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ORIGINAL PAPER

Evaluating the Quality of Mindfulness Instruction Delivered in School Settings: Development and Validation of a Teacher Quality Observational Rating Scale

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Abstract

As interest increases in mindfulness in education programs for youth, there is a need to develop reliable measures of the quality of program implementation. This paper describes the development and psychometric properties of a measure that can be used to assess and monitor quality of implementation of mindfulness programs/curricula in typical classroom or out-of-school settings. The Teaching Mindfulness in Education Observation Scale (TMEOS) is a 28-item instrument that integrates qualitative and quantitative aspects of mindfulness instruction. Items focus on procedural adherence as well as aspects of implementation that reflect embodiment during instructional delivery (e.g., alignment with the attitudinal foundations of mindfulness). Reliability and validity data were examined and indicated that the four major scoring domains and key features showed adequate inter-rater reliability and internal consistency. We conclude that observational assessment of multiple dimension of implementation quality, including adherence and process-oriented aspects of implementation such as embodiment, can be reliably used to assess implementation quality of mindfulness programs in education settings. However, adequate preparation and training are critical. Implications and directions for future research are discussed.

Keywords Fidelity · Implementation · Training · Professional development · Coaching · Mindfulness · Schools · Education

Mindfulness-based interventions (MBIs) have grown increasingly popular around the world over the past few decades, generating substantial interest in applications for children and youth (Frank et al. 2013). Recent meta-analyses have suggested that mindfulness-based interventions in education (MBI-ED) hold promise (Burke 2010; Zoogman et al. 2015). However, questions about dosage, frequency, feasibility, acceptability, outcomes, and developmental appropriateness of mindfulness programs remain (Greenberg and Harris 2012; Maynard et al. 2017). Much more research needs to be done to strengthen our understanding of mindfulness interventions in education because programs in current use often suffer from lack of empirical support (Semple et al. 2017). Providing a reliable means of assessing fidelity of program implementation could strengthen this body of research, support instructor training, and contribute to program improvement (Durlak 2016; Gould et al. 2014).

Assessing implementation fidelity requires attention to two major domains: program adherence (e.g., what was done) and quality or process of implementation (e.g., how it was done). Such assessment requires a clear delineation of the core structural and process-oriented components of the program. The quality or process-oriented components are of particular importance in MBIs. Presumably, it is the mindfulness instructor's embodiment of mindfulness in the way s/he conducts the program and interacts with participants that provides the essential model of mindfulness in action (see McCown et al. 2011, 2016).

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Despite the notable exception of a measure of mindfulness teaching quality developed in the UK (Crane et al. 2012), few studies have assessed program implementation in even the most rudimentary way. In a review of three recent literature reviews of research on the effectiveness of mindfulness-based interventions (Chiesa and Serretti 2009; Grossman et al. 2004; Virgili 2013), Harrison (2014) found that very few of the studies reviewed even considered how the amount of mindfulness training an individual underwent (e.g., "dose") related to outcomes. Specifically, only between 11 and 29% of the highest quality studies in the field on mindfulness training (those that met rigorous criteria of validity) examined the question of whether or not program dose was associated with the outcomes of training (Harrison 2014). This is also true in education, where existing research on mindfulness intervention has not addressed implementation quality with respect to MBIs for educators, children, and youth, even at the basic level of dose (see Harrison 2014). At present, there are no published and available assessment measures to assess the quality of implementation for MBI-ED programs. Gould et al. (2014) reviewed 48 yoga and mindfulness reports with youth and found that fewer than 20% assessed any aspect of implementation fidelity beyond participant dosage, and only 4% of studies observed and rated program quality. When included in these studies, program quality was assessed using participant feedback about instructor performance or instructor self-report, not the observed quality of the program implementation.

Being mindful, or intentional and present-focused with compassionate awareness, involves both internal and interpersonal processes. When mindful, one is aware of bodily sensations and habitual, well-practiced patterns of thoughts and emotions as they are occurring. Because present experience is approached with curiosity, acceptance, and nonjudgment, its transitory nature becomes more apparent. Habitual ways of acting and reacting, both in relation to ourselves and to others, become less automatic and limiting. An increased sense of efficacy and the potential for greater discernment may emerge with more freedom for choosing how to respond. Mindful awareness shifts our relationship to everyday life and helps us live more fully in the present. As such, in teaching mindfulness practices to others, core components of the program not only include adhering to the program model, but embodying the attitudinal foundations of mindfulness as well (Kabat-Zinn 1990).

These attitudes and correspondent behaviors represent what many call "embodiment" (Brown et al. 2016; Roeser 2016), and, according to experienced mindfulness instructors, are the fruit of deliberate practice (Crane et al. 2012; Cullen 2011; Jennings 2015; McCown et al. 2011, 2016). Crane et al. (2016) identify "embodiment of foundational mindfulness qualities" as one of the four distinguishing characteristics of MBI instructors. Other characteristics include knowledge of and competency in teaching MBIs, commitment to mindfulness practice, and participation with students in a process of inquiry during the teaching process.

In the more fully developed field of MBIs for adults, exemplary teacher training and certification programs have been developed for well-established interventions like mindfulness-based stress reduction (MBSR; Center for Mindfulness in Medicine, Health Care and Society http://www.umassmed.edu/cfm/) and mindfulness-based cognitive therapy (MBCT; Center for Mindfulness in Center for Mindfulness Research and Practice https://www.bangor.ac.uk/mindfulness/). These training programs include best practice guidelines, supervision, and assessment rubrics, though the use of these assessment rubrics remains rare in existing research studies.

As interest in evidence-based mindfulness programs for youth increases and evidence accumulates for its effectiveness, it will be essential that teachers in schools are trained to a high-quality standard and deliver programs with integrity in order to obtain the desired outcomes, as is the case in adult programs. In addition to the traditional implementation measures of adherence (delivery of program components), instructor embodiment of qualities of mindfulness is seen as a critical component for engaging students in participatory learning in their own lives (Crane et al. 2012; Gould et al. 2014; Kabat-Zinn et al. 2011; Roeser 2016).

For example, it is consistent with the nature of mindfulness to be "in the moment" and to respond flexibly to students at any given point in time, rather than adhering rigidly to a manual (Kabat-Zinn et al. 2011). Indeed, the ability of the instructor to be flexible in responding to the "present moment" of what is unfolding is a core component for MBIs. This issue of being embodied and flexible while at the same time covering the core components of the specified program presents intricate challenges for both instructors and the assessment of implementation. Dobkin et al. (2014) emphasize the importance of maintaining the "heart of the mindfulness intervention" while adapting it for specific populations as well as the need to join with participants in skillfully introducing mindfulness into specific contexts.

In addition to population and contextual issues, if mindfulness is to be integrated in educational settings, it will likely require that universal, school-based programs will be taught by classroom teachers. Training classroom teachers to become mindfulness instructors represents a different set of challenges compared to training mindfulness instructors for adult MBIs. In educational settings, teachers are not clinicians, and programs tend to be simpler and somewhat more directive, befitting younger audiences. In most clinical settings, participants have volunteered and thus have some personal motivation to learn and practice mindfulness skills, whereas in classrooms, children may not be motivated or interested in such skills. Thus, just as context demands developmentally appropriate programs, context also demands non-clinical, alternative ways of training and supporting teachers to deliver MBIs for students. An influential meta-analysis of universal SEL programs (Durlak et al. 2011) showed that school personnel were more effective teachers of

SEL skills compared to outside experts, presumably because of their established relationships with students and ability to generalize the new skills across the classroom day.

In order to assure sustainability of mindfulness-based interventions, it may be necessary for school personnel to be the primary instructors of mindfulness in these settings. If this is so, it raises a number of questions such as (1) what cultivation of their own mindfulness is needed to lead mindfulness with students? (2) what kind of training, supervision, and support is necessary to move teachers toward mindful embodiment, which is unlike most standard educational pedagogy? (3) what kinds of translation can be made to educators to communicate and support the foundational attitudes that appear to be central to embodying mindfulness?

One existing assessment measure with some research support, the mindfulness-based interventions: teaching assessment criteria (MBI:TAC; Crane et al. 2013), offers a springboard for the current measure development and adaptation to classroom teachers and other educators. The MBI:TAC was developed to train and assess clinicians utilizing mindfulness-based cognitive therapy (MBCT), an 8-week program intended to prevent depressive relapse. The MBI:TAC assesses multiple domains including (1) coverage, pacing, and organization; (2) relational skills; (3) embodiment of mindfulness; (4) guiding mindfulness practices; (5) conveying course themes through interactive inquiry and didactic teaching; and (6) holding the group learning environment. Assessments may be made on a single session or the whole 8-week program. The MBI:TAC is used for instructor training purposes, and raters "need to be very experienced mindfulness-based instructors in the particular program (MBCT) they are assessing (R. Crane, personal communication, Jan. 11, 2017)."

Embodiment of mindfulness by the instructor is a critical domain in the MBI:TAC, one of the core features of mindful teaching (Crane et al. 2016) and quite possibly one of the most challenging to translate into observable behavior. Brown et al. (2016) argue that embodiment is not an "add-on" set of behaviors but an authentic reflection of the teacher and the model of presence through which students learn to be mindful themselves. The key quality we are discussing here is not simple "embodiment" but the mindfulness instructor's *embodied presence*, what Rodgers and Raider-Roth (2006) define as "A state of alert awareness, receptivity and connectedness to the mental, emotional, and physical workings of both the individual and the group in the context of their learning environments and the ability to respond with a considered and compassionate next step" (p. 266).

Kabat-Zinn (1990) identified seven foundational attitudes of mindfulness that constitute the cognitive, affective, and behavioral aspects of "embodiment." These attitudinal foundations include non-judgment, patience, acceptance, beginner's mind, trust, non-striving, and letting go. Kabat-Zinn used the term "attitudes" instead of "behaviors" to communicate a manner of approaching *all* experience, including classroom experience, in a way that goes beyond simply describing behavior. However, behavioral descriptors are commonly used in research to operationalize, validate, communicate clearly among various groups, and assess program effectiveness. The developers of the MBI:TAC caution against an overly prescriptive list of specific mindful teaching behaviors, although examples are provided in the manual (Crane et al. 2016). Mindfulness, by definition, requires negotiation of the "tricky territory of daily events as they unfold in a classroom" (Brown et al. 2016, p. 209). Thus, scale developers should attempt a balance of retaining the essence of foundational attitudes as they strive for constructing clear observational code definitions. Crane advises raters to maintain awareness of their own preferences and preconceptions about teaching style because "there is no single way to look embodied" (Crane et al. 2016, p. 8) or to embody mindful presence.

With these considerations in mind, we adapted the basic MBI:TAC structure to construct a teacher rating scale (TMEOS) with a specific focus on the assessment of how well high school health teachers implemented the Learning to BREATHE (L2B) curriculum. Learning to BREATHE (L2B) is a mindfulness-based universal prevention program for adolescents that was designed to be integrated into educational settings and be compatible with school curricula. Learning to BREATHE is designed to help cultivate emotion regulation, attention, and performance, teach stress management, and help students integrate mindfulness into everyday life (see Broderick and Frank 2014; Broderick and Jennings 2012; Broderick and Metz 2016 for reviews). The program includes instruction in the practice of mindful awareness and provides opportunities to practice these skills in a group setting. L2B objectives are explicitly linked to standards for health, counseling, and other professional areas so that the L2B program may be incorporated into existing curricula and assessment plans. Thus, the program was designed for classroom implementation and alignment with secondary school standards, and the goal of this study was to begin to develop a systematic way to assess the quality of such in-school implementations on the part of regular health education teachers.

Six themes, built around the "BREATHE" acronym, form the core of the curriculum which may be adapted for various student groups and may be presented in six, 12, or 18 sessions. Each lesson includes a short introduction to the topic, a choice of activities for group participation and discussion to engage students in the lesson, and an opportunity for in-class mindfulness practice. The core practices of mindfulness-based stress reduction (MBSR), including the body scan, awareness of thoughts and feelings, mindful movement, and loving kindness practices, are adapted for adolescents in the program. In these implementations, health teachers taught an orientation to stress lesson followed by 12 class sessions using selected activities, experiences, and practices in the L2B manual.

The current study describes the development and psychometric evaluation of an observational instrument, the Teaching Mindfulness in Education Observation Scale (TMEOS), which can be used to assess teacher implementation quality when delivering MBIs to youth. A central goal of the rating scale is to take into account unique factors of presenting MBIs in a school setting and to use language that fits the educational context. Although the instrument was developed for a specific MBI, Learning to BREATHE (Broderick 2013), we believe that it can be useful for those who offer other MBIs in educational settings.

Method

Participants

The present study took place in the context of a randomized control trial of Learning to BREATHE (L2B), a manualized mindfulness-based program for adolescents, by public high school teachers. Given the absence of measures to assess implementation quality of MBI in education, we developed a new instrument to assess the "implementation quality" of the L2B program as utilized by high school teachers. Three high school health teachers were observed and videotaped teaching numerous sections of their classes over a 2-year period. Teachers taught the program during their required 11th grade health education class. The various iterations of the L2B program were videotaped and used for the development and validation of the TMEOS. The videos were drawn from three classes of 11th grade students in two large suburban high schools in the northeast USA that were composed of approximately 50% majority (Caucasian) and 50% ethnic minority (mostly African American) students. Consent to participate was obtained from teachers, students, and parents in accordance with university Institutional Review Board procedures and school district policies.

Procedure

Teacher Training

L2B instructors varied somewhat in their degree of prior personal mindfulness practice. Teacher 1 had an existing personal practice and had already attended a previous L2B training as well as a mindfulness retreat. Teachers 2 and 3 did not have prior experience with mindfulness practice nor with L2B. Prior to training in L2B, the program developer, on-site coach, and two teachers met after school for a four-session introduction to mindfulness program modeled on themes of MBSR. The sessions included weekly home practice and journaling to promote a personal practice. All three teachers participated in an "intensive" training specifically focused on implementing L2B in their classrooms. The 2-day intensive training involved practice teaching each lesson segment in small groups, sharing feedback with the whole group, and discussing practical details about implementation. In addition to the curriculum manual, teachers were given other materials, such as a "quick reference guide" to lesson structure and expanded outlines for sessions, developed to help them recognize key transitions in each lesson and to balance their use of time between activities, discussion, and mindfulness practice. One and/or both trainers visited teachers' classrooms on a weekly or bi-weekly basis to observe classes and to provide feedback for improvement. Videotapes of each session were also made. Both trainers reviewed videotapes for each session theme and had an average of four to six phone consultations with teachers over the course of each 12 lesson program, in addition to the in vivo observations. Thus, teachers were introduced to personal mindfulness practice, participated in an intensive training on implementing L2B, were offered specialized program materials, and received on-site and phone coaching support during implementation. Teachers were free to contact the coaches at any time during program implementations.

Measure Development

Teachers taught L2B to at least five classes of students per semester. One teacher taught L2B during three separate semesters, and one teacher taught it over two semesters. A third teacher taught L2B over the course of one semester but was not included in the reliability analysis. Over the course of scale development, 80 class videotapes were observed.

Scale domains were originally taken from the MBI:TAC (Crane et al. 2016), but, over time, key features were adapted to reflect the reality of teaching in actual secondary school classrooms. For example, the MBI:TAC description of *patience* ("The teaching process simply works as it is right now and allows an understanding that things can emerge in their own time") was modified to include the pedagogical concept of wait-time as a means to encourage patience in classroom teachers. Early videotapes and observations (n = 68) were used in an iterative process to both refine the coding system as well as to provide exemplars that could be used as clear anchors for scaling.

TMEOS Assessment Domains

The TMEOS is comprised of four general domains including (1) planning, organization, and curriculum coverage; (2) teaching mindfulness; (3) guiding mindfulness practices; and (4) management of the learning environment. Domain 1 contains ten key features, and Domains 2–4 each contain six. While many of the key features from Domain 1 and 4 are typically used in assessing effective classroom functioning, Domains 2 and 3 focus on unique elements involved in teaching an MBI in a school-type setting (see Supplementary materials online xxx).

Domain 1: Planning, Organization, and Curriculum Coverage Domain 1 assesses conventional aspects of teaching typically found in classrooms regardless of content presented. Key features include advanced preparation of materials, provision of a conducive setting, effective use of class time, coverage and sequence of the elements of the lesson, clarity of instruction, accuracy of presentation, use of transitions to scaffold and link lesson elements, and use of clear and developmentally appropriate examples.

Domain 2: Teaching Mindfulness Domain 2 translates the foundational attitudes of mindfulness into teacher-friendly language using classroom examples. The first feature of Domain 2 addresses how teachers model the attitudes of curiosity and nonjudgment because teaching mindfulness requires a shift from top-down, content-heavy instruction (Pedagogy of Knowledge) to a more facilitative position (Pedagogy of Curiosity). Feature 2 addresses teachers' awareness of present-moment experience in the classroom and ability to maintain focus on present experience during the lessons. The third feature assesses the quality of inquiry utilized during the lesson (i.e., questioning is directed toward noticing and exploring feelings and sensations and their patterns). Feature 4 assesses the balance of teacher talk versus student talk during lessons as well as class interactions. A fifth feature assesses teachers' patience with the process of cultivating mindful awareness. Finally, feature 6 addresses the teacher's willingness to be accepting of uncertainty and unpleasant experiences without reactivity. Domain 2 was particularly challenging to assess, and organization of key features went through multiple iterations. Developers relied both on videos and live observations of L2B classroom teaching to identify instances that demonstrated mindful attitudes in practice or, in some cases, the absence of the attitude. Overall, the ultimate goal was to identify, using authentic examples, how embodiment of mindfulness might "look" in the context of a regular classroom.

Domain 3: Guiding Mindfulness Practices Domain 3 focuses on teachers' guidance of mindfulness awareness practices during L2B lessons. The first feature of Domain 3 addresses how teachers create conditions conducive for practice, including the manner in which s/he settles the class and offers directions concerning posture. Feature 2 focuses on the vocal tone of the teacher during mindful practices. The third and fourth features assess the content (e.g., clear and accurate) and pace (e.g., smooth, appropriate pauses) of practices presented. Feature 5 addresses how the teacher helps students better understand and engage in key attentional and attitudinal processes of each specific mindfulness practice. Finally, the sixth feature focuses on how teachers conclude each practice, including allowing sufficient time for individual students to return attention to the large group.

Domain 4: Management of the Learning Environment Similar to Domain 1, Domain 4 includes assessment of effective teacher behaviors typically found in classroom settings. Key features of this domain include creating a safe and effective learning environment (e.g., use of group guidelines, confidentiality when sharing), using appropriate strategies to facilitate student participation and engagement during lessons, fostering participation from a wide range of students, effectively addressing challenging student behaviors, motivating disengaged students, and attending to individual needs of students.

Scoring Procedures

For each domain, observers rate instructors on each of key features within the domain. Scores range from 1 to 3, using the anchor descriptions provided for each key feature (see supplementary materials online xxx). For example, a key feature of Domain 1 (planning, organization and curriculum coverage) is *a clear instruction for activities of the lesson*. Raters score teachers' performance on a continuum from 1 (*Instructions for activities are unclear or confusing to students*) to 3 (*Instructions are clear and succinct in accordance with the curriculum*). A score of 2 reflects general competence in the key feature with some minor exceptions (*Teacher demonstrates minor lack of clarity or ease when giving instructions but this does not detract from the intent. Most instructions are clear.*) More detailed descriptions of key features are available in the supplementary materials online (xxx).

Domain proficiency scoring is based on an adaptation of the Dreyfus model utilized by Crane (Crane et al. 2013; Dreyfus and Dreyfus 1986). In the absence of prior data to guide cut-point selections, we created equal interval cut-points to characterize proficiency. Teachers receive a rating of "beginner" (average scores of 1–1.6) for a particular domain if inadequacy in performance is noted on most or all of the key features (i.e., scores of 1), thus implying the need for further skill development as well as possible close supervision. Teachers who receive average scores in the range of 1.7–2.3 may earn a rating of "competent." There may be a few inconsistencies in the performance of teachers rated as competent, but their teaching reflects definite skill in the domain overall. A domain score between 2.4 and 3 is considered "proficient." Essentially, "proficient" teachers demonstrate skillful confidence and flexibility in lesson delivery while maintaining the integrity of the program. These teachers present lessons in a smooth, flexible, and responsive manner, indicating a deep, implicit understanding of the program. Skills are consistently demonstrated, even when difficulties arise (e.g., challenges from students, time or space constraints, interruptions within the school).

Observational Coding Process

To assess the reliability and internal consistency of the TMEOS, 23 videotapes from the final implementation were coded by seven pairs of coders. Coders included a mixture of individuals including *experts*, who had an average of 13 years of experience in delivering mindfulness instruction and had served as lead instructors on MBIs on at least ten occasions, and *novices* who had not taught programs themselves but who had some experience in a mind-body practice like yoga or meditation. Training consisted of a whole group didactic training session followed by coaching practice. Specifically, each coder received a manual containing the TMEOS coding procedures, operational definitions of all codes, example sand non-examples, and step-by-step observational recording procedures. During the training, coders watched a series of training videos, which included demonstrations of coded behaviors. All coders worked independently during the coding process.

Results

Previous research suggests that the observational assessment of low base-rate behaviors may cause problems in the estimation of reliability (see Cicchetti et al. 1991). Therefore, prior to estimating inter-rater reliability, data were screened for any items with low-base rates or restricted range. Table 1 provides an overview of the mean, standard deviation, and range of instrument items and scales. The observability of behaviors was adequate across all assessed items and dimensions (see Tables 1 and 2). All domains displayed the full range of possible scores and adequate variance. All analyses were conducted in IBM SPSS Statistics for Windows Version 23.

Reliability and Specificity of Domain Scores

Findings related to overall scale psychometrics for each domain including internal consistency, average absolute agreement, and one-way random intra-class correlation coefficients (ICCs) are provided in Table 2. Overall, the four domains exhibited excellent internal consistency (range = 0.91–0.96) and strong ICC values ranging from 0.59 to 0.66. Absolute coder agreement ranged from 70.08 to 82.99%; the average coder agreement across scales was 76.07%. These slightly lower values are not unexpected given this is a 3-point vs. dichotomous observational scale. The average item-total correlation for the *planning*, *organization*, *and curriculum coverage* domain was 0.81, the *teaching mindfulness* domain was 0.77, *guiding mindfulness practices* domain was 0.75, and *management of the learning environment* domain was 0.80, all indicating very strong discrimination value among items comprising each domain. Pearson correlations were computed to examine the extent to which the four domains of the TMEOS represented related but distinct dimensions of behavior related to mindfulness instruction (see Table 4). Associations among domain scores were all positively correlated with a magnitude in the moderate to high range (range = 0.72–0.89) in expected directions (see Tables 3 and 4).

Discussion

This paper describes the development of a reliable rating system for assessing fidelity in classroom teachers' implementation of MBIs in school settings. The Teaching Mindfulness in Education Observation Scale is intended to assess both the structural (adherence) and process (quality) aspects of program implementation. The scale was designed to be used with classroom teachers and other educators using the L2B program for youth, primarily in school or out-of-school contexts. While some aspects of the rating system are naturally specific to the program components of L2B, we believe that this system could be effectively used with slight modifications with other MBI-ED programs.

Similar to other social and emotional learning programs, it was important that the TMEOS incorporated quantitative and qualitative aspects of implementation, capturing both adherence and implementation quality (Dobkin et al. 2014; Gould et al. 2014). Furthermore, following from the work of Crane et al. (2013), the TMEOS carefully assesses the teacher's embodiment of foundational attitudes of mindfulness. Not surprisingly, the results show that behavioral aspects of program adherence were somewhat easier to assess reliably than aspects of implementation quality like teacher embodiment. Given the

Table 1 Domain level descriptive statistics

	Item			Scale		
Domain	Mean	Standard deviation	Range	Mean	Standard deviation	Range
Planning, organization, and curriculum coverage	2.10	0.61	1–3	21.00	6.15	11–30
Teaching mindfulness	1.67	0.60	1–3	10.02	3.57	6–18
Guiding practices	1.78	0.55	1–3	10.70	3.33	6–18
Learning environment	1.92	0.62	1–3	11.53	3.72	6–18

Table 2 Domain item level agreement

	Mean	Range	Standard deviation	Item-total correlation	Absolute agreement
Domain 1: *Planning, organization and curriculum coverage*					
1.1. Physical environment	2.17	1–3	0.68	0.61	57.89%
1.2. Preparation	2.33	1–3	0.70	0.80	68.42%
1.3. Coverage	2.22	1–3	0.73	0.84	84.21%
1.4. Time usage	2.07	1–3	0.65	0.86	73.68%
1.5. Information accuracy	2.00	1–3	0.84	0.88	78.95%
1.6. Order of lesson	1.98	1–3	0.75	0.84	73.68%
1.7. Clarity of instructions	1.96	1–3	0.79	0.83	78.95%
1.8. Transitions	1.93	1–3	0.77	0.83	89.47%
1.9. Appropriate examples	2.24	1–3	0.57	0.76	73.68%
1.10. Avoid extraneous content	2.11	1–3	0.77	0.85	89.47%
Domain 2: *Teaching mindfulness*					
2.1. Pedagogy of curiosity	1.61	1–3	0.68	0.86	78.95%
2.2. Focus on present moment	1.74	1–3	0.71	0.80	73.68%
2.3. Inquiry directed	1.70	1–3	0.79	0.84	68.42%
2.4. Student talk time	1.37	1–3	0.57	0.57	73.68%
2.5. Teacher patience	1.85	1–3	0.67	0.77	63.16%
2.6. Teacher acceptance	1.76	1–3	0.79	0.80	63.16%
Domain 3: *Guiding mindfulness practices*					
3.1. Optimal practice conditions	2.00	1–3	0.79	0.87	89.47%
3.2. Vocal tone	1.80	1–3	0.69	0.71	78.95%
3.3. Clarity of guidance	1.74	1–3	0.53	0.81	94.74%
3.4 Pacing of guidance	1.59	1–3	0.54	0.68	89.47%
3.5. Effective guidance	1.78	1–3	0.63	0.80	84.21%
3.6. Appropriate duration	1.80	1–3	0.79	0.65	61.11%
Domain 4: *Management of the learning environment*					
4.1. Safe and effective environment	1.89	1–3	0.80	0.73	42.11%
4.2. Engagement strategies	1.78	1–3	0.73	0.75	73.68%
4.3. Encourages participation	2.07	1–3	0.77	0.87	84.21%
4.4. Behavior management	1.97	1–3	0.77	0.83	69.23%
4.5. Effective motivation	1.90	1–3	0.75	0.85	83.33%
4.6. Effective differentiation	2.05	1–3	0.57	0.75	90.00%

essential nature of embodiment for effective teaching of mindfulness, it seems clear that, in both training and assessment efforts for classroom teachers, cultivating teachers' own mindfulness practice on a sustained basis is essential (see Roeser 2016). We also concur with Crane that it is important for evaluators to have prior mindfulness and program experience before rating others' teaching any mindfulness program. As stated earlier, there is not one right way to demonstrate embodied mindfulness. The essence of the foundational attitudes should be understood both conceptually and procedurally so

Table 3 Domain scale internal consistencies

Domain	Cronbach's alpha	Average absolute agreement	Intraclass correlation	
			Estimate	CI
Planning, organization, and curriculum coverage	0.96	76.84%	0.66	0.56–0.77
Teaching mindfulness	0.92	70.18%	0.62	0.51–0.74
Guiding practices	0.91	82.99%	0.59	0.47–0.71
Learning environment	0.93	73.76%	0.66	0.54–0.78

Table 4 Domain scale correlations

Domain	1	2	3	4
1. Planning, organization, and curriculum coverage	1			
2. Teaching mindfulness	0.72**	1		
3. Guiding practices	0.89**	0.74**	1	
4. Management of learning environment	0.79**	0.87**	0.72**	1

**Indicates p value less than 0.01

that they can be recognized as they are flexibly, authentically, and variously manifested in real classrooms.

It should be reiterated that behaviors and attitudes are not mutually exclusive entities, and most of the key features do contain both behavioral and attitudinal elements. However, some key features are more behavioral and concrete than others, and these primarily tended to reflect program adherence. For example, Domain 1: *planning*, *organization*, *and curriculum coverage* contained key features, such as lesson structure, that are specific to activities and practices covered in the lesson. Both percent agreement and inter-observer reliability assessed with actual scores (ICC) for this domain were relatively high. Although within the acceptable range, Domain 2 and 3: *teaching mindfulness and guiding practices* showed comparatively weaker inter-coder agreement and ICC values (see Table 2). These domains capture manifestations of the attitudinal foundations of mindfulness and strategies for creating conditions conducive to mindfulness practices, which may require a deep understanding of mindfulness and, perhaps, somewhat greater subjectivity compared to the other three domains. Domain 4: *management of the learning environment* showed adequate agreement and ICC values; however, it is important to note that not all key features from this domain can necessarily be evidenced in every class observed. For example, two key features addressed the teacher's ability to handle noncompliant and unmotivated students effectively while maintaining group cohesion, which may or may not be present in all cases. In the majority of classes observed in this study, students were largely cooperative, so this feature was sometimes scored as "not-applicable." However, the TMEOS is relatively flexible with regard to what constitutes "student misbehavior," and individual investigators may impose more specific requirements regarding what constitutes an appropriate behavioral response. Our goal was to produce a generalizable instrument, but teachers and researchers adopting the TMEOS may choose to implement more specific criteria for their population or context regarding student behavior and appropriate teacher responses.

Despite the potential applicability of this scale, there are several limitations that should be addressed in further studies. This scale was developed using observations from a limited number of teachers. This allowed for a highly in-depth understanding of teacher development as these individuals transitioned from a more directive teaching style to a more facilitative, experiential one to accommodate the pedagogy of the program. Working intensely with a small number of teachers over time allowed us to observe and describe teachers' "emerging embodiment of mindfulness" at close range. However, a broader array of teachers, including those with more experience in teaching and practicing mindfulness, could reveal other patterns of strengths and difficulties that might be incorporated into this scale. Therefore, evaluating this instrument with larger and more diverse teacher samples and settings (e.g., special education) could strengthen its usefulness.

It would be important to also explore numeric cut-points used to characterize levels of proficiency. Although beyond the scope of the present paper, examining the meaningfulness of proficiency discriminations is an important area for future research. We used raters to assess teacher videos who represented a range of mindfulness and/or L2B experience themselves. Future work should carefully examine the contributions that personal mindfulness practice and program experience of the assessors contribute to the overall reliability of the instrument. Finally, future research using these domains may be able to assess the relative contributions of program adherence and quality of implementation to overall program effectiveness.

Despite these limitations, the above evidence suggests that the TMEOS might be useful not only as an observational scale for evaluative purposes, but also as a tool for scaffolding the teacher coaching/learning process. Instructor development is a critical component of effective MBI programming, particularly in the area of embodying mindfulness. Because MBIs by definition are practice-intensive, teacher mindfulness provides the essential procedural model whereby students learn how to be mindful themselves. No mindfulness curriculum alone can accomplish its intended goals. The teacher's capacity to implement the curriculum effectively rests on both his/her grasp of the program as well as embodiment of mindfulness as a way of being. We believe that the TMEOS could be used in the training process as a rubric for teachers' self-assessments of behaviors and attitudes as they develop expertise.

On the one hand, the high inter-correlations we observed between the domain scores suggest that a total "Quality of Implementation Score" may be usefully derived from this measure for general purposes. On the other hand, with larger samples of teachers who had different capacities and background experience in mindfulness, we might expect more

differentiation in the domain scores and thereby, greater specificity around targets for classroom teacher support. Finally, our work on this paper suggests a need for TMEOS assessors to embody mindfulness and be well-versed in the behavioral and attitudinal aspects of the curriculum being implemented in preparation for assessing others' level of expertise.

The issue of teacher quality and embodiment of mindfulness remains a relatively unexplored issue with regard to teaching mindfulness to children and youth. This study represents an attempt to bridge the gap between what is considered essential to the teaching of adult mindfulness programs with the reality of teaching mindfulness in educational settings. Use of a relevant observational instrument in combination with best-practice examples and supportive feedback may better equip teachers to shift from the "doing" mode of highly task-oriented systems to the kind of "being-mode" that supports mindful awareness. Therefore, a psychometrically validated instrument that accurately reflects teachers' expertise in program adherence and embodiment of mindfulness may be a useful component in facilitating their development and can make the teaching of mindfulness more accessible and effective in schools.

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Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study

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