changes were not predicted by age (p = .161), length of teaching experience (p = .271), level of education (p = .680), or technology acceptance (p = .329). The change in knowledge of classroom management practices from pretest mean (M = 4.13) to posttest mean (M = 5.68) was also statistically significant, $t(36) = 4.95$, $p < .001$ (Cohen's d = 0.82). Social validity ratings based on results from the posttest User Satisfaction Survey were highly positive: 97% of respondents found

CMA easy to use, 94% said they would recommend the study site to a colleague or friend, 86% reported that the program met their expectations, and 81% reported that the training was effective for changing student behavior. Finally, teachers rated the relevance of the classroom management topics presented in *CMA* for their own classroom practices on a 5-point scale. Results indicated that the majority of respondents felt that *CMA* was relevant for responding to aggressive students (89%), attention-seeking students (87%), and bullying behaviors (86%). Practices for responding to attention seeking behaviors were rated as most useful ($M = 4.32$).

Study Two: Psychometric Properties of the Elementary Social Behavior Assessment (ESBA)

We examined the content validity, reliability, and construct validity of the 12-item ESBA. This evaluation built on the rigorous research conducted by Walker and colleagues over several decades (Hersh & Walker, 1983; Walker, 1986; Walker & Rankin, 1983; Walker et al., 2015) which led to the identification of 56 adaptive behaviors that teachers associated with overall school success. Our intent was to develop a scale that would consist of fewer items without compromising the accuracy of the construct measured.

Samples. Content validity was evaluated with focus groups consisting of teachers, administrators, school personnel and parent volunteers as described above. We conducted reliability and validity testing of the ESBA with a sample of nine elementary school teachers and their students ($n = 187$).

Procedures. We tested both internal consistency and test-retest reliability at eight weeks. To evaluate the construct validity of the ESBA, we correlated ESBA scores with the Walker-McConnell Scale of Social Competence and School Adjustment—Elementary Version (WMS-EV; Walker & McConnell, 1995). The WMS-EV consists of three subscales: teacher-preferred behaviors, school adjustment behaviors, and peer-preferred behaviors. Finally, we conducted exploratory factor analysis and examined the social validity of the ESBA by asking study participants to complete a short consumer satisfaction survey (Riley-Tillman, Kalberer, & Chafouleas, 2005).

Results. Focus group and interview participants rated the content of the ESBA items as satisfactory and suggested only minor changes in wording. The internal consistency of the ESBA was high, with Cronbach's $\alpha = .95$. Correlations between the ESBA and the total WMS-EV scale were statistically significant, $r = .84$, $F(1, 185) = 434.9$, $p < .001$. Similarly, correlations

between the ESBA and the WMS-EV subscales were statistically significant: teacher preferred behaviors: $r = .84$, $t(185) = 20.7$, $p < .001$; school adjustment behaviors: $r = .83$, $t(185) = 20.0$, $p < .001$; and peer-preferred behaviors: $r = .73$, $t(185) = 15.5$, $p < .001$. Exploratory factor analysis yielded a single-factor solution that accounted for 66.6% of the variance, with item-factor coefficients of .54 or greater. Results of the consumer satisfaction survey indicated that participants valued the tool's efficiency most: Screening an entire classroom with the ESBA took 15 to 20 minutes, compared to 60 to 100 minutes using the WMS-EV. For a more extensive evaluation of the ESBA's psychometric properties, see Pennefather and Smolkowski (2015).

Study Three: Effectiveness of CMA to improve teacher and student outcomes

We conducted a randomized controlled trial to evaluate the extent to which *CMA* implementation (a) taught teachers evidence-based classroom management skills, (b) increased teacher self-efficacy, (c) improved student behavior, (d) was feasible in authentic elementary school classroom settings, and (e) was deemed socially valid by its intended users. Data were collected at three points in time: at pretest, at posttest (15 weeks after pretest), and at follow-up to assess skill maintenance (15 weeks after post-test).

Sample. A total of 101 teachers who taught 1st through 6th grade in elementary school settings and their students ($n = 1894$) participated. The majority of participating teachers were female ($n = 78$) and White ($n = 77$). The majority of participants taught multiple grade levels. The average teaching experience was 13.6 years; 61% of teachers had a graduate degree. Study participants were recruited from school districts located in seven states representing the Pacific, Mountain, Midwestern, and Southern regions of the United States. Because we did not collect individual student data, we cannot report student demographics for our sample. However, participating districts had highly ethnically and racially diverse student populations.

Procedure. After providing informed consent, teachers in both conditions completed the following pretest measures: the TSES (see above), the ESBA to assess student behavior (see above), a 31-item program specific Knowledge Test, and the My Class Inventory for Teachers (MCIT; Sink & Spencer, 2007). The MCIT consists of 30 items measured on a Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Internal reliability of the scale was Cronbach's $\alpha = .73$ at pretest, .70 at posttest, and .74 at follow-up. We used MCIT scores as a covariate to control for the pre-existing classroom environment.

At pre-test, participants were randomly assigned to the intervention or control condition. A total of 47 teachers were assigned to the intervention condition and 54 were assigned to the control condition. No matching criteria were used. After completion of the pre-test assessment, participants in the intervention condition were given access to all *CMA* Modules. Intervention teachers were asked to access one Skill Video per week and implement the learned skill in their classroom over a total intervention period of 15 weeks. Fidelity of implementation was assessed via weblogs reflecting participants' access of and navigation patterns through the online materials and self-report checklists submitted at posttest. Based on these data, of the 47 teachers in the intervention condition, 34 completed the posttest assessment, and 27 completed the follow-up assessment. Of the 54 teachers in the control condition, 49 completed posttest assessments and 44 completed follow-up assessments. Thus, our attrition rate at posttest was 18%, and at follow-up 30%.

At posttest, all participants completed the same measures as at pretest. Teachers in the intervention condition also completed a Consumer Satisfaction survey. At follow-up, participants completed the same measures as at pretest, in addition to a 16-item scale to assess Behavioral Intention. The Behavioral Intention measure used a 5-point Likert scale ranging from 1 = "definitely will not" to 5 = "definitely will" to evaluate teachers' intention to implement a learned classroom management practice. The measure showed good internal reliability with Cronbach's $\alpha = .82$.

Results. We conducted Analysis of Co-variance (ANCOVA) with condition as factor and controlling for pretest when appropriate. To assess equivalency of groups at pretest, we conducted a series of t-tests and a Chi-Square test and found no statistically significant difference between groups in teacher age , $t(81) = -0.3$, $p = .75$, teaching experience, $t(73) = -0.6$, $p = .56$, and level of education, X^2 (2, $n = 83$) = 4.5, $p = .21$.

Of greatest interest to us was the condition effect at posttest and follow-up. Table 1 summarizes condition effects and effect sizes from pretest to posttest. At posttest teachers in the treatment condition showed statistically significant improvement in knowledge of classroom management practices $F(1,80) = 6.74$, $p = .011$. At posttest, teachers in the treatment condition also showed statistically significant improvement in self-efficacy when controlling for pretest scores, $F(1,80) = 8.83$, $p = .004$. Program specific self-efficacy did not differ across conditions at posttest, $F(1,80) = 2.82$, $p = .097$. Student behavior at posttest did not differ across conditions, $F(1,79) = 1.33$, $p = .252$. We achieved medium effect sizes for teacher knowledge and self-efficacy, and small effect sizes for program-specific self-efficacy and student behavior.

Table 1

Pretest and Posttest Descriptive Statistics and ANCOVA Results for Condition Effects

Measure / condition	Pretest *M* *(SD)*	Posttest *M* *(SD)*	*F* test	*p*-value	Partial *Eta*^{2}
Teacher Self-Efficacy (TSES)			8.83	.004	.099
Treatment	7.15 (0.80)	7.49 (0.63)			
Control	7.12 (1.13)	7.04 (0.92)			
Program Self-efficacy			2.82	.097	.034
Treatment	6.90 (0.83)	7.44 (0.79)			
Control	6.83 (1.07)	7.09 (1.03)			
Knowledge					
Treatment	NA	13.50 (1.80)	6.73	.011	.077
Control	NA	12.33 (2.23)			
Student Behaviors			1.33	.252	.016
Treatment	2.62 (0.18)	2.75 (0.16)			
Control	2.61 (0.26)	2.71 (0.18)			

Note. Analyses controlling for pretest (if applicable). $N = 83$; 34 Treatment and 49 Control participants. Univariate F-test $df = 1, 80$. Eta-square of .14, .06, and .01 are considered large, medium, small effect sizes, respectively (Cohen, 1988).

Table 2 summarizes condition effects and effect sizes from pretest to follow-up. At follow-up, teachers in the treatment condition maintained a statistically significant improvement in knowledge of evidence-based classroom management practices, $F(1,67) = 9.88$, $p = .002$. Teachers in the treatment condition also maintained a statistically significant improvement in self-efficacy when controlling for pretest scores, $F(1,67) = 5.68$, $p = .020$. Finally, at follow-up, student behavior in the treatment condition improved more than student behavior in the control condition, although the difference between conditions did not reach statistical significance, $F(1,67) = .98$, $p = .325$. The condition effect on behavioral intention to implement the learned skills was statistically significant, $F(1,67) = 4.08$, $p = .047$, reflecting participants' desire to implement what they learned. We achieved a large effect size for knowledge change, a medium effect sizes for self-efficacy and behavioral intention, and a small to medium effect size for program-specific self-efficacy. The effect size for change in student behavior was small.

Table 2

Pretest to Follow-Up Descriptive Statistics and ANCOVA Results for Condition Effects

Measure / condition	Pretest *M* *(SD)*	Follow-Up *M* *(SD)*	*F* test	*p*-value	Partial *Eta*^{2}
Teacher Self-Efficacy (TSES)			5.68	.020	.078
Treatment	7.15 (0.80)	7.40 (0.65)			
Control	7.12 (1.13)	7.00 (0.85)			
Program Self-efficacy			2.69	.106	.039
Treatment	6.90 (0.83)	7.46 (0.68)			
Control	6.83 (1.07)	7.18 (0.91)			
Knowledge			9.88	.002	.127
Treatment	NA	13.67 (1.21)			
Control	NA	12.39 (1.40)			
Behavioral intentions			4.08	.047	.057
Treatment	NA	4.71 (0.21)			
Control	NA	4.57 (0.34)			
Student Behaviors					
Treatment	2.62 (0.18)	2.77 (0.16)	0.98	.325	.014
Control	2.61 (0.26)	2.70 (0.23)			

Note. Analyses controlling for pretest (if applicable). $N = 71$; 27 Treatment and 44 Control participants. Univariate F-test $df = 1, 67$. Eta-square of .14, .06, and .01 are considered large, medium, small effect sizes, respectively (Cohen, 1988).

Ratings on the Consumer Satisfaction Survey were overwhelmingly positive, with 100% of respondents indicating that they were satisfied with the quality of the training, and 88% indicating that they would recommend the program to other educators. Table 3 summarizes consumer satisfaction ratings. Qualitative feedback from study participants in the intervention condition included appreciation of the focused and easy-to-remember training videos: "I liked the video clips that showed teachers using the strategies. Also, the ideas were short and sweet (the 2-step), which made them easy to remember when I was engaged with a student." Participants also noted increased awareness of the constant need to self-evaluate:

> It reminded me of things to reevaluate. I became more conscientious of my strengths and weaknesses. Some strategies I did natu-

rally and others I needed to tweak in order to be a more efficient classroom manager. I loved the videos. I am visual and hands on. The videos allowed me to see the actual behaviors and a resolution that is applicable and efficient. This is the best classroom management training I have ever had.

Table 3

Means and Standard Deviations (SD) for Consumer Satisfaction Items

Item	Mean	*SD*
Overall, I was satisfied with the quality of this training.	6.00	1.10
I was satisfied with the quality of the information.	5.09	1.06
The training met my expectations.	4.94	1.01
I would recommend the program to other educators.	4.85	1.13
The training content was well organized.	5.24	1.18
It was easy to understand the ideas presented in the program.	5.32	1.20
I agree with the ideas presented in the program.	5.09	1.39
I am likely to use many of the strategies described in the program.	5.18	1.11
The program was engaging.	4.85	1.13
It will be easy for me to implement this approach.	4.94	1.13

DISCUSSION

The primary goals of our studies were to evaluate the extent to which *CMA* implementation (a) taught teachers evidence-based classroom management skills and thereby increased their sense of self-efficacy, (b) improved student behavior, and (c) was perceived as socially valid by teachers. Results indicated that use of *CMA* improved teachers' knowledge of evidence-based classroom management practices as well as their sense of self-efficacy, and that those improvements maintained at follow-up. Consistent with the literature, *CMA's* blended learning approach led to increased knowledge of classroom management practices (Yeh et al., 2011) and increased sense of efficacy (Woolfolk Hoy et al., 2006). Improvements in student behavior emerged only at follow-up and were statistically non-significant. As the literature suggests, the benefits of changed teacher practices on student behavior take time to materialize and tend to emerge only when teachers have gained fluency with the newly learned skills (Sugai & Horner, 2002). While we were unable to document statistically significant improve-

ments in teacher-reported student behavior, student behavior in the intervention condition improved at each measurement occasion, while student behavior in the control condition improved slightly from pretest to posttest and then declined minimally from posttest to follow-up. With an extended timeline, continuous improvement in student behavior might have reached statistical significance.

The strong social validity ratings of *CMA* suggest that teachers resonated with the program's content and found its delivery relevant to their needs. The formative research we conducted to carefully shape program content, presentation, and delivery likely contributed to its social validity, a prerequisite for program adoption (Elmore, 2002).

The results of our studies need to be interpreted in the context of a number of limitations. First, because much of our work focused on program development, our studies to test *CMA's* feasibility and effectiveness were conducted with small samples and therefore underpowered. At follow-up, the test of teacher knowledge had adequate power (.873), while power for the other tests ranged from .652 (teacher self-efficacy) to .164 (student behavior). Adequately powered follow-up studies will be necessary to confirm our outcomes. Second, given the complexity of acquiring and implementing classroom management skills, the duration of our small-scale effectiveness trial might not have been sufficient to produce statistically significant change in student outcomes. Third, because of the limited scope of our studies, we were unable to assess how outcomes vary across school-level variables, including percent of minority enrollment, percent of students on free and reduced lunch, percent of students who are English language learners, or urbanicity. Fourth, although direct observation is the gold standard for assessing fidelity of implementation or changes in teacher and student behavior (Hintze, Volpe, & Shapiro, 2002), the limited resources available for our study did not allow us to conduct direct observations. Instead, we relied on web-logs and checklists completed by participants to assess program implementation and teacher reported change in student behavior. Finally, study three had unusually high attrition rates, which further reduced sample sizes.

Despite these limitations, our findings offer useful insights into potential approaches to effective delivery of PD in classroom management and guidance for future research. The literature clearly recommends that PD for teachers (a) offer knowledge in easily digestible doses, (b) be interactive to promote transfer of knowledge, and (c) be accessible and affordable. The use of technology appears to facilitate translating these recommendations into practice. Teachers could pace their progression through the *CMA* curriculum according to their own learning speed, as long as they accessed one

skill lesson per week. They could complete the lesson in one sitting or in several sittings, and they could go back and watch the skill videos repeatedly to solidify their understanding of the key components of the classroom management practice. This self-paced learning is difficult to achieve in face-to-face workshops that can inundate teachers with information without giving them time to process it.

Interactive engagement with content to promote transfer of knowledge into practice can also be facilitated through the use of technology. The *My Action Plan* component of *CMA* encouraged teachers to take stock of their current practices and set realistic goals for improving their practices. However, this level of interaction might not have been sufficient to keep teachers engaged. The relatively high attrition rate in study three suggests that teacher engagement faded over time. For maximal transfer of knowledge into practice the literature recommends job-embedded training, which blends technology-based content learning with coached practice through on-site professional learning communities (Birman et al., 2000; Huffman, Hipp, Pankake, & Moller, 2014; Joyce & Showers, 2002). Completing PD in classroom management together with their colleagues might motivate teacher to stay engaged. Thus, *CMA* made available to professional learning communities and in conjunction with on-site or on-line coaching might increase user retention and possibly strengthen its effectiveness.

The on-line availability of *CMA* makes PD in classroom management easily accessible and affordable. High costs associated with trainer fees and travel can make PD in classroom management inaccessible to many teachers (Blonigen et al., 2008). In the context of ever-shrinking school budgets as well as the training needs of teachers in geographically remote schools, the use of technology becomes an important tool to provide needed training.

Based on our findings, we can suggest the following recommendations for future research on PD in classroom management. High social validity of PD programs is a prerequisite to their adoption. Teachers tend to rate PD programs as socially valid and practically useful if the program content is relevant to their own needs. One potential way to maximize relevance of PD in classroom management is to use student behavioral data as a motivator for teachers to engage in classroom management training. For example, rather than using student behavior as an *outcome* measure of the effectiveness of a classroom management training program, it could very well serve as a *diagnostic* measure of a teacher's training need. Specific deficits in student behavior could point towards specific deficits in a teacher's classroom management. Based on these student data, PD in classroom management could then be specifically tailored to teachers' needs. Teachers might perceive individually tailored training as more relevant.

Keeping teachers engaged in the training is imperative for the training to be of practical value to them. Our study participants valued the use of visually appealing videos featuring authentic classroom settings and presenting management strategies in a concise manner. Integrating video technology into classroom management training, as recommended by the literature (Birman et al., 2000), and a focus on blended learning (Yeh et al., 2011) might increase the perceived practical value of PD in classroom management. In study three, we found that participants in the intervention condition scored significantly higher on the behavioral intention measure than participants in the control condition, indicating that teachers exposed to the *CMA* program intend to apply classroom management practices to a larger extent than those who were not exposed to the program. This finding suggests that *CMA* was perceived not only as relevant, but also practically applicable.

Maximizing cost-effective access to PD appears increasingly important. While an Internet connection was the only requirement to access *CMA*, the program could be made even more accessible with future developments of a web-based app that teachers could download to various mobile devices. Delivered via mobile app, *CMA* could be accessed from anywhere at any time. Mobile technology might also promote interactions between individuals engaged in PD and help create mobile professional learning communities that are not defined by geographic space (Kukulska-Hulme & Pettit, 2008).

The ultimate reason for teachers to access PD in classroom management is improvement in student behavior (Brouwers & Tomic, 2000). Teachers are likely to avail themselves of PD opportunities only if the program has been shown to result in positive changes in student behavior. To improve the effectiveness of PD in classroom management on student behavior, it might be useful to intervene simultaneously with teachers and students. While teachers learn classroom management strategies, students could receive instruction in social skills (e.g., Marquez et al., 2014). This two-pronged approach to creating orderly classrooms conducive to learning would suggest that teachers as well as students are accountable for creating classrooms where teachers can teach and students can learn.

IMPLICATIONS FOR POLICY AND PRACTICE

As a rule, most practitioners are not offered meaningful opportunities to acquire classroom management skills (Reinke et al., 2013). A recent review of teacher training programs conducted by the National Council on Teacher Quality found that, although classroom management is a nominal

part of most teacher training programs, instruction in classroom management strategies tends to be non-research based, lacking in practice opportunities, and dispersed over multiple courses (Greenberg, Putnam, & Walsh, 2014). Making classroom management an essential educational practice that is research-based and reflected in educational policy is therefore of the utmost importance.

The outcomes of our studies have a number of implications for policy makers as well as practitioners. Educational policy is largely driven by teacher accountability for improving measurable student outcomes, most notably disciplinary referrals (e.g., suspensions and expulsions) and test performance, often measured at the whole school level. Classroom management is commonly considered a tool to change teacher behavior to achieve these desirable outcomes, and policy makers tend to evaluate the utility of classroom management trainings by the student outcomes they produce (Hickey & Shafer, 2006). Our studies have shown that intermediate teacher-level outcomes, such as teacher sense of self-efficacy, teacher knowledge of specific practices, teacher intention to use those practices, and satisfaction with classroom management training are critical in increasing and sustaining teachers' capacity to change their classroom behavior and practices to ultimately improve student outcomes.

Our results imply that classroom management training is both a cognitive and a behavioral process that needs to be carefully aligned with teacher needs. Rather than making specific evidence-based practices central to our training, we make authentic classroom situations necessitating specific evidence-based practices the center of our training. Video scenarios engage teachers on a cognitive level by allowing them to recognize themselves in a given situation and by providing them with the rationale for *why* a specific practice is important. This emphasis on cognitive engagement resonated with teachers and motivated them to learn. Policy makers concerned with integrating classroom management into teacher pre-service and in-service trainings might consider a focus on cognitive-behavioral approaches to classroom management training.

Successful educational policy needs to be contextually flexible (Huffman et al., 2014). Teachers operate in a vast variety of contexts, and contextual variables impact teachers' access to as well as motivation to engage in classroom management training. Among these contextual variables are their perceived need to acquire specific classroom management practices as well as the collegiate and institutional support in acquiring those practices. Our results implied that the motivational effectiveness of authentic video scenarios is limited. Further motivation for teacher to engage in classroom man-

agement training can come from student behavioral data from a teacher's classroom. Integrating student behavioral data as a diagnostic tool to assess a teacher's training needs and thereby motivate a teacher to engage in training is likely to contextualize abstract policy within the teacher's immediate environment.

Perhaps most importantly, our studies have shown the importance of closely aligning research, policy, and practice. While education research has resulted in clearly defined evidence-based classroom management practices based on rigorously conducted effectiveness trials (Bradshaw, Mitchell, & Leaf, 2010; Raver et al., 2008), education policy has generalized those research findings into widely applicable recommendations for teacher training to enhance student outcomes (Emmer & Stough, 2001). Practitioners then have to tailor policy recommendations to individual teachers who are accountable for student outcomes (Torjman, 2005). It is often school principals who have to find the delicate balance between the needs of individual teachers and their school's overall performance goals. The needs of individual teachers often go beyond motivation and engagement and include simple logistics like making time for training and accessing training content. Our studies imply that the use of technology can facilitate meeting those needs. Teachers who are motivated to acquire training in classroom management yet do not have the time to attend scheduled trainings are likely to avail themselves of training that is available when they are, that can be accessed from where they are, and that can be completed in several installments rather than one single sitting. Technology appears an important medium to effectively link research, policy and practice.

CONCLUSION

Our development and evaluation of *CMA* has shown that PD in classroom management that is developed in close collaboration with the end users (teachers) as well as firmly rooted in research has the potential to appeal to teachers and engage them in learning essential skills for managing their classrooms. Video technology facilitated engaging teachers in authentic scenarios, promoted their understanding of specific strategies, and made the training accessible. Our initial findings associating *CMA* with improved teacher knowledge of classroom management strategies, improved teacher sense of self-efficacy, and positive trends in student behavior were promising. Further testing of *CMA* might strengthen the evidence of its impact, especially on changing student behavior. Further development might explore

the benefits or mobile delivery of *CMA* and prepare it for use by professional learning communities, an emerging approach to PD for teachers.

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