



## **The Effects of Mindfulness Training on Wisdom in Elementary School Teachers**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author JNB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors BH and HHM designed the study, wrote the protocol, managed the literature searches and contributed to drafts of the manuscript. Authors BH and HCN managed the analyses of the study and contributed to drafts of the manuscript. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aims:** School teachers have hundreds of spontaneous interactions with students each hour, requiring frequent decision-making. Often these interactions require social understanding and emotional self-regulation, two constructs often identified with wisdom and mindfulness. Increasing mindfulness could aid wiser management of classroom demands. The present study evaluated effects of an online mindfulness course on measured wisdom in a sample of public elementary school teachers.

**Study Design:** This study used a pretest posttest design using data collected immediately before taking the online mindfulness course and after completion of the course. End of the school year follow-up data was analyzed for all teachers.

**Place and Duration of Study:** Participants were enrolled from multiple cities across the United States including Boston, Columbus, Chicago, Milwaukee, Seattle, and San Diego between June 2014 and June 2015. Data were collected online and analyzed at the University of Chicago.

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**Methodology:** Public elementary school teachers ( $n = 12$ ) were assigned to a mindfulness training or a matched wait-list condition (11 female, 1 male; age range 26 – 57 years). Teachers had a range of teaching experiences from 1 to 36 years (median =18 years) and taught grades K-4 at schools with 30% - 50% Caucasian students with 40%-60% students receiving free and reduced-price lunches. We used standardized measures for mindfulness, wisdom, emotion regulation, compassion, theory of mind, state/trait anxiety, stress, burnout, and efficacy.

**Results:** Online mindfulness training produced a significant increase in mindful awareness and changes in cognitive wisdom implying increased understanding of inter/intrapersonal concerns. There was a significant increase in mindful attention in those who completed both pre- and post-class online evaluations ( $n = 10$ ) solicited by Mindful Schools ( $t(9) = 2.738, p = .02$ ) from 54.3 to 59.9 following training ( $\Delta M = 5.6, SD = 6.5$ ). Wisdom, measured with Ardelt's Three-Dimensional Wisdom Scale ( $n = 12$ ), demonstrated a significant change increase in the cognitive dimension of wisdom ( $t(11) = 2.39, p = .03$ ) with a non-significant increase in the affective dimension ( $t(11) = 1.38, p = .19$ ) and a non-significant reduction in the reflective dimension of wisdom ( $t(11) = .96, p = .35$ ) following mindfulness training.

**Conclusion:** Online mindfulness training may help develop wise decision making as a skill for teachers to aid classroom management and social problem solving.

*Keywords: Elementary teacher education; practice-based teacher education; problem solving; reflection; learning environment; wisdom; mindfulness training.*

## 1. INTRODUCTION

Over the past few decades, there have been increased challenges for public school teaching including regimented standardized testing, heightened curricular expectations, greater demands for classroom management, and a need for differentiated instruction across diverse student populations [1]. The toll of these challenges can be seen on the profession through teaching shortages and attrition rates. In 2003, the National Commission on Teaching and America's Future (NCTAF) [2] reported that the attrition rate for teachers was 46% within the first 5 years of becoming a public-school teacher. Statewide teaching shortages have varied across the nation. For example, 62% of Arizona school districts had unfilled teaching positions in 2013, while California had one-third of its permits issued to underprepared teachers in 2014 [3]. Since the 1990s, the rate of teachers leaving the profession far exceeded the rate of teachers entering the field [2]. It has been reported that across the United States, 42 states have shortages in math teachers and 40 states have shortages in science teachers [3]. At this rate, the ratio of teachers to students could potentially fall below the level of teachable classroom sizes in which student learning may be affected by teacher skills, instructional approaches, and coping mechanisms [4,2,1].

Recent research has indicated some of the major factors contributing to teacher stressors including workload, difficulty managing classroom

behavior, and lack of administrative support [5]. Although these are described as stressors for teachers, there are adverse implications for students as well. While teacher-student interactions can range from 1200-1500 per day with most requiring frequent, impromptu complex decision making [6], teacher cognition and attitudes impact relationships in the classroom and overall school climate [7]. Jennings and Greenberg [8] have described the ill effects of teacher burnout on students and school climate, such that increased stress on teachers due to classroom and work demands degrade the quality of the learning environment.

In recent years, education reform has called into question the resources available for teachers to effectively educate, and the ability of school systems to retain teachers and safeguard their well-being. Proposed solutions have included changes in teacher training, mentorship, teacher selection processes, and continued professional development [9]. One of the areas targeted for teacher training is professional disposition, which is of primary interest in the present study given that teacher disposition or learned habits of mind critically affect teacher behavior and judgment in routine decision making and when confronted with potentially difficult and demanding situations in the classroom [9,1,7]. We hypothesized that increasing wise decision making could benefit teachers in meeting such demands because wise decision making is typically effective in the domain of social problem solving [10] and should increase human flourishing [11]. We

hypothesized that increasing mindfulness may have positive effects on wisdom [12] - recent research shows that meditation and wisdom are related [13] and suggests that mindfulness may be important. The current study was designed to examine specifically the relationship between a mindfulness intervention for teachers through an online training course and changes in measured wisdom in a cohort of elementary public school teachers under the assumption that wisdom is related to increased expertise in social decision making and emotional self-control [14,15].

## 1.1 Literature Review

Kabat-Zinn [16] defined mindfulness as intentionally directing attention to aspects of a current situation without making judgments about those aspects. Mindfulness has become a technique used by many to relieve stress and enhance resilience [17,18,19]. It also may aid in developing habits of mind that are key to teacher success including such things as emotional balance, personal well-being, and learning from failure without judgement [1]. In a prior study, teachers reported mindfulness practice as an effective means of dealing with daily work stressors, and as teachers increased in mindful awareness, they used these skills to cultivate compassion towards self and others during challenging moments [5]. We assessed changes in mindfulness by using the Mindful Attention Awareness Scale (MAAS) which has been positively correlated with openness to experience and negatively correlated with rumination or perseverance of affectively negative thoughts [20].

Sternberg [21] notes that a dictionary definition of wisdom involves right judgment and sound action based in knowledge, understanding, and experience. His *Balance Theory of Wisdom* argues that wisdom is a kind of practical intelligence that balances intrapersonal, interpersonal, and extrapersonal interests to achieve a common good [21]. From a related but slightly different theoretical perspective, Ardel's [15] Three-Dimensional Wisdom Scale (3D-WS) measures wisdom on: a cognitive dimension that measures a person's ability to understand the deep meaning of life; a reflective dimension that measures self-awareness and insight; and an affective dimension that measures emotional homeostasis and prosocial attitudes and behaviors, such as compassion. These three dimensions can be viewed as skills that are intended to be strengthened through mindfulness practice. Indeed, recent research has

demonstrated a relationship between measured wisdom and meditation [13] with a relationship to mindfulness.

Mindfulness practice, though not specifically intended to develop wisdom, may nonetheless lead to an increased ability to make wiser decisions. Research has indicated that mindfulness affects multiple psychological aspects that may correlate with some aspects of wisdom. Pascual-Leone [12] argued that mindful meditation practice may increase wisdom by applying knowledge, experience, and insight to daily life in a loving and mindful way. This is achieved through mindful meditation practice that pursues a higher level of consciousness defined as dominant executive control of mental schemes [12]. Some evidence of this may be seen in patterns of prefrontal cortex activity as an effect of mindfulness. While performing a cognitive task, high stress groups across multiple studies including medical students, nursing students, incarcerated youth, and military cohorts from the Army and Marines, have shown similar patterns of prefrontal cortex activity that correlated with mindfulness practice [22,23,24]. More specifically, mindfulness practice has demonstrated left asymmetry and prefrontal activation [19,25]. These studies may provide some evidence to Pascual-Leone's [12] assertion that strengthening cognitive control through mindfulness meditation could increase wise decision making.

Ardel's [15] affective dimension of wisdom involves emotional homeostasis and compassion. In terms of emotional self-regulation, results from past research have shown mindfulness practice to bolster emotion regulation in high stress groups [24], and to predict emotional awareness [18]. While we recognize that wisdom is not a psychological construct that is typically invoked either in teacher training or education research, the present study used Ardel's [15] 3D-WS in order to assess changes in wisdom as an effect of a mindfulness intervention. We also included measures specific to emotion regulation [26] and compassion [27,28].

## 1.2 Study Objectives

### 1.2.1 General objectives

The present study aimed to assess the relationship between mindfulness and wisdom as it relates to emotional homeostasis and social decision making.

### 1.2.2 Specific objectives

The present study examined how wisdom and wisdom-related measures would be affected by mindfulness training through an online mindfulness training program developed and administered by Mindful Schools (mindfulschools.org). Past research with the program indicated beneficial effects of the 6-week online course including changes in mindful awareness [29]. We hypothesized that there would be an increase in mindfulness, wisdom, emotion regulation, self-compassion, and compassion for others from pretest to posttest (following training). We also predicted a decrease in teachers' stress, anxiety, and burn-out from pretest to posttest.

## 2. METHODOLOGY

This research was supported by the University of Chicago Center for Practical Wisdom and funded in part by the John Templeton Foundation.

### 2.1 Participants

Teachers ( $n = 12$ ) were recruited from public, elementary schools in various cities across the United States, including Boston, Columbus, Chicago, Milwaukee, Seattle, and San Diego. Of the original 16 enrolled, 4 were unable to complete the 6-week online course. Of the remaining 12 teachers, most were female ( $n = 11$  female;  $n = 1$  male). Age ranged from 26 years to 57 years ( $M = 40.5$  years) with most teachers being Caucasian ( $n = 8$  Caucasian,  $n = 2$  African American,  $n = 2$  Hispanic). Teachers were recruited from schools within the following parameters: schools within the six aforementioned cities; teachers of grades K – 4; and schools with student demographics of 30%-50% Caucasian, and 40%-60% students receiving free and reduced-price lunches. The range of years of teaching experience among participants was 1 to 36 years ( $M = 16$  years; Median of 18 years).

### 2.2 Study Design

This study used a pretest/posttest design in which data were collected immediately before taking the online mindfulness course and after completion of the course. End of the school year follow-up data was analyzed for all teachers. A waitlist control (one group initially took the course while, a second group waited during that time period for the opportunity to take the course) was used to compare the treatment effect with a no-treatment control during the same time period as shown in Table 1.

This table represents a timeline of testing points across two groups. Sixteen teachers were initially enrolled in the study. They were randomly and evenly assigned to one of two groups (Group I – Immediate and Group II – Waitlist). Group I was assigned to the 6-week online mindfulness course during the summer of 2014 (ending 8/23/14), while teachers in Group II were waitlisted and assigned to available 6-week course sections during the winter (ending 11/14/14 or 2/27/15). Surveys were administered to all participants just prior to Group 1's start date, at Group 1's course completion, at Group 2's course completion, and at the end of the school year. Pre-intervention survey data were collected just prior to their respective course start dates (Group I on 7/10/14 and Group II on 8/23/2014). Post-intervention surveys were implemented after course completion (Group I on 8/23/14 and Group II split between two dates, 11/14/2014 and 2/27/15). End-of-year follow-up survey data from all participants were collected on 5/1/2015.

Two teachers from each group failed to complete the mindfulness training at varying points in the course. Therefore data collected from four teachers were excluded from the analysis. Additionally, for those who completed the course, data that did not coincide as pre/post course data were not included in the analysis.

**Table 1. Data collection time points by group**

Group	7/10/14	8/23/14	11/14/14	2/27/15	5/1/15
Group I – immediate (n=8)	8	6	4	0	8
Group II – waitlist (n=8)	8	8	3	3	8
Keys:	Pre test data		Excluded data		
	Post test data		Follow – up- data		

## 2.3 Procedure

All qualifying teachers completed a pretest survey and were randomly assigned into either the online mindfulness training intervention (Group 1) or a waitlist group (Group 2). The online mindfulness course has been reported to elicit behavioral changes in attentional control, social interaction, and emotional self-control and an increase in mindfulness in new practitioners [29]. For this exploratory study on wisdom and mindfulness, the pre-developed program was a practical method of providing training to mindfulness novices across multiple cities in a standardized format.

The online mindfulness course, Mindfulness Fundamentals, is a 6-week self-paced online course offered routinely by Mindful Schools. The course objectives included learning and daily practice of the basics of mindfulness meditation, techniques for navigating emotions, cultivating positive states of mind (e.g., gratitude, kindness, joy, compassion), and the role of mindfulness in communication [30]. Each course was led by an experienced guiding teacher who facilitates the course activities and provides ongoing feedback to participants. Teaching and learning methods included readings, recorded lectures, other multimedia, daily practice, regular written reflections, and online discussions. This online training course has been reported to elicit behavioral changes such as emotional awareness, increased compassion, and increased mindfulness for new practitioners [29].

All teachers were given a follow-up survey upon Group 1's completion of the online course and then subsequently in conjunction with Group 2's completion of the online mindfulness intervention. They completed a final follow-up survey at the end of the school year to determine if there were any long-term effects of the intervention (see Table 1). To understand the scope of impact that the mindfulness course may have on wisdom in elementary school teachers, several self-report measures were included in our study: 3D-WS [15], MAAS [17], ERQ [26], Five Facet Mindfulness Questionnaire (FFMQ) [20], Self-Compassion Scale [28], SCBCS [27], Reading the Mind in the Eyes (RMET) [31], Teacher Stress Inventory [32], Teachers' Sense of Efficacy Scale [33], Teacher Burnout Scale [34], and the State-Trait Anxiety Inventory for Adults (STAI) [35]. The MAAS [17] was administered by mindfulschools.org as a

standard measure of effectiveness of their program. The Cognitive Reflection Task-Expanded (CRT-E) [36] was administered upon completion of Group 2's training and at follow-up, after preliminary results demonstrated changes in the various dimensions of wisdom. All other surveys were administered prior to the course, at course completion for Group 1, at course completion for Group 2, and upon follow-up at the end of the school year (see Table 1). End of the year follow-up included questions on continued use were as follows:

- 1) Since taking the online course, have you used the skills or techniques you learned in your online training?
- 2) How often do you use these skills and techniques?
- 3) Which skills or techniques do you use?
- 4) Do you use any of the skills or techniques from your online training in your classroom with your students?
- 5) If so, which skills or techniques do you use in the classroom with your students?

All surveys were administered online. Participants were sent a link to the group of surveys with the STAI [35] presented first to avoid inducing state anxiety from taking numerous surveys, followed by 3D-WS [15] and FFMQ [20], the most salient characteristics of interest. The rest of the surveys were randomized to take into account the possibility for incomplete surveys due to length of multiple instrument completion in a single session.

The RMET is a performance measure of theory of mind through indexing emotion recognition in 36 sets of eyes and word choice selections [31]. The CRT-E is a 7-item measure of reflective and deliberative ability as opposed to superficial spontaneous response [36]. The rest of the surveys were Likert scale, self-report measures to assess a degree of varying characteristics. Both the MAAS [17] and FFMQ [20] are scales that measure aspects of mindfulness. Compassion for the self was measured using the Neff [28] self-compassion scale while compassion for others was measured using the SCBCS [27]. To understand perception of anxiety, this study used the STAI [35]. Measures that were specific to adverse characteristics of teaching included the Teacher Burnout Scale [34] and the Teachers Stress Inventory [32]. The perception of teaching effectiveness was measured with the Teachers' Sense of Efficacy Scale [33].

### 3. RESULTS

Given that the online course intervention was designed to increase mindfulness, we assessed changes in mindfulness as measured by the Mindful Attention Awareness Scale [17]. Using data provided by the online training program ( $n = 10$ ), there was a significant increase in mindful attention in those who completed both pre- and post-class online evaluations (MAAS) solicited by Mindful Schools ( $t(9) = 2.738, p = .02$ ) from 54.3 to 59.9 following training ( $\Delta M = 5.6, SD = 6.5$ ). Further, as measured by the 3D-WS [15], there was a significant change in cognitive wisdom ( $t(11) = 2.39, p = .03$ ) from 51.58 at pretest to 53.33 at posttest ( $\Delta M = 1.75, SD = 2.52$ ), with a non-significant increase in the affective dimension ( $t(11) = 1.38, p = .19$ ) from 50.33 to 52.4 ( $\Delta M = 2.07, SD = 5.2$ ), and a non-significant reduction in the reflective dimension of wisdom ( $t(11) = .96, p = .35$ ) from 48 to 46.75 ( $\Delta M = -1.25, SD = 4.51$ ) as a result of mindfulness training as shown in Fig. 1. No other measures showed significant changes as a result of mindfulness training.

Compassion for others showed a marginal change ( $t(9) = 1.9, p = .09$ ) from 5.88 before training to 6.14 following training ( $\Delta M = .26, SD = .43$ ), as did changes in self compassion ( $t(11) = 2.11, p = .06$ ) from 3.2 to 3.48 ( $\Delta M = .28, SD = .45$ ) as shown in Fig. 2.

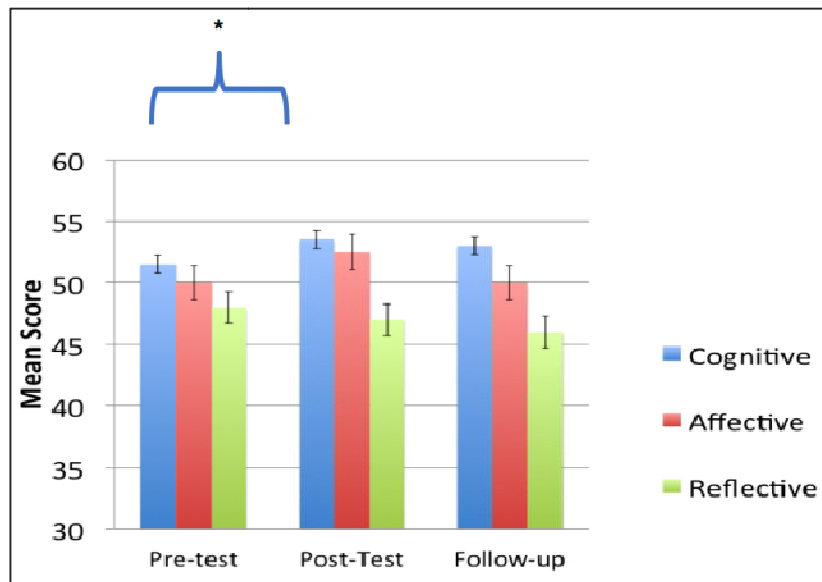
There was no change in any of the other measures (see Table 2).

This table indicates individual scales with listed pre-test mean, post-test mean, change in mean, standard deviation, and statistical report including p-value for each of the measures used in this study. Data from incomplete surveys were excluded from analyses.

At the end of the school year, additional surveys were administered. Incomplete surveys were not included in analyses, thus the sample sizes varied for these end of year measurements. For those measures that showed significant or near significant changes from pre- to post-intervention administration, the end-of-the-year measures indicated no significant changes from the posttest after participation in the online mindfulness course had ended. There was no change in the cognitive dimension of wisdom ( $t(10) = .058, p = .96$ ) from 53.18 following training to 53.09 at end of year follow-up. There was no change in self-compassion ( $t(10) = 1.4, p = .19$ ) from 3.4 after training to 3.3 at follow-up. For those participants who were able to complete all follow-up surveys of compassion for others ( $n = 7$ ), there was a significant reduction in compassion for others across time ( $t(6) = 4, p = .007$ ) from 6.2 after training to 5.7 at the end of the school year follow-up. In addition, all teachers ( $n = 12$ ) reported some continued use of the mindfulness skills learned in the course at the end of the year: 20% used mindfulness daily; 40% reported using mindfulness once per week; and 40% reported using mindfulness less than once per month.

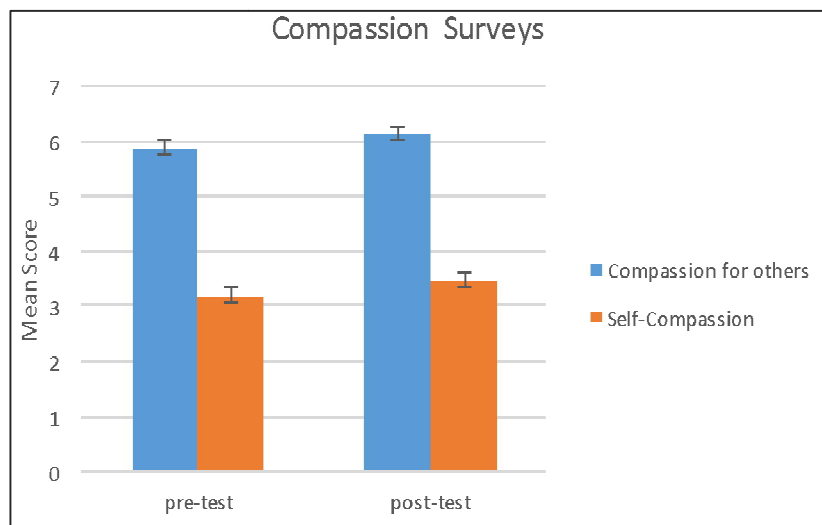
**Table 2. Scores by specific scales and subscales**

Scale	pre-test <i>M</i>	post-test <i>M</i>	$\Delta M$	<i>SD</i>	Value
MAAS*	54.3	59.9	5.6	6.5	$t(9) = 2.738, p = .02$
<b>3DWS</b>					
cognitive wisdom*	51.58	53.33	1.75	2.52	$t(11) = 2.39, p = .03$
affective wisdom	50.33	52.40	2.07	5.2	$t(11) = 1.38, p = .19$
reflective wisdom	48.00	46.75	-1.25	4.51	$t(11) = .96, p = .35$
Compassion for others	5.88	6.14	0.26	0.43	$t(9) = 1.9, p = .09$
Self-compassion	3.20	3.48	0.28	0.45	$t(11) = 2.11, p = .06$
<b>ERQ</b>					
reappraisal	32.2	33.6	1.4	3.86	$t(9) = 1.14, p = .281$
suppression	13.4	16.5	3.1	7.9	$t(9) = 1.24, p = .25$
FFMQ	136.25	135.50	-0.75	9.39	$t(11) = -.09, p = .93$
State anxiety	31.6	30.8	-0.8	7.6	$t(11) = .34, p = .74$
Trait anxiety	35.8	37.2	1.4	4.8	$t(11) = .95, p = .36$
RMET	26.8	28.8	2	4.6	$t(10) = 1.4, p = .18$
Teacher sense of efficacy	7.7	7.8	0.1	0.72	$t(11) = .5, p = .63$
Teachers burnout	33.5	33.6	0.1	5.96	$t(11) = .05, p = .96$
Teachers concerns	2.2	2.2	0	0.33	$t(11) = .14, p = .89$
CRT	.3	.27	-.03	.3	$t(11) = .28, p = .78$



**Fig. 1. Comparison of changes in three dimensions of wisdom**

Results demonstrated an increase in cognitive wisdom from 51.58 to 53.33 ( $\Delta M = 1.75$ ,  $SD = 2.52$ ), with mindfulness training ( $t(11) = 2.39$ ,  $p = .03$ ), with no change at the time of follow-up ( $M = 53.09$ ). Though not statistically significant, affective wisdom increased from pre to post test ( $t(11) = 1.38$ ,  $p = .19$ ) from 50.33 to 52.4 ( $\Delta M = 2.07$ ,  $SD = 5.2$ ) and returned to baseline ( $M = 49.9$ ) with a decrease in mindfulness practice; and reflective wisdom gradually decreased from 48 at pre test to 46.75 at post test ( $\Delta M = -1.25$ ,  $SD = 4.51$ ), ( $t(11) = .96$ ,  $p = .35$ ), with a continued decrease to 45.81 at follow-up



**Fig. 2. Compassion surveys pre and post test**

Though not significant, an increase in compassion for others ( $t(9) = 1.9$ ,  $p = .09$ ) from 5.88 to 6.14 following training ( $\Delta M = .26$ ,  $SD = .43$ ) and an increase in self compassion ( $t(11) = 2.11$ ,  $p = .06$ ) from 3.2 at pre test to 3.48 post mindfulness training was demonstrated. Changes on compassion scales follow a similar pattern to the changes in the affective/compassion dimension of wisdom. Data from incomplete surveys were excluded from analyses

#### 4. DISCUSSION

The present results suggest that mindfulness training can increase mindful attention attributes

in the elementary school teacher cohort, even when provided through an online program. Further, mindfulness training increased mindful awareness along with the cognitive dimension of

wisdom. This dimension refers to a person's ability to make decisions when there is uncertainty [15]. One explanation is that as mindfulness increases, applying tacit knowledge of life may lead to a more comprehensive understanding of situations and which can improve decision making. Teacher disposition and mindful awareness may be mechanisms by which teacher behavior and judgment in routine decision making potentially lead to wiser decision making in the classroom. While the present results suggest that mindfulness training can improve aspects of wisdom, future replications with (1) larger samples, (2) fewer self-report measures, and (3) active control groups would be useful to further investigate the effect of mindfulness practice on wisdom. Also, a measure of actual time spent engaged with the mindfulness training as well as time spent practicing the mindfulness techniques would make it possible to assess engagement with training and the effects of training intensity on mindfulness and wisdom.

At the end of the school year, participant teachers reported experiencing a benefit from the mindfulness course, and reported continued use of some form of mindfulness techniques learned in the class. This implies there can be lasting effects of mindfulness practice over time. However, most reported using the techniques infrequently, once per week to less than once a month. Thus, it was not surprising to there was not continued growth in the effects of the training from the posttest to the end of the school year given the decrease in daily practice from engagement in the 6-week course.

Furthermore, some descriptive trends in the data may be of interest to study further with respect to aspects of wisdom and mindfulness. Although increases in compassion for others, measures of self-compassion, and emotion regulation did not change significantly from pretest to posttest, further analysis of those participants who completed all surveys in every session, indicated a significant decrease in compassion for others upon end-of-year follow-up ( $n = 7$ ). Whether this is due to sample selection, repeated testing, or just fatigue at the end of a school year cannot be assessed in the current study.

## 5. CONCLUSION

While an online mindfulness training course requires time and effort, it has some measurable benefits for teachers. It is possible that a more intensive, in-person mindfulness training for

teachers might have greater benefits. Continued use of mindfulness techniques after training ends may be helpful in maintaining and further developing the benefits of training. It may be best to think of mindfulness as a practice that is engaged regularly rather than something that once learned retains a benefit.

The present results indicate the need for further research to better understand the relationship between mindfulness and dimensions of wisdom, to further delineate the impact of mindfulness on compassion, particularly with continued daily practice, and how mindfulness and wisdom may impact teacher well-being and effectiveness in the classroom. From a classical view, wisdom is important to make decisions that benefit both one's self as well as others to increase human flourishing. Developing wisdom and mindfulness may well reduce the stresses and demands of the classroom and thereby provide the cognitive and emotional capacity to address classroom challenges more effectively, specifically in such things as classroom behavior, pedagogy, teacher disposition, routine decision making, and school climate. It is important to understand these unique challenges that teachers face, as these were barriers to obtaining the teachers for assessment across the school year. Even with the limited sample, it might be said that practical wisdom may be developed in some way as a skill for teachers to utilize in the classroom and in dealing with everyday life stressors that may one day contribute to lower attrition rates and increase quality of learning for children.

## ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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