

Research Article

Implementation of a Whole-School Mindfulness Curriculum in an Urban Elementary School: Tier 1 through Tier 3

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Abstract

Mindful education (ME) in schools can address student well-being and stressors, as well as improve the overall school environment. Implementing a whole-school mindfulness curriculum can be challenging, especially when serving students in both general education and emotional behavioral disorder (EBD) settings. We investigated the feasibility,



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implementation, and benefits of a whole-school mindfulness curriculum (MindUP) in an urban elementary school. This study is unique in that it investigated how to implement mindfulness curriculum within both general education and EBD student populations. Participants included 55 staff and 436 students. This study used a concurrent mixed methods design. The qualitative data included interviews, informal focus groups, and participant feedback, and the quantitative data included participant satisfaction surveys and teacher assessment of student behaviors before/after the curriculum. While implementing MindUP, teacher feedback was incorporated to adapt the program (e.g., decrease lesson length, provide supplemental child-friendly breathing activities). Qualitative data indicated the adapted MindUP program improved school climate and aided teachers with teaching coping skills, especially breathing techniques, to help their students self-regulate when stressed. Data indicated students in regular education improved in their aggression/disruptive behaviors, concentration/attention, and social/emotional competence, whereas students in the EBD program only improved in their aggression/disruptiveness (effect sizes 0.15 to 0.51). An adapted MindUP curriculum was accepted, implemented, effective, and sustainable in both the general education and EBD settings. The program helped students learn mindfulness-based coping strategies with breathing being the most beneficial mindfulness intervention for managing and reducing student stress and for creating a calmer school climate.

Keywords

Mindful education (ME); MindUP; breathing; elementary school; whole-school approach; emotional and behavioral disorders (EBD); stress; concurrent mixed methods

1. Introduction

School systems face more demands and stress than ever with high stakes as students, teachers, and schools are graded based upon their performance and outcomes. Students and school personnel alike experience stress as they navigate the busy school day. Since the start of the pandemic, teachers may be experiencing even more stress [1] and students may be experiencing a decline in positive mood [2]. This is concerning because the social-emotional well-being of the individuals within a school is essential for the learning environment to be optimal [3].

Schools carry out the critical charge of promoting both the academic and the social-emotional growth of youth. Academic demands and social-emotional learning (SEL) are often separate and viewed as conflicting and competing for scarce resources. Now more than ever, schools need SEL strategies to help students and school personnel overcome and manage the increased stressors they encounter.

1.1 Mindfulness-Based School Interventions

A new educational movement-mindful education (ME)-has gained momentum. Research suggests that social and emotional awareness trainings support and improve academic performance, decrease stress, and improve the overall school environment [4-6]. ME programs concentrate on helping students to develop their emotional and social competence by teaching lessons focused on

‘mindful attention awareness’ and promoting optimism and positive affect [7, 8]. ME curriculum bridge the gap between academics and SEL [9, 10] by having students and teachers practice the intentional cultivation of moment-by-moment non-judgmental focused attention and awareness during the school day. A ME program utilizes various mindfulness-based interventions (MBIs) to teach students and school personnel awareness and regulation skills. These school-based MBIs training programs are delivered in a variety of ways, including seamlessly blending mindfulness approaches to the daily academics and routines; teaching specific mind-body awareness strategies (e.g., yoga poses, breathing, body scans, imagery, thought watching); and using structured curriculum manuals that emphasize different mindful elements (e.g., awareness, social-emotional learning, neuroscience, and/or kindness practices).

Mindfulness-based school interventions embedded within the school day are potential catalysts for school transformation [6, 11]. A review of school-based MBIs demonstrates evidence for promoting and improving four main areas of student outcomes: mental health and psychological well-being, self-regulation, physical health, and academic functioning [12]. Mindfulness interventions have been successfully introduced into the classroom setting and demonstrate effectiveness for not only students, but also for teachers (e.g., less stress, more focus, and happiness [13]), the classroom environment (e.g., calmer, fewer conflicts, and children more kind to each other [14]), and the school culture (e.g., increased compassion and healthy school-family partnerships [11]). Furthermore, mindfulness skills integrated into the school routine help teachers and students cope with and reduce daily stressors [15, 16].

A variety of ME training curriculums have been developed to teach MBIs to children throughout the school day, such as MindUP [8], the Mindful Education Workbook [10], and the Mindfulness in Schools Project [17]. The research is still unclear about how to immerse mindfulness into schools with efficacy due to the varying structural components (i.e., content, format, duration, facilitators [6, 12, 18]). It is also unclear which parts of a ME program are most helpful for decreasing the stress that students face in their school day. Since there are numerous ways to deliver mindfulness in an educational setting, it remains unclear which approaches and components are most useful and ultimately lead to beneficial outcomes.

While the research on ME is promising, there is a need for understanding the acceptability, feasibility, and implementation of mindfulness programs in schools [18]. Investigation of the feasibility and implementation of educational MBIs is important, but not well established for school settings [19, 20]. Due to the growing field of school-based MBIs research, the evaluation and replication of established ME programs is encouraged to help determine the most important aspects of the implementation process and if adaptations can be made without harming the intervention’s integrity [16, 20]. Zenner and colleagues [16] encourage the use of mixed methods data collection approaches (e.g., teacher reports, focus sessions, interviews, observations of training sessions, and student input) to assess feasibility and acceptability. Given many SEL programs, including ME, launch in a mandated, whole-school or district-wide manner (versus allowing teachers to self-select participation), it is important to explore whole-school approaches to mindfulness curriculums [15, 21, 22]. The implementation of whole-school SEL is “not a one-time process...to be done effectively and sustainably, SEL must be implemented using continuous improvement approaches that allow schools and districts to learn from both their successes and challenges, adapting their approach along the way and adjusting strategies” ([23], para. 1).

1.2 Mindful Education Efficacy in Special Needs Students

MindUP is a popular and universal, Tier 1 mindfulness-based SEL curriculum designed for implementation in schools by regular classroom teachers [4]. Research investigating the MindUP curriculum in schools demonstrate positive outcomes, including improved student prosocial behavior, executive functioning, and academic achievement [7, 24]. However, most studies were performed in a Tier 1, general education classroom setting. A particular subset of students that could benefit from a mindfulness curriculum—such as MindUP— are children with emotional and behavioral disorders (EBD) who are taught at the Tier 2 or Tier 3 targeted and intensive levels of support. School-based mindfulness programs have demonstrated successful implementation with children diagnosed with learning disabilities and special education needs [19, 25], as well as children on the autism spectrum [26]. However, the literature does not address mindfulness interventions with children specifically diagnosed with EBD and not mainstreamed into the general education classroom.

1.3 Aims and Hypotheses

The aim of the present study was the evaluation of an established school-based mindfulness curriculum, MindUP, utilizing a whole-school implementation model. Specifically, we utilized a concurrent mixed method design to examine the acceptability, implementation, effectiveness, and sustainability of MindUP in an underserved urban, elementary school. Given the lack of research to support the benefits of mindfulness with students diagnosed with an EBD, the second aim of this manuscript was to discover how to implement and understand the benefits of MindUP with a Tier 3, EBD student population. Following the recommendations of Zenner and colleagues [16], we followed a mixed methods approach, which includes rich ethnographic qualitative data from school leadership, teachers, students, and university researchers, and quantitative data from both teachers and students.

The following research questions were investigated in this study: (a) Can MindUP be accepted, implemented, and sustained in a whole-school launch at an urban elementary school? (b) Will key differences exist in the acceptability, implementation, and benefits of MindUP between Tier 1, general education and Tier 3, EBD student populations? (c) Will teachers and students perceive MindUP beneficial in improving student behaviors, stress and school climate? It was hypothesized that MindUP would be accepted, implemented, and sustained within the whole elementary school, but that there would be differences discovered in implementation of the MindUP program between Tier 1 and Tier 3 populations. Additionally, it was hypothesized that the MindUP program would support positive student behaviors and school climate and may reduce school stress.

2. Methods

2.1 Participants

The participants included staff and students from an urban elementary school within a school district in Northeast Florida. This elementary school serves kindergarten through 5th grade students. The school reported 42% of students are at the low-income level. The school is unique due to its self-contained emotional-behavior day treatment program (called the “Pride” program) for

students in the district who need targeted services to mainstream back to their school and classroom.

Participants included all 55 staff (35 main teachers, 20 paraprofessionals and administrators) and 436 students (46% White, 24% African American, 17% Hispanic, and 13% Other). Of the 436 total students in the study, 47 students were in the Pride program. Only 4 students in the school had parents opt out of this study.

2.2 Ethics Statement

This study was approved by the IRB of the University of Florida (IRB Number: 201801110) and therefore performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

2.3 Procedure

A local university with an established partnership with the local school district secured a community grant to support this school-based mindfulness feasibility project. Grant funding paid for: (a) mindfulness materials (i.e., chimes and MindUP curriculum books for all teachers); (b) MindUP first year training model support (i.e., fees for trainings and consultations from MindUP personnel); (c) compensation allowances for school personnel participants; and (d) three hours weekly salary support for the university's principal investigator and hourly support for two university researchers.

The public-school district in Northeast Florida identified the elementary school willing to participate in this MindUP feasibility program. The school district classified the school as "high-need" due to their low socioeconomic status, surrounding area, and degree of behavioral problems. The school was identified as a site for the mindfulness program because of its focus on improving school climate and outcomes while educating and caring for children from urban, low socioeconomic status neighborhoods. This school was also selected for participation because it serves a variety of students (from gifted, to general education, to the Pride EBD program), and the school personnel were interested in understanding if mindfulness interventions could be helpful to all students (i.e., Tier 1 through Tier 3 programs).

The school district and the university's Institutional Review Board (IRB) consulted and classified this research study as a program feasibility and implementation research project. At the beginning of the school year, parents of students received an opt-out letter informing them that their child would participate in the MindUP program (i.e., 15 MindUP lessons) and explaining how they could opt out if they did not wish to have their child participate. The four students of the parents who opted out attended reading sessions in the library during the MindUP lessons.

All teachers and staff voluntarily consented to participate, which demonstrated initial school-wide acceptance of the implementation of a mindfulness curriculum. Teachers were compensated (i.e., \$25 for each of the two workshops, \$50 for the teacher pre- and post-evaluations completed for each student) for evaluating the MindUP training program.

2.4 MindUP Curriculum

The university team chose to use the MindUP curriculum [27, 28], which is a mindfulness-based social-emotional learning (SEL) manualized program designed for implementation in schools by

regular classroom teachers. MindUP is informed by theory and research in cognitive developmental neuroscience, contemplative science and mindfulness, and positive psychology [4]. There are 15 MindUP lessons, approximately 20 to 45 minutes in length that include lesson plans, teaching scripts, and worksheets to aid teachers. The 15 Lessons are typically taught over the school year so teachers can spend 2 to 3 weeks covering each concept. Each lesson offers strategies for helping students focus their attention, improve their self-regulation skills, build resilience to stress, and develop a positive mindset.

In addition to the 15 Lessons, MindUP provides a series of core practices called “brain breaks” which focus on helping children learn deep belly breathing and attentive listening. Ideally, three times a day, for three minutes, the teacher sounds a chime and guides the students through mindful breathing exercises (i.e., “brain breaks”). The goal is for MindUP core practices to become routine for the opening and closing of each school day as well as during times of transition, such as when settling down after recess, waiting for lunch, or moving from one subject to the next [27, 28]).

Teachers and staff were trained on the MindUP lessons and core practices during two MindUP workshops led by a MindUP consultant and three university researchers. Two tele-video coaching sessions were also held with the MindUP consultant and the school personnel. On-going mindfulness coaching was readily available throughout the school year from the university researchers. For instance, at least once a week, a university researcher was at the elementary school to meet with teachers and/or staff to provide implementation assistance, receive feedback, and hold focus groups about the program.

2.5 MindUP Evaluation

This study utilized a mixed methods approach to provide an all-inclusive understanding of participant behaviors, beliefs, attitudes, and values related to implementing a MindUP program in an elementary school serving both a general education and EBD student population. A concurrent triangulation design [29] was applied in this program feasibility and implementation study. To maximize the validity and reliability of the data, multiple methods (e.g., ethnographic notes of the researchers, focus groups, and pre-post survey data) were employed to collect qualitative and quantitative data for the entire school year from diverse sources. Quantitative and qualitative methods and data collection were simultaneously implemented (i.e., during the school year) and given equal weight when identifying the areas of convergence in the acceptability, implementation, and effectiveness of the MindUP program [29].

Qualitative data included informal and formal discussions with school administrators, teachers, and university researchers. Observational field notes provided data from teacher training sessions, teacher focus groups, process meeting notes among the three university researchers, and open-ended teacher surveys. These converged data were used to validate responses across quantitative instruments and to paint a richer picture of the implementation and feasibility of a MindUP program. Mixed methods data leads to a convergence of findings [30] that are necessary when examining the mindfulness intervention in different subgroups.

A MindUP Evaluation Toolkit—made available to the school by the certified MindUP consultant—provided measures for quantitative data collection [27, 28]. From this Toolkit, teachers completed the Teacher Social Competence Rating Scale (TSCR) for each of their students before and after the MindUP program. In addition, students and teachers completed Satisfaction Surveys (SSS

and TSS, respectively) at the end of the school year following implementation of the MindUP program. Below is a description of the measures from the Toolkit.

2.5.1 Teacher Social Competence Ratings Scale (TSCR; [31])

This 30-item measure asks teachers to rate each of their students via a 6-point Likert scale (0 = *never or almost never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*, 5 = *almost always*). The items fall into three subscales: (a) Aggression and Disruptive Behavior, (b) Concentration and Attention, and (c) Social and Emotional Competence. The Aggressive and Disruptive Behavior subscale scores were reversed for ease of comparison with other constructs. With the current sample, Cronbach alpha reliability analyses indicated the internal consistency of each subscale (Aggression and Disruptive Behavior subscale $\alpha = 0.96$, Concentration and Attention subscale $\alpha = 0.97$, and Social and Emotional Competence subscale $\alpha = 0.96$).

2.5.2 Teacher Satisfaction Survey (TSS; [27, 28])

This 9-item measure invites teachers to provide useful feedback regarding how well the MindUP program met the needs of teachers and their students. Answers to questions were dichotomous, categorical, or open-ended (e.g., fill in the blank). Questions on the TSS evaluated the ease of use, feasibility, and effectiveness of the trainings, MindUP curriculum books, components of the program, and MindUP overall.

2.5.3 Student Satisfaction Survey (SSS; [27, 28])

This 4-item measure asks students how they felt about the program. Prior to completing the measures, teachers provided the students with a scripted explanation about how the surveys were confidential and how students could answer each question. Next, the teachers read the questions aloud while the students responded to the questions via a scale of smiley faces with the corresponding descriptor below (i.e., *bad*, *just ok*, *good*, and *really good*).

2.6 Data Analyses

Following a concurrent mixed methods design, each data source (i.e., qualitative and quantitative) was analyzed separately and then findings were merged to identify converging themes [29, 32]. Qualitative data collected throughout the year and end-of-year satisfaction measures were analyzed for salient themes and determination of consistency with the pre- and post-quantitative measures. Relevant data concerning interventions and feasibility was extracted by three researchers and then cross checked by each other [16].

Differences became apparent between the teachers and students in the general education (GE) and emotional behavioral disorder (EBD) program (Pride); therefore, quantitative results were separated according to these groups. Because few teachers (7 total) taught within the Pride EBD program, it was not possible to run statistical analyses to compare the satisfaction of the GE and Pride teachers. In contrast, we were able to use Wilcoxon rank sum and chi-square test to compare the groups with regard to the students' satisfaction with the program. The Wilcoxon rank-sum tests were also useful in comparing the pre- and post-MindUP scores to determine if significant improvements occurred for the students in GE and Pride programs.

3. Results

This section addresses these feasibility areas of the MindUP program: acceptability, implementation, effectiveness, and sustainability [33]. The qualitative and quantitative results related to the process of delivering this MindUP mindfulness program and the potential benefits of its implementation are discussed, with direct quotes from administrators, teachers, and students added throughout.

3.1 Acceptability

Similar to Zenner and colleagues, we defined acceptability as the extent the program is viewed as acceptable (i.e., suitable, satisfying, or attractive) to the teachers and students [16]. Acceptability also includes the openness to the program prior to implementation. For a successful implementation of the MindUP program, buy-in from school administration and leadership was needed at multiple levels because “leadership has biggest influence in cementing the importance.” Thus, during the summer months preceding the school year, the university researchers met with the school principal to gain a better understanding of the culture of the school and to plan for a whole-school MindUP program. The principal verbalized a commitment to the MindUP program and eagerness to partner the school with both the university and MindUP personnel for trainings, coaching, and consultations. Fortunately, the principal was onboard with integrating the MindUP program into the school day stating, “The program requires an investment, and every child deserves an investment.”

The school principal and university research team identified a group of teachers at the start of the program (i.e., after teaching the initial 3 MindUP lessons) who embraced the mindfulness principles and lessons and found benefit in the program. This teacher group, known as the *Mindfulness Stars*, became integral in helping advocate, problem-solve, develop/adapt, and coach others in this mindfulness program. These *Mindfulness Stars* very much accepted mindfulness-based interventions (MBIs) and one of them commented that “the overall atmosphere of the school was much calmer and is impressed with how introspective and insightful students have been.” Most teachers (even if not identified as a *Mindfulness Star*) reported that MBIs were overall well received by the students and staff: “Our whole school got on board with mindful breathing...it was great that our principal practiced it during the morning news program each morning. Not all of my kids did the breathing with the principal, but many did and the others were interested!” It should be noted that generally mindfulness activities and interventions (especially breathing skills) were well received and accepted by students, staff, and teachers at the school. However, the MindUP program overall, had mixed acceptability from teachers due to implementation issues, as will be discussed below.

3.2 Implementation

Implementation was defined as to what extent the MindUP program was successfully taught to students during their typical day [16] and carried out as planned and proposed [33]. It was expected that the 15 MindUP lessons would be taught over the course of the school year so the teachers would spend roughly two weeks on the concepts covered in each lesson. In addition, it was expected that the teachers engage their students in a “brain break” core mindfulness practice (e.g., deep

breathing with a focus on the sound of a chime rung by the teacher at the start of the practice) three times each day.

Before the school year started, the certified MindUP consultant hosted an in-person, teacher-staff workshop at the school with a focus on correct delivery of the curriculum/lessons and core practices. The teachers appeared engaged and asked questions related to implementation in their classrooms.

During the school year, the university researchers acted as liaisons between the school and MindUP personnel. Weekly, the university researchers went into the school to coordinate with school administrators, organize and adjust the MindUP implementation schedule and materials, provide mindfulness coaching to school personnel, and gather mixed methods data. In addition, they consulted with and aided teachers with their MindUP lessons and skills to ensure the teachers had everything they needed to implement MindUP in their classrooms with fidelity. They also collaborated with teachers and staff to assess and problem-solve issues related to the implementation of the MindUP curriculum. Because teachers found it “too burdensome” to complete implementation logs after each lesson, the university researchers made themselves available to discuss with school personnel the MindUP curriculum and provide candid feedback on both successes and challenges to its implementation.

Implementation concerns arose throughout the school year that necessitated adaptations to MindUP curriculum. Specifically, teachers indicated the MindUP lessons were “too long” and suggested they be adapted to fit into the school day. Because of the belief expressed by an educator that the program “was directed towards a specific type of student, not urban education, in which their stress and cultural norms are different,” the program was adapted to be more appropriate for diverse classrooms and students. The adapted program also sought to address teachers’ “struggle with engagement piece” and need for “more hands on” materials and to consider “younger kids need more help with transitions.” Teachers indicated a need for additional training, resources, and modified/adapted curriculum for the MindUP program.

Researchers took in all feedback from broad statements of concerns for the MindUP program “adding more work into a busy school day” to specific feedback including the MindUP “manual being too cumbersome” and what was not working within each age group. Based on teacher feedback, it also became apparent that children diagnosed with emotional behavioral disorder (EBD) at the Pride program, needed different implementation strategies (e.g., more movement strategies, lessons to be brief and spread throughout the week versus taught in one sitting, and the chime was upsetting and dysregulating to students and thus discontinued during the breathing exercises). Dynamically assessing the program at multiple time points allowed researchers to identify the necessary changes to increase program success in both the general education (GE) and Pride program settings.

The university researchers discussed the feedback from teachers, staff, and administrators with the certified MindUP consultant, who provided video consultations twice during the school year (i.e., in October and January). At the mid-point of the school year, MindUP provided a second in-person, teacher-staff workshop with a parent training that same evening.

With the guidance and approval of the certified MindUP consultant, the university researchers implemented more coaching/training for teachers, adapted the materials for the MindUP lessons, and added more activities to keep students engaged. Because it was difficult for the teachers to find the time to read the MindUP manual to decide what to teach, the research team was asked to create and distribute PowerPoint lessons to guide teacher instruction. The PowerPoint lessons gathered

the most important pieces of the MindUP curriculum and summarized them into fun, shorter, easier-to-use, developmentally appropriate, and visually appealing lessons that guided teachers in administering the lessons. The PowerPoint lessons included the core part of the MindUP lessons with these adaptations: breathing activities with written scripts for teachers to read aloud; mindfulness breathing and instructional videos that helped with engagement and demonstration; additional information regarding social-emotional learning (SEL); examples of mindfulness games and movements; and a reading list to help demonstrate SEL (i.e., child-appropriate stories to teach SEL concepts such as optimism, gratitude, perspective taking, kindness, etc.). Thus, based on the experiences with lessons 1 through 4 (taught September through October), there were adaptations made to lessons 5 through 7 (taught November and December) and heavy adaptations and supplementations made to lessons 10 through 15 (taught January through May). With these adaptations and supplementations to the MindUP program, the school excelled and benefitted from the intervention.

3.3 Effectiveness

We defined effectiveness as the ability of the MindUP program to show promise of being successfully implemented and beneficial to students during real-world school conditions, including how students and teachers acquire and effectively apply the mindfulness knowledge, skills, and competencies during the school day [33]. Success was measured quantitatively through pre- and post-implementation surveys and the results were supported via qualitative data.

Table 1 displays the results of the Teacher Satisfaction Survey (TSS) that were completed in May (i.e., end of the school year). As evident, the majority of teachers had no prior experience with the MindUP program. They viewed the certified MindUP consultant and training program favorably (i.e., compelling, interesting, engaging, knowledgeable, thorough, professional, and memorable). Teachers reported the two MindUP trainings were enjoyable, “clear, concise, and upbeat/positive, and very student centered on the whole-child.” They also provided constructive feedback, including “it would have been helpful to see some lessons implemented with children. Maybe a classroom video could be made and shared at trainings.” A teacher commented on the challenges with finding time for more training “to problem solve around implementation and coaching issues.” Another teacher indicated the need for “an active leader [within the school] to take charge of the program and organization.”

Table 1 Teacher Satisfaction with Adapted MindUP Program.

Question	General Education		Pride	
	N	%	n	%
Have you taught MindUP in your classroom before (yes)?	7	29.17	0	0.0
Did you think one day of training was sufficient for you to be comfortable and confident to implement the program?	19	79.17	3	42.86
Was the trainer/training program:				
Compelling, interesting, and engaging?	24	100	7	100
Knowledgeable, thorough, and professional?	24	100	7	100
Memorable with ideas you can use?	23	95.83	6	85.17

How many lessons were you able to teach by the end of the school year?				
Lesson 1: Intro to the Brain	19	79.17	5	71.43
Lesson 2: Mindful Awareness	19	79.17	5	71.43
Lesson 3: Core Practice	19	79.17	5	71.43
Lesson 4: Listening	19	79.17	6	85.71
Lesson 5: Seeing	19	79.17	6	85.17
Lesson 6 & 7: Smelling & Tasting	17	70.83	4	57.14
Lesson 8 & 9: Movement & Balance	18	78.26	6	85.71
Lesson 10: Perspective Taking	16	66.67	4	57.14
Lesson 11: Optimism	17	70.83	4	57.14
Lesson 12: Happy Experiences	16	69.57	5	71.43
Lesson 13: Gratitude	15	62.50	3	42.86
Lesson 14: Acts of Kindness	15	65.22	4	57.14
Lesson 15: Mindful Action in the World	8	36.36	3	42.86
On an average day, how many brain breaks for breathing did the class take?				
One	6	25	1	14.29
Two	12	50	2	28.57
Three	3	12.50	3	42.86
Four to Six	3	12.50	1	14.29
Generally, how do you feel about the MindUp program				
Negative	0	0.0	0	0.0
Neutral	1	4.35	1	14.29
Positive	23	95.65	5	85.71
Did the MindUp program have a positive effect on the students in your class this year?				
No	0	0.0	0	0.0
Not sure	1	4.17	0	0.0
Yes	23	95.83	7	100
Did the MindUP program have a positive effect on the students' attitudes and behaviors regarding bullying this year?				
No	1	4.17	0	0.0
Not sure	7	29.17	3	42.86
Yes	16	66.66	4	57.14

Note: "Pride" is the name of the self-contained emotional behavior (EBD) day treatment program for students in the district who need targeted services to mainstream back to their school and classroom.

The results presented in Table 1 suggests the GE teachers felt more prepared after the pre-implementation MindUP training and implemented more lessons than the Pride teachers. These differences were due to the MindUP trainings not being tailored to the application of the program with students who have significant emotional and behavioral needs (i.e., Tier 3 student populations). However, both GE and Pride teacher comments suggested, "Just putting in the time [for lessons]

was a little challenging” because teachers were “already crunched for time.” It became “cumbersome” and “felt like an additional reading lesson.” Because time was “the biggest obstacle...the PowerPoints [supplemented] were so helpful!”

Although, the GE teachers reported doing the breathing exercises less frequently than the Pride teachers (see Table 1), qualitative feedback from administrators, teachers, and students indicated that breathing was the overall most helpful aspect of the program. Pride teachers especially noticed the benefits of breathing as a strategy for student regulation and used it frequently (sans the chime). The most helpful breathing strategies for all teachers were written scripts that instructed their students on a breathing technique for approximately 1-3 minutes. Breathing techniques that were most enjoyed and embraced by students were playful, developmentally appropriate, and often included breathing with mindful movement (e.g., breathing while doing yoga, moving arms up and down during inhales and exhales) or child-friendly metaphors and imagery (e.g., bumble bee breaths, breathing like a hot air balloon, and visualizing being in a garden smelling flowers).

After breathing was established as a tool, the teachers helped students to apply the calming effects of the breath to social and emotional awareness (e.g., using the breath to help observe internal feelings and thoughts, behavior urges, and perspective of others). Focus of the breath and internal and external awareness was then beneficial to regulation and resulted in a more calming classroom and school climate. Teachers reported that they led their class through daily breathing “brain breaks” (typically 1-3 times a day) for regulating emotions and focus in the classroom. At the midpoint of the school year, the principal began leading whole-school morning “breathing moments” during the morning announcements. The whole school started calling all breathing strategies “Breathe First” to help remind each other (school personnel and students alike) to be calm and manage stress. The addition of the school-wide breathing exercises “made a big difference, promoted group mentality.”

The following sample of quotes from teachers demonstrated how mindfulness breathing interventions provided the most effective coping tool for helping students manage stress. Mindful breathing, in turn, created a calmer atmosphere for a less stressed school environment:

- Some of my students had difficulty handling stressful situations and negative behaviors from other students. They were quick to respond with another negative behavior, which only added to the situation. Through this program, they learned how to appropriately handle their stress and anger.
- Many of my students would bring stress from their morning routine (getting ready, car or bus ride/walk to school, breakfast in the cafeteria, etc.) into the classroom each morning. I then started doing the breathing exercises each morning and that really helped to calm them down and get ready to learn. I believe implementing Breathe First has had an extremely positive impact in our classroom environment and school. It provides an opportunity for students to reset and calm their minds.
- Reminding the students to breathe when they were upset or anxious about something and them learning to do this on their own without being reminded.
- 5th grade is difficult because of physical, emotional, and school changes, so this was an excellent way to debrief about the stress factors and try to figure out what works for my kids.
- Students used the breathing when they were upset.

As evident in Table 1, most teachers reported feeling positive about the adapted MindUP program. Teachers that engaged in mindfulness in their own lives were especially successful in

implementing the mindfulness program within their classrooms. Teachers identified as *Mindfulness Stars* indicated they participated in “meditation and yoga at home-had personal buy-in...personally happier this year and less stressed.” Another *Mindfulness Star* teacher commented that it “benefits staff and students” and that they needed “to believe in it...to make it meaningful.”

There was a consensus that there was a culture of mindfulness, the campus was calmer, and students were more kind and connected in the classrooms. Specific comments related to the benefits of the adapted program include:

- The biggest benefit may be the program has strengthened the family atmosphere we have established and work tirelessly to maintain. MindUP creates a common language, creates consistency with routines, and provides prescriptive problem-solving strategies.
- This is about empathy, kindness, gratitude... It's beyond the classroom.
- Impressed by how introspective/insightful students are and how they use language.
- Students are showing more confidence and are making mature decisions when faced with adversity.
- Discipline referrals are down from the previous year. Teachers see students working through challenges and the whole child is being developed (emotionally, socially, and academically).
- My students were able to use the breathing techniques and calming strategies to remain focused in the classroom.

As evident in Table 1, most teachers reported the program had a positive effect on the students in their class, including the students’ attitudes and behaviors regarding bullying. This observation is consistent with the improvements noted in Table 2, which shows the mean teacher rating scores on the Teacher Social Competence Rating Scale (TSCR) completed for each student at the beginning and end of the program. Although there was a comment about noticing that the “kids with behavior issues had the most growth,” Wilcoxon rank-sum test comparisons indicated that the students in the Pride program only exhibited improvements in terms of their aggression and disruptiveness, and not in terms of their attentional abilities and social and emotional competence. In contrast, the students in the GE program exhibited significant improvements in their level of aggression and disruptive behaviors, concentration and attention, and social and emotional competence.

Table 2 Teacher Rating of Student Social Competence Pre- and Post-Adapted MindUP Program.

Construct/Sample	Pre			Post			Effect Size (r) ^a	p ^b
	n	M	SD	N	M	SD		
Aggression/Disruptive Behaviors^c								
General Education	389	3.58	0.63	382	4.33	0.93	0.51	<0.001
Pride Program	47	2.09	0.93	53	2.57	1.10	0.23	0.022
Concentration/Attention								
General Education	389	3.15	1.20	379	3.47	1.35	0.15	<0.001
Pride Program	47	2.59	0.95	53	2.69	1.34	0.04	0.706
Social and Emotional Competence								
General Education	389	3.59	1.07	380	3.89	1.10	0.16	<0.001
Pride Program	47	3.13	0.93	53	3.12	1.07	0.01	0.923

Notes: ^aEffect size *r*, which measures strength of relationship between pre and post survey scores, is calculated as Z statistic divided by square root of *n* ($r = Z/\sqrt{n}$). ^bGenerated via Wilcoxon Rank Sum Test. ^cBecause scores for Aggression/Disruptive Behaviors were reverse coded for consistency with other constructs, higher scores represent more behavioral control.

The group differences (i.e., between GE and Pride students) in the benefit of the program did not translate to significant differences in the satisfaction with the program, as evident in Table 3. The majority of students (both GE and Pride) believed the MindUP program was *good* or *really good*, and that it helped kids feel more relaxed, happier, get along better, and be kinder to each other. About 40% of students reported teaching someone at home, school, or their neighborhood something learned in MindUP, and the majority reported that they would tell a friend to do the MindUP program.

Table 3 Student Satisfaction with Adapted MindUP Program.

Question	General Ed %	Pride %	<i>p</i>
What do you think of the MindUP program?			
Bad	7.69	23.53	0.262 ^a
Just ok	27.38	23.53	
Good or Really Good	64.93	52.94	
How much do you think the MindUp helps kids...			
To feel more relaxed			
Not at all	6.56	17.65	0.640 ^a
Some or a little bit	19.00	14.71	
A lot	74.44	67.65	
Feel Happy			
Not at all	6.79	23.53	0.077 ^a
Some or a little bit	26.02	20.59	
A lot	67.19	55.88	
Get along better			
Not at all	14.48	23.53	0.710 ^a
Some or a little bit	23.98	11.76	
A lot	61.54	64.71	
Be kind, and not mean to each other			
Not at all	12.22	29.41	0.236 ^a
Some or a little bit	21.27	11.76	
A lot	66.52	58.83	
Did you teach anyone at home, school, or in your neighborhood about something you learned in MindUP?			
No	55.88	64.17	0.317 ^b
Yes	44.12	35.29	
Would you tell a friend to do MindUP?			
No	30.77	44.12	0.107 ^b

Yes	69.23	55.88
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Note. ^aWilcoxon Rank-Sum Test, ^bChi-Square Test.

3.4 Sustainability

Sustainability involves both the immediate feasibility of and long-term commitment to the program. This included whether implementation of the MindUP program was overall practical and achievable within the high-needs, urban school and continued through the school year, while accounting for advantages and disadvantages to integrating the program into daily routines and curriculum.

Overall, the school was able to continue an adapted mindfulness program because of the significant adaptations made to the MindUP intervention based on feedback from the teachers and staff. The core practice of breathing (using MindUP “brain breaks” and supplemented breathing scripts and strategies) reportedly produced positive outcomes. In addition, the abbreviated lessons delivered in a PowerPoint format with supplemental materials (e.g., videos, games, books) are what teachers and administrators reported as most feasible to use.

In terms of sustainability, the school was so satisfied with the results of this adapted and supplemented mindfulness program, that the principal (as well as staff and teachers) asked the university research team to implement mindfulness strategies with their staff and students the following school year. They also developed their own whole-school mindfulness initiative, which they coined “*Positive Energy from Our Nose to Our Toes!*” As a result of this program, the school’s long-term strategy included daily morning breathing, mindful meters (to help teachers and students notice and rate their internal regulation system), calm corners in the classrooms, and an entire school-wide resource class dedicated to weekly mindfulness-based interventions (e.g., breathing, social-emotional learning curriculum, stress management techniques, and mindful movement) taught by a dedicated mindfulness-informed teacher (e.g., breathing, social-emotional learning curriculum, stress management techniques, and mindful movement). Along with these teaching tools, the university research team has continued to provide the school with the coaching and training of teachers on mindfulness strategies to work towards independent implementation.

4. Discussion

The purpose of this mixed methods feasibility study was to investigate the logistics of implementation and benefits of a whole-school Mindful Education (ME) curriculum called MindUP with Tier 1 and Tier 3 children in an urban elementary school. We hypothesized that MindUP would be accepted, implemented, and sustained within this school. Overall, the program was well received and implemented, however, the school was unable to implement MindUP with fidelity. Based on school feedback, the program required external supports (e.g., funding, training, and technical) and necessary adaptations (e.g., shorter, simplified, supplemental activities) to be successful. We also hypothesized that there would be key differences between Tier 1, general education and Tier 3, EBD student populations for MindUP. As predicted, we found that Tier 1 and Tier 3 students required different approaches in mindfulness for success and benefits. We then hypothesized that the MindUP program would support positive student behaviors and school climate and may reduce school stress. Our project identified that the mindfulness-based social-emotional learning (SEL) curriculum was beneficial to both the elementary students and to the overall school climate in a

high-needs, urban school. We discovered that the crucial mindfulness-based intervention (MBI) for coping with stress while at school was breathing. The lessons learned in this mindfulness, whole-school curriculum project follow.

Whole-school mindfulness models require strategy and flexibility [22]. Similar to our experience, other schools utilizing MindUP school-wide discovered that teachers preferred a combined approach of stand-alone curriculum supported with adaptations and additional mindfulness tools [20]. We found that MindUP lessons and curriculum were more successful when adapted to be shorter, simpler, and supplemented. Similar to the experiences of others implementing school-based SEL and ME programs [6], the teachers consistently expressed concerns with the amount of time required to implement the MindUP lessons. Thus, the lessons were shortened so they would take no more than 15 minutes to administer.

Guided by teacher feedback that the lessons were too complex, the simplification of MindUP involved the creation of easy-to-use PowerPoints translated from the MindUP manual that included mindfulness activities selected for the teachers (versus teachers choosing from many options) and intentionally focused on teaching simple breathing and mindfulness techniques (versus teaching the entire MindUP lessons). As requested by the teachers, the MindUP curriculum was supplemented with activities and materials to enhance teacher instruction and student engagement. Supplementation included the use of developmentally appropriate and playful breathing games and exercises, mindfulness videos, and stories paired with mindfulness practices to deepen the teaching of SEL concepts (e.g., reading a child-friendly book demonstrating kindness). These changes cultivated increased buy-in to teaching the MindUP lessons as adaptations reportedly produced positive outcomes in the classroom with students.

It is important to note that these adaptations were made possible because the intervention program possessed many supports and resources that may not be available to other schools (especially high-need, urban schools). We were fortunate to have grant funding to cover the cost of: (a) the mindfulness materials made available to all involved in implementing the program, (b) compensation for the certified MindUP consultant that led the trainings and was available for consultations, (c) compensation for teachers to complete pre- and post-surveys, and (d) the technical support of a university research team that organized and adapted the program and provided teachers with continual coaching and hands-on guidance. Unfortunately, those resources are hard to come by for urban schools that may need these interventions the most [6]. However, schools may also be able to find local funding to cover the start-up costs of a beneficial mindfulness program.

Although some challenges can be addressed through an adaptive or modified approach, some implementation challenges stem from within the school environment. Even with the adaptations and external support from the MindUP consultant and university research team, there may have been other factors stemming from disparities (e.g., high crime areas, trauma history) that may contribute to the effectiveness of the program. In spite of the challenges, the whole-school approach to mindfulness—and specifically an adapted MindUP—demonstrated multiple positive outcomes for teachers and children. The convergent mixed data of qualitative information support the quantitative findings that this adapted mindfulness program was well received by the teachers, as 90% of the teachers felt positive to very positive about the program.

The aspect of the program they recognized as easiest to employ and most beneficial was the brief (1-to-3 minute) deep breathing exercises. Teachers reported breathing to be the most helpful aspect

of this mindfulness program for regulating emotions, managing and decreasing stress, and for improving focus in the classroom [34]. The principal especially found breathing to be beneficial to the school culture; at the mid-year point he began leading whole-school breathing exercises for several minutes during morning announcements. Thus, it appears that simple breathing exercises (versus a heavy curriculum) taught and practiced with students several times a day can result in significant positive outcomes for high-risk students [34].

Information provided in the Teacher Satisfaction Survey (TSS) indicated that the percentage of completed MindUP lessons taught by teachers significantly decreased as the school year progressed. Fortunately, this measure also sheds light on how the MindUP program can be better taught to teachers and administered to students. For instance, 29.05% of teachers (9 total) felt that more than one day of training was needed to be comfortable and confident with implementing the program. Some teachers indicated they would have liked more time to learn about mindfulness, particular techniques, and to practice and brainstorm problem areas. Teachers need to feel comfortable and readily trained in order to use the material with more ease [12]. This feedback from teachers is vital to improve upon the administration and implementation of MindUP in the future [20].

We found that 97% of teachers reported that the program had a positive effect on the students in their class (e.g., decreasing bullying). These findings are consistent with the students' report on the Student Satisfaction Survey (SSS) that the adapted MindUP program was beneficial (e.g., feeling more relaxed and happier) for themselves and their classmates. These positive feelings of calm spread to the larger school climate, as reported by the teachers, administrators, and the university researchers. It appears that as the teachers were instructing the students about the mindfulness strategies they were also instructing themselves, consequently personally benefiting from the interventions.

The results of the Teacher Social Competence Ratings Scale (TSCR) indicate that the adapted MindUP led to improvements with regard to all the behavior outcomes (i.e., less aggression/disruptive behaviors and improved concentration/attention and social/emotional competence) for students in Tier 1 general education (GE) classes. Although the students in the Tier 3 Pride program did not exhibit significant improvement in concentration/attention and social-emotional competence, the educators (i.e., administrators, teachers, and behavior interventionists) involved in educating these students observed the mindfulness-informed strategies to be particularly helpful for their specialized Tier 3 student population. These positive results are particularly interesting because the Pride teachers initially did not expect the program to work on their students because of the additional emotional and behavioral challenges they face in the self-contained classroom. These findings appear to be unique because we are not aware of any other published study documenting the benefits of a school-based mindfulness program for children with these types of emotional and behavioral issues. The most closely related study focused on children with autism spectrum and found that school-based mindfulness program led to improvements in response inhibition, interference control, and overall selective attention [26], which are executive self-control functions that EBD children struggle with as well. Therefore, a ME program can be beneficial for student within a general and/or emotional behavioral disorder (EBD) educational setting.

4.1 Limitations and Future Research

The results of this mixed methods intervention program need to be considered in light of the study's limitations. We did not have a control group; due to MindUp being a year-long program the school district was not in agreement with having some students receive mindfulness and others not. As such, we decided to utilize a whole-school approach, which allowed for the opportunity for all student to participate, but did not allow for a control group. Because this study was deemed to be a program feasibility and implementation project, it was designed so that all children whose parents did not opt out would be included. While this resulted in a large sample size, it was not possible to create information that would allow the researchers to link the individual student data from pre- and post-intervention because the school district de-identified the data. Fortunately, there was not a lot of student turnover during the school year and we were able to examine changes within the classroom groups and the cohorts representing the two types of classrooms (GE versus EBD/Pride education) and grades. It is unfortunate that data on gender was not collected as there may have been gender differences in the responsiveness to and benefits of the program.

Limitations related to the data collection include the inability to determine if the GE and Pride teachers differed in their satisfaction with the program because of the small number of Pride teachers. This information would have provided valuable information about additional mindfulness adaptations that may be necessary for teachers working with an EBD student population. Another limitation relates to the use of a subjective measure (i.e., TSCR) where teachers rate each child in their class before and after the intervention. It is not clear how well the teachers knew the students when completing the first assessment at the beginning of the school year and how well they could recall details about each child when completing the final assessment. Because this quantitative data was only collected at two time points, it was not possible to determine which aspects of the intervention were most appreciated and beneficial to the students as examined in the TSCR. This information would have been useful in potentially streamlining the program so that it may be more easily implemented in other schools. Limitations in data coding are also acknowledged as the three university researchers all bring positionalities that influence their worldview as they coded data. Future studies of ME curriculum could utilize applied thematic analysis for coding to increase rigor and transparency, thereby reducing potential bias [35].

Future studies should be designed in a manner that allows for the collection of demographics and linking information and naturalistic and behavioral data to increase our understanding of who benefits from the program. Data should also be collected at various points so progress can be assessed and it can be determined if there is a point in which the majority of the benefits are achieved. Future studies can also measure various constructs associated with student- and teacher-reported well-being and stress, with more focus on how teachers benefit from implementing a mindfulness education program (e.g., self-compassion, life-satisfaction, burn-out) [13]. In addition, our study did not examine how a mindfulness curriculum positively impacts important teacher variables (e.g., teaching styles, teacher satisfaction/frustration, teacher enthusiasm) [36-38] and should be an area to study.

As recommended by the program's stakeholder it is also important to get caregivers involved earlier in a whole-school mindfulness program so they can more readily reinforce strategies at home, and expand the program to include the modeling of breathing techniques before the start of PTA meetings and parent nights. Mindfulness coping strategies could have carry-over benefits at home,

especially for student stress and parent frustrations when managing homework [39]. Specifically, future studies could investigate how mindfulness tools can be taught as an effective intervention to both students and parents and utilized at home to manage stressors associated with homework [40]. With these adaptations, it may be possible to achieve the goals of expanding the scope of a school-based MBI tool utilization from school to home environments [11].

5. Conclusions

A Mindful Education (ME) curriculum—an adapted MindUP program—was accepted, implemented, effective, and sustainable in an urban school serving both Tier 1 and Tier 3 students, with breathing as the most beneficial mindfulness-based intervention (MBI) for managing and reducing student stress and for creating a calmer school climate. This mindfulness, school-based study supports the recent research [41] that mindfulness lessons in classrooms can reduce the negative effects of stress, improve focus, and decrease behavior problems. These findings suggest that mindfulness instruction—with a focus on breathing—can be an appropriate and easy-to-use social-emotional learning (SEL) tool to increase student resiliency and an effective coping mechanism for school-related stress.

Despite significant challenges in a whole-school integration of MindUP into current daily school curriculum, there were opportunities to address these challenges through increased teacher support/coaching and adopting a modified approach to the MindUP program. It may be cumbersome and unrealistic for underserved schools to carry out this type of whole-school ME program with fidelity. Nonetheless, a ME curriculum, such as MindUP, could be beneficial to the teachers in these environments who are heavily invested and interested in integrating mindfulness instruction throughout the school day as research suggests the importance of teacher buy-in on successful SEL outcomes [5, 42, 43]. Thus, we recommend generating more buy-in from a self-selected small group of leaders and teachers who are already knowledgeable and/or showing interest in MBIs and want a more robust mindfulness program within their classroom. From this smaller subset, program fidelity would be easier to track and measure, and the training, coaching, and development of teachers' skills could be more tailored and detailed.

The feedback-integrated adaptations to the MindUP intervention program were well received by the teachers and beneficial to the students. Important lessons were learned from a whole-school implementation of the MindUP curriculum in an urban school. First, because breathing is the most liked and beneficial aspect, programs with limited funding should consider integration of mindful breathing into their curriculum. Second, regardless of whether implementing a full-scale curriculum or a breathing focused intervention, the lessons need to be short, simple, and fun. Third, for buy-in and implementation fidelity, begin with a self-identified group of teachers and then move outward to a whole-school approach. Finally, enlist parental buy-in to the culture of mindfulness to keep students practicing mindfulness in their home environments.

Author Contributions

Allison B. Ventura: Conceptualization, methodology, investigation, formal analysis, writing-original draft, writing-review and editing, funding acquisition. Barbara I. Kissam: implementation, data collection. Kandise Chrestensen: implementation, data collection. Ian Tfirm: formal analysis.

Jennifer Brailsford: formal analysis, writing-original draft. Lourdes P. Dale: writing-review and editing, formal analysis, supervision.

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Competing Interests

The authors declare that they have no conflict of interest.

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