Relation of Teachers' Mindfulness with Classroom and Student Outcomes: Examining Potential Mediating Mechanisms

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2016

Relation of Teachers' Mindfulness with Classroom and Student Outcomes: Examining Potential Mediating Mechanisms

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Submitted to Lee Kong Chian School of Business
in partial fulfilment of the requirements for the

Degree of Doctor of Philosophy in Business (General Management)

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2016

ABSTRACT

In recent years, there has been an increasing interest among researchers to investigate the efficacy of mindfulness within the educational sector. However, the majority of existing studies have focused on intrapersonal effects, such as the benefits of mindfulness interventions experienced by specific student or teacher samples. Set within a tertiary institution in Singapore, the present research examines the relations of teachers' trait and state mindfulness with classroom and student outcomes as well as the potential mediating mechanisms.

Analysis of results using hierarchical linear modelling revealed that (i) teachers' state mindfulness was positively related to student engagement in class, (ii) teachers' trait mindfulness was positively related to end-of-term student feedback on teaching quality, and (iii) teachers' trait mindfulness was positively related to student academic performance. Further exploratory analyses also indicated that the effect of teacher mindfulness on teaching quality is significantly mediated by student engagement. In addition, the positive effect of mindfulness was stronger on teaching quality for new teachers than for experienced teachers, and marginally for male teachers than for female teachers.

The present research contributes to our understanding of the interpersonal effects of mindfulness. Methodologically, this research explores the value of using other-ratings of mindfulness.

I discuss how these findings can provide guidance to school management who wish to implement mindfulness programmes and consequently improving students' overall academic performance. Finally, I present suggestions for future research in interpersonal effects of mindfulness in schools and organisations at large.

EXTENDED ABSTRACT

Context

This research is set within a tertiary institution located in Singapore.

Objective

The objective of this research is to examine the associations and mediating mechanisms linking the hypothesised relationships between teacher mindfulness and student-rated outcomes such as student engagement, teaching quality and academic performance, thereby providing theoretical contribution to the paucity of research in interpersonal mindfulness. The strengths of the two studies lie in their use of student-rated measures and outcomes.

Design, Setting and Subjects

Consisting of two cross-sectional studies, respectively, (i) to investigate the relationship between teachers' state mindfulness (measured before tutorials) and students' engagement in tutorials (measured after tutorials) and mediated by teachers' decentering ability, as they go about teaching their usual classes in a typical week; (ii) to investigate the relationship between teachers' trait mindfulness (measured at the start of the semester) and students' academic performance and teaching quality (measured at the end of the semester), mediated by teachers' empathic concern, fear of compassion for self, emotional intelligence as well as psychological inflexibility.

Measures

Study 1	Independent Variable		Mediators		Dependent Variable	
	Construct	**Measure**	**Construct**	**Measure**	**Construct**	**Measure**
	Trait Mindfulness	FFMQ-SF [T] (24 items)	Emotional Intelligence	WLEIS [T] (12 items)	Academic Performance	Module Score[A]
			Empathic Concern	Davis Interpersonal Reactivity Index – Empathic Concern Subscale [T] (7 items)	Teaching Quality	Standard Student Feedback [S] (7 items)
			Fear of Compassion (Self)	Fear of Compassion Scales – Self Subscale[T] (15 items)		
			Psychological Inflexibility	AAQ-II [T] (7 items)		

Study 2	Independent Variable		Mediator		Dependent Variable	
	Construct	**Measure**	**Construct**	**Measure**	**Construct**	**Measure**
	Mindfulness State	State MAAS [T] (5 items) State-MAAS [S] (5 items)	Decentering	EQ [T] (11 items)	Student Engagement (9 items)	UWES-S [S]
	Control Variables					
	Construct	**Measure**				
	State Affect	PANAS [T] (10 items)				

Legend

T : Teacher/Self-rated; S : Student-rated; A : Archive records

AAQ-II : Acceptance and Action Questionnaire–II (APPENDIX J); EQ : Experiences Questionnaire – Decentering Subset (APPENDIX B); Davis IRI : Davis Interpersonal Reactivity Index–Empathic Concern Subscale (APPENDIX C); Fear of Compassion Scale – Self Subscale (APPENDIX I); FFMQ-SF : Short Form Five-Factor Mindfulness Questionnaire (APPENDIX F); I-PANAS-SF : International Positive and Negative Affect Schedule Short Form (APPENDIX C); Standard Student Feedback : Standard Student Feedback conducted at end of semester (APPENDIX K); State MAAS[T] : State - Mindfulness Attention Awareness Scale (APPENDIX A); State MAAS[S] : State - Mindfulness Attention Awareness Scale (APPENDIX E); UWES-S : Utrecht Work Engagement Scale – Student (APPENDIX D); WLEIS : Wong and Law's Emotional Intelligence Scale (APPENDIX G)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

AAQ-II	Acceptance and Action Questionnaire-II
BPM	Buddhist Psychological Model
CAStRM	Class Average Student-rated State Mindfulness Attention Awareness Scale
DBT	Dialectical Behaviour Therapy
EmpCon	Empathic Concern
Engage	Student Engagement
Fdbk	Feedback rating , measure of Teaching Quality
FearCom	Fear of Compassion for Self
FFMQ	Five-Factor Mindfulness Questionnaire
I-PANAS-SF	International Positive and Negative Affect Schedule - Short Form
MAAS	Mindfulness Attention Awareness Scale
MBCT	Mindfulness-based Cognitive Therapy
MBI	Mindfulness-based Intervention
MBSR	Mindfulness-based Stress Reduction
ModSc	Module Score, measure of Student Academic Performance
PsyInflex	Psychological Inflexibility
SMAAS	State Mindfulness Attention Awareness Scale
StRM	Student-rated State Mindfulness Attention Awareness Scale
TAFdbk	Teacher Average Feedback rating, measure of Teaching Quality
TAStRM	Teacher Average Student-rated State Mindfulness Attention Awareness Scale
TeRM	Teacher-rated State Mindfulness Attention Awareness Scale
UWES-S	Utrecht Work Engagement Scale - Student
WLEIS	Wong and Law's Emotional Intelligence Scale
YrsExp	Years of Teaching Experience

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisors, Associate Professor Jochen Reb, Associate Professor William Tov and Professor Thomas Menkhoff for their continued advice, guidance and support throughout the dissertation process. I could not have asked for a better dissertation committee and supervisors! I will always remember the many interesting chats and discussions over coffee and tea.

Just as importantly, to my employer, colleagues and students who graciously participated in various surveys despite their work commitments and studies, without which this dissertation would not have been possible.

Finally, a big thank you to my family especially my mother, who has been forever so supportive throughout the period of my studies, and not forgetting the endless supply of her love, sumptuous food and herbal teas. I am forever deeply indebted to you, Mum!

INTRODUCTION

Managing any educational institution is a complex business; there are multiple stakeholders that the management is accountable to, both externally and internally. On one hand, to its external environment, school management is accountable to the education ministry, industry partners and potential students. On the other hand, they will need to contend with the day to day operations and internal coordination among support and corporate departments.

Perhaps more importantly, school-specific issues pertaining to professional development of staff, holistic development of students as well as instructional quality are often key to the continued success and competitiveness of the institution within the education sector that it operates in. To assist school administrations in managing their institutions, it is imperative that performance in these critical areas be translated into measurable classroom and student outcomes for continuous monitoring, reviews and improvement.

For the purpose of this research, we define classroom outcomes as the results of teachers' interaction with students as experienced by the latter in class as a whole. This will entail effectiveness of classroom management, nature of interpersonal climate and teacher-student relationship in class (Roeser, Skinner, Beers, & Jennings, 2012), as well as the level of instructional support and teaching quality. Next, we define student outcomes as the consequences of teacher-student interactions as experienced by students individually. Following this definition, we consider students' individual academic performance and engagement in class as student outcomes. At the class level, students' collective engagement is also be viewed as an important aspect of classroom outcomes.

Prior research has shown that students' engagement in class was important in determining their scholastic achievement (Willingham, Pollack, & Lewis, 2000), and that teachers' support and interpersonal involvement were essential in helping students stay engaged (Klem & Connell, 2004; Skinner & Belmont, 1993). Yet, many will agree, that these remain as some of the many challenges faced by teachers today.

It follows then that any skillset that can help teachers to improve their interaction with students will consequently result in better student engagement and ultimately their academic performance. Therefore, the "the volitional, metacognitively guided employment of non-automatic, usually effortful processes" (Salomon & Globerson, 1987) in mindfulness presents itself as a plausible candidate in teaching and learning environments, through enhancing student engagement and improving their academic performance.

To date, most studies relating to mindfulness done in the education setting generally involved exploring the effects of mindfulness interventions on specific groups of students or teachers separately. While results have been encouraging, some studies lack statistical power due to small sample size, have weak research methodologies (Meiklejohn et al., 2012) or explained few or no mediating mechanisms. These studies ranged from case studies to quasi-experiments, with limited number of causal studies such as randomised controlled trials (Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011).

Specifically related to education settings, in one notable study by Singh, Lancioni, Winton, Karazsia, and Singh (2013), the authors posit that increased mindfulness is likely to change the "bidirectional teacher-student interactions" (Singh et al., 2013, p. 214) and will result in transformational changes in the

teachers, which in turn manifest as improvements in their students. In the said study, the authors employed a multiple-baseline design with a sample of only 3 teachers. While they were able to demonstrate experimental control, the authors also recognised that the study was weak in terms of external validity.

Since the introduction of Mindfulness-Based Stress Reduction (MBSR) programme in 1979, there has been large number of research on mindfulness in clinical settings (Baer, 2003) and increasingly also in non-clinical settings. Among the promising studies in non-clinical settings, research in education settings has begun to receive increased attention and interest, albeit still being in a nascent stage of development. In particular, researchers have been keen to investigate the efficacies of MBSR training in reducing stress in teachers (Franco, Mañas, Cangas, Moreno, & Gallego, 2010; Frank, Reibel, Broderick, Cantrell, & Metz, 2015; Roeser et al., 2013) and in specific groups of students (Franco, Mañas, Cangas, & Gallego, 2010; Van Gordon, Shonin, Sumich, Sundin, & Griffiths, 2014; Viafora, Mathiesen, & Unsworth, 2015). However, most studies only investigated the direct effects that mindfulness training had on the subjects themselves and few examined the indirect effects on others.

The present research is novel and significant in that it examines the influence of mindfulness on third parties through different mediators. Findings from these two studies are expected to make significant contribution in theory and the growing body of literature on impact of mindfulness in non-clinical settings such as education. Furthermore, they are expected to provide useful insights into its potential benefits via the mediating mechanisms.

Accordingly, this research aims to demonstrate empirically the relationships between mindfulness and third party benefits, informed by

theoretically sound conceptual framework and careful research design. In addition, the current research will explore the potential underlying mediating mechanisms. It is envisaged that the positive correlations expected to result from this research will encourage schools' administration to adopt and promote mindfulness training as part of an educator's development programme. On one hand, mindfulness-based interventions will benefit educators directly through reduction of their stress levels, and on the other, their students in terms of engagement and academic performance through enhanced teacher-student interactions.

CHAPTER 1: LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1.1 Defining Mindfulness

The concept of mindfulness can be traced back to more than 2500 years ago, when the Buddha expounded Right Mindfulness as one of the Noble Eight-fold Path. The Nobel Eight-fold Path, the fourth of the Four Noble Truths, is a road map that will ultimately lead one to the cessation of suffering after understanding the truths of suffering, its causes and that suffering can be ended. Right understanding, thought, speech, action, livelihood, effort, concentration, along with Right Mindfulness, together forms the Nobel Eight-fold Path.

The teachings on right mindfulness were recorded in the Anapanasati Sutta, where “anapana” means inhalation and exhalation, “sati” means awareness or mindfulness and “sutta” means scriptures in the Pali language. In the Chinese language, it is commonly translated into “正念” (zheng nian) which means “right thoughts”. “念” in itself, comprises two characters, namely, “今” which means “now” or “present” while “心” means “heart” or “mind”. More recently, another term “静观” (jing guan) has been adopted, which is literally translated to “quietly observing”.

In Buddhist literature, mindfulness is defined as the intentional awareness of one's thoughts and actions in the present moment without judgment, and is applied to one’s body actions as well as thoughts and feelings. Along with ethical conduct and wisdom, one can eradicate the three root causes of sufferings, namely, greed, hatred, and delusion (Rathnasiri, 2012). Mindfulness is also considered to be a prerequisite for developing further insights and wisdom, as one

can be expected to obtain clarity of thoughts and open to new ideas (Brown & Ryan, 2003).

Dr Jon Kabat-Zinn, who founded the Mindfulness-Based Stress Reduction (MBSR) programme while in University of Massachusetts Medical School in 1979, defined mindfulness as "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (Kabat‐Zinn, 2003, p. 145), and accepting the thoughts as they are (Kabat-Zinn & Hanh, 2009). By focusing on the present moment in a welcoming and non-judgemental manner, the mind can be trained to respond to stimuli skilfully without automatic reacting.

Bishop et al. (2004), in their work, proposed operationalisation of mindfulness into (i) self-regulation to attention and (ii) orientation to experience. Essentially, mindfulness is seen as a process of experiential processing by "regulating attention in order to bring a quality of non-elaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance" (Bishop et al., 2004, p. 232). By approaching all experiences with a beginner's mind, there is an element of self-compassion involved, in that one is kinder to oneself by not ruminating and getting frustrated. Invariably, this will result in better coping with daily experiences through less reactivity.

It is worthy to note, at this point, that mindfulness and concentration meditations are discriminately different constructs (Naranjo & Ornstein, 1971). Internal and external stimuli are perceived as distractions in concentration meditations, and in such situations, the mind is brought back repeating a word, mantra, sound or sensation. This is not the case with mindfulness meditation,

where a stimulus is perceived as an “object of observation, not a distraction” (Bishop et al., 2004, p. 232).

1.2 Trait (Dispositional) and State Mindfulness

According to the American Psychological Association, personality is referred to as "individual differences in characteristic patterns of thinking, feeling and behaving" ("American Psychological Association," 2016). When individuals demonstrate these patterns consistently over time, these patterns become their personality traits.

In other words, personality traits tend to be relatively stable over time, long lasting and manifest themselves as a result of intrinsic factors. In addition, the differences between persons in their innate abilities to engage mindfully tends to remain stable (Eisenlohr-Moul, Peters, Pond, & DeWall, 2016). Conversely, when a thought, feeling or behaviour is temporary in nature and is caused by external circumstances or using mindfulness skills on purpose, this is referred to as state mindfulness which is expected to fluctuate within a person.

The existence of trait and state mindfulness, however, are not mutually exclusive. For example, a person who generally has a happy disposition can be sad due to some events. One common analogy used to differentiate between trait and state is that of climate and weather. Singapore generally has a hot and humid all year round, however, it does not preclude the existence of occasional showers and cool nights. Therefore, like any emotion or behaviour, an individual who is usually mindful may be less mindful on certain occasions and vice versa. This is supported by previous works in mindfulness, where it was illustrated that people could similarly exhibit (i) state mindfulness over specific instances and (ii) trait mindfulness as one's own dispositional tendency (Brown & Ryan, 2003).

1.3 Mindfulness-Based Interventions

The most common form of mindfulness-based interventions currently in use is the Mindfulness-Based Stress Reduction training (MBSR) developed by Dr Jon Kabat-Zinn at the University of Massachusetts Medical School. The standard MBSR programme comprises eight 2 to 2.5 hours weekly classes and an all-day retreat. A typical class structure includes mindfulness education, meditation and movement practices, teacher-led discussions as well as practices and exercises for participants to complete at home on a daily basis.

The objective of MBSR is help participants learn to recognise undesirable habits and automatic reactions and to bring an accepting and non-judgmental attitude to all experiences instead. By practising mindfulness, participants will begin to recognise that many of their thoughts are not realities in themselves and thus less likely to be affected by them adversely. Since the founding of MBSR, research in its efficacy for medical conditions had gained significant interest and wide acceptance in the last 40 years. Particularly, in the last 10 years, MBSR has also made its major headway into education and mainstream management literature.

A related mindfulness intervention, Mindfulness-Based Cognitive Therapy (MBCT), was developed by Zindel Segal, Mark Williams and John Teasdale (Teasdale et al., 2000) based on MBSR and Cognitive Behaviour Therapy to specifically treat depression and prevention of its recurrence. The main difference between MBCT and MBSR is the former's emphasis on recognising negative thoughts early in patients with major depression and to respond to them in a skilful manner. A recent systematic review of randomised controlled trials

found that MBSR improved mental health while MBCT was able to prevent relapse of depression (Fjorback et al., 2011).

Other related mindfulness interventions include Dialectical Behaviour Therapy (Linehan, 1997), Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999), Mindfulness-based Relapse Prevention (Witkiewitz, Marlatt, & Walker, 2005), Mindfulness Based Eating Awareness Training (MB-EAT) and Relapse Prevention (Marlat and Gordon 1985) are excluded for the purpose of this research as they are targeted at specific groups of patients. As with all interventions, the MBSR programme does carry potential risks, such as potential physical injuries associated with yoga poses, as well as possible release of emotions. However, these risks, if any, are no more than minimal and can often be mitigated through stringent inclusion criteria, constant reminders to participants to respect their limits during yoga practices, and for the intervention to be conducted by experienced MBSR trainer.

With the advent of technology, mindfulness training programmes are now increasingly being offered online. Research has shown these programmes to be effective in reducing perceived stress and anxiety (Cavanagh et al., 2013; Krusche, Cyhlarova, King, & Williams, 2012; Morledge et al., 2013) as well as mental health (Spijkerman, Pots, & Bohlmeijer, 2016), improving engagement at work (Aikens et al., 2014) and enhancing quality of life in late stage bipolar disorder patients (Murray et al., 2015).

1.4 Mechanisms of Mindfulness

Be it as a state of mind, personality trait, process, meditational practice or intervention, research to date has shown that mindfulness has provided benefits in clinical and non-clinical settings. A discourse in mindfulness will not be

complete without reference to the mechanisms via which mindfulness translates into benefits to those who practise it or to others.

In Shapiro's (1992) study pertaining to meditation practitioners' intentions, the author noted that their intentions to meditate moved in a "self-regulation, self-exploration and self-liberation continuum" (p. 25). In her later works, Shapiro and colleague (S. L. Shapiro & Schwartz, 2000) found that the self-regulating function enhances one's ability to change and thus provided feedback loops towards order and better health.

Extending this virtue of self-regulatory function, S. L. Shapiro, Carlson, Astin, and Freedman (2006) attempted to explain how mindfulness actually works and how it can result in positive changes and transformation. In this conceptual paper, the authors defined mindfulness and theorised a model where Intention (purpose), Attention (observing) and Attitude (non-evaluative and with acceptance) are identified as the three core components that underlie mindfulness practices. The authors explained that since mindfulness is essentially the observing from moment to moment, the three components are not distinct stages but is instead a continuous cyclical process.

By observing thoughts as merely objects as and when they arise without being judgemental, mindfulness practitioners are in effect shifting their perspectives on experiences that would otherwise have affected them cognitively, be it pleasurable or not pleasurable. It is this very essence of "reperceiving" (S. L. Shapiro et al., 2006, p. 377) that one can observe the moments as they unfold and as a result, not be controlled or conditioned by them. The "observing self" is not treated as concrete or of material existence, but is used as a mean to observe and question. The authors were quick to point out that reperceiving is not the

same as detachment or dissociation, nor does it cause one to be indifferent to their experiences. McCown, Reibel, and Micozzi (2011, p. 66) also highlighted that reperceiving "does not create distance and disconnection from one's experience". Instead, it allows "a deep, penetrative non-conceptual seeing into the nature of mind and world" (Kabat‐Zinn, 2003, p. 146) with greater depth and richness.

To this end, Grabovac, Lau, and Willett (2011) proposed a Buddhist Psychological Model (BPM) to explain how mindfulness practices and interventions can reduce mental proliferation which leads to well-being, acceptance, attention regulation and symptom reduction. As the mind is bombarded with continuous streams of mental objects, it produces a rapid succession of mental events such as thoughts, memories and emotions. An untrained mind will react habitually to these events through constant cognitive processing due to aversion or attachment to these events, thus leading to mental proliferation and rumination. However, when one recognises that (i) these mental events are but transient in nature, (ii) any attachment and aversion will cause mental suffering, and (iii) there are merely objects and not aspects of self, he will be aware mindfully and be able to accept these mental events without mental cognition and non-judgementally.

To necessitate a deeper understanding of the underlying mechanisms of mindfulness, researchers had begun to explore mindfulness from a neuroscientific perspective in recent years, in addition to psychological and behavioural changes (Hölzel, Lazar, et al., 2011). These studies on neuroplasticity generally involve the use of non-invasive neuroimaging techniques such as magnetic resonance imaging, where grey matter, known to be responsible for information processing in the brain, can be quantified in terms of cortical thickness as well as volume and

density. By studying magnetic resonance images of an experiment group exposed to a mindfulness-based intervention, Hölzel, Carmody, et al. (2011) found that there were significant changes in grey matter concentration in the regions of the brains associated with learning, memory, emotion regulation and perspective taking as compared to the control group.

In their review of the role of mindfulness in workplace functioning, Good et al. (2015) integrated existing mindfulness studies in mainstream management research into an integrated framework. The authors proposed that mindfulness affected functional domains in cognition, emotion, behaviour and physiology through increased attention capability, and this turn, resulted in better performance, relationships and well-being.

Consequently, it is not surprising that mindfulness has gained traction as a modality for treatment and a form of intervention in various clinical and non-clinical settings. These are discussed in detail as follows.

1.5 Mindfulness in Clinical Settings

Originally developed to treat stress, various researches had also shown that MBSR is well regarded in the medical community to have positive impact on a wide range of conditions. These include anxiety (Anderson, Levinson, Barker, & Kiewra, 1999; Beauchemin, Hutchins, & Patterson, 2008), cancer (Carlson & Garland, 2005; Lengacher et al., 2012; S. L. Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003), chronic illness (Veehof, Oskam, Schreurs, & Bohlmeijer, 2011), depression (Hofmann, Sawyer, Witt, & Oh, 2010), irritable bowel syndrome (Zernicke et al., 2013) and even brain injuries (Goldin & Gross, 2010) and so forth.

Additional meta-analyses of clinical applications of MBSR can be found in the works of Grossman, Niemann, Schmidt, and Walach (2004), Chiesa and Serretti (2009), Khoury et al. (2013) and Goyal et al. (2014).

1.6 Mindfulness in Non-Clinical Settings

In recent years, other than the mindfulness researches in clinical settings, non-clinical studies in mindfulness have entered the mainstream management research arena. Examples of these include impact of mindfulness in performance enhancement (De Petrillo, Kaufman, Glass, & Arnkoff, 2009; Kaufman, Glass, & Arnkoff, 2009; Röthlin, Horvath, Birrer, & grosse Holtforth, 2016), personnel management (Walach et al., 2007), and workplace outcomes of performance and citizenship behaviour (Giluk, 2010).

The cross-sectional study by Röthlin et al. (2016) is of particular interest to the present research. The authors studied 133 athletes from 23 sports and concluded that higher trait mindfulness were associated with fewer worries about their performance, and that higher trait mindfulness prevented other worries from affecting their behaviours thus allowing them to perform better. The authors attributed two plausible mechanisms, namely, (i) people with high trait mindfulness were less overwhelmed with worries during periods of high stress (Eysenck & Calvo, 1992) and (ii) increased in capacity to engage in motor skills automatically (Kaufman et al., 2009). While the study was focused on competitive sports, the mechanisms through which mindfulness could impact performance may be relevant to any profession facing high stresses, with teachers being one of them (Kyriacou, 2001).

1.7 Mindfulness in Educational Settings

Existing research in mindfulness set within education settings can be broadly classified into those relating to teachers as participants and those relating to students. We first discuss an illustrative selection of these studies, and will turn to studies on interpersonal mindfulness thereafter.

1.7.1 Teachers

Soloway, Poulin, and Mackenzie (2011) adapted the standard MBSR programme into a 36-hour Mindfulness-Based Wellness Education (MBWE) for new teachers. They found that experiential and practical-based MBWE not only reduced their stress and burnout, it also prepared them to excel in the classrooms, provided them with new perspectives in teaching pedagogies and supported them to create a calm and inclusive learning environment in class.

In the authors' earlier research (Poulin, Mackenzie, Soloway, & Karayolas, 2008), they measured the efficacies of teaching-related outcomes, such as student engagement, instructional strategies and classroom management, the authors used the self-rated Teachers' Sense of Efficacy Scale (TSES;Tschannen-Moran & Hoy, 2001). Significant improvements ($p < 0.05$) in reported TSES and TSES Student Engagement subscale were found between pre-test and post-test, but not in instructional strategies and classroom management. As one embodies mindfulness training, one can extend the benefits from within to people around them. The authors acknowledged study limitations due to lack of random assignment to treatment and control groups and the choice of participants who were particularly prone to burnout and stress. As such, the study further

suggested longer term longitudinal research to study the effects on human services professionals and people whom they are working with.

Gold et al. (2010) studied a small sample of school teachers and noted that most participants showed signs of reduced stress post-intervention. Using the self-reported Kentucky Inventory of Mindfulness Skills (KIMS) scale, the authors noted that there were improvements in all factors of the scale, namely, (i) Observing, (ii) Describing, (iii) Act With Awareness, and (iv) Accept Without Judgment. However, only the "Accept Without Judgment" factor was statistically significant.

Likewise, Frank, Reibel, Broderick, Cantrell, and Metz (2013) in their quasi-experiment pilot study reported that educators who underwent MBSR training showed reduced stress levels, improved self-regulation and well-being. Franco, Mañas, Cangas, Moreno, et al. (2010) was also able to find significant reduction in psychological distress in their experimental group of teachers.

1.7.2 Students

In comparison to mindfulness-based interventions relating to teachers, there are comparatively more studies involving students. In two separate studies involving medical students who underwent MBSR programme, S. L. Shapiro, Schwartz, and Bonner (1998) and Rosenzweig, Reibel, Greeson, Brainard, and Hojat (2003) found that MBSR was effective in reducing their stress levels and psychological distress.

Beddoe and Murphy (2004) studied a convenience sample of 16 nursing students and found that MBSR was able to help them to cope with stress. Additionally, these nursing students were less likely to take upon themselves the

negative emotions of others. Kiselica, Baker, Thomas, and Reedy (1994) were also able to demonstrate the reduction in anxiety and stress, although no significant relationship was found between stress inoculation training and improved academic performance.

In a larger scale randomised controlled trial involving 288 medical and psychology students from the University of Tromsø and University of Oslo, de Vibe et al. (2013) concluded that only the female students demonstrated significant reduction in their study stress and mental distress, as well as improvement in mindfulness and general well-being post-MBSR intervention. By employing mindfulness-based training, students and teachers can be partners in the students' learning experience (Napoli, Krech, & Holley, 2005), and are likely to show more creativity, cognitive flexibility and better memory retention if they adopt mindful practices.

Zenner, Herrnleben-Kurz, and Walach (2014) conducted a meta-analysis of 24 studies on mindfulness-based interventions (MBIs). The study covered 1348 students from grade 1 to 12 who underwent various MBIs, and found that MBIs were helping in improving students' cognitive performance in learning by approximately one standard deviation. Effect sizes also indicated that MBIs were helpful in helping students in resilience to stress. The authors, however, also noted that sample sizes of most of studies were small and hence the studies were underpowered.

1.8 Interpersonal Effects of Mindfulness

Another line of mindfulness research in recent years has focused on interpersonal effects of mindfulness. Not only the participants themselves who

have undergone mindfulness training benefit from the interventions, those associated with the participants may also benefit from mindfulness training indirectly (Poulin et al., 2008).

In a study involving mindful caregivers, it was found that individuals with multiple disabilities showed higher level of happiness, even though the individuals themselves did not practise mindfulness (Singh et al., 2004). In a subsequent study involving 3 mindful mothers and their respective autistic children, Singh et al. (2006) noted that the children showed less aggression, non-compliance and self-injury. The authors posited that the mindfulness training in the mothers had allowed them to accept their children's behaviours non-judgementally thereby promoting positive interactions between them.

Similar findings were also found in a recent study by Siu, Ma, and Chui (2016), where mindfulness in mothers was shown to have significant negative indirect effects on children's emotional, conduct and peer issues. Additionally, the authors also demonstrated that mothers' mindfulness exert a positive and significant impact on their children's prosocial behaviour. This was attributed to mothers' involvement in their children's lives and increased awareness of their needs.

Furthermore, Singh et al. (2009) found that mindful staff use potentially less physical restraints and administered less stat medication when dealing with intellectually disabled persons. More recently, Singh et al. (2013) studied the effect of mindfulness training for 3 teachers and found that the students under their charge showed a decline in maladaptive behaviours as well as increases in compliance with the teachers.

Barnes, Brown, Krusemark, Campbell, and Rogge (2007) in their studies found that romantic couples who were more mindful tended to be more satisifed with the relationships. Furthermore, couples' state mindfulness was found to be associated with better communication between them. Similarly, in a randomised controlled trial, Carson, Carson, Gil, and Baucom (2004) also found that mindfulness intervention was effective in promoting couples' satisfaction in their relationships.

Yet another recent research on interpersonal effects of mindfulness was undertaken by Reb, Narayanan, and Chaturvedi (2014) who demonstrated that mindfulness of leaders had a positive influence on subordinates' work performance. One interesting and important strength of the study rest in the fact that leader mindfulness and employee performance were obtained from different sources, and as such, did not suffer from common source bias. This was consistent with an exploratory study by Napoli (2004), where he set out to understand the effects of mindfulness training for teachers in their personal lives and as well as in their roles as teachers. Three elementary teachers underwent intensive mindfulness training and provided feedback on their experience after 1 year of mindfulness practice. During the interviews, the teachers related that they were able to use mindfulness to deal with anxiety, to focus in their curriculum development and more interestingly, to facilitate positive changes in and out of the classroom. While the feedback was promising, they were admittedly drawn entirely from interviews with a small sample of 3 teachers and thus lacked external validity. Since the study was exploratory in nature and did not use any standardised instrument to measure predictors and outcome variables, no association between them could be drawn.

In a recent study, Medeiros, Gouveia, Canavarro, and Moreira (2016) advanced our knowledge of interpersonal effects of mindful parenting by studying a large sample of 243 family triads. The level of mindful parenting as independent variable and their respective child's well-being as dependent variables were measured separately using established questionnaires. Significant association between mindful parenting and their child's well-being was established.

Thus, to further our understanding of the relation between teacher mindfulness and its indirect effects on students, an empirical study with a sufficiently large sample size and rigorous methodology is certainly warranted.

1.9 Relation of Teachers' Mindfulness with Classroom and Student Outcomes

This section will now focus on the relation of teacher mindfulness with classroom and student outcomes. Within an educational institution, these outcomes are often measured in terms of teachers' teaching quality, students' academic performance and engagement, amongst others. These indicators are clearly important to school administration, and hence studied as the dependent variables of the present research.

In what ways, then, is teacher mindfulness associated with teaching quality, students' academic performance and students' engagement in class? To address this, we first identify the factors that are essential for effective teaching and learning. Other than cognitive and communicative abilities, literature have supported that emotional stability, compassion, empathy and interactional abilities are important (Erdle, Murray, & Rushton, 1985; Greenberg, 1969; McAllister &

Irvine, 2002) as teaching involves constant interaction with students. Felver and Jennings (2016) also argued that since mindfulness is a construct that involves awareness of oneself and behaviour towards others, both interpersonal and intrapersonal mindfulness are therefore likely to contribute towards effective teaching. Secondly, mindful teachers are more likely to re-perceive daily stressors constructively to be teaching and development opportunities, thus are more engaged and satisfied. This will in turn result in students' achievement and engagement (Skinner & Beers, 2016).

In a school setting, we noted that these interactions can occur over two time dimensions, namely, over the course of a semester and during a class tutorial. Extending our earlier discussion on the distinction between trait and state mindfulness, we posit that teacher trait mindfulness, being stable over time, is associated with longer term dependent variables such as academic performance and teaching quality. In the same vein, teacher state mindfulness which can vary from tutorial to tutorial, is associated with student engagement in class.

H_1: Teacher state mindfulness is positively associated with student engagement in class.

H_2: Teacher trait mindfulness is positively associated with teaching quality.

H_3: Teacher trait mindfulness is positively associated with student academic performance.

1.10 Relation of Teacher State Mindfulness and Student Engagement

1.10.1 Decentering as Mediator

Decentering is defined as the ability to observe one's own thoughts and feelings as events of temporary nature in the mind, that may not necessarily be true nor reflective of one's self (Fresco et al., 2007). In the study, it was found that decentering in people with chronic pain correlated significantly with their psychological flexibility to perceive their pain as an outside observor and they enjoyed a better quality of daily functioning as a result.

Recent research suggests that mindfulness and decentering should be treated as two distinct constructs (Gecht et al., 2014), and that decentering may be regarded as a mechanism of mindfulness (Feldman, Greeson, & Senville, 2010; Gecht et al., 2014) and a mediator for positive health outcomes (Pearson, Brown, Bravo, & Witkiewitz, 2015). It was posited that decentering itself comprises four mechanisms, namely, values clarification, self-regulation, cognitive flexibility, and exposure. In fact, decentering forms the basis for mindfulness-based intervention such as MBCT, where mindfulness practices are used to help patients with recurring depressive symptoms in recognising negative thoughts early before they spiral downwards into ruminations (Baer, 2010). Different levels of mindfulness should therefore be capable of predicting differences in self-regulation and behavioural flexibility, and mediated by changes in reperceiving or decentering (Carmody, Baer, Lykins, & Olendzki, 2009).

Since mindfulness raises the level of teachers' awareness (Mendelson et al., 2010), it follows that teachers will be more sensitive to the needs of the students and the classroom dynamics, in a non-judgemental manner (de Vibe et al., 2013; Gold et al., 2010). For example, a student who is habitually late for

classes turns up late again. It is common for teachers to react in anger automatically, and reprimand the student for the offence immediately in front of his or her classmates. However, a mindful teacher may view this offence as if it was committed for the first time and not judge the student immediately. Instead, the teacher who is decentred may seek to clarify the student's reason for being late in a calm manner and decide flexibly as to how the situation is to be managed.

Yet another common situation in class where the mindfulness and decentering abilities of teachers can be applied positively is when certain students appears disengaged in class. In a class of, say, 30 students, a student may be unsually quiet compared to his normal self. Instead of assuming that the student was disengaged and continues with the tutorial in the manner that he has intended to, a mindful teacher may immediately notice the abnomaly and thus stop to clarify whether the student understood the material. If necessary, the teacher may then flexibly change his lesson plan and address the concerns of the student.

In scenarios like these, we can reasonably expect students to exhibit positive emotions when interacting with mindful teachers in class. It is thus plausible that the qualities of decentering in teachers, associated with them being more mindful and more engaged (Skinner & Beers, 2016) , makes them more effective in classroom management and hence better in student engagement.

H_4: The relation between teacher state mindfulness and student engagement is mediated by teachers' decentering ability.

To date, we are not aware of any empirical study which investigates the relationships of teachers' mindfulness on student outcomes at the tertiary level,

mediated by various mediators. Accordingly, an empirically rigorous research such as the current research was warranted. This call for empirical studies which are rigorous in design is echoed by the Roeser et al. (2012) themselves, who also proposed that mindfulness training should form part of teachers' professional development.

1.11 Relation of Teacher Trait Mindfulness and Teaching Quality & Academic Performance

1.11.1 Emotional Intelligence as Mediator

Emotional intelligence was first conceptualised by Salovey and Mayer (1990) as one's ability to appraise and express emotions in self and others, to regulate self and other's emotions, as well as to utilise emotions flexibly. Several studies (Baer, Smith, & Allen, 2004; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003) have found relationships between mindfulness and emotional intelligence.

Roeser et al. (2012) hypothesised that mindfulness training can lead to teacher's mindfulness and associated "habits of mind", such as being able to focus, tolerate uncertainties, think flexibly and regulate emotions. This in turn, the authors argued, should lead to the better well-being of teachers who can form positive inter-relationships between themselves and students, thus creating and maintaining "emotionally supportive classroom climates in which all students can learn." (Roeser et al., 2012, p. 170). More specifically, Roeser et al. (2012) posited that classroom outcomes such as effective classroom management, positive interpersonal climate and teacher-student relationships will lead to better student outcomes like classroom engagement and motivation to learn.

Similarly, based on the recent conceptual work of Jennings and Greenberg (2009), socially and emotional competent teachers tend to have higher level of self-awareness and are likely to exhibit joy and enthusiasm in order to motivate others to learn. In addition, Jennings and Greenberg (2009) postulated that teachers will also exhibit high level of social awareness in their interactions with stakeholders, such as students and parents, thus building supportive relationships.

By being more aware and sensitive to self and others' emotions, teachers can regulate their emotions and influence their students positively. This, they argued, will result in positive academic outcomes.

H_5: The relation between teacher trait mindfulness and teaching quality/student academic performance is mediated by teachers' emotional intelligence.

1.11.2 Fear of Self-Compassion as Mediator

Neff (2003a) defined self-compassion as being kind to one's self, not being too self-critical and perceiving own experience not as an isolated event but as part of common humanity, and viewing own unpleasant thoughts and emotions mindfully without overweighing on their negativity. In the study, the author found that self-compassion had positive correlation with emotional processing. This could be due to individuals who are self-compassionate tended to seek to understand the nature of their emotions instead of ruminating. In her later paper, Neff (2015) also suggested that self-compassion can result in positive well-being by being kind to self and being mindful (Neff, 2015). We have previously established that being mindful involves one being more self-aware and non-judgmental. These are clearly complementary skillsets that can enhance one's capacity for self-compassion.

Flook, Goldberg, Pinger, Bonus, and Davidson (2013), using a modified 5-week MBSR customised for educators, found that with mindfulness training, teachers displayed increase in self-compassion and achieved better observer-rated classroom teaching practices. In the study, teachers were rated on their

performance in classroom, including their ability to management classroom behaviours, reduced attentional biases, as well as instructional and emotional support for the students. The authors argued that mindfulness training could have prevented the teachers from being stressed, and in turn, promoted their well-being and increased their teaching effectiveness and quality. The positive relationship between MBSR and self-compassion was also documented by Khoury, Sharma, Rush, and Fournier (2015).

Similarly, Jennings (2015) suggested that mindfulness and self-compassion are important determinants of teacher's social and emotional competence. These, in turn, will lead to their performance and classroom outcomes. Another plausible explanation is drawn from Gilbert, McEwan, Matos, and Rivis (2011), who summarised some of the prior studies in compassion. The authors suggested that it could be due to "attributes of compassion such as a motivation to care, a capacity for sympathy, an ability to tolerate unpleasant emotions, the capacity for empathic understanding, and non-judging or condemning". They also suggested that it could be that compassionate individuals were more sensitive in detecting and responding to distress in others.

Furthermore, self-compassion is positively related to mental health (MacBeth & Gumley, 2012) and negatively associated with neuroticism (Neff, Rude, & Kirkpatrick, 2007). Individuals who are compassionate towards themselves are also kinder, shows more concern for others and are more supportive in their relationships.

Evidently, self-compassion is a desirable trait in teachers who are required to interact with students on a day to day basis. This, however, is build on the

premise that individuals do not have a predisposition against being compassionate. Take for example where a teacher made a mistake in instruction in class. This can be particularly an embrassing and stressful situation for the teacher. There are two ways in which the teacher can respond to such incident, either adaptively by reflection of the incident and not be too hard on themselves, or maladaptively by rumination (Košir, Tement, Licardo, & Habe, 2015) and be disheartened. Clearly, how the teacher reacts when faced with such situations will have an impact on his or her performance.

In a study by Raes (2010), people who are less compassionate towards themselves tend to ruminate by brooding more. They are either highly critical of themselves (Gilbert & Procter, 2006), or exhibit a general reluctance to and fear of self-compassion (Neff, 2003b). Given that the possibility of teachers who are less compassionate and are more self-critical exists, we expect the fear of compassion for self to exhibit negative associations with teacher trait mindfulness and students' academic performance.

H_6: The relation between teacher trait mindfulness and teaching quality/student academic performance is mediated by teacher's fear of compassion for self.

1.11.3 Empathic Concern as Mediator

Empathy, as defined by Merriam-Webster Dictionary, is the "action of understanding, being aware of, being sensitive to, and vicariously experiencing the feelings, thoughts, and experience of another of either the past or present without having the feelings, thoughts, and experience fully communicated in an objectively explicit manner". This can be distinguished as "emotional contagion" in which one assumes another's emotions and "empathic concern" where no emotions are borne while being genuinely concerned about another person's well-being (Beddoe & Murphy, 2004). In this regard, Omdahl and O'Donnell (1999) was able to demonstrate that trait empathic concern was negatively correlated with burnout, while emotional contagion was a good predictor of burnout and reduced occupational commitment.

Empathic concern, as a mediator, is in fact studied in many empirical researches relating to helping professions and human service workers, such as in patient-doctor relationships (Hojat et al., 2014), rehabilitation counsellors (Day & Chambers, 1991) as well as volunteer recruitment (Takada & Levine, 2007). As mindfulness is the non-judgmental awareness of the present moment, it helps teachers to be more concerned about students on a day to day basis. Consequently, it presents itself as a viable catalyst to develop the qualities of empathic concern as well as fostering more meaningful inter-personal relationships (Block-Lerner, Adair, Plumb, Rhatigan, & Orsillo, 2007).

Since human service workers includes teachers (Miller, Stiff, & Ellis, 1988), Hamre and Pianta (2005) suggested that strong instructional and emotional support to kindergarten students can result in better academic achievements

through stronger teacher-student relationships. Consistent with the above, we set out to hypothesise that mindfulness can lead to better students' academic performance, mediated by empathic concern which reduces burnout and foster meaningful relationships.

H_7: The relation between teacher trait mindfulness and teaching quality/student academic performance is mediated by teacher's level of empathic concern.

1.11.4 Psychological Inflexibility as Mediator

A closely related concept to decentering is that of psychological flexibility (Safran, 1990). As mentioned in preceding discussions, S. L. Shapiro and Schwartz (2000) found that the self-regulating function enhances one's ability to change and thus provided feedback loops towards order and better health. This led us to another important mediating mechanism that was not apparent in mindfulness studies in education setting to date, namely, the psychological flexibility or inflexibility of teachers. In addition to being open and aware of one's present moment as defined by mindfulness, psychological flexibility introduced an added dimension of active adaptation to internal and external stimuli.

Psychological flexibility has been defined as the ability to decide on whether to react to an experience, regardless if the experience was desired or not (Densham, Williams, Johnson, & Turner-Cobb, 2016). Kashdan and Rottenberg (2010) presented evidence that psychological flexibility is fundamental to psychological health and that its definition should reflect the "repeated

transactions between people and their environmental contexts" (Kashdan & Rottenberg, 2010, p. 866). The authors further elucidated that psychological flexibility should not be defined narrowly as a specific trait within a person. Within an educational setting, it should encompass how one balances and adapts to constantly changing situational and competing demands in and outside of classrooms often faced by educators.

In validating the Teaching Efficacy Scale, a measure of teaching effectiveness, Gibson and Dembo (1984) found that low-efficacy teachers appeared to be flustered when there are interruptions of their routine while high-efficacy teachers seemed to use this with greater ease and flexibility. This ability to be flexible in class, along with teacher efficacy and verbal ability, may influence certain aspects of classroom management yielding postive results.

Consistent with the frameworks articulated by Roeser et al. (2012) and Jennings and Greenberg (2009), we postulate that psychological flexibility/inflexibility can mediate the relationship between teacher trait mindfulness and students' academic performance.

H_8: The relation between teacher trait mindfulness and teaching quality/student academic performance is mediated by teachers' psychological inflexibility.

Synthesising the abovementioned arguments, it is clear that higher level of teacher trait mindfulness should then be positively correlated with teachers' self-compassion, empathy, emotional intelligence, teaching quality and ultimately students' academic outcomes. Accordingly, together with relevant extractions of

Roeser et al. (2012) and Jennings and Greenberg (2009) models, I posit that teacher's state and trait mindfulness are related to students' engagement and academic performance via the following model:

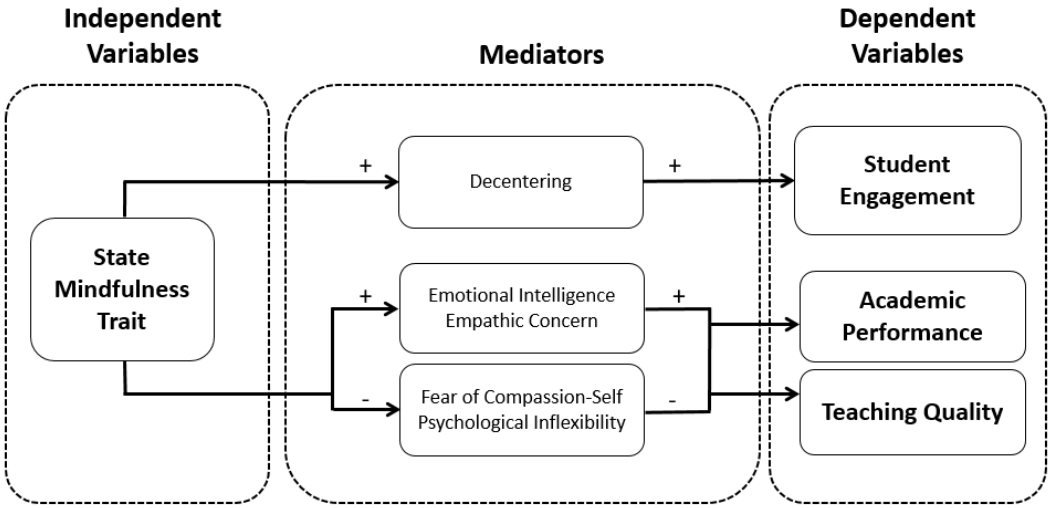


Figure 1: Hypothesised Model Linking Mindfulness to Classroom and Student Outcomes

1.12 Chapter Conclusion

Our literature review shows that there is considerable and growing scientific interest in mindfulness research. Although mindfulness has its origin based on Buddhist philosophy, it can be and has been practiced in a non-secular context. Notably, a set of mindfulness and yoga practices have been formalised into the Mindfulness Based Stress Reduction (MBSR) programme by Dr Jon Kabat-Zinn in 1979, and had gained popularity and received endorsement since. Along with variants such as Mindfulness Based Cognitive Therapy (MBCT) and other mindfulness interventions, mindfulness has consistently been shown to be efficacious in reducing stress and pain, as well as treatment for depression, chronic illnesses, irritable bowel syndrome and other conditions.

Since then, scholars had begun exploring the effects mindfulness beyond the medical context, such as in the management and education sectors. Burgeoning evidence in these fields continue to indicate the positive roles played by mindfulness and the effectiveness of mindfulness interventions for participants themselves.

Yet another recent and nascent line of research has focused on the interpersonal effects of mindfulness. However, our review of literature identified a current gap in interpersonal mindfulness research as majority of the existing studies were anecdotal in nature, and generally lacking in scientific rigour. Consequently, the present study is among the first attempts designed to further our understanding of how mindfulness can affect third parties.

Guided by the profound works of Roeser et al. (2012) and Jennings and Greenberg (2009), we accordingly developed testable hypotheses to investigate the relationships between mindfulness of teachers and students' academic

performance and engagement, mediated by emotional intelligence, empathic concern, fear of compassion for self, psychological inflexibility and decentering.

CHAPTER 2: STUDY 1 ON STATE MINDFULNESS

2.1 Method

2.1.1 Participants and Procedures

Study 1 is a correlational study involving surveys to investigate the relationship between teachers' state mindfulness and students' engagement with their teachers in class, mediated by teachers' decentering abilities, in a normal teaching week.

The research setting was a business school located within a tertiary institution in Singapore. The business school admits 17 year-old students for nine diploma programmes, such including Accountancy & Finance, Banking & Finance and Fund Management & Administration. These diplomas are three-year programmes.

There were a total of 122 teachers comprising 88 full time and 34 adjunct teachers allocated with teaching assignments for Year 2 and Year 3 classes across all diplomas in Academic Year 2016/17. Each teacher typically taught 2 to 10 tutorials per week depending on their appointments and other non-academic duties.

All teachers teaching Year 2 and 3 classes (where students are above 18 years old) were invited to participate in this study on a voluntary basis with no penalty for non-participation. They were requested to indicate their consent for participation prior to the start of the semester via electronic direct mailer using Qualtrics. This was followed up with 2 email reminders. An information session was also conducted to all teachers during staff meeting to provide details of the research. The information session was video-recorded and made available to staff who were not able to attend the session to ensure consistent dissemination of

information. They were also informed that student-research assistants would be approaching them just before they begin their tutorials, and once again at the end of the tutorials to survey the students in their absence.

All study-related procedures were approved by the Institutional Review Board of Singapore Management University (SMU IRB). Just before the commencement of tutorials, teachers were requested by student-research assistants to answer a survey measuring their state mindfulness and decentering on tablets or smart phones. Each tutorial was identified by a unique TutorialID. The unique TutorialID took on a "WXXXYZZ" format, where:

- W = 1 indicates adjunct and 6 indicates full-time teacher;
- XXX = Teacher ID;
- Y = 1, 2, 3, 4 or 5 representing day of the week from Monday to Friday respectively; and
- ZZ = 08,09,10 etc representing the starting time of the tutorial

At the end of each tutorial after the teachers had left the classroom, student-research assistants re-entered the class and briefed students about the survey using a standard script prepared by the Principal Investigator to ensure consistency in survey administration. Student research assistants received proper training with regards to the conduct of data collection as well as briefing on strict adherence to SMU IRB policies conducted by the Principal Investigator. Thereafter, all students in the tutorial sessions were provided with a URL to a questionnaire for them to rate their engagement during that specific tutorial session. A particular tutorial was identified using the same TutorialID as the teachers for their respective tutorial sessions.

Students in the class could choose not to respond without any penalty, and their decision had no impact on their grades. The students were invited to

participate as long as the teacher for that tutorial had opted to participate in the study. To ensure that all student participants were above 18 years old, only Year 2 and 3 classes were eligible for the survey. In addition, student research assistants reiterated before the survey that they must be 18 years old and above in order to participate. Finally, students were required to read consent form which included the minimum age requirement before participating in the survey to measure their engagement in class as well as their perception of their teachers' state mindfulness.

The teachers had no access to the students' responses and they would not be able to know who participated in the study. The data were collected in separate files, and subsequently merged into one file for analysis. Data were used anonymously and in an aggregated manner.

A total of 66 (54%) eligible teachers gave their consent for Study 1, with a corresponding total of 242 unique tutorial sessions. Participation was voluntary and there was no penalty for non-participation or subsequent drop out.

Overall, surveys from teachers were collected from 231 tutorial sessions. We were not able to conduct surveys for all 242 eligible sessions as (i) there were teachers who consented previously but disagreed to participate just prior to a particular tutorial session as he/she was already late for class and (ii) tutorials were rescheduled and hence the classrooms were empty. Additionally, there were sessions with teachers who completed surveys but no matching student responses were collected because the students were dismissed early by their teachers before the student researchers could return to the classrooms. Furthermore, some students keyed in the TutorialIDs by mistake and the actual TutorialIDs could not

be positively determined or matched during data cleaning process. Overall, this resulted in 170 tutorial sessions with corresponding teacher and student responses.

2.1.2 Measures

2.1.2.1 State Mindful Attention Awareness Scale to Measure State Mindfulness (Independent Variable)

The original Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003) is a well-accepted and validated measure of mindfulness for clinical and non-clinical research. The MAAS is a 15-item self-reported scale designed to assess an individual's disposition to be attentive and aware of his or her present moment experiences. It has been shown to be a valid and reliable instrument for use in general adult population, that it can be used with subjects with or without meditation experience. In addition, Brown and Ryan (2003) demonstrated that the MAAS showed discriminate validity between populations with differing degrees of mindfulness, and is associated with self-regulation and well-being without being confounded with socially desirable responding.

There is no reason to believe that our sample of teachers were predominantly meditators, hence, MAAS was selected as a preferred scale to measure teacher state mindfulness. MAAS was shown by Baer et al. (2006) to exhibit non-significant correlations with prior meditation experience, as compared to Freiburg Mindfulness Inventory, Cognitive Affective Mindfulness Scale (CAMS) and Mindfulness Questionnaire (MQ). Another recently developed scale, the Toronto Mindfulness scale (Lau et al., 2006), was not selected for the same reason. For a complete discussion of all currently available validated

scales measuring mindfulness, please refer to the work of Bergomi, Tschacher, and Kupper (2013).

The State MAAS is a 5-item questionnaire (APPENDIX A) derived from the 15-item MAAS, and was designed to measure one's current state of mindfulness instead of the more stable mindfulness trait. It is a validated measure (Brown & Ryan, 2003), and was shown to be correlated with Trait MAAS scores and psychological wellbeing outcomes thereby providing evidence for the State MAAS' construct validity. State MAAS in our study was measured on a 7-point Likert scale (0 = *Not at all*, 5 = *Very much*). Examples of items include "I was doing something without paying attention" and "I was doing something automatically, without being aware of what I was doing."

2.1.2.2 Experiences Questionnaire – Decentering Subset to measure Decentering Ability (Mediator)

The complete 20-item self-reported Experiences Questionnaire (EQ) developed by Fresco et al. (2007) is a validated measure for two sub-scales, namely, decentering (11 items) and rumination (9 items). The decentering subscale (APPENDIX B) was used to measure teachers' decentering ability as a mediator based on a 5-point Likert scale (1 = *Never*, 5 = *Always*). Examples of items in Decentering scale include "I notice that I don't take difficulties so personally" and "I view things from a wider perspective".

2.1.2.3 Positive Affect and Negative Affect Schedule (PANAS) as Control Variable

The original PANAS was a 20-item scale developed by Watson, Clark, and Tellegen (1988) that measures "the extent to which a person feels

enthusiastic, active, and alert" or positive affect (PA), and "subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness" (Watson et al., 1988, p. 1063) or negative affect (NA). The items in PANAS are self-rated on a 5-point Likert scale from 1 (*very slightly or not at all*) to 5 (*extremely*). The PANAS will be used as control variables as it has been showed to be sensitive to capture changes in mood (Crawford & Henry, 2004).

In view of the limited time available to administer multiple scales just before the commencement of classes, we had adopted the International PANAS Short Form (I-PANAS-SF) scale developed by Thompson (2007) which has only 10 items (APPENDIX C). The I-PANAS-SF scale was found to be valid, reliable and psychometrically acceptable after our tests for normality.

2.1.2.4 Utrecht Work Engagement Scale Short Form (Student) to Measure Student Engagement with Teachers (Dependent Variable)

The Utrecht Work Engagement Scale Short Form - Student (UWES-S) was a validated 9-item scale measuring the level of engagement experienced by students. It comprised Vigor, Dedication and Absorption subscales, and was adapted to for use in our context (APPENDIX D). The original items were measured on a 5-point Likert scale (1 = *Totally Disagree*, 5 = *Totally Agree*) and were recalibrated to 7-point Likert scale (1 = *Strongly Disagree*, 7 = *Strongly Agree*) for the purpose of this research. Examples of items in this scale include "I feel like coming to this tutorial again" and "I am immersed in this tutorial".

2.1.2.5 State Mindful Attention Awareness Scale adapted to Measure Teacher State Mindfulness (Independent Variable) as perceived and rated by Students

One potential issue with self-rated surveys is that of social desirability, where respondents are inclined to respond in a manner that will reflect themselves favourably. Prior studies (S. L. Shapiro, Brown, Thoresen, & Plante, 2011) had recognised the limitation of self-reported measures and thus recommended the use of behavioural and peer reported measures which were considered to be more objective. Choi and Leroy (2015) also elucidated the shortcomings of self-reported surveys as the only mean of measuring mindfulness, and suggested third party-rated mindfulness to provide objectivity.

As such, a novel approach was adopted in this study to adapt the State MAAS instrument for students to rate their teachers' state mindfulness during the tutorials as an additional and objective measure (APPENDIX E). This third-person approach was feasible as the State MAAS items measure behaviours that are observable (Roeser et al., 2012). Examples of items include "The tutor was instructing without really paying attention" and "The tutor was rushing through class without being really attentive to what was going on".

2.2 Results

2.2.1 Data Analysis

All data analysis were performed using SPSS Version 21. A 95% confidence level is adopted in all the analyses, representing the probability within which the true values of the unknown population parameters are contained. This correspondingly reflects a significance level of 0.05. Data was first checked for normality distributions, followed by preliminary analyses, Pearson's correlations and finally appropriate statistical analyses.

2.2.2 Preliminary Analysis

After data collection, factor analyses and reliability analyses were conducted so as to reduce all items from independent and dependent variables as well as mediators for analyses.

2.2.2.1 State Mindful Attention Awareness Scale to Measure State Mindfulness (Independent Variable)

Self-reported Teacher State MAAS (TeRM), a measure of how mindful a teacher was rated by teachers themselves, which were collected from the 231 tutorial sessions had a mean score of 5.8 (*SD* = 1.21). Distribution of these scores, although slightly negatively skewed, was within acceptable range of between -1 to +1. Kurtosis was also within acceptable range of between -3 to +3.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TeRM	231	1.8	7.0	5.797	1.2132	-.943	.160	.073	.319
Valid N (listwise)	231								

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.815	.816	5

Any psychological state is influenced not only by the situation at a particular point in time, but also by participants' own personality in general. Hence, in order to remove these personality effects, item responses of State MAAS were centered on each participant's mean response to the item for each teacher across all tutorials. Factor analysis was then performed on the centred items.

Factor analysis using the Principal Axis Factoring Extraction method yielded one factor with eigenvalue greater than 1. It accounted for 47.2% of the total variance. Factor loadings ranged from 0.62 to 0.75, and Cronbach alpha for the self-reported State MAAS by teachers in our sample was 0.82, thus indicating that the scale was internally consistent and acceptable for use in our statistical analyses.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.883	57.651	57.651	2.362	47.237	47.237
2	.773	15.457	73.109			
3	.547	10.943	84.052			
4	.507	10.137	94.189			
5	.291	5.811	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
MAAS1c	.753
MAAS5c	.719
MAAS4c	.678
MAAS3c	.660
MAAS2c	.618

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 6 iterations required.

Since we did not manage to collect student responses for all 242 eligible tutorial sessions, we proceeded to ascertain if those tutorial sessions without student responses had any association with teachers' state mindfulness. For instance, could students have deliberately avoided the survey because they were lenient towards unmindful teachers and chose not to rate them negatively?

As such, further tests were conducted to determine the relationship between Teacher-rated State MAAS (TeRM) and presence/absence of student responses as well as the number of student responses. The results from the logistic regression indicated that TeRM was a significant predictor of existence of student responses. The odds ratio of 1.37 implies that a one point increase in TeRM will increase the likelihood of having student responses by a factor of 1.37. This implied that the level of teacher-rated mindfulness was significant in explaining whether there was corresponding student responses. By excluding teachers without student responses, which represented "unmindful" teachers in our analysis, the power of the study was likely to be reduced due to range restriction.

On the other hand, the results from the linear regression, β = .12, *t*(217) = 1.72, *p* = .087, indicated that TeRM was not a predictor of the number of student responses received. In order words, the number of student responses received at the end of a particular tutorial had no relationship with how mindful the teacher was.

Table 1: Logistic Regression Comparing State Mindfulness of Teachers With and Without Student Responses

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	217	100.0
	Missing Cases	0	.0
	Total	217	100.0
Unselected Cases		0	.0
Total		217	100.0

a. If weight is in effect, see classification table for the total number of cases.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	TeRM	.315	.131	5.764	1	.016	1.370
	Constant	-.525	.758	.480	1	.488	.591

a. Variable(s) entered on step 1: TeRM.

Table 2: Linear Regression Predicting Count of Student Responses

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	161.642	1	161.642	2.957	.087[b]
	Residual	11754.321	215	54.671		
	Total	11915.963	216			

a. Dependent Variable: CountStdResp

b. Predictors: (Constant), TeRM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.083	2.537		1.609	.109
	TeRM	.728	.423	.116	1.719	.087

a. Dependent Variable: CountStdResp

2.2.2.2 Experiences Questionnaire – Decentering Subset to measure Decentering Ability (Mediator)

Overall, decentering scores had a mean of 3.7 (*SD* = 0.56) and was normally distributed, with skewness of 0.33 (*SE* = 0.16) and kurtosis of -0.19 (*SE* = 0.32).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Decen	231	2.5	5.0	3.737	.5603	.333	.160	-.191	.319
Valid N (listwise)	231								

Next, factor analysis on the items using Principal Axis Extraction Method was conducted. Prior to performing factor analysis, decentering was first centered on the mean for each teacher. Since one's level of decentering was a function of his or her personality and the circumstances at that point in time, centering of the items was necessary to remove the effect of each teacher's personality.

Factors were rotated using Direct Oblimin Rotation as it provided the best defined factor structure. Initial eigen values indicated that the first two factors explained 32.0% and 3.8% of the total variance in Decentering scale respectively.

Table 3: Factor Analysis for Decentering Variable

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.140	37.632	37.632	3.515	31.954	31.954	3.115
2	1.031	9.372	47.004	.422	3.834	35.788	3.005
3	.954	8.674	55.678				
4	.846	7.688	63.366				
5	.780	7.092	70.458				
6	.757	6.880	77.337				
7	.632	5.750	83.087				
8	.554	5.032	88.119				
9	.505	4.592	92.711				
10	.431	3.918	96.629				
11	.371	3.371	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix[a]

	Factor	
	1	2
Decen10c	.802	-.067
Decen6c	.673	-.049
Decen1c	.498	.145
Decen2c	.450	.131
Decen4c	.411	.084
Decen8c	-.120	.675
Decen5c	.015	.624
Decen7c	.213	.500
Decen3c	.115	.450
Decen9c	.156	.406
Decen11c	.218	.356

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 18 iterations.

Factor Correlation Matrix

Factor	1	2
1	1.000	.707
2	.707	1.000

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Items 1, 2, 4, 6 and 10 of the decentering scale were loaded on the first factor while the remaining were loaded on the second factor. Examination of the

scale items loaded on either factors revealed that they both included common themes such as awareness and dealing with difficult situations. This rendered the two-factor solution uninterpretable. However, both factors were highly correlated with each other at 0.71, implying that they could be measuring the same construct.

This provided rationale for the factors to be re-rotated, specifying one factor which accounted for 31.5% of the total variance. All 11 items had factor loadings between 0.462 and 0.668. In addition, the one-factor solution was preferred due to its previous theoretical support as well as the "levelling off" of eigenvalues after one factor and the Cronbach alpha for this scale was 0.83. As such, the decentering scale was deemed to be internally consistent and suitable for statistical analyses.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.826	.832	11

Table 4: Factor Analysis for Decentering Variable (rotated)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.140	37.632	37.632	3.469	31.537	31.537
2	1.031	9.372	47.004			
3	.954	8.674	55.678			
4	.846	7.688	63.366			
5	.780	7.092	70.458			
6	.757	6.880	77.337			
7	.632	5.750	83.087			
8	.554	5.032	88.119			
9	.505	4.592	92.711			
10	.431	3.918	96.629			
11	.371	3.371	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
Decen10c	.668
Decen7c	.657
Decen1c	.598
Decen5c	.576
Decen6c	.574
Decen2c	.542
Decen11c	.533
Decen3c	.519
Decen9c	.518
Decen8c	.493
Decen4c	.462

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 4 iterations required.

2.2.2.3 Positive Affect and Negative Affect Schedule (PANAS) as Control Variable

Similar to our earlier analysis of independent variables, we computed the means of each item categorised as PA and NA, and centred each item on respective individual teacher's mean so as to remove the effect of their personalities. Factor analysis on the centered items indicated that all items in PA and NA subscales were loaded on one factor each, accounting for 55.9% and 44.6% respectively. Factor loadings in PA subscale ranged from 0.642 to 0.852, while the same ranged from 0.483 to 0.854 in NA subscale.

Table 5: Factor Analysis for Positive Affect

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.221	64.417	64.417	2.795	55.903	55.903
2	.658	13.165	77.583			
3	.440	8.804	86.387			
4	.407	8.146	94.533			
5	.273	5.467	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
PA4c	.852
PA2c	.776
PA5c	.739
PA3c	.714
PA1c	.642

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 6 iterations required.

Table 6: Factor Analysis for Negative Affect

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.733	54.668	54.668	2.231	44.610	44.610
2	.840	16.810	71.478			
3	.618	12.358	83.836			
4	.529	10.576	94.412			
5	.279	5.588	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
NA2c	.854
NA3c	.727
NA4c	.625
NA5c	.591
NA1c	.483

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 8 iterations required.

In our sample, the Cronbach alphas for Positive Affect (PA) and Negative Affect (NA) subscales were 0.86 and 0.78 respectively.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.857	.861	5

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.777	.788	5

2.2.2.4 Utrecht Work Engagement Scale Short Form (Student) to Measure Student Engagement with Teachers (Dependent Variable)

As discussed previously, there was a total of 242 eligible tutorials based on the scheduled time-tables of teachers who consented to Study 1. In all, 231 teacher responses and 2,244 student responses were successfully collected. Since participation was entirely voluntary, there were teachers who changed their minds and decided not to proceed with the survey just prior to the start of tutorials, even though they had previously given consent for this study. Likewise, there were tutorial sessions that were re-scheduled by teachers during the week in which the data collection was conducted, thus resulting in a lower response rate.

In addition, student responses without matching or identifiable TutorialIDs or responses that were not completed within specific timeframe (for example, completed within 15 minutes of scheduled start time of tutorials or more than 30 minutes after the scheduled end time of tutorials) as indicated by Qualtrics' time stamps, were excluded. As we are measuring student engagement in class, any

responses completed within 15 minutes from the scheduled starting times were deemed to be too short a duration for any meaningful engagement to be established.

On the other hand, student responses submitted more than 30 minutes after the scheduled ending times were deemed to be unreliable due to the passage of time. Overall, 1,912 student responses were used in our analysis which were related to a total of 177 tutorial sessions. Table 7 summarises the breakdown of student responses in terms of the timings.

Table 7: Breakdown of Student Responses Based on Timings

Timing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.0	1912	85.2	85.2	85.2
	2.0	197	8.8	8.8	94.0
	3.0	75	3.3	3.3	97.3
	9.0	60	2.7	2.7	100.0
	Total	2244	100.0	100.0	

Note: 1 = Surveys completed within stipulated timing; 2 = Surveys completed too early; 3 = Surveys completed too late; 9 = Surveys not traceable to any tutorial

Factor analysis and reliability test for Utrecht Engagement Student scale revealed one eigenvalue greater than 1 and Cronbach alpha of 0.955 respectively. This indicated that all 9 items of the UWES-S were essentially measuring the same construct. Further analysis of the Vigor, Dedication and Absorption subscales showed Cronbach alphas of 0.926, 0.947 and 0.775 respectively. Scores for Vigor ranged from 1.0 to 7.0 (M = 4.8, SD = 1.46), and was normally distributed, with skewness of -0.55 (SE = 0.06) and kurtosis of -0.116 (SE = 0.11). Scores for Dedication ranged from 1.0 to 7.0 (M = 4.95, SD = 1.37), and was normally distributed, with skewness of -0.65 (SE = 0.06) and kurtosis of 0.35 (SE = 0.11). Finally, scores for Absorption ranged from 1.0 to 7.0, and was similarly

normally distributed, with skewness of -0.49 (*SE* = 0.06) and kurtosis of 0.57 (*SE* = 0.11).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Vigor	1912	1.000000000	7.000000000	4.805962343	1.458719495	-.554	.056	-.116	.112
Valid N (listwise)	1912								

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Dedic	1912	1.000000000	7.000000000	4.946307531	1.368586620	-.649	.056	.349	.112
Valid N (listwise)	1912								

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Absorp	1912	1.000000000	7.000000000	4.709025453	1.228101034	-.482	.056	.570	.112
Valid N (listwise)	1912								

Accordingly, all three sub-scales were aggregated as UWES-S ("Engage") for our analyses. Scores for Engage ranged from 1.0 to 7.0 (*M* = 4.82, *SD* = 1.28), and was normally distributed, with skewness of -0.60 (*SE* = 0.06) and kurtosis of 0.32 (*SE* = 0.11). Cronbach alpha of Engage was 0.954.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Engage	1912	1.0000	7.0000	4.820432	1.2800168	-.603	.056	.322	.112
Valid N (listwise)	1912								

One-way ANOVA was then performed on all student response to ascertain if there were differences in means of Engage scores. The means for Engage were significantly higher when students completed their responses within the stipulated timeframe (coded as "1") as compared to those who responded too early (coded as "2"). This provided rationale to exclude the latter group of students since it was not likely that they had sufficient interaction time to respond fairly whether they were indeed engaged in class. While there were no significant mean differences between responses which were completed within the stipulated time and those that were completed late (coded as "3"), the latter were also

excluded since it was plausible that they could be interfered by subsequent tutorials.

Table 8: Multiple Comparisons of Timing of Responses and Engagement

Multiple Comparisons

Dependent Variable: Engage

LSD

(I) Timing	(J) Timing	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.0	2.0	.3400968*	.0962631	.000	.151323	.528871
	3.0	.2280457	.1514251	.132	-.068902	.524994
	9.0	-.2158201	.1634672	.187	-.536383	.104743
2.0	1.0	-.3400968*	.0962631	.000	-.528871	-.151323
	3.0	-.1120511	.1745328	.521	-.454314	.230212
	9.0	-.5559169*	.1850774	.003	-.918858	-.192976
3.0	1.0	-.2280457	.1514251	.132	-.524994	.068902
	2.0	.1120511	.1745328	.521	-.230212	.454314
	9.0	-.4438657*	.2188986	.043	-.873131	-.014600
9.0	1.0	.2158201	.1634672	.187	-.104743	.536383
	2.0	.5559169*	.1850774	.003	.192976	.918858
	3.0	.4438657*	.2188986	.043	.014600	.873131

*. The mean difference is significant at the 0.05 level.

2.2.2.5 State Mindful Attention Awareness Scale adapted to Measure Teacher State Mindfulness (Independent Variable) as perceived and rated by Students

Student-rated Teacher State MAAS (StRM) had a mean of 6.3 (*SE* = 1.14) with a skewness of -1.8 (*SE* = 0.06) and kurtosis of 3.6 (*SE* = 0.11).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
StRM	1912	1.0	7.0	6.251	1.1583	-1.882	.056	3.622	.112
Valid N (listwise)	1912								

Factor analysis resulted in one factor explaining 68.5% of the variances. Additionally, reliability test indicated that Cronbach alpha was 0.89 on our sample and hence the scale was suitable for statistical analyses.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.695	73.908	73.908	3.427	68.533	68.533
2	.677	13.546	87.455			
3	.298	5.963	93.417			
4	.197	3.930	97.348			
5	.133	2.652	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
StudRatedSMAAS4	.918
StudRatedSMAAS3	.896
StudRatedSMAAS5	.887
StudRatedSMAAS2	.821
StudRatedSMAAS1	.566

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 5 iterations required.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.892	.908	5

One-way ANOVA tests conducted earlier indicated that student responses which were completed too early scored significantly lower in terms of engagement, and we provided rationale that these should be excluded since there were insufficient time for student engagement with teachers to take effect. Hence, for consistency in our analyses, all responses which did not meet our stipulated timeframe criterion were disregarded.

Multiple Comparisons

Dependent Variable: StRM

LSD

(I) Timing	(J) Timing	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.0	2.0	.1484	.0869	.088	-.022	.319
	3.0	.1843	.1367	.178	-.084	.452
	9.0	-.2691	.1523	.077	-.568	.030
2.0	1.0	-.1484	.0869	.088	-.319	.022
	3.0	.0359	.1576	.820	-.273	.345
	9.0	-.4175*	.1713	.015	-.753	-.082
3.0	1.0	-.1843	.1367	.178	-.452	.084
	2.0	-.0359	.1576	.820	-.345	.273
	9.0	-.4533*	.2012	.024	-.848	-.059
9.0	1.0	.2691	.1523	.077	-.030	.568
	2.0	.4175*	.1713	.015	.082	.753
	3.0	.4533*	.2012	.024	.059	.848

*. The mean difference is significant at the 0.05 level.

2.2.3 Descriptive Statistics

Out of the eligible 242 tutorial sessions, a total of 231 responses from teachers were collected. Since each teacher completed the state survey more than once, the means for all independent variables were computed and the tutorial scores were centred on the respective teacher's mean across all tutorials to remove the effects of their personalities.

After taking into account of responses which did not meet our timing criteria as well as responses which could not be positively traced to any tutorial session, a total of 170 usable tutorials with corresponding teacher and student responses remained. The descriptive statistics for mediators, independent and dependent variables are presented in Table 9.

Table 9: Descriptive Statistics for IVs, Mediators and DVs for State Study

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TeRM_c	170	-4.22	.98	-.0349	1.09773	-1.213	.186	1.068	.370
StRM_c	177	-2.86	1.55	.0226	.34751	-1.857	.183	32.009	.363
Decen_c	170	-1.20	1.25	.0017	.52942	.366	.186	.049	.370
PA_c	170	-14.00	6.00	.2460	3.97747	-.917	.186	1.772	.370
NA_c	170	-1.11	8.89	.0916	2.16371	2.399	.186	5.963	.370
Engage	177	2.67	6.50	4.8058	.69487	-.078	.183	.063	.363
Valid N (listwise)	170								

2.2.4 Correlation Analysis

The correlation matrix for mediators, independent and dependent variables are presented in Table 10. Centered Teacher-rated State MAAS (TeRM) was significantly correlated with decentering and control variables in the expected directions. Furthermore, PA and NA scales as control variables did not exhibit any significant relationship with each other.

Table 10: Correlation Matrix for IVs, Mediators and DVs for State Study

Correlations

		TeRM_c	StRM_c	Decen_c	PA_c	NA_c	Engage
TeRM_c	Pearson Correlation	1	.024	.451**	.290**	-.457**	-.024
	Sig. (2-tailed)		.755	.000	.000	.000	.754
	N	170	170	170	170	170	170
StRM_c	Pearson Correlation	.024	1	-.026	-.035	.029	.173*
	Sig. (2-tailed)	.755		.736	.648	.710	.021
	N	170	177	170	170	170	177
Decen_c	Pearson Correlation	.451**	-.026	1	.360**	-.386**	.016
	Sig. (2-tailed)	.000	.736		.000	.000	.840
	N	170	170	170	170	170	170
PA_c	Pearson Correlation	.290**	-.035	.360**	1	-.177*	-.028
	Sig. (2-tailed)	.000	.648	.000		.021	.722
	N	170	170	170	170	170	170
NA_c	Pearson Correlation	-.457**	.029	-.386**	-.177*	1	-.103
	Sig. (2-tailed)	.000	.710	.000	.021		.181
	N	170	170	170	170	170	170
Engage	Pearson Correlation	-.024	.173*	.016	-.028	-.103	1
	Sig. (2-tailed)	.754	.021	.840	.722	.181	
	N	170	177	170	170	170	177

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis also indicated that Student-rated State Mindfulness (StRM), a measure of how mindful a teacher was as perceived individually by students, did not exhibit any significant relationship with mediator Decentering. However, higher StRM is significantly associated with higher student engagement.

2.2.5 Hierarchical Linear Modelling – Student Engagement

Before we delve into our statistical analysis, we first present how the classes in this institution were arranged in Figure 2.

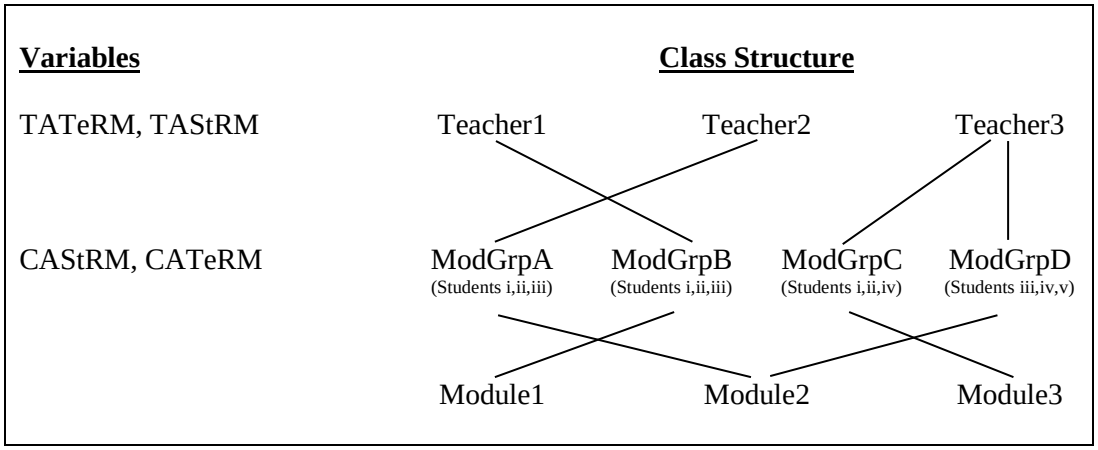


Figure 2: Graphical Representation of the Class Structure

Note: TATeRM = Teacher Average Teacher-rated State MAAS, TAStRM = Teacher Average Student-rated State MAAS; TAFdbk = Teacher Average Feedback; TAModSc = Teacher Average Module Score; CAStRM = Class Average Student-rated State MAAS; CATeRM = Class Average Teacher-rated State MAAS

In this institution, typically 20 to 30 students would form one module group and they took five to six module topics (subjects) on average per semester. While they usually attend tutorials together as a module group, there were cases where students would attend tutorials with another module group due to time table clashes or were enrolled in other module topics instead. Each tutorial was taught by one teacher, although the same teacher could teach the same students for two or more module topics. In addition, more than one teacher could be teaching the same module topic to different groups of students. Each teacher could also be teaching more than one module topic.

Since different teachers could teach the same module topic and students were nested in module groups, module groups were cross-classified by module topic and teacher. Therefore, a cross-classified multilevel model was initially

conducted as the independence assumption required for ordinary least squares regression was violated. However, student responses were collected anonymously and could not be attributed to any individual, and as such, did not provide enough information to estimate the random effect of module topic.

Consequently, a three-level HLM was conducted with Level 1 representing the responses of individual students (e.g., Student-Rated State MAAS of the teacher or StRM), Level 2 representing module group variables (e.g., the Class-Average Student-Rated MAAS of the teacher at a single tutorial or CAStRM) and finally, Level 3 representing teacher-level variables (e.g., self-reported Teacher-Rated State MAAS or TeRM). StRM, TeRM and CASTRM were all centred on their respective sample means.

Hierarchical Linear Modelling (HLM), or mixed modelling, was accordingly employed. Three models of HLM were constructed predicting engagement variables from teacher mindfulness. A summary of the results are presented in Table 11.

Table 11: Estimates of Fixed Effects for Mixed Models for Study 1

		Engage		
		Parameter estimate	**Standard error**	**p-value**
Model 1	TeRM_c	0.020	0.052	.705
Model 2	StRM_c	0.220***	0.025	< .001
Model 3	StRM_c	0.220***	0.025	< .001
	CAStRM_c	0.526***	0.081	< .001

Note: TeRM_c = Centred Teacher-rated State MAAS; StRM_c = Centred Student-rated State MAAS; CAStRM_c = Centred Class Average Student-rated State MAAS

In Model 1, self-reported Teacher State MAAS was not a significant predictor of Engagement experienced by students in class. Since the results of Model 1 indicated that there was no significant relationship between the

dependent (TeRM) and independent variable (Engage), and that there was no association between the mediator (Decentering) and Engage, no mediator analysis relating to TeRM was considered meaningful or necessary.

In Model 2, we have in this instance found that student-rated Teacher State MAAS (StRM), a measure of how mindful a teacher was as perceived individually by students, was a significant and positive predictor of students' engagement in tutorials. In other words, this means that a student who perceives a teacher to be more mindful is more engaged.

In Model 3, individual students' perceptions were aggregated at the class level (CAStRM), and were added as a predictor. Results indicated that CAStRM was a significant and positive predictor for Engage, and the effect is stronger when compared with StRM. This indicates that a class that collectively rates their teacher to be more mindful tends to be more engaged on average, independent of individual student's own perception.

Finally, a combined model was developed across the three levels of Teacher State MAAS with predictors as follows:

- Level 1 Student-rated Teacher State MAAS centered on Level 2 Class (Module Group) Mean;
- Level 2 Student-rated Teacher State MAAS by Class (Module Group) centered on Level 3 Teacher Mean; and
- Level 3 Teacher-rated State MAAS centered on Grand Mean

The results of the combined model confirmed that StRM and CAStRM were significant predictors of student engagement. In addition, results of the estimates of covariance parameters strongly implied that there were signicant variances across teachers and tutorials.

Recall that we surveyed 66 teachers who taught 170 tutorials, averaging 2.6 tutorials per teacher. Results arising from Level 2 predictor in our HLM also suggests that there is a significant within-teacher effects of mindfulness. This means that Engagement as a class is higher when a particular teacher is more mindful during a particular tutorial when compared to another tutorial taught by the same teacher when he/she was less mindful.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	55.835	4902.292	.000
L1StRM_c	1	1752.473	75.696	.000
L2CAStRM_c	1	125.762	10.448	.002
L3TeRM_c	1	66.717	.017	.896

a. Dependent Variable: Engage.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	4.773921	.068183	55.835	70.016	.000	4.637326	4.910517
L1StRM_c	.220144	.025303	1752.473	8.700	.000	.170517	.269771
L2CAStRM_c	.328095	.101505	125.762	3.232	.002	.127215	.528975
L3TeRM_c	.008746	.066346	66.717	.132	.896	-.123692	.141184

a. Dependent Variable: Engage.

Overall, based on our analyses above, we did not find sufficient evidence to support H_1 when teacher-rated State MAAS was used as a predictor. However, there was strong evidence to support H_1, in that teachers' State MAAS as perceived by students individually and as a class had significant positive relationships with students' engagement in class. Specifically, we found strong evidence for within-teacher effects, indicating that more mindful teachers are significantly associated with better student engagement.

2.3 Chapter Conclusion

In this chapter, we focused on the study exploring state mindfulness and its association with student engagement in class. This study is cross-sectional in design and is set within a tertiary educational institution in Singapore. State mindfulness as independent variable and decentering as mediator were collected from eligible and consenting teachers before the commencement of their tutorials, while eligible students in the respective tutorials rated their level of engagement in class as well as their teachers' state mindfulness at the end of the tutorials.

Based on our correlation analysis, Teacher-rated State Mindfulness was significantly associated with decentering but did not predict student engagement. However, the positive and significant correlation between Student-rated State Mindfulness and student engagement indicated that the greater perception of their teacher mindfulness, the more engaged they are during tutorials.

As the students were cross-classified by module topics and teachers who taught them, each student provided multiple responses corresponding to the tutorials taught by participating teachers. Accordingly, hierarchical linear modelling (HLM) was employed as the choice for statistical analysis.

Our analysis using HLM indicated that Student-rated Teacher State MAAS was positively and significantly associated with students' engagement. It should be emphasised that student-rated mindfulness and class-average teacher mindfulness have independent effects on student engagement. That is, independent of how mindful the class thinks the teacher is, an individual student's own perception of teacher mindfulness predicts his or her engagement in class. In addition, independent of the students' own perception of teacher mindfulness,

he or she still benefits in class by being more engaged from a teacher who is rated to be more mindful by his/her classmates collectively.

In other words, the aggregate class-average mindfulness (CAStRM) predicts above and beyond students' own perception of teacher mindfulness (StRM). The class-average mindfulness measure captures more reliably how mindful the teacher is throughout the class than to any specific student, and is thus more objective.

CHAPTER 3: STUDY 2 ON TRAIT MINDFULNESS

3.1 Method

3.1.1 Participants and Procedures

Study 2 is a correlation study involving surveys to investigate the relationship between teachers' trait mindfulness and students' academic performance as well as teaching quality, and to explore the roles of emotional intelligence, empathic concern, fear of self-compassion and psychological inflexibility as potential mediators.

The research setting was a business school within a tertiary institution located in Singapore. There was a total of 114 full time and 59 adjunct teachers allocated with teaching assignments for all stages of studies across all diplomas in Academic Year 2016/17. Teachers were invited to indicate their consent for participation prior to the start of the semester via electronic direct mailer using Qualtrics. This was followed up with two reminders, and an information session was also conducted to provide details of the research. The information session was video-recorded and made available to staff who were not able to attend the session to ensure consistent dissemination of information. Participation is voluntary and there was no penalty for non-participation or subsequent drop out.

Each teacher was assigned a coded ID, where it is prefixed with "1" if they are adjunct or "6" if they are full-time. For example, 1001 and 6002 will represent "Adjunct Staff 1001" and "Full-time staff 6002" respectively. The linkage file containing names of staff and assigned IDs was only available to Principal Investigator, kept separated and secured with a password.

The research procedures relating to this study were approved by the Institutional Review Board of Singapore Management University. At the start of

the semester, all recruited teachers were provided with a URL to complete an online questionnaire using Qualtrics to measure independent variables and mediators for this study. A total of 130 (75.1%) completed surveys were collected from teachers and used accordingly for this study.

Of the 130 respondents, 62% were female and 38% were male, and the mean years of teaching experience was 8.83 years (*SD* = 5.9). Among these 130 responses, the final four were received approximately one month after most participants submitted their responses. As trait mindfulness tend to remain stable over time (Baer et al., 2004; Barnhofer, Duggan, & Griffith, 2011; Brown & Ryan, 2003), ranging from 4 months (Bowen & Kurz, 2012) to 6 months (Vøllestad, Sivertsen, & Nielsen, 2011), they were included in our sample for analysis henceforth. 66 of the 130 teachers also participated in Study 1 on teachers' state mindfulness as discussed in the earlier chapter. Table 12 presents additional information relating to this sample of 130 teachers.

Table 12: Descriptive Statistics of Teachers

	Mean Years of Experience	**N**	**%**
Adjunct	**8.27**	**30**	**23%**
Female	8.04	23	77%
Male	9.00	7	23%
Full-time	**9.00**	**100**	**77%**
Female	8.79	57	57%
Male	9.28	43	43%
Grand Total	**8.83**	**130**	**100%**

Independent t-tests performed to compare adjunct and full-time teachers revealed that there were no significant difference in years of experience between adjunct teachers (M = 8.2, SD = 5.6) and full-time teachers (M = 9.0, SD = 6.0), $t(128) = -0.60$, $p = 0.55$. In terms of gender, we could not demonstrate gender

balance for full-time and adjunct teachers; $\chi^2(1) = 3.77$, $p = .052$. Since p-value was marginally > .05, the sample of male and female adjunct/full-time teachers was treated as one sample for our analyses henceforth, where teaching quality and module scores would be collected at the end of the semester.

Group Statistics

	1=Adj,6=FT	N	Mean	Std. Deviation	Std. Error Mean
YrsExp	1.00	30	8.267	5.5828	1.0193
	6.00	100	9.000	5.9916	.5992
Gender	1.00	30	1.767	.4302	.0785
	6.00	100	1.570	.4976	.0498

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
YrsExp	Equal variances assumed	.541	.464	-.597	128	.552	-.7333	1.2285	-3.1641	1.6974
	Equal variances not assumed			-.620	50.730	.538	-.7333	1.1823	-3.1073	1.6406
Gender	Equal variances assumed	25.810	.000	1.956	128	.053	.1967	.1006	-.0023	.3957
	Equal variances not assumed			2.115	54.384	.039	.1967	.0930	.0103	.3830

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
1=Adj,6=FT * Gender	130	100.0%	0	0.0%	130	100.0%

1=Adj,6=FT * Gender Crosstabulation

			Gender		Total
			1.0	2.0	
1=Adj,6=FT	1.00	Count	7	23	30
		Expected Count	11.5	18.5	30.0
	6.00	Count	43	57	100
		Expected Count	38.5	61.5	100.0
Total		Count	50	80	130
		Expected Count	50.0	80.0	130.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.771[a]	1	.052		
Continuity Correction[b]	2.986	1	.084		
Likelihood Ratio	3.973	1	.046		
Fisher's Exact Test				.057	.040
Linear-by-Linear Association	3.742	1	.053		
N of Valid Cases	130				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.54.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.170	.052
	Cramer's V	.170	.052
N of Valid Cases		130	

For this study, there were two dependent variables, namely, Student Academic Performance and Teaching Quality. The Module Scores attained by students for the modules they took were retrieved from the institution after approval from the school management was obtained and the official release of results to the students. As for Teaching Quality, we adopted feedback ratings provided by students as part of the institution's standard student feedback exercise. Both measures were taken at the end of the semester, approximately 3.5 months after the measures for independent variables and mediators were collected.

3.1.2 Measures

3.1.2.1 Five Factor Mindfulness Questionnaire (Independent Variable)

The original FFMQ is a 39-item questionnaire developed by Baer et al. (2006) which measures five components of mindfulness skills, namely:

(i) Observing/noticing/attending to sensations/ perceptions/ thoughts/ feelings (8 items);

(ii) Describing/labelling with words (8 items);

(iii) Acting with awareness/automatic pilot/concentration/non-distraction (8 items);

(iv) Non-judging of experience (8 items) and

(v) Non-reactivity to inner experience (7 items).

The original items are scored on a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*) and can be used in respondents with or without meditation experience (Baer et al., 2008). The MAAS, though a well-accepted measure of mindfulness, remains a "unidimensional instrument yielding a single total score" (Baer et al., 2008, p. 330). It was later shortened to the 24 item FFMQ-Short Form by Bohlmeijer, Peter, Fledderus, Veehof, and Baer (2011) and was found to be valid and reliable, similar to the original FFMQ. As such, the FFMQ-SF (APPENDIX F) is selected as the measure for mindfulness in this study as it allows for greater depth and richness in our analysis.

For the purpose of this research, the FFMQ-SF was recalibrated to 7-point (1 = *Never*, 7 = *Every time*) for ease of administration together at the beginning of the semester with the other measure instruments. Examples of items include "I pay attention to physical experiences, such as the wind in my hair or sun on my

face” and “It seems I am ‘running on automatic’ without much awareness of what I’m doing”.

3.1.2.2 Teacher-rated and Student-rated Teachers' State Mindful Attention Awareness Scale (Independent Variable)

In addition to FFMQ as a measure of trait mindfulness, two other trait mindfulness measures were collected subsequently at mid term; one was rated by teachers and the other was rated by students.

Recall that of the 130 teachers who participated in Study 2, 66 of them also participated in Study 1 which related to teachers' state mindfulness. These teachers taught between 1 to 8 tutorials during the week when the surveys were conducted. In Study 1, two sets of teachers' State MAAS were collected; one at the beginning of tutorial responded by teachers themselves and one at the end of tutorial which was rated by students. While State MAAS was designed to measure teachers' state mindfulness, repeated measures of State MAAS over different times of day or over different days could be averaged and used as a proxy for teachers' level of trait mindfulness. Additionally, prior literature has informed the strong correlation between Trait MAAS and State MAAS (Brown & Ryan, 2003).

For each teacher, their average self-reported State MAAS across tutorials was computed. This score was referred to as the Teacher-Average Teacher-Rated MAAS (TATeRM). It represented how mindful teachers rated themselves (on average) at the beginning of each tutorial. Similarly, the Teacher-Average Student-Rated MAAS (TAStRM) score were computed by averaging student-reported State MAAS across tutorials for each teacher. This represented how mindful teachers were on average as perceived by students.

Cronbach alphas for the self-rated and student-rated teachers' State MAAS were 0.815 and 0.895 respectively in our sample. Preliminary analyses of both variables had been conducted and the results were presented in Section 2.2.1. Accordingly, these two additional measures of trait mindfulness were included as independent variables for Study 2.

3.1.2.3 Wong & Law Emotional Intelligence Scale to Measure Teachers' Emotional Intelligence (Mediator)

Teachers were also requested to complete the Wong & Law Emotional Intelligence Scale (WLEIS; Wong & Law, 2002) at the same time as the FFMQ. WLEIS is a 16-item questionnaire (APPENDIX G) measuring self-emotion appraisal (SEA), emotion appraisal of others (OEA), use of emotion (UOE), and regulation of emotion (ROE). The scale was measured on a 7-point Likert scale (1 = *Strongly Disagree*, 7 = *Strong Agree*). Examples of items include "I am sensitive to the feelings and emotions of others" and "I have good control of my own emotions".

3.1.2.4 Davis Interpersonal Reactivity Index – Empathic Concern Subscale (Mediator)

The complete Interpersonal Reactivity Index (IRI) developed by Davis and Association (1980) comprises 28-items made up of 4 subscales with 7 items each based on a 5-point Likert scale (0 = *Does not describe me at all*, 4 = *Describe me very well*). The subscales are, namely, Perspective Taking, Fantasy, Personal Distress and Empathic Concern. The Perspective Taking scale measures one's propensity to adopt another person's point of view while the Fantasy measures one's tendency to identify with imagined characters portrayed in fictions such as movies and books. Personal distress items measure the extent to which one feels distressed, while Empathic Concern items measure one's predisposition to feel "warm, compassion and concern" as a result of another person's negative experiences.

In our hypothesised model in Figure 1, we posited Empathic Concern as a mediator linking teacher trait mindfulness and teaching quality as well as student academic performance. As such, only the Empathic Concern subscale will be used for the purpose of this proposed research (APPENDIX H). Similarly, this scale has been recalibrated into 7-point (1 = Very untrue of me, 7 = Very true of me) for this research. Examples included positively coded item like "When I see someone being taken advantage of, I feel kind of protective toward them" and reverse coded items such as "Sometimes I don't feel sorry for other people when they are having problems".

3.1.2.5 *Fear of Compassion (Self) Scale (Mediator)*

Developed by Gilbert et al. (2011), the Fear of Compassion Scale comprises 3 subscales in (i) fears of compassion for others, (ii) fears of compassion from others and (iii) fears of compassion for self. Only the 15-item Fear of Compassion for Self subscale (APPENDIX I) was used for the purpose of this research. Originally measured on a 5-point Likert scale (0 = *Do not agree at all*, 4 = *Completely agree*), the scale was recalibrated to 7-point (1 = *Strongly disagree*, 7 = *Strongly agree*) for this study. Examples of items in this scale include “I feel that I don't deserve to be kind and forgiving to myself” and “I find it easier to be critical towards myself rather than compassionate”.

3.1.2.6

Psychological Inflexibility (Mediator)

The more recent version of the Acceptance & Action Questionnaire – II (AAQ-II) is a widely accepted and validated measure of psychological inflexibility, consistent with the Acceptance and Commitment Therapy model of mental health. Developed by Bond et al. (2011), the AAQ-II (APPENDIX J) comprised 7 items measured on a 7-point Likert (1= *never true* to 7 = *always true*). Examples included "My painful experiences and memories make it difficult for me to live a live that I would value" and "I worry about not being able to control my worries and feelings".

3.1.2.7 Module Scores to Measure Student Academic Performance (Dependent Variable)

The module scores of students as the outcome measure of student academic performance were obtained from archival records at the end of the semestral examinations, approximately 4 months after the independent variables and mediators were collected. The release of module scores were approved by senior management of the institution in writing.

The scores were de-identified and could not be attributed to any particular student. The access to the module scores and feedback ratings is limited to the Principal Investigator, who is also a member of the institution's management team. Risk, if any, was mitigated by obtaining the module scores after the official release of semestral academic results and reporting students' academic performance on an aggregated basis.

This institution adopts the following Grade Point Average (GPA) system, where each grade is awarded within a band of 5 marks as appended in Figure 3.

Figure 3: Grading System of Institution

Module Grade			Grade Point
DIST	Distinction	(awarded by the Assessment Board)	4.0
A	>=80%		4.0
B+	75% -		3.5
B	70% -		3.0
C+	65% -		2.5
C	60% -		2.0
D+	55% -		1.5
D	50% -		1.0
F			0.0
P	Pass	(for modules graded Pass/Fail)	NA
*DEB	Debarred		0.0

Note: Accessed from institution website.

3.1.2.8 Student Feedback Ratings to Measure Teaching Quality (Dependent Variable)

One of the key strengths of this research was the use of third-party measures, as observer-rated behaviours and feedback ratings were less likely to be influenced by social desirability (Heppner, Wampold, & Kivlighan Jr, 2007). In order to measure teaching quality as an outcome measure objectively, students were asked to rate their teachers on 7 items (Likert 4-point scale, 1 = *Very Good* and 4 = *Below Average*) at the end of the instruction semester as part of the tertiary institution's standard feedback exercise (APPENDIX K).

This feedback exercise occurred approximately 3.5 months after the start of the semester and approximately 3 months after Study 1 on state mindfulness was conducted, thereby allowing sufficient time for classroom interaction with the teachers throughout the semester. Additionally, it is important to note that all

students has been informed that feedback ratings are confidential, and are made known to teachers on an aggregated basis after the release of the examination results. These procedures are in place so as to ensure that the feedback are fair and unbiased reflection of teachers' teaching quality.

The feedback ratings were re-coded (Likert 4-point scale, 1 = *Below Average* and 4 = *Very Good*), and subsequently aggregated and averaged by teacher. Examples of items included in the student feedback were "He/She has good knowledge of the module and imparts theory and concepts using effective teaching techniques and relevant examples" and "He/She is good at classroom management".

3.2 Results

3.2.1 Data Analysis

All data analysis were performed using SPSS Version 21. A 95% confidence level is adopted in all the analyses, representing the probability within which the true values of the unknown population parameters are contained within. This correspondingly reflects a significance level of 0.05. Data were first checked for normality distribution, followed by preliminary analyses, Pearson's correlations and finally appropriate statistical analyses.

3.2.2 Preliminary Analysis

After data collection, factor analyses and reliability analyses were conducted so as to reduce all items from independent and dependent variables as well as mediators for analyses.

3.2.2.1 Five Factor Mindfulness Questionnaire (Independent Variable)

Factor analysis was performed on the FFMQ scale with the principal axis factoring extraction method. The analysis revealed that there were 6 eigenvalues greater 1, with all 6 factors explaining 53.2% of the total variance in FFMQ.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings [a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.138	21.408	21.408	4.708	19.615	19.615	3.822
2	3.613	15.055	36.463	3.139	13.081	32.695	2.404
3	2.337	9.736	46.199	1.957	8.155	40.850	3.539
4	1.836	7.648	53.847	1.424	5.933	46.784	2.535
5	1.395	5.811	59.658	.993	4.138	50.922	2.249
6	1.017	4.238	63.896	.553	2.304	53.226	1.134
7	.975	4.062	67.958				
8	.859	3.581	71.539				
9	.787	3.280	74.819				
10	.682	2.844	77.662				
11	.651	2.714	80.377				
12	.619	2.578	82.955				
13	.533	2.221	85.176				
14	.506	2.109	87.284				
15	.476	1.984	89.269				
16	.435	1.812	91.081				
17	.409	1.706	92.787				
18	.332	1.382	94.168				
19	.322	1.343	95.512				
20	.265	1.104	96.616				
21	.256	1.066	97.682				
22	.226	.941	98.622				
23	.172	.715	99.337				
24	.159	.663	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix[a]

	Factor					
	1	2	3	4	5	6
@_AA5	.902	.070	-.089	.076	-.135	.051
@_AA4	.804	.151	.017	.046	-.117	.264
@_AA2	.715	-.038	-.033	.029	.004	-.084
@_AA3	.707	-.052	-.029	-.079	.064	-.070
@_AA1	.542	-.129	.062	.006	.195	.048
@_NJ3	-.148	-.857	.030	.056	.004	-.049
@_NJ1	.022	-.619	.010	-.041	-.024	.063
@_NJ4	.356	-.585	.152	-.012	-.083	-.087
@_NJ2	-.086	-.412	-.232	-.121	-.006	.206
@_NJ5	.259	-.347	.051	.018	-.002	-.007
DS2	-.089	-.092	.900	-.032	.037	-.023
DS1	-.062	.003	.874	.018	-.014	.040
DS5	-.024	.026	.697	.075	-.040	.052
OB3	.006	.028	-.047	.848	-.011	.340
OB2	.091	-.043	-.050	.707	-.022	-.278
OB4	-.107	-.017	.137	.702	.005	-.020
OB1	.107	.103	.093	.437	.098	-.233
NR4	-.070	-.088	-.155	.116	.882	.098
NR5	-.058	.080	.014	-.203	.639	-.055
NR3	.151	.158	.205	.095	.448	.034
NR1	.103	.039	.364	.047	.413	-.109
NR2	.079	.022	.257	.133	.296	-.056
@_DS4	.212	-.109	.209	-.105	.094	.396
@_DS3	.244	-.192	.328	-.030	-.056	.363

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 14 iterations.

Note: Reverse-coded items were prefixed with "@_"

Items DS3 and DS4 of the Describe subscale, which were originally reversed coded, loaded strongly on their own 6th factor but contributed only 2.3% of total variance in FFMQ. Both items also loaded on Factor 3, which included the other three DS items. Since Factor 6 only had two items, it might not be substantive and possibly reflected only the effects of reverse wordings. Accordingly, five factors were subsequently extracted, and the results of the analysis are depicted as follows:

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.138	21.408	21.408	4.684	19.517	19.517	3.840
2	3.613	15.055	36.463	3.114	12.975	32.491	2.444
3	2.337	9.736	46.199	1.919	7.995	40.487	3.501
4	1.836	7.648	53.847	1.391	5.795	46.281	2.568
5	1.395	5.811	59.658	.956	3.982	50.263	2.267
6	1.017	4.238	63.896				
7	.975	4.062	67.958				
8	.859	3.581	71.539				
9	.787	3.280	74.819				
10	.682	2.844	77.662				
11	.651	2.714	80.377				
12	.619	2.578	82.955				
13	.533	2.221	85.176				
14	.506	2.109	87.284				
15	.476	1.984	89.269				
16	.435	1.812	91.081				
17	.409	1.706	92.787				
18	.332	1.382	94.168				
19	.322	1.343	95.512				
20	.265	1.104	96.616				
21	.256	1.066	97.682				
22	.226	.941	98.622				
23	.172	.715	99.337				
24	.159	.663	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Since DS3 factor loading is > 0.3 and DS4 factor loading is marginally < 0.3, we concluded that the 6th factor is not substantially meaningful and could be disregarded. Cronbach alpha for the FFMQ scale was 0.791. Overall, FFMQ has a mean of 4.57 (*SE* = 0.50) and is normally distributed with skewness of 0.05 (*SE* = 0.21) and kurtosis of 0.30 (*SE* =0.42).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
FFMQ	130	3.2500	5.9167	4.566664	.4974252	.045	.212	.302	.422
Valid N (listwise)	130								

3.2.2.2 Wong & Law Emotional Intelligence Scale to Measure Teachers' Emotional Intelligence (Mediator)

Factor analysis were conducted on all SEA, OEA, UOE and ROE subscales of the WLEIS. All items were loaded on 4 factors in WLEIS scale as expected.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.011	43.817	43.817	6.737	42.107	42.107	4.680
2	2.503	15.644	59.461	2.252	14.077	56.184	3.949
3	1.447	9.042	68.502	1.168	7.301	63.485	4.779
4	1.414	8.835	77.338	1.099	6.870	70.354	4.629
5	.686	4.288	81.626				
6	.596	3.725	85.351				
7	.472	2.949	88.300				
8	.385	2.406	90.706				
9	.338	2.114	92.820				
10	.233	1.458	94.279				
11	.214	1.338	95.616				
12	.173	1.078	96.695				
13	.163	1.021	97.715				
14	.158	.985	98.700				
15	.143	.893	99.593				
16	.065	.407	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

The means and standard deviations of the SEA, OEA, UOE and ROE subscales are 5.60 (*SE* = 0.74), 5.23 (*SE* = 1.02), 5.61 (*SE* = 0.87) and 5.34 (*SE* = 1.06) resectively. All subscales exhibited good internal consistency reliabilities of 0.847, 0.913, 0.868 and 0.934 respectively. Overall, WLEIS has mean of 5.45 (*SE* = 0.69) and is normally distributed with a skewness of -0.582 (*SE* = 0.21) and kurtosis -0.14 (*SE* = 0.42).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SEA	130	3.5000	7.0000	5.596154	.7375482	-.537	.212	.306	.422
OEA	130	1.7500	7.0000	5.234615	1.0162220	-.897	.212	.800	.422
UOE	130	3.0000	7.0000	5.611538	.8749649	-.587	.212	.045	.422
ROE	130	2.0000	7.0000	5.340385	1.0570013	-.959	.212	.983	.422
WLEIS	130	3.5000	6.7500	5.445677	.6940254	-.582	.212	-.136	.422
Valid N (listwise)	130								

Pattern Matrix[a]

	Factor			
	1	2	3	4
UOE3	.852	-.144	.059	.134
UOE2	.820	.114	.001	-.055
UOE4	.763	-.068	.063	.073
UOE1	.598	.188	-.021	-.036
OEA2	.030	.869	-.069	.038
OEA1	.006	.833	.003	.094
OEA3	-.076	.825	.085	-.011
OEA4	.168	.772	.034	-.005
ROE4	.050	.027	.928	-.018
ROE3	-.081	.035	.879	-.032
ROE1	.009	-.017	.834	.010
ROE2	.104	-.022	.823	.109
SEA2	-.039	.024	.049	.930
SEA1	-.066	.057	-.058	.850
SEA3	.078	-.038	.012	.709
SEA4	.105	.039	.086	.498

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 11 iterations.

3.2.2.3 Davis Interpersonal Reactivity Index – Empathic Concern Subscale (Mediator)

Factor analysis performed on the Empathic Concern subscale revealed the existence of two eigenvalues greater than 1. These two factors explained 45.5% of the variance in Empathic Concern with the second factor contributing 14.3%. Items EC2, 5 and 6, which were originally reversed coded, loaded strongly on

their own second factor. However, this could be just a reflection of wording effects rather than a substantive factor.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.693	38.467	38.467	2.187	31.240	31.240	1.867
2	1.350	19.282	57.749	.998	14.263	45.503	1.787
3	.942	13.456	71.205				
4	.663	9.476	80.681				
5	.598	8.543	89.224				
6	.444	6.344	95.568				
7	.310	4.432	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix[a]

	Factor	
	1	2
EC3	.854	.093
EC1	.565	.049
EC4	.549	-.097
EC7	.487	-.206
@_EC5	-.201	-1.027
@_EC6	.151	-.555
@_EC2	.086	-.371

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The factor analysis was then repeated with one factor. The resulting factor explained 28.3% of the total variance in Empathic Concern. Since all factor loadings were > 0.3, we conclude that the all items can be loaded on to 1 factor, i.e., measuring the same construct. The Cronbach alpha's was 0.722, indicating strong reliability. The mean of Empathic Concern is 5.38 (*SE* = 0.69) with skewness of -0.31 (*SE* = 0.21) and kurtosis of -0.33 (*SE* = 0.42).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EmpCon	130	3.4286	6.8571	5.381314	.6949537	-.310	.212	-.325	.422
Valid N (listwise)	130								

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.693	38.467	38.467	2.004	28.626	28.626
2	1.350	19.282	57.749			
3	.942	13.456	71.205			
4	.663	9.476	80.681			
5	.598	8.543	89.224			
6	.444	6.344	95.568			
7	.310	4.432	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
EC7	.635
EC3	.620
EC4	.574
@_EC6	.561
@_EC5	.471
EC1	.462
@_EC2	.370

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 6 iterations required.

3.2.2.4 Fear of Compassion (Self) Scale (Mediator)

A factor analysis was similarly performed on the Fear of Compassion (Self) Scale, resulting in an initial solution of three factors which explained 68.3% of the variance in this scale. The first factor alone accounted for 56.6% of total variance and the factor loadings of the items ranged from 0.542 to 0.880. The Cronbach alpha was 0.946, higher than 0.92 for students and 0.85 for therapists demonstrated by Gilbert et al. (2011). The mean of Fear of Compassion scale

was 2.85 (SE = 1.04), with a skewness of 0.40 (*SE* = 0.21) and kurtosis of -0.72 (*SE* = 0.42).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
FearCom	130	1.0000	6.0000	2.854872	1.0386382	.404	.212	-.716	.422
Valid N (listwise)	130								

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.786	58.573	58.573	8.493	56.622	56.622	7.238
2	1.347	8.978	67.551	1.047	6.983	63.605	5.963
3	1.051	7.006	74.558	.706	4.710	68.315	5.695
4	.829	5.527	80.085				
5	.536	3.571	83.656				
6	.416	2.775	86.431				
7	.398	2.654	89.085				
8	.350	2.332	91.417				
9	.298	1.990	93.407				
10	.238	1.584	94.991				
11	.198	1.323	96.314				
12	.187	1.247	97.561				
13	.158	1.054	98.615				
14	.115	.765	99.379				
15	.093	.621	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix[a]

	Factor		
	1	2	3
FC8	.880	.017	-.098
FC10	.777	.174	-.030
FC7	.747	.015	.140
FC5	.636	-.047	.373
FC9	.628	.210	.058
FC6	.542	.112	.186
FC13	.155	.801	-.059
FC12	.100	.793	-.140
FC14	-.057	.606	.208
FC15	-.054	.575	.134
FC11	.297	.509	.041
FC2	.038	.159	.788
FC1	-.012	.160	.788
FC3	.366	-.047	.700
FC4	.438	.001	.556

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 12 iterations.

Factor Correlation Matrix

Factor	1	2	3
1	1.000	.642	.580
2	.642	1.000	.488
3	.580	.488	1.000

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Results also indicated that the factors were highly correlated to each other, ranging from 0.488 to 0.642, thus providing support to disregard the extra factors. The factor analysis was subsequently repeated to yield one factor, which then accounted for 55.8% of the total variance and factor loadings were between 0.522 and 0.841. This one-factor solution is consistent with prior theory, internally consistent and is thus acceptable to be considered as one scale for analysis.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.786	58.573	58.573	8.373	55.819	55.819
2	1.347	8.978	67.551			
3	1.051	7.006	74.558			
4	.829	5.527	80.085			
5	.536	3.571	83.656			
6	.416	2.775	86.431			
7	.398	2.654	89.085			
8	.350	2.332	91.417			
9	.298	1.990	93.407			
10	.238	1.584	94.991			
11	.198	1.323	96.314			
12	.187	1.247	97.561			
13	.158	1.054	98.615			
14	.115	.765	99.379			
15	.093	.621	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
FC3	.841
FC4	.841
FC5	.841
FC10	.827
FC7	.807
FC9	.795
FC2	.775
FC6	.740
FC8	.734
FC13	.732
FC1	.730
FC11	.719
FC12	.612
FC14	.603
FC15	.522

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 4 iterations required.

3.2.2.5 *Psychological Inflexibility (Mediator)*

One factor was extracted using principal axis factoring, consistent with our expectation. All factor loadings were between 0.731 and 0.882, indicating the existence of one underlying construct as intended to be measured. In our sample of 130 teachers, the Cronbach alpha was 0.932 for Psychological Inflexibility variable, indicating internal consistency for statistical analysis The mean for Psychological Inflexibility is 2.62 (*SE* = 1.10) with a skewness of 1.03 (*SE* = 0.21) and kurtosis of 1.86 (*SE* = 0.42).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
PsyInflex	130	1.0000	7.0000	2.618682	1.1000269	1.034	.212	1.861	.422
Valid N (listwise)	130								

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.009	71.562	71.562	4.690	67.004	67.004
2	.550	7.858	79.419			
3	.451	6.439	85.859			
4	.406	5.807	91.666			
5	.225	3.219	94.885			
6	.197	2.813	97.698			
7	.161	2.302	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
PI4	.882
PI2	.879
PI1	.855
PI6	.838
PI3	.767
PI7	.763
PI5	.731

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 4 iterations required.

3.2.2.6 Module Scores to Measure Student Academic Performance (Dependent Variable)

A total of 13,001 cases of academic results were downloaded from the school, each representing the module score of a student for each module he or she took during the semester. This corresponded to a total of 2,574 students taking 107 modules, taught by the 130 business school teachers who agreed to this research. These scores excluded those relating to non-business students who took modules taught by participating business school teachers, as they were under the purview of another school and were not approved for download. Data cleaning was subsequently done to exclude most general studies modules which were graded as only pass or fail without numerical scores. Students who were barred from taking examinations due to failure to meet attendance requirements, hence achieving a score of zero, were also excluded.

Overall, this resulted in 11,724 usable cases of module scores. The individual Module Scores (ModSc) ranged from 1.0 to 95.0 (M = 70.8, SD = 9.21), with skewness of -0.963 (SE = 0.023) and kurtosis of 2.813 (SE = 0.045). The module scores were also aggregated at the teacher level, and ranged from 51.1 to 76.2 (M = 70.8, SE = 2.7), with skewness -1.6 (SE = 0.23) and kurtosis of 6.7 (SE = 0.05).

Statistics

ModSc

N	Valid	11724
	Missing	0
Mean		70.77
Std. Deviation		9.214
Skewness		-.963
Std. Error of Skewness		.023
Kurtosis		2.813
Std. Error of Kurtosis		.045
Minimum		1
Maximum		95

ModSc

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.0	.0	.0
	2	2	.0	.0	.0
	7	1	.0	.0	.0
	11	1	.0	.0	.0
	14	1	.0	.0	.1
	15	1	.0	.0	.1
	18	2	.0	.0	.1
	20	2	.0	.0	.1
	21	3	.0	.0	.1
	22	1	.0	.0	.1
	23	2	.0	.0	.1
	24	1	.0	.0	.2
	25	2	.0	.0	.2
	27	4	.0	.0	.2
	28	4	.0	.0	.2
	29	2	.0	.0	.3
	30	2	.0	.0	.3
	31	4	.0	.0	.3
	32	4	.0	.0	.3
	33	2	.0	.0	.4
	34	7	.1	.1	.4
	35	3	.0	.0	.4
	36	5	.0	.0	.5
	37	6	.1	.1	.5
	38	2	.0	.0	.6
	39	2	.0	.0	.6
	40	8	.1	.1	.6
	41	5	.0	.0	.7
	42	6	.1	.1	.7
	43	2	.0	.0	.8
	44	7	.1	.1	.8
	45	1	.0	.0	.8
	48	1	.0	.0	.8
	50	272	2.3	2.3	3.1
	51	91	.8	.8	3.9
	52	54	.5	.5	4.4
	53	71	.6	.6	5.0
	55	207	1.8	1.8	6.8
	56	106	.9	.9	7.7
	57	127	1.1	1.1	8.7
	58	126	1.1	1.1	9.8
	60	334	2.8	2.8	12.7
	61	245	2.1	2.1	14.8
	62	236	2.0	2.0	16.8
	63	291	2.5	2.5	19.3
	65	541	4.6	4.6	23.9
	66	398	3.4	3.4	27.3
	67	422	3.6	3.6	30.9
	68	552	4.7	4.7	35.6
	70	1019	8.7	8.7	44.3
	71	608	5.2	5.2	49.4
	72	586	5.0	5.0	54.4
	73	856	7.3	7.3	61.7
	75	897	7.7	7.7	69.4
	76	515	4.4	4.4	73.8
	77	400	3.4	3.4	77.2
	78	472	4.0	4.0	81.2
	80	751	6.4	6.4	87.6
	81	374	3.2	3.2	90.8
	82	234	2.0	2.0	92.8
	83	184	1.6	1.6	94.4
	84	107	.9	.9	95.3
	85	231	2.0	2.0	97.3
	86	113	1.0	1.0	98.2
	87	76	.6	.6	98.9
	88	43	.4	.4	99.2
	89	38	.3	.3	99.6
	90	22	.2	.2	99.8
	91	10	.1	.1	99.8
	92	7	.1	.1	99.9
	93	5	.0	.0	99.9
	94	3	.0	.0	100.0
	95	3	.0	.0	100.0
	Total	11724	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ModSc	11724	1	95	70.77	9.214	-.963	.023	2.813	.045
TAModSc	11724	51.07	76.24	70.7739	2.68852	-1.597	.023	6.707	.045
Valid N (listwise)	11724								

3.2.2.7 Student Feedback Ratings to Measure Teaching Quality (Dependent Variable)

Table 13 summarises the Descriptive Statistics for Feedback Ratings as a measure of Teaching Quality. The Feedback ratings ranged from 1.0 to 4.0 (M = 3.41, SD = 0.57), with skewness of -0.79 (SE = 0.02) and kurtosis of 1.09 (SE = 0.04). Higher ratings represent better teaching quality. Factor analysis was performed using the principal axis factoring extraction method, resulting in one eigenvalue greater than 1, which explained 79.3% of the total variance in student feedback (as a measure for teaching quality). All factor loadings were 0.863 and above, and Cronbach's alpha was 0.964. As such, Feedback ratings exhibited internal consistency and will be used as a measure of teaching quality instead of the individual scale items.

Table 13: Summary Statistics for Feedback Ratings (Teaching Quality)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q14	12380	1.0	4.0	3.421	.6206	-.862	.022	1.046	.044
Q15	12380	1.0	4.0	3.470	.5932	-.881	.022	1.126	.044
Q16	12380	1.0	4.0	3.478	.6050	-.974	.022	1.272	.044
Q17	12380	1.0	4.0	3.349	.6652	-.866	.022	.979	.044
Q18	12380	1.0	4.0	3.370	.6378	-.827	.022	1.069	.044
Q19	12380	1.0	4.0	3.365	.6530	-.866	.022	1.040	.044
Q20	12380	1.0	4.0	3.425	.6297	-.932	.022	1.210	.044
Feedback	12380	1.0000	4.0000	3.411032	.5703765	-.794	.022	1.089	.044
Valid N (listwise)	12380								

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.754	82.204	82.204	5.548	79.259	79.259
2	.347	4.961	87.164			
3	.233	3.325	90.490			
4	.209	2.992	93.481			
5	.176	2.517	95.999			
6	.146	2.079	98.078			
7	.135	1.922	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor
	1
Q14	.887
Q15	.895
Q16	.885
Q17	.874
Q18	.863
Q19	.896
Q20	.930

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 4 iterations required.

Reliability Statistics

Cronbach's Alpha	N of Items
.964	7

3.2.3 Descriptive Statistics

Of the 130 teachers who completed the questionnaire involving independent variables and mediators, three of them did not receive corresponding teachers' feedback ratings by students for the semester, as one teacher had only lecturing duties and the remaining two taught only foundation courses which were not included in this feedback exercise. Table 14 presents the descriptive statistics for all trait study variables at teacher level.

It is noted that skewness for sub-scales of FFMQ and WLEIS as well as EmpCon were slightly negatively skewed, while FearCom and PsyInflex were slightly positively skewed, indicating that teachers could have tended to respond in a socially desirable manner. Nevertheless, indicators of skewness and kurtosis were within acceptable ranges for all scales and sub-scales.

Table 14: Descriptive Statistics for Trait Study Variables at Teacher Level

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
1=Adj,6=FT	130	1.00	6.00	4.8462	2.11477	-1.293	.212	-.334	.422
Gender	130	1.0	2.0	1.615	.4884	-.480	.212	-1.798	.422
YrsExp	130	1.0	27.0	8.831	5.8867	.649	.212	-.212	.422
DS	130	2.8000	6.4000	4.916923	.7747106	-.495	.212	-.105	.422
NR	130	1.8000	6.4000	4.400000	.8057930	-.222	.212	.103	.422
NJ	130	2.0000	6.4000	4.103077	.8641829	-.091	.212	-.082	.422
OB	130	1.5000	7.0000	4.401923	1.0599730	-.042	.212	-.075	.422
AA	130	2.4000	6.8000	4.978462	.9021065	-.383	.212	-.285	.422
FFMQ	130	3.2500	5.9167	4.566664	.4974252	.045	.212	.302	.422
SEA	130	3.5000	7.0000	5.596154	.7375482	-.537	.212	.306	.422
OEA	130	1.7500	7.0000	5.234615	1.0162220	-.897	.212	.800	.422
UOE	130	3.0000	7.0000	5.611538	.8749649	-.587	.212	.045	.422
ROE	130	2.0000	7.0000	5.340385	1.0570013	-.959	.212	.983	.422
WLEIS	130	3.5000	6.7500	5.445677	.6940254	-.582	.212	-.136	.422
EmpCon	130	3.4286	6.8571	5.381314	.6949537	-.310	.212	-.325	.422
FearCom	130	1.0000	6.0000	2.854872	1.0386382	.404	.212	-.716	.422
PsyInflex	130	1.0000	7.0000	2.618682	1.1000269	1.034	.212	1.861	.422
TAFdbk	127	2.5795	3.9068	3.405866	.2278389	-.692	.215	.715	.427
TAStRM	63	4.0000	7.0000	6.236875	.4987095	-1.832	.302	6.149	.595
TATeRM	69	2.6000	7.0000	5.841846	1.0728679	-1.104	.289	.630	.570
TAModSc	128	51.0690	76.2381	70.647018	3.2379594	-2.129	.214	9.677	.425
Valid N (listwise)	62								

3.2.4 Correlation Analysis

Table 15 below represents the correlation matrix for all variables in Study 2, where the unit of analysis is teacher.

Table 15: Correlation Matrix for Trait Study Variables

Correlations

		FFMQ	WLEIS	EmpCon	FearCom	PsyInflex	TAStRM	TATeRM	TAModSc	TAFdbk
FFMQ	Pearson Correlation	1	.462**	.003	-.292**	-.478**	.136	.328**	.128	.082
	Sig. (2-tailed)		.000	.969	.001	.000	.289	.006	.151	.361
	N	130	130	130	130	130	63	69	128	127
WLEIS	Pearson Correlation	.462**	1	.229**	-.172	-.416**	.174	.129	.196*	.138
	Sig. (2-tailed)	.000		.009	.051	.000	.173	.290	.027	.122
	N	130	130	130	130	130	63	69	128	127
EmpCon	Pearson Correlation	.003	.229**	1	-.201*	-.205*	.072	.047	.049	-.016
	Sig. (2-tailed)	.969	.009		.022	.019	.573	.699	.579	.862
	N	130	130	130	130	130	63	69	128	127
FearCom	Pearson Correlation	-.292**	-.172	-.201*	1	.500**	-.054	-.396**	-.082	.052
	Sig. (2-tailed)	.001	.051	.022		.000	.675	.001	.359	.564
	N	130	130	130	130	130	63	69	128	127
PsyInflex	Pearson Correlation	-.478**	-.416**	-.205*	.500**	1	-.030	-.435**	-.160	-.129
	Sig. (2-tailed)	.000	.000	.019	.000		.817	.000	.072	.147
	N	130	130	130	130	130	63	69	128	127
TAStRM	Pearson Correlation	.136	.174	.072	-.054	-.030	1	.056	-.042	.551**
	Sig. (2-tailed)	.289	.173	.573	.675	.817		.667	.746	.000
	N	63	63	63	63	63	63	62	63	63
TATeRM	Pearson Correlation	.328**	.129	.047	-.396**	-.435**	.056	1	-.079	-.107
	Sig. (2-tailed)	.006	.290	.699	.001	.000	.667		.523	.381
	N	69	69	69	69	69	62	69	68	69
TAModSc	Pearson Correlation	.128	.196*	.049	-.082	-.160	-.042	-.079	1	.077
	Sig. (2-tailed)	.151	.027	.579	.359	.072	.746	.523		.391
	N	128	128	128	128	128	63	68	128	125
TAFdbk	Pearson Correlation	.082	.138	-.016	.052	-.129	.551**	-.107	.077	1
	Sig. (2-tailed)	.361	.122	.862	.564	.147	.000	.381	.391	
	N	127	127	127	127	127	63	69	125	127

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Note: FFMQ = Five Facets Mindfulness Questionnaire, WLEIS = Wong & Law's Emotional Intelligence Scale, EC = Empathic Concern, FearCom = Fear of Compassion (Self), PsyInflex = Psychological Inflexibility, TAStRM = Teacher Average Student-rated State MAAS, TATeRM = Teacher Average Teacher-rated State MAAS, TAFdbk = Teacher Average Feedback; TAModSc = Teacher Average Module Score. For the complete correlation matrix which includes all sub-scales, please refer to APPENDIX L.

The complete correlation matrix which included all sub-scales is attached as APPENDIX L. It was interesting to note that OB and NJ (both subscales of the FFMQ) were significantly negatively correlated, $r(129) = -.18$, $p < 0.05$, in our sample. An immediate question arose whether this relationship indeed occur in the general population or only within this sample. A review of literature indicated that the relationship was reasonable and consistent with prior studies. Baer et al. (2008) suggested that the Observe subscale may have stronger correlations with the other facets of mindfulness depending on an individual's

level of meditation experience. In the non-meditating samples, relationships between observing and psychological adjustment were found to be non-significant or in the opposite direction.

While we did not collect data on the meditation experience in our sample of teachers, there is no reason to believe that they comprised predominantly experienced meditators. As non-meditators without formal attentional training, people may actually focus in a maladaptive manner. Conversely, for the meditating samples, they achieved higher scores in DS, NJ, NR and OB indicating that they may be capable of observing stimuli without judgement or reacting in a maladaptive manner unlike the non-meditators.

3.2.4.1 Links Between Mindfulness and Outcome Variables

At teacher level, correlation analysis indicated that teacher mindfulness, measured using FFMQ and average of their self-rated state mindfulness as a proxy, did not have any significant relationship with outcome variables Module Scores and Feedback. However, student rated teacher mindfulness was significantly and positively correlated with Teaching Quality, measured by students' feedback.

3.2.4.2 Links Between Mindfulness and Proposed Mediators

FFMQ is positively and significantly correlated all mediators at .05 significance level, except for OEA which correlated at .1 significance level. Empathic Concern (EmpCon) did not correlate significantly with FFMQ or with of its facets. Consistent with prior studies (Baer et al., 2004; Baer et al., 2006; Brown & Ryan, 2003), emotional intelligence (measured by WLEIS) was associated positively with FFMQ, as well as DS, NR and AA. Higher WLEIS

was associated with greater EmpCon and lower PsyInflex. Expectedly, EmpCon was significantly correlated with OEA. Fear of Compassion for Self and PsyInflex had negative associations with other scales and sub-scales measuring mindfulness and emotional intelligence.

Grossman and Van Dam (2011) compared a small group meditators and students without meditation experience, and found evidence that those with similar scores did not necessarily respond in the same way. Meditators were just as likely to indicate that they are mindful or not mindless as they are, while students (non-meditators) tended to reject statements that indicated absent-mindedness. The authors then suggested that the meaning of items could be different between different populations. Similar findings were also noted in Menon, Doddoli, Singh, and Bhogal (2014) and Vindholmen, Høigaard, Espnes, and Seiler (2014).

3.2.4.3 Links Between Proposed Mediators and Outcome Variables

In the current sample, correlations at the teacher-level indicated a strong and positive association between FFMQ and WLEIS, $r(128) = 0.46$, $p < .001$, and between emotional intelligence (WLEIS) and academic performance (TAModSc), $r(126) = 0.2$, $p = .03$.

Separately, correlation coefficients pointed towards FFMQ as not being significant predictors of Feedback. There was only a weak but significant association $r(125) = 0.2$, $p = .04$ between Others-Emotions Appraisal (OEA) subscale of the WLEIS and Feedback.

The results were noteworthy on several counts. Firstly, other than the aforementioned weak correlation between OEA and Feedback ratings, Feedback ratings had virtually negligible associations with all other variables in our sample,

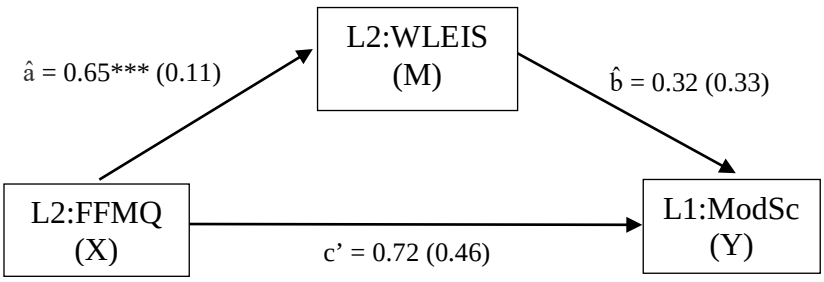
including ModSc. This indicated that students taught by the same teacher provided feedback on their teachers independently of how they will fare in their academic performance.

Secondly, contrary to the theories put forth by Roeser et al. (2012), Jennings and Greenberg (2009) and even common wisdom, emotional intelligence did not exhibit any significant association, $r(126) = 0.14$, $p = .12$, with teaching quality in the current sample.

3.2.5 Mediation Analysis

In previous sections, our results indicated that FFMQ was positively and significantly associated with all proposed mediators, except empathic concern. However, only one of the mediators, WLEIS, was a significant predictor of the outcome variable Module Score (ModSc).

Therefore, a mediation analysis was conducted to test the indirect effects of FFMQ on ModSc through WLEIS. We proceeded to conduct a multilevel mediation analysis to test hypothesis H_5 that emotional intelligence (WLEIS) mediates the effect of mindfulness (FFMQ) on academic performance (ModSc).



We first ran a linear regression on WLEIS with FFMQ as the predictor to obtain the coefficient for Path â, $b = 0.65$, $SE = 0.11$. Next, we ran a mixed model on ModSc with FFMQ and WLEIS as predictors, resulting in coefficients of Path b̂, $b = 0.32$ $SE = 0.33$ and Path c', $b = 0.72$ $SE = 0.46$. Finally, we entered the coefficients and standard errors for â and b̂ into RMediation[1], which computed the indirect effect estimate as 0.208 ($SE = 0.22$). Since the distribution of the product of coefficients at 95% CI is [-0.213, 0.66], covering the value zero, we conclude that the mediating effect of WLEIS on the relationship between FFMQ and ModSc is not statistically significant.

[1] https://amplab.shinyapps.io/MEDCI/ Accessed on 9 Oct 2016

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.462[a]	.214	.208	.6178104

a. Predictors: (Constant), FFMQ

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.279	1	13.279	34.791	.000[b]
	Residual	48.856	128	.382		
	Total	62.136	129			

a. Dependent Variable: WLEIS

b. Predictors: (Constant), FFMQ

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.500	.502		4.977	.000
	FFMQ	.645	.109	.462	5.898	.000

a. Dependent Variable: WLEIS

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	74.162	954.282	.000
FFMQ	1	61.871	2.481	.120
WLEIS	1	67.309	.955	.332

a. Dependent Variable: ModSc.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	65.957498	2.135137	74.162	30.891	.000	61.703299	70.211698
FFMQ	.716649	.455006	61.871	1.575	.120	-.192932	1.626230
WLEIS	.320060	.327473	67.309	.977	.332	-.333524	.973644

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		73.992514	.987496	74.929	.000	72.082152	75.953506
Intercept [subject = TeacherID]	Variance	1.788752	.854129	2.094	.036	.701619	4.560358
Intercept [subject = ModGrpID]	Variance	6.259562	.752665	8.317	.000	4.945308	7.923089
Intercept [subject = ModCodID]	Variance	2.389683	.865317	2.762	.006	1.175211	4.859202

a. Dependent Variable: ModSc.

Since no other mediators had significant associations with outcome variables Feedback or ModSc other than WLEIS, no further mediation analysis was conducted. Overall, we did not find sufficient evidence to support hypotheses H_5, H_6, H_7 and H_8.

3.2.6 Hierarchical Linear Modelling - Academic Performance

In the previous study, we have shown that data collected was hierarchical in nature. As a recapitulation, typically 20 to 30 students would form one module group and they took five to six module topics (subjects) on average per semester in this institution. While they usually attend tutorials together as a module group, there were cases where students would attend tutorials with another module group due to time table clashes or were enrolled in other module topics instead. Each tutorial was taught by one teacher, although the same teacher could teach the same students for two or more module topics. In addition, more than one teacher could be teaching the same module topic to different groups of students. Each teacher could also be teaching more than one module topic.

Since different teachers could teach the same module topic and students were nested in module groups, module groups were cross-classified by module topic and teacher. Therefore, a cross-classified multilevel model was initially conducted as the independence assumption required for ordinary least squares regression was violated.

In the analyses that follow, we adopted the following terminologies. Teacher-rated State MAAS (TeRM) is the self-reported measure of teacher state mindfulness collected at the beginning of each tutorial, while Teacher Average Teacher-rated State MAAS (TATeRM) represents the teacher's average TeRM scores for all tutorials taught by him or her. Teacher Average Student-rated State MAAS (TAStRM) is a measure of how mindful teachers were as perceived and rated by their students at the end of each tutorial and averaged across all their

students, while the Class Average Student-rated State MAAS (CAStRM) is a measure of how mindful teachers were as perceived the all students in a particular tutorial collectively, derived by averaging the students' individual responses. Figure 4 below presents graphically the class structure in this institution.

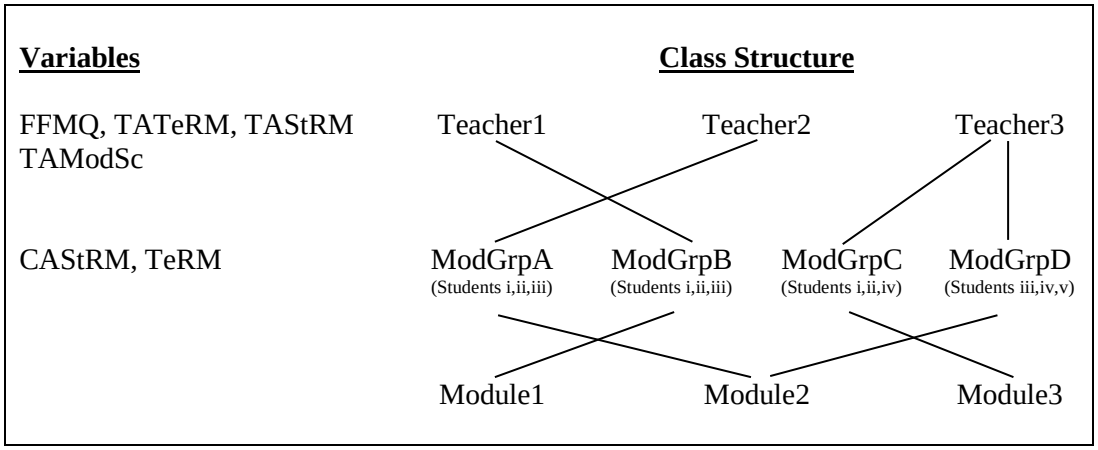


Figure 4: Graphical Representation of the Class Structure

Note: TATeRM = Teacher Average Teacher-rated State MAAS, TAStRM = Teacher Average Student-rated State MAAS; TAFdbk = Teacher Average Feedback; TAModSc = Teacher Average Module Score; CAStRM = Class Average Student-rated State MAAS; TeRM = Teacher-rated State MAAS

It was possible that students' responses might be affected by attributes other than mindfulness of teachers who taught them, the particular modules that they were enrolled and their classmates in the particular module groups that they studied in. Thus, student responses were inter-dependent instead of independent of each other. In other words, there were random effects arising from teachers, module topics and module groups.

Given that students may have provided multiple cases of data points, each relating to a different module score for each module they took, we used hierarchical level modelling (HLM) to test our hypotheses.

A total of 11,724 module scores at the end of the semester were used. Firstly, responses were analysed using HLM with FFMQ, Teacher Average Teacher-rated State MAAS (TATeRM), Teacher Average Student-rated State

MAAS (TAStRM), Class Average Student-rated State MAAS (CAStRM) and Teacher-rated State MAAS (TeRM) as predictors individually, followed by all five predictors in a single model.

Results of the one-predictor models indicated that FFMQ_c, b = .90, SE = .41, p = .03, was a significant predictor of module scores. Other one-predictor models revealed no significant associations as follows: TATeRM_c b = .310, SE = .21, p = .15; CATeRM_c b = .18, SE = .193, p = .343; TAStRM_c b = .161, SE = .592, p = .79; and CAStRM_c b = 1.16, SE = .606, p = .068.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	70.965133	.267351	90.611	265.438	.000	70.434042	71.496224
FFMQ_c	.897385	.412062	68.229	2.178	.033	.075178	1.719593

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		73.992252	.987490	74.930	.000	72.081902	75.953231
Intercept [subject = TeacherID]	Variance	1.653992	.822735	2.010	.044	.623915	4.384714
Intercept [subject = ModGrpID]	Variance	6.292836	.757151	8.311	.000	4.970845	7.966408
Intercept [subject = ModCodID]	Variance	2.490556	.865875	2.876	.004	1.259983	4.922980

a. Dependent Variable: ModSc.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	70.774814	.316174	64.490	223.848	.000	70.143276	71.406352
TATeRM_c	.310480	.211460	38.753	1.468	.150	-.117327	.738286

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		73.326551	1.284381	57.091	.000	70.851931	75.887601
Intercept [subject = TeacherID]	Variance	.981928	.954762	1.028	.304	.146025	6.602856
Intercept [subject = ModGrpID]	Variance	6.141049	.948744	6.473	.000	4.536685	8.312784
Intercept [subject = ModCodID]	Variance	2.749015	1.011793	2.717	.007	1.336248	5.655452

a. Dependent Variable: ModSc.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	70.815536	.352093	53.674	201.127	.000	70.109533	71.521538
CATeRM_c	.183924	.192651	74.689	.955	.343	-.199882	.567731

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		75.216435	1.547741	48.598	.000	72.243276	78.311955
Intercept [subject = TeacherID]	Variance	.153952	.938869	.164	.870	.000001	23900.65268
Intercept [subject = ModGrpID]	Variance	6.877635	1.275603	5.392	.000	4.781518	9.892646
Intercept [subject = ModCodID]	Variance	3.075045	1.110550	2.769	.006	1.515098	6.241114

a. Dependent Variable: ModSc.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	70.935847	.300393	60.432	236.143	.000	70.335059	71.536634
TAStRM_c	.160953	.591569	65.719	.272	.786	-1.020247	1.342153

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		69.897380	1.256706	55.620	.000	67.477175	72.404390
Intercept [subject = TeacherID]	Variance	.730229	.868629	.841	.401	.070946	7.516024
Intercept [subject = ModGrpID]	Variance	6.130659	.943858	6.495	.000	4.533762	8.290021
Intercept [subject = ModCodID]	Variance	2.258286	.897709	2.516	.012	1.036122	4.922060

a. Dependent Variable: ModSc.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	71.254638	.243581	103.133	292.529	.000	70.771559	71.737716
CAStRM_c	1.156128	.606366	244.026	1.907	.058	-.038250	2.350507

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		63.484958	.961949	65.996	.000	61.627294	65.398618
Intercept [subject = TeacherID]	Variance	.800691	.602633	1.329	.184	.183153	3.500376
Intercept [subject = ModGrpID]	Variance	4.698111	.644286	7.292	.000	3.590806	6.146878
Intercept [subject = ModCodID]	Variance	2.087354	.625074	3.339	.001	1.160640	3.754004

a. Dependent Variable: ModSc.

Estimates of fixed effects of FFMQ_c implied that FFMQ was a signifcant predictor of ModSc. For every 1 unit increase in FFMQ above the mean, module score of student increased by 0.9 mark on average, thus providing evidence to

support H_3, that teacher trait mindfulness is positively associated with student academic performance.

Next, we included all five predictors in the same model. Estimates of the fixed effects of Teacher Average Teacher-rated State MAAS (centred on grand mean), Teacher Average Student-rated State MAAS (centred on grand mean) Class Average Teacher-rated Teachers' State MAAS (centred on grand mean), and Teachers-rated State MAAS for a particular tutorial session (centred on grand mean) did not indicate any significant relationship with Feedback. However, estimates of the fixed effects of FFMQ (centred on grand mean) indicated a weak relationship with Feedback. For every increase in 1 unit of FFMQ above the grand mean, module score improved by an average of 1.2 mark, $p = .086$, 95% CI [-.18, 2.65].

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	71.128449	.359242	60.160	197.996	.000	70.409898	71.847001
FFMQ_c	1.239006	.714130	106.607	1.735	.086	-.176732	2.654745
TATeRM_c	-.014246	.479564	175.460	-.030	.976	-.960702	.932209
CATeRM_c	-.284462	.370962	155.634	-.767	.444	-1.017231	.448307
TAStRM_c	.176544	.721639	158.516	.245	.807	-1.248723	1.601811
CAStRM_c	.959281	.790995	113.739	1.213	.228	-.607714	2.526275

a. Dependent Variable: ModSc.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		73.344943	1.577959	46.481	.000	70.316500	76.503818
Intercept [subject = TeacherID]	Variance	.000000[b]	.000000	.	.	.	.
Intercept [subject = ModGrpID]	Variance	6.202864	1.096809	5.655	.000	4.386117	8.772114
Intercept [subject = ModCodID]	Variance	2.943053	1.101474	2.672	.008	1.413271	6.128735

a. Dependent Variable: ModSc.

b. This covariance parameter is redundant. The test statistic and confidence interval cannot be computed.

Estimates of random intercepts also indicated that there were significant variances in module scores across module groups ($p < .001$) and across module topics ($p = .008$). This suggested that there were important predictors for each subject which were not measured but affected Module Scores.

Recall that in our descriptive analysis, the individual Module Scores (ModSc) ranged from 1.0 to 95.0 (M = 70.8, SD = 9.21). A total of 86 scores were 42 marks and below, representing scores lower than the winsorized mean of 43 (M – 3SD). It is important to note that the 86 module scores were actual scores obtained by students, even though they were considered as outliers in statistical terms. Supplementary HLM analyses repeated using the winsorized mean yielded results that were not materially different from the preceding analysis. Overall, the HLM analysis using the complete data set was more conservative due to larger variances.

3.2.7 Hierarchical Linear Modelling - Student Feedback

Similar to our earlier arguments, given that each student provided multiple cases of data responses (different feedback for each module), we used hierarchical-level modelling (HLM) to test our hypotheses.

A total of 12,830 feedback responses were received from 2,579 students across 110 modules were collected at the end of the semester. Firstly, responses were analysed using HLM with FFMQ as the predictor. Results of the one-predictor model indicated that FFMQ_c, b = 0.03, SE = 0.04, p = 0.53, was not a predictor of Feedback.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.415756	.022889	126.630	149.232	.000	3.370462	3.461051
FFMQ_c	.025338	.040282	119.301	.629	.531	-.054422	.105098

a. Dependent Variable: Feedback.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.255609	.003324	76.906	.000	.249177	.262207
Intercept [subject = TeacherID]	Variance	.035929	.006415	5.601	.000	.025320	.050982
Intercept [subject = ModGrpID]	Variance	.024676	.002682	9.202	.000	.019943	.030534
Intercept [subject = ModCodID]	Variance	.010348	.003790	2.730	.006	.005048	.021212

a. Dependent Variable: Feedback.

Recall that in Study 1, teachers were asked to rate themselves using the State MAAS before each tutorial session while students rated their teachers' state mindfulness at the end of the tutorial sessions using the adapted State MAAS. We had earlier argued that State MAAS could be averaged across all tutorials taught by a teacher to approximate teachers' trait mindfulness, albeit for that week in which the study was conducted. As such, we ran further three further hierarchical linear models with Teacher Average Teacher-rated State MAAS (TATeRM), Teacher Average Student-rated State MAAS (TAStRM), Class Average Student-rated State MAAS (CAStRM) and Teacher-rated State MAAS at a particular tutorial session (TeRM) as predictors individually.

TAStRM_c was found to be a significant predictor of Feedback $b = 0.29$, $SE = 0.06$, $p < .001$, as was CAStRM_c $b = 0.07$, $SE = 0.03$, $p = .015$. Estimates of random effects also strongly indicated that after adjusting for random effects, there were significant variances in Feedback across teachers and module groups. It is important to reiterate that student-rated State MAAS was collected at the beginning of the semester and that the Feedback was collected approximately 3.5 months after at the end of semester. As such, it was less likely that both student-

rated State MAAS and student-rated Feedback measures were confounded by other variables, such as general liking for a teacher which caused students to respond favourably in all aspects for that teacher.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.417269	.027841	64.427	122.742	.000	3.361657	3.472881
TAStRM_c	.285632	.056158	75.860	5.086	.000	.173780	.397483

a. Dependent Variable: Feedback.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.267955	.004757	56.332	.000	.258793	.277442
Intercept [subject = TeacherID]	Variance	.024160	.007402	3.264	.001	.013253	.044045
Intercept [subject = ModGrpID]	Variance	.033766	.004610	7.325	.000	.025839	.044125
Intercept [subject = ModCodID]	Variance	.010422	.004955	2.103	.035	.004105	.026465

a. Dependent Variable: Feedback.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.395174	.034425	58.010	98.626	.000	3.326266	3.464082
CAStRM_c	.066123	.026878	140.346	2.460	.015	.012985	.119260

a. Dependent Variable: Feedback.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.266230	.006196	42.966	.000	.254358	.278656
Intercept [subject = TeacherID]	Variance	.047085	.012815	3.674	.000	.027620	.080269
Intercept [subject = ModGrpID]	Variance	.019420	.004512	4.304	.000	.012317	.030620
Intercept [subject = ModCodID]	Variance	.005898	.005848	1.008	.313	.000845	.041187

a. Dependent Variable: Feedback.

On the other hand, TATeRM_c, b = -0.03, SE = 0.03, p = .26, and CATeRM_c, b = 0.01, SE = 0.02, p = .56, were not found to be significant predictors of Feedback.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.415527	.031141	75.034	109.678	.000	3.353491	3.477564
TATeRM_c	-.031172	.027682	67.792	-1.126	.264	-.086412	.024069

a. Dependent Variable: Feedback.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.267560	.004631	57.780	.000	.258636	.276792
Intercept [subject = TeacherID]	Variance	.039716	.009840	4.036	.000	.024438	.064544
Intercept [subject = ModGrpID]	Variance	.033587	.004442	7.561	.000	.025917	.043527
Intercept [subject = ModCodID]	Variance	.010680	.004805	2.222	.026	.004421	.025797

a. Dependent Variable: Feedback.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.402557	.034303	71.103	99.191	.000	3.334161	3.470954
CATeRM_c	.010949	.018746	203.784	.584	.560	-.026012	.047910

a. Dependent Variable: Feedback.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.273562	.005713	47.881	.000	.262590	.284992
Intercept [subject = TeacherID]	Variance	.049737	.012584	3.952	.000	.030290	.081667
Intercept [subject = ModGrpID]	Variance	.028714	.005035	5.702	.000	.020362	.040491
Intercept [subject = ModCodID]	Variance	.007673	.005581	1.375	.169	.001844	.031923

a. Dependent Variable: Feedback.

Next, all five predictors were included in the model. Estimates of the fixed effects of FFMQ (centred on grand mean), TATeRM (centred on grand mean), TeRM (centred on grand mean), and CAStRM (centred on grand mean) did not indicate any significant relationship with Feedback. However, estimates of the fixed effects of TAStRM (centred on grand mean) strongly indicated a significant relationship with Feedback at $\alpha = 0.001$. For every increase in 1 unit of Teacher Average Student-rated State MAAS above the average, teacher's Feedback improved by 0.33 unit.

Model Dimension[a]

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	FFMQ_c	1		1	
	TATeRM_c	1		1	
	CATeRM_c	1		1	
	TAStRM_c	1		1	
	CAStRM_c	1		1	
Random Effects	Intercept[b]	1	Variance Components	1	TeacherID
	Intercept[b]	1	Variance Components	1	ModGrpID
	Intercept[b]	1	Variance Components	1	ModCodID
Residual				1	
Total		9		10	

a. Dependent Variable: Feedback.

b. As of version 11.5, the syntax rules for the RANDOM subcommand have changed. Your command syntax may yield results that differ from those produced by prior versions. If you are using version 11 syntax, please consult the current syntax reference guide for more information.

Estimates of Fixed Effects[a]

						95% Confidence Interval	
Parameter	Estimate	Std. Error	df	t	Sig.	Lower Bound	Upper Bound
Intercept	3.419139	.029891	49.386	114.387	.000	3.359083	3.479196
FFMQ_c	.129281	.069089	53.494	1.871	.067	-.009264	.267825
TATeRM_c	-.072107	.040322	125.013	-1.788	.076	-.151909	.007695
CATeRM_c	.036236	.026534	107.348	1.366	.175	-.016363	.088834
TAStRM_c	.331481	.067886	95.107	4.883	.000	.196711	.466250
CAStRM_c	.020320	.029691	111.866	.684	.495	-.038509	.079150

a. Dependent Variable: Feedback.

This supports our hypothesis H_2 that teacher's trait mindfulness, using Teacher Average Student-rated State MAAS as a proxy, has a positive and significant relationship with the end-of-semester Teaching Quality.

Estimates of Covariance Parameters[a]

						95% Confidence Interval	
Parameter		Estimate	Std. Error	Wald Z	Sig.	Lower Bound	Upper Bound
Residual		.268121	.006397	41.912	.000	.255872	.280957
Intercept [subject = TeacherID]	Variance	.026972	.009078	2.971	.003	.013945	.052168
Intercept [subject = ModGrpID]	Variance	.020550	.004914	4.182	.000	.012861	.032836
Intercept [subject = ModCodID]	Variance	.005342	.005084	1.051	.293	.000827	.034490

a. Dependent Variable: Feedback.

Estimates of random intercepts for each subject also strongly indicated that there were significant variances in Feedback ratings across module groups and across teachers. Recall that the institution in this research offered nine different diplomas, of which the minimum entry requirements differ. Hence it was plausible that classes from, for example, diplomas with higher minimum entry requirements may be more demanding and accordingly, less charitable in terms of their feedback independent of the teachers.

Up till now, this study has not taken into consideration that teaching styles could vary significantly from teacher to teacher. In this regard, we offer a possible explanation that certain teaching styles adopted by teachers may be preferred than others by students regardless of the modules taught, thus contributing to the variances in teaching feedback across teachers.

Given that modules can be quantitative or qualitative in nature, compulsory or elective, offered in Year 1 or penultimate year, it was interesting to find that these differences did not translate into any significant variance across modules (ModCodID).

Collectively, the above analyses suggested that students did not give a teacher excellent feedback as a result of the latter being mindful in any particular tutorial. Rather, the teacher was given an excellent feedback because he or she was more mindful on average compared to all teachers, as perceived by the students.

3.2.8 Exploratory Analysis

3.2.8.1 Mediation Analysis of Aggregated Variables

Based on our correlation analysis for Study 2, we did not find significant relationships between independent variables and students' academic performance at the teacher level. However, we found that Average Student-rated State MAAS (as a proxy for trait mindfulness) has a positive effect on Teacher Average Feedback. As such, we proceeded with exploratory analyses on Teaching Quality as the dependent variable.

Recall that Student-rated State MAAS for teachers and UWES-S were collected at the student-level in Study 1 while individual student's Feedback was collected in Study 2. Factor analysis of the 9-item UWES-S indicated that all 9 items were effectively measuring the same construct and thus could be averaged to one scale. Since all responses for each variable were collected at the student level, reliabilities for aggregated variables at the teacher-level were computed using the following formula:

$$\text{Reliability} = \frac{\text{Level 2 var}}{\text{(Level 2 var + [(Level 1 var)/number of students per teacher])}}$$

The reliabilities for the aggregated variables are presented as follows:

	StRM	**Engage**	**Fdbk**
n	30.33	30.33	97.48
τ_{00}	0.109	0.211	0.047
σ^2	1.232	1.427	0.279
Reliability = $\tau_{00} / (\tau_{00} + \sigma^2/n)$	0.73	0.82	0.94

Note: StRM = Student-rated State MAAS; Engage = Mean of UWES-S items; Fdbk = Feedback; n = average number of responses per teacher; τ_{00} = between group Level 2 (teacher) variance; σ^2 = within-group Level 1 (student) variance

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		1.232142	.040466	30.449	.000	1.155329	1.314062
Intercept [subject = TeacherID]	Variance	.109472	.028396	3.855	.000	.065843	.182010

a. Dependent Variable: StRM.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		1.426585	.046896	30.420	.000	1.337568	1.521525
Intercept [subject = TeacherID]	Variance	.211219	.049691	4.251	.000	.133192	.334955

a. Dependent Variable: Engage.

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.278811	.003562	78.271	.000	.271916	.285881
Intercept [subject = TeacherID]	Variance	.047243	.006488	7.282	.000	.036094	.061835

a. Dependent Variable: Feedback.

Correlation analysis of the aggregated variables revealed that higher TAStRM was associated with higher TAEngage, $r(61) = .66$, $p < .001$, and higher TAFdbk, $r(61) = .55$, $p < .001$.

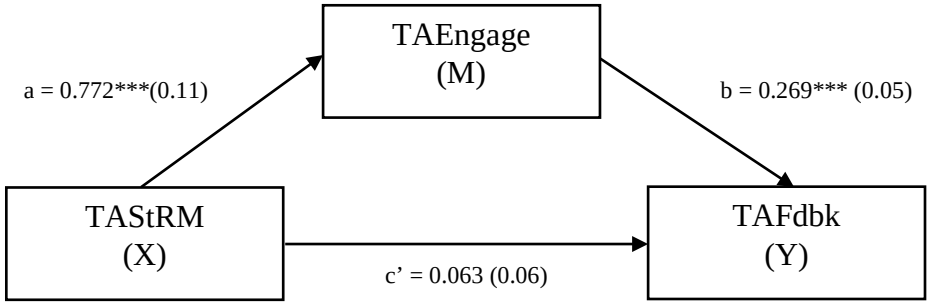
Correlations

		FFMQ	TAStRM	TAEngage	TAFdbk	TAModSc
FFMQ	Pearson Correlation	1	.136	.189	.082	.154
	Sig. (2-tailed)		.289	.137	.362	.086
	N	130	63	63	127	126
TAStRM	Pearson Correlation	.136	1	.656**	.551**	-.058
	Sig. (2-tailed)	.289		.000	.000	.655
	N	63	63	63	63	62
TAEngage	Pearson Correlation	.189	.656**	1	.729**	.125
	Sig. (2-tailed)	.137	.000		.000	.334
	N	63	63	63	63	62
TAFdbk	Pearson Correlation	.082	.551**	.729**	1	.141
	Sig. (2-tailed)	.362	.000	.000		.119
	N	127	63	63	127	123
TAModSc	Pearson Correlation	.154	-.058	.125	.141	1
	Sig. (2-tailed)	.086	.655	.334	.119	
	N	126	62	62	123	126

**. Correlation is significant at the 0.01 level (2-tailed).

Note: There was a total of 130 teachers who participated in Trait Study, but 3 of them had no feedback. 69 teachers participated in State Study, but since we used only student responses which fit our timing criteria, corresponding number of teachers was 63.

The hypothesised model is depicted schematically as follows:



Results of linear regression analysis indicated that teacher mindfulness (TAStRM) significantly predicted the mediator student Engagement (TAEngage scores), $\beta = 0.66$, $t(61) = 6.79$, $p < .001$, in the positive direction. TAStRM also explained a significant proportion of variance in TAEngage scores, $R^2 = .43$, $F(1, 61) = 46.08$, $p < .001$.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.656[a]	.430	.421	.44687067

a. Predictors: (Constant), TAStRM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.201	1	9.201	46.075	.000[b]
	Residual	12.181	61	.200		
	Total	21.382	62			

a. Dependent Variable: TAEngage

b. Predictors: (Constant), TAStRM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.075	.712		-.105	.916
	TAStRM	.772	.114	.656	6.788	.000

a. Dependent Variable: TAEngage

In addition, teacher mindfulness (TAStRM) predicted dependent variable Teaching Quality (TAFdbk) significantly in the positive direction, $b = .55$, $t(61) = 5.16$, $p < .001$. TAStRM also explained a significant proportion of variance in TAFdbk scores, $R^2 = .30$, $F(1, 61) = 26.58$, $p < .001$.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.551[a]	.303	.292	.20652033

a. Predictors: (Constant), TAStRM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.134	1	1.134	26.580	.000[b]
	Residual	2.602	61	.043		
	Total	3.735	62			

a. Dependent Variable: TAFdbk

b. Predictors: (Constant), TAStRM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.705	.329		5.183	.000
	TAStRM	.271	.053	.551	5.156	.000

a. Dependent Variable: TAFdbk

Using Model 4 of PROCESS Procedure for SPSS, we regressed dependent variable Teaching Quality (TAFdbk) on both the independent variable teacher mindfulness (TAStRM) and mediator student engagement (TAEngage) at the teacher level. Results indicated that TAEngage is positively associated with TAFdbk, $b = 0.27$, $t(60) = 5.56$, $p < .001$ while the effect of TAStRM on TAFdbk had reduced to 0.063 ($p = .27$). As the direct effect (path c′) is now non-significant, this suggested that all of the effects of TAStRM on TAFdbk were transmitted through TAEngage. Accordingly, we inferred full mediation of the relationship between Teacher Mindfulness and Teaching Quality via mediator Student Engagement.

```
*************************************************************************
Model = 4
    Y = TAFdbk
    X = TAStRM
    M = TAEngage

Sample size
        63

*************************************************************************
Outcome: TAEngage
```

```
Model Summary
        R      R-sq       MSE         F       df1       df2         p
     .6560     .4303     .1997    46.0753    1.0000   61.0000     .0000

Model
            coeff        se         t         p      LLCI      ULCI
constant    -.0750     .7120    -.1053     .9165    -1.4987    1.3487
TAStRM       .7725     .1138    6.7879     .0000     .5449    1.0000

**************************************************************************
Outcome: TAFdbk

Model Summary
        R      R-sq       MSE         F       df1       df2         p
     .7350     .5402     .0286    35.2444    2.0000   60.0000     .0000

Model
            coeff        se         t         p      LLCI      ULCI
constant    1.7255     .2696    6.4005     .0000    1.1862    2.2648
TAEngage     .2694     .0485    5.5575     .0000     .1724     .3664
TAStRM       .0630     .0571    1.1042     .2739    -.0512     .1772

************************* TOTAL EFFECT MODEL ****************************
Outcome: TAFdbk

Model Summary
        R      R-sq       MSE         F       df1       df2         p
     .5509     .3035     .0427    26.5800    1.0000   61.0000     .0000

Model
            coeff        se         t         p      LLCI      ULCI
constant    1.7053     .3290    5.1826     .0000    1.0473    2.3633
TAStRM       .2711     .0526    5.1556     .0000     .1660     .3763

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
    Effect        SE         t         p      LLCI      ULCI
     .2711     .0526    5.1556     .0000     .1660     .3763

Direct effect of X on Y
    Effect        SE         t         p      LLCI      ULCI
     .0630     .0571    1.1042     .2739    -.0512     .1772

Indirect effect of X on Y
           Effect   Boot SE   BootLLCI   BootULCI
TAEngage     .2081     .0369     .1443     .2935

******************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
  67

------ END MATRIX -----
```

3.2.8.2 Moderated Mediation Analysis

Following from the above, we expanded the mediation model to include Gender and Years of Teaching Experience (YrsExp) as potential moderators of the relationship between TAStRM and TAEngage (Path a). According to Preacher, Rucker, and Hayes (2007, p. 193), "moderated mediation occurs when the strength of an indirect effect depends on the level of some variable, or in other words, when mediation relations are contingent on the level of a moderator".

3.2.8.2.1 Teacher Mindfulness (TAStRM) →Mediator Student Engagement (TAEngage) → Teaching Quality (TAFdbk) at different genders (W)

The "Index of Moderation Mediation" provides the most direct test for evidence of moderated mediation. It quantifies the effect of Gender (W) on the indirect effect of TAStRM (X) on TAFdbk (Y) through TAEngage (M). Using SPSS Process Model 7, moderated mediation was not significant since index of moderated mediation of TAEngage was -.0357 with a 95% CI: -.3345 to .1661. This means that the path was not moderated, and hence indirect effects were not be conditioned on Gender.

```
**************************************************************************
Model = 7
   Y = TAFdbk
   X = TAStRM
   M = TAEngage
   W = Gender

Sample size
        63

**************************************************************************
Outcome: TAEngage

Model Summary
R       R-sq        MSE          F        df1        df2          p
.6596      .4350      .2048    15.1430     3.0000    59.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    -1.6650     3.1353     -.5310      .5974    -7.9388     4.6088
TAStRM       1.0100      .4993     2.0227      .0476      .0108     2.0091
Gender        .8917     1.7212      .5181      .6064    -2.5524     4.3357
int_1        -.1327      .2744     -.4835      .6305     -.6817      .4164

Product terms key:
```

```
int_1    TAStRM      X     Gender

**************************************************************************
Outcome: TAFdbk

Model Summary
R       R-sq        MSE          F        df1        df2          p
.7350      .5402      .0286    35.2444     2.0000    60.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     1.7255      .2696     6.4005      .0000     1.1862     2.2648
TAEngage      .2694      .0485     5.5575      .0000      .1724      .3664
TAStRM        .0630      .0571     1.1042      .2739     -.0512      .1772

****************** DIRECT AND INDIRECT EFFECTS ************************

Direct effect of X on Y
    Effect         SE          t          p       LLCI       ULCI
     .0630      .0571     1.1042      .2739     -.0512      .1772

Conditional indirect effect(s) of X on Y at values of the moderator(s):

Mediator
            Gender     Effect    Boot SE   BootLLCI   BootULCI
TAEngage     1.0000      .2364      .1097      .0632      .5259
TAEngage     2.0000      .2006      .0421      .1321      .2987

Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.

****************** INDEX OF MODERATED MEDIATION ************************

Mediator
             Index   SE(Boot)   BootLLCI   BootULCI
TAEngage     -.0357      .1207     -.3345      .1661

When the moderator is dichotomous, this is a test of equality of the
conditional indirect effects in the two groups.


****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
 64
------ END MATRIX -----
```

3.2.8.2.2 Teacher Mindfulness (FFMQ) →Mediator Student Engagement (TAEngage) → Teaching Quality (TAFdbk) at different genders (W)

Using SPSS Process Model 7, moderated mediation was not significant since index of moderated mediation of TAEngage was -.0320 with a 95% CI:-.2264 to .1792. This means that the path was not moderated, and hence indirect effects were not be conditioned on Gender.

```
**************************************************************************
```

```
Model = 7
   Y = TAFdbk
   X = FFMQ
   M = TAEngage
   W = Gender

Sample size
        63

*************************************************************************
Outcome: TAEngage

Model Summary
R       R-sq        MSE          F         df1         df2          p
.1954      .0382      .3486      .7805     3.0000    59.0000      .5096

Model
             coeff         se          t          p       LLCI       ULCI
constant     2.6962     3.0001      .8987      .3725    -3.3070     8.6994
FFMQ          .4351      .6532      .6662      .5079     -.8719     1.7422
Gender        .5160     1.7099      .3018      .7639    -2.9055     3.9375
int_1        -.1046      .3732     -.2803      .7803     -.8513      .6421

Product terms key:

int_1    FFMQ        X     Gender

*************************************************************************
Outcome: TAFdbk

Model Summary
R       R-sq        MSE          F         df1         df2          p
.7287      .5310      .0292    33.9686     2.0000    60.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     1.9816      .2648     7.4837      .0000     1.4519     2.5112
TAEngage      .3056      .0376     8.1200      .0000      .2303      .3809
FFMQ         -.0076      .0509     -.1493      .8818     -.1093      .0942

****************** DIRECT AND INDIRECT EFFECTS *************************
Direct effect of X on Y
    Effect         SE          t          p       LLCI       ULCI
    -.0076      .0509     -.1493      .8818     -.1093      .0942

Conditional indirect effect(s) of X on Y at values of the moderator(s):

Mediator
            Gender     Effect    Boot SE   BootLLCI   BootULCI
TAEngage     1.0000      .1010      .0981     -.0952      .2504
TAEngage     2.0000      .0691      .0493     -.0291      .1634

Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.

****************** INDEX OF MODERATED MEDIATION ************************

Mediator
            Index   SE(Boot)   BootLLCI   BootULCI
TAEngage     -.0320      .1095     -.2264      .1792

When the moderator is dichotomous, this is a test of equality of the
conditional indirect effects in the two groups.

****************** ANALYSIS NOTES AND WARNINGS *************************
Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
 64

------ END MATRIX -----
```

3.2.8.2.3 Teacher Mindfulness (TAStRM) →Mediator Student Engagement (TAEngage) → Teaching Quality (TAFdbk) at different levels of Years of Experience (YrsExp)

Using SPSS Process Model 7, moderated mediation was not significant since index of moderated mediation of TAEngage was -0.0112 with a 95% CI: -0.0287 to 0.0039. This means that the path was not moderated, and hence indirect effects were not be conditioned on YrsExp.

```
**************************************************************************
Model = 7
   Y = TAFdbk
   X = TAStRM
   M = TAEngage
   W = YrsExp

Sample size
        63

**************************************************************************
Outcome: TAEngage

Model Summary
R       R-sq        MSE          F         df1         df2          p
.6789      .4608      .1954    16.8100     3.0000    59.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    -2.2689     1.5040    -1.5085      .1368    -5.2785      .7407
TAStRM       1.1320      .2400     4.7157      .0000      .6516     1.6123
YrsExp        .2510      .1495     1.6795      .0984     -.0481      .5502
int_1        -.0414      .0240    -1.7255      .0897     -.0895      .0066

Product terms key:

int_1    TAStRM      X     YrsExp

**************************************************************************
Outcome: TAFdbk

Model Summary
R       R-sq        MSE          F         df1         df2          p
.7350      .5402      .0286    35.2444     2.0000    60.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     1.7255      .2696     6.4005      .0000     1.1862     2.2648
TAEngage      .2694      .0485     5.5575      .0000      .1724      .3664
TAStRM        .0630      .0571     1.1042      .2739     -.0512      .1772

****************** DIRECT AND INDIRECT EFFECTS ************************

Direct effect of X on Y
    Effect         SE          t          p       LLCI       ULCI
     .0630      .0571     1.1042      .2739     -.0512      .1772

Conditional indirect effect(s) of X on Y at values of the moderator(s):

Mediator
            YrsExp     Effect    Boot SE   BootLLCI   BootULCI
TAEngage     2.4108      .2781      .0710      .1587      .4468
TAEngage     7.8413      .2174      .0413      .1356      .3008
TAEngage    13.2718      .1568      .0490      .0917      .2800

Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.
```

```
****************** INDEX OF MODERATED MEDIATION ************************

Mediator
             Index   SE(Boot)   BootLLCI   BootULCI
TAEngage     -.0112      .0083     -.0287      .0039
```

3.2.8.2.4 Teacher Mindfulness (FFMQ) →Mediator Student Engagement (TAEngage) → Teaching Quality (TAFdbk) at different levels of Years of Experience (YrsExp)

Using SPSS Process Model 7, moderated mediation was not significant since index of moderated mediation of TAEngage was -0.0014 with a 95% CI: -0.0186 to 0.0177. This means that the path was not moderated, and hence indirect effects were not conditioned on YrsExp.

```
**************************************************************************
Model = 7
   Y = TAFdbk
   X = FFMQ
   M = TAEngage
   W = YrsExp

Sample size
        63

**************************************************************************
Outcome: TAEngage

Model Summary
R       R-sq        MSE          F        df1        df2          p
.2353      .0554      .3424     1.1523     3.0000    59.0000      .3356

Model
             coeff         se          t          p       LLCI       ULCI
constant     3.4224     1.5214     2.2495      .0282      .3781     6.4668
FFMQ          .3173      .3398      .9337      .3542     -.3627      .9974
YrsExp        .0056      .1586      .0351      .9721     -.3118      .3229
int_1        -.0046      .0352     -.1308      .8964     -.0750      .0658

Product terms key:

int_1    FFMQ        X     YrsExp

**************************************************************************
Outcome: TAFdbk

Model Summary
R       R-sq        MSE          F        df1        df2          p
.7287      .5310      .0292    33.9686     2.0000    60.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     1.9816      .2648     7.4837      .0000     1.4519     2.5112
TAEngage      .3056      .0376     8.1200      .0000      .2303      .3809
FFMQ         -.0076      .0509     -.1493      .8818     -.1093      .0942

****************** DIRECT AND INDIRECT EFFECTS ************************

Direct effect of X on Y
    Effect         SE          t          p       LLCI       ULCI
    -.0076      .0509     -.1493      .8818     -.1093      .0942

Conditional indirect effect(s) of X on Y at values of the moderator(s):
```

```
Mediator
            YrsExp     Effect    Boot SE   BootLLCI   BootULCI
TAEngage     2.4108      .0936      .0694     -.0570      .2147
TAEngage     7.8413      .0859      .0432      .0009      .1660
TAEngage    13.2718      .0783      .0609     -.0465      .1910

Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.

******************** INDEX OF MODERATED MEDIATION ************************

Mediator
             Index   SE(Boot)   BootLLCI   BootULCI
TAEngage     -.0014      .0090     -.0186      .0177

******************** ANALYSIS NOTES AND WARNINGS *************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
 64

------ END MATRIX -----
```

3.2.8.3 Simple Moderation

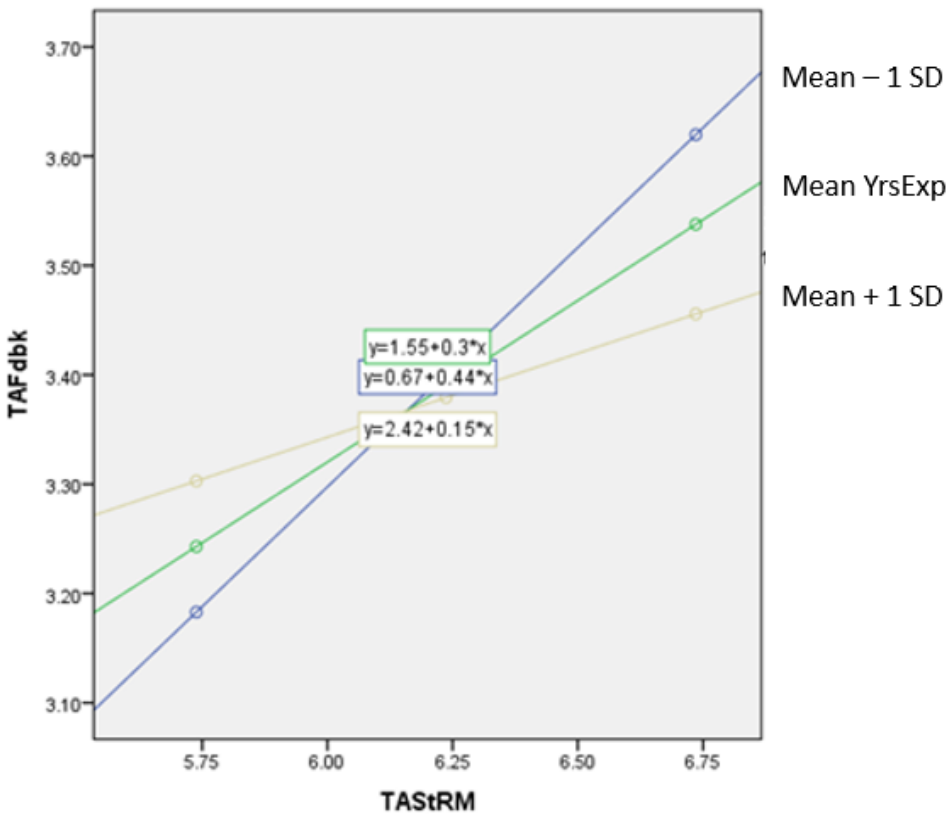
3.2.8.3.1 Teacher Mindfulness (TAStRM) → Teaching Quality (TAFdbk) moderated by Years of Experience (YrsExp)

Next, we used SPSS Process Model 1 to test a simple moderation model, with YrsExp moderating the relationship between TAStRM and TAFdbk.

Controlling for TAStRM, for every 1 year increase in teaching experience, we found a 0.16 unit increase in Teaching Quality (TAFdbk), $b = 0.16$, $t(59) = 2.39$, $p = .03$. Similarly, controlling for YrsExp, results showed that for every 1 unit increase in teacher mindfulness (TAStRM), Teaching Quality (TAFdbk) increase by .50 unit, $b = 0.50$, $t(59) = 4.61$, $p < .001$. Overall, the model is statistically significant, $F(3,59) = 11.39$, $p < .001$, $R^2 = .37$.

Our moderation analysis indicated that higher level of mindfulness measured by TAStRM is associated significantly with better TAFdbk for all teachers with different levels of YrsExp. However, the interaction effect of TAStRM and YrsExp indicated that the effect of teacher mindfulness was attenuated with more experience, $b = -.03$, $t(59) = -2.41$, $p = .02$. For less-experienced teachers (M - 1 SD), the effect of Mindfulness $b = 0.44$, $t(59) = 5.06$, $p < .001$, is stronger on TAFdbk than for teachers with mean 7.8 years of experience $b = 0.30$, $t(59) = 5.65$, $p < .001$. In other words, mindfulness interacts with teaching experience such that it benefits inexperienced teachers more. This potentially implies that new teachers who adopted mindfulness practices could potentially achieve better student feedback than experienced teachers. It is interesting to note, also, that even for experienced teachers ($M + 1\ SD = 13.3$ years), mindfulness remains beneficial in terms of improving teaching quality, $b = 0.15$, $t(59) = 5.06$, $p < .03$.

```
**************************************************************************
Model = 1
   Y = TAFdbk
   X = TAStRM
   M = YrsExp

Sample size
        63

**************************************************************************
Outcome: TAFdbk

Model Summary
          R       R-sq        MSE          F        df1        df2          p
     .6056      .3667      .0401    11.3872     3.0000    59.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant      .2805      .6813      .4117      .6820    -1.0828     1.6438
YrsExp        .1615      .0677     2.3853      .0203      .0260      .2970
TAStRM        .5012      .1087     4.6089      .0000      .2836      .7187
int_1        -.0262      .0109    -2.4105      .0191     -.0480     -.0045

Product terms key:

int_1    TAStRM      X     YrsExp


R-square increase due to interaction(s):
        R2-chng          F        df1        df2          p
int_1      .0624     5.8103     1.0000    59.0000      .0191

**************************************************************************

Conditional effect of X on Y at values of the moderator(s):
    YrsExp     Effect         se          t          p       LLCI       ULCI
    2.4108      .4379      .0865     5.0638      .0000      .2649      .6110
    7.8413      .2955      .0523     5.6533      .0000      .1909      .4002
   13.2718      .1532      .0705     2.1733      .0338      .0121      .2942
```



```
********************* JOHNSON-NEYMAN TECHNIQUE *************************

Moderator value(s) defining Johnson-Neyman significance region(s)
     Value    % below    % above
   13.5648    80.9524    19.0476

Conditional effect of X on Y at values of the moderator (M)
    YrsExp     Effect         se          t          p       LLCI       ULCI
    1.0000      .4749      .0993     4.7842      .0000      .2763      .6736
    2.1500      .4448      .0888     5.0095      .0000      .2671      .6224
    3.3000      .4146      .0789     5.2554      .0000      .2568      .5725
    4.4500      .3845      .0698     5.5043      .0000      .2447      .5242
    5.6000      .3543      .0620     5.7131      .0000      .2302      .4784
    6.7500      .3242      .0559     5.7973      .0000      .2123      .4361
    7.9000      .2940      .0522     5.6374      .0000      .1897      .3984
    9.0500      .2639      .0512     5.1487      .0000      .1613      .3664
   10.2000      .2337      .0533     4.3810      .0000      .1270      .3404
   11.3500      .2035      .0581     3.5022      .0009      .0872      .3198
   12.5000      .1734      .0650     2.6681      .0098      .0434      .3034
   13.5648      .1455      .0727     2.0010      .0500      .0000      .2909
   13.6500      .1432      .0734     1.9525      .0556     -.0036      .2900
   14.8000      .1131      .0828     1.3660      .1771     -.0526      .2787
   15.9500      .0829      .0929      .8923      .3759     -.1030      .2689
   17.1000      .0528      .1036      .5093      .6124     -.1545      .2601
   18.2500      .0226      .1147      .1973      .8443     -.2068      .2520
   19.4000     -.0075      .1260     -.0598      .9525     -.2596      .2445
   20.5500     -.0377      .1375     -.2741      .7849     -.3128      .2374
   21.7000     -.0678      .1492     -.4548      .6509     -.3664      .2307
   22.8500     -.0980      .1610     -.6088      .5450     -.4201      .2241
   24.0000     -.1282      .1729     -.7413      .4615     -.4741      .2178

****************** ANALYSIS NOTES AND WARNINGS ************************

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
 64
------ END MATRIX -----
```

3.2.8.3.2 Years of Experience (YrsExp) → Teaching Quality (TAFdbk) at different levels of Teacher Mindfulness (TAStRM)

Separately, we explored the effects of mindfulness (TAStRM) on the relationship between teaching experience (YrsExp) and teaching quality (TAFdbk). The model indicated that the moderating effect of teacher mindfulness on teaching experience was significant, b = -.02, $t(59)$ = -2.04, p = .046, implying that at higher level of mindfulness, experience was less strongly associated with teaching quality.

Overall, the more experienced a teacher is, the higher the students rated his or her teaching quality. However, at higher levels of mindfulness, experience appeared to be negatively associated with Feedback.

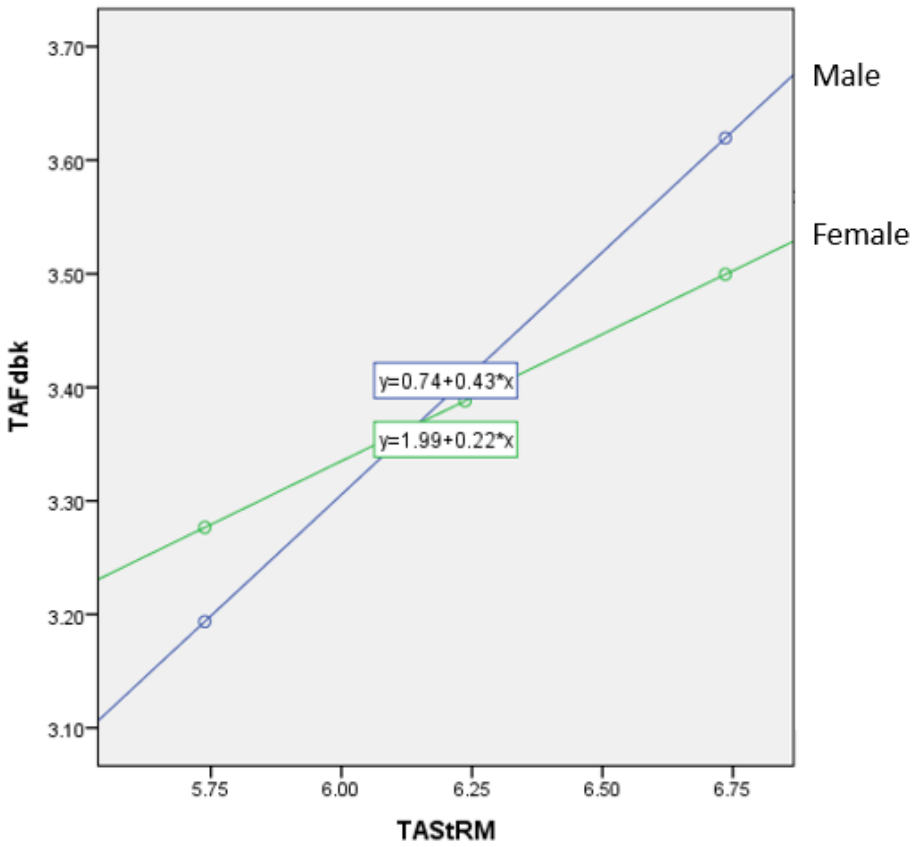
```
**************************************************************************
Model = 1
   Y = TAFdbk
   X = YrsExp
   M = TAStRM

Sample size
       63

**************************************************************************
Outcome: TAFdbk

Model Summary
         R      R-sq       MSE         F       df1       df2         p
     .6056     .3667     .0401   11.3872    3.0000   59.0000     .0000

Model
            coeff        se         t         p      LLCI      ULCI
constant     .2805     .6813     .4117     .6820    -1.0828    1.6438
TAStRM       .5012     .1087    4.6089     .0000     .2836     .7187
YrsExp       .1615     .0677    2.3853     .0203     .0260     .2970
int_1       -.0262     .0109   -2.4105     .0191    -.0480    -.0045

Product terms key:

 int_1    YrsExp     X    TAStRM

R-square increase due to interaction(s):
        R2-chng         F       df1       df2         p
int_1     .0624    5.8103    1.0000   59.0000     .0191

**************************************************************************

Conditional effect of X on Y at values of the moderator(s):
    TAStRM    Effect        se         t         p      LLCI      ULCI
    5.7382     .0111     .0070    1.5891     .1174    -.0029     .0250
    6.2369    -.0020     .0047    -.4294     .6692    -.0114     .0074
    6.7356    -.0151     .0074   -2.0390     .0459    -.0299    -.0003

Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.

******************** ANALYSIS NOTES AND WARNINGS *************************

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
  64

------ END MATRIX -----
```

3.2.8.3.3 Teacher Mindfulness (TAStRM) → Teaching Quality (TAFdbk) moderated by Gender

In addition, we also used SPSS Process Model 1 to test another simple moderation model, with Gender moderating the relationship between teacher mindfulness (TAStRM) and teaching quality (TAFdbk). Slopes for TAStRM predicting TAFdbk for male/female are significant, with mindfulness in male

teachers, b = .43, having greater positive association with TAFdbk compared to female teachers, b = .22. Interaction effect was inconclusive, b = .03, $F(1,59)$ = 2.80, p = .11. Overall model fit was $F(3,59)$ = 11.39, $p < 0.001$, R^2 = .37.

```
**************************************************************************
Model = 1
   Y = TAFdbk
   X = TAStRM
   M = Gender

Sample size
        63

**************************************************************************
Outcome: TAFdbk

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5793      .3356      .0421     9.9350     3.0000    59.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     -.5079     1.4211     -.3574      .7221    -3.3515     2.3357
Gender       1.2511      .7801     1.6037      .1141     -.3099     2.8121
TAStRM        .6306      .2263     2.7865      .0072      .1778     1.0835
int_1        -.2036      .1244    -1.6370      .1069     -.4524      .0453

Product terms key:

int_1    TAStRM      X     Gender

R-square increase due to interaction(s):
        R2-chng          F        df1        df2          p
int_1      .0302     2.6799     1.0000    59.0000      .1069

**************************************************************************

Conditional effect of X on Y at values of the moderator(s):
    Gender     Effect         se          t          p       LLCI       ULCI
    1.0000      .4271      .1092     3.9118      .0002      .2086      .6455
    2.0000      .2235      .0596     3.7525      .0004      .1043      .3426
```




```
Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.

******************** ANALYSIS NOTES AND WARNINGS ************************

Level of confidence for all confidence intervals in output:
   95.00

NOTE: Some cases were deleted due to missing data.  The number of such cases was:
 64

NOTE: The Johnson-Neyman method cannot be used with a dichotomous moderator
------ END MATRIX -----
```

3.3 Chapter Conclusion

In this study, we set out to examine the relationship between teacher trait mindfulness and students' academic performance and teaching quality. At the beginning of the semester, 130 participating teachers completed a series of online questionnaires measuring their teacher mindfulness (FFMQ), emotional intelligence, empathic concern, fear of compassion for self and psychological inflexibility (mediators). One of the dependent variables, students' feedback, were obtained as part of the institution's feedback exercise after approximately 3.5 months of interaction with the teachers. Students' module scores as another dependent variable were also obtained from school administration after the official release of examination results to students.

As students were cross-classified by the modules they took and the teachers who taught them, hierarchical level modelling (HLM) was similarly employed to investigate the relationships among the variables.

In our analyses, it was demonstrated that teacher mindfulness was significantly and positively associated with higher academic performance. While emotional intelligence was also significantly related to teacher mindfulness as well as academic performance, we did not find sufficient evidence to conclude that this relationship between teacher mindfulness and academic performance was mediated by emotional intelligence. Results also indicated that there were significant variances across teachers, module groups (classes) and modules. Essentially, this indicated that there might be other predictors that accounted for academic performance but were not included in the model.

Recall that in Figure 3, we presented the grading system used by the institution where this research was conducted. Notably, each grade band

comprises 5 marks. Assuming that there is equal distribution of marks within each grade, approximately 20% of the students at each grade band would be clustered around the borderline. Our analysis indicated that for every unit increase in teacher mindfulness, there is an associated increase in 0.9 mark. Hence, applying this finding within the context of this institution, a more mindful teacher can potentially influence 20% of students to attain the next better grade vis-à-vis another teacher who is less mindful. Furthermore, the institution follows a guideline in moderating the results of all students enrolled in a particular module, a common practice among educational institutions. Despite this practice, estimates of fixed effects of measure of mindfulness indicated that the effects of mindfuless on academic performance continue to vary significantly across teachers, module groups and modules.

Another important point to that is that academic modules are classified into two categories; namely, examinable and non-examinable modules in this institution. The assessment components for examinable modules typically includes class participation (15%), individual written test or a group project (35%) and a final examination (50%). For group projects, it is common to ascribe 10% to 30% of that assessment component to individual performance, such as one's performance during group presentation and contribution towards the group project. As for non-examination modules, there are comparatively more variations to the assessment components. It can range from two to three assessments in the form of written assignments and project work (individually or group-based) with varying weightages, as well as class participation. This implied that individual efforts could account for 100% to as low as 60% of the final module score. Conceptually, it will be ideal if the scores arising from

individual efforts can be extracted. This will commensurate directly with the performance of individual students, for which they can exercise direct control. However, the current study was constrained by limitations in the computer system which reported only the overall module scores. We are unable to ascertain or determine, had this information been available, the extent to which the relationship between teacher mindfulness and academic performance found in this study will be impacted.

As opposed to academic performance, FFMQ as a measure of teacher mindfulness did not predict Teaching Quality (Feedback) as hypothesised. Instead, our findings revealed that higher Teacher Average Student-rated State MAAS (TAStRM) and Class Average Student-rated State MAAS (CAStRM) were significantly associated with better Teaching Quality. Results also indicated that there were significant variances across teachers, module groups and modules when TAStRM was used as the predictor, while only significant variances across teachers and module groups existed when CAStRM was used as the predictor. This indicates that there are likely to be other factors that influenced Teaching Quality (Feedback) but have not been included in the HLM models as predictors. The effects of TAStRM on teaching quality was also found to be greater than that of CAStRM when both are entered together as predictors in the model.

Further exploratory analyses were also conducted at the teacher level after confirming the reliabilities of aggregated variables. The positive relationship between Teacher Mindfulness (TAStRM) and Teaching Quality (TAFdbk) was fully mediated by students' engagement at the teacher level.

Additionally, several simple moderation models were examined with regard to the positive relationship between Teacher Mindfulness (TAStRM) and Teaching Quality (TAFdbk). Firstly, moderation analysis indicated that the relationship remained significant and positive for teachers with different years of experience (YrsExp). The moderating effect of YrsExp on TAFdbk was found to be stronger for less-experienced teachers than for experienced teachers. It is plausible that experienced teachers would have accumulated a repertoire of tools to aid in their teaching, of which mindfulness is just one of them. Conversely, new teachers, being inexperienced, would have comparatively fewer tools of the trade and less skilled in instructional management. As such, any effect arising from these limited tools is likely to account for a larger proportion of the total effects in the outcomes.

Secondly, the moderating effect of Gender of teachers on the relationship between Teacher Mindfulness (TAStRM) and Teaching Quality (TAFdbk) was marginally significant at $\alpha = 0.1$, with effects of mindfulness being stronger with male teachers as compared to female teachers. A prior study by Martin, Yin, and Mayall (2006) has informed that male teachers as well as inexperienced teachers were less controlling in terms of instructional management in class when compared to female and experienced teachers respectively. The way is which classroom activities are managed, structured and enforced defines the classroom management style of the teachers. Since two of the facets of mindfulness are observing and describing without active manipulation of external conditions, it would appear that higher mindfulness is likened to being less controlling. Accordingly, when male teachers who are less experienced in teaching adopted a classroom management style which is congruent to being less controlling, their

mindful teaching is likely to exhibit a greater effect on Teaching Quality (Feedback).

Another plausible reason we speculate is related to gender differences in rumination. Johnson and Whisman (2013), in their meta-analysis, found that women tend to ruminate more than men. They noted that the magnitude of effect sizes for gender differences were small but statistically significant.

CHAPTER 4: DISCUSSIONS AND CONCLUSION

To the best of our knowledge, the present research is among the first studies examining the relations of teacher state and trait mindfulness with student and classroom outcomes in a tertiary institution in Singapore. Two studies were conducted in this research, namely, (i) Study 1 which examined the relationships between teacher state mindfulness and student engagement as measured by Utrecht Work Engagement – Student (UWES-S) scale, which comprised 3 sub-scales representing Vigor, Dedication and Absorption, with decentering of teachers as potential mediator; and (ii) Study 2 which examined the relationship between teacher trait mindfulness and teaching quality as well as academic performance, with emotional intelligence, empathic concern, fear of compassion for self and psychological inflexibility of teachers as potential mediators. The research site was a business school of a tertiary educational institution located in Singapore. With strong support from the institution and its staff, the research was able to collect sufficiently large amount of data that increases the power of both studies.

In Study 1, we found evidence to support H_1 that student-rated teacher state mindfulness was significantly associated with student engagement in class, both collectively and at the individual level. However, we did not find evidence to support H_4 that this relation was mediated by decentering abilities of the teachers.

In Study 2, our results indicated that teacher trait mindfulness measured using FFMQ significantly predicted students' academic performance but not

teaching quality. Recall that in Study 1, teachers were surveyed before tutorials that they taught in with respect to their state mindfulness. Similarly, students also rated their teachers' state mindfulness as perceived by them at the end of the tutorials. When repeated measures were taken over a period of time, we argued that the State MAAS scores would converge as a proxy to teachers' trait mindfulness perceived by students. Student-rated teachers' State MAAS was collected approximately 3.5 months before the dependent variable, Feedback, thus exhibiting temporal precedence. We also argued that there was little likelihood of confounding variables affecting both dependent and independent variables.

Using HLM, we found a strong positive relationship between teacher trait mindfulness and teaching quality, thus lending support to H_2 as hypothesised. However, there were insufficient evidence to conclude that this relationship was mediated by emotional intelligence, fear of compassion for self, empathic concern or psychological inflexibility.

Further exploratory analyses revealed that (i) teacher mindfulness rated by students is a significant predictor of teaching quality fully mediated by their engagement, (ii) the positive effect of mindfulness on teaching quality is significant for both gender, and is greater for male teachers than female teachers, (iii) the positive effect of mindfulness on teaching quality is significant for inexperienced as well as experienced teachers, (iv) the positive effect of mindfulness on teaching quality is stronger for less-experienced teachers as compared to experienced teachers and (v) at higher level of mindfulness, years of teaching experience is less strongly but significantly associated with teaching quality.

4.1 Theoretical Implications

Several important theoretical implications arise for this research. Firstly, it explores the value of using other-ratings of mindfulness from a methodological perspective.

While self-reported measures often suffer from single-source bias, its prevalent use in longitudinal studies does not usually pose significant issues. Since researchers are typically interested in quantifying changes in intrapersonal effects from participants' baselines, any bias of mindfulness scores at baseline is likely to be carried forward post-intervention as well.

However, recall that in Study 2, we found that teacher mindfulness, when measured using the student-rated teacher mindfulness and averaged across teachers, was a significant predictor of Teaching Quality. Results were, however, inconclusive when teacher mindfulness was measure using FFMQ. A careful examination of the State Mindfulness Attention Awareness Scale items revealed that the items were similar to those in FFMQ, particularly those relating to Attention Awareness. As the other facets of FFMQ which were generally non-observable to outsiders, questionnaire items in Attention Awareness were translated into observable form for rating by others in this present study.

In connection with this, we draw attention to the careful evaluation and assessment of the suitability of instruments to measure mindfulness constructs for the purpose of interpersonal mindfulness research. To date, there are limited studies on interpersonal effects of mindfulness. Existing studies in this area were either case studies or relied predominantly on self-reported measures. It is reasonable to believe that, as a result of social desirability, respondents may overstate their mindfulness scores resulting in range restriction, and rendering

non-detection of any possible relationships. Accordingly, where studies relating to interpersonal effects are concerned, the current research strongly suggests that there is value in using other-ratings as a viable and necessary alternative in measuring mindfulness constructs. In Study 1, we found that the aggregate class-average mindfulness (CAStRM) predicted above and beyond students' own perception of teacher mindfulness (StRM). The class-average mindfulness measure captured more reliably how mindful the teacher was throughout the class than to any specific student, and was thus more objective.

Secondly, at the conceptual level, the present research contributes to our knowledge and understanding of the interpersonal effects of mindfulness. The majority of existing studies have focused on intrapersonal effects, such as the efficacies of mindfulness interventions in managing specific conditions as experienced by specific samples of participants (Grossman et al., 2004; Khoury et al., 2015). Research in interpersonal mindfulness in the organisational management domain is also at a nascent stage, with limited empirical studies dedicated solely to this purpose. There is even less research on interpersonal relationship in the education sector. To the best of our knowledge, there is currently no empirical study on interpersonal effects of mindfulness conducted within tertiary institutions in Singapore.

Thirdly, the present research contributes to our understanding of the effects of gender and experience on teaching quality. Higher mindfulness is associated significantly with better teaching quality for both experienced and inexperienced teachers. For less-experienced teachers, the effect of mindfulness is stronger on teaching quality than for more-experienced teachers. Even for very experienced teacher, mindfulness is still significantly associated with teaching

quality. In terms of gender effects, higher mindfulness is associated significantly with better teaching quality for both male and female teachers, and the effect is stronger for male than for female teachers.

Overall, the results of the current study strongly suggest that benefits of mindfulness can be extended well beyond one self. In teacher-student relationships, we have shown that students can benefit in terms of their engagement, better teaching quality and academic performance. This new knowledge may have potentially wide ranging applications in other relationships, including but not limited to doctor-patient, therapist-client and parent-child relationships. Further research to establish interpersonal benefits of mindfulness in these relationships are thus encouraged.

4.2 Organisational Implications

The results from this study can potentially bring about significant benefits to schools at different levels. First and foremost, at the personal level, various research had found that mindfulness interventions could result in intrapersonal benefits, such as reduction in teacher stress and burnout. This can invariably translate into lower absenteeism, lower turnover and higher productivity of teachers. Furthermore, as demonstrated in this research, teachers will be able to receive better feedback ratings from students, which is often a key performance indicator for educators and perhaps equally as important, a recognition of their teaching quality. At the inter-personal level, students were also shown in the present study to benefit in terms of their engagement in class and academic results due to teachers' higher level of mindfulness.

Additionally, the results are expected to have practical implications for school administration and education management. It is not unusual for a typical tertiary institution in Singapore to have an enrolment of 10,000 to 15,000 students. While any person can learn mindfulness practices on their own, class-based commercial mindfulness programmes are typically expensive. Introducing such programmes to all students on a recurring basis for most institutions is clearly not sustainable.

A more feasible and cost effective approach may be to provide mindfulness training for teachers (Roeser et al., 2012). In a recent meta-analysis of preventive online mindfulness interventions (POMI), Jayewardene, Lohrmann, Erbe, and Torabi (2016) analysed eight included studies that were delivered entirely online. Significant effects were found for reduction in perceived stress (Hedges' g = 0.432) and mindfulness (Hedges' g = 0.275) post-intervention.

Accordingly, the authors advocated the use of POMIs as a more convenient and cost-efficient alternative to face to face programmes.

Findings from the present research also suggest that mindfulness training programmes for teachers may be introduced in phases, first targeting at new and followed by male teachers. With the increasing number of recent studies advocating the efficacies of online mindfulness interventions in promoting, for example, well-being (Spijkerman et al., 2016) as well as vigor, resilience and work engagement (Aikens et al., 2014), another promising and viable alternative for school administration is to leverage on their existing e-learning platforms by offering online mindfulness training programmes. Most of the commercial e-learning platforms also offer smartphone versions. This relatively lower cost training format has also been shown to have comparative effect size as the classroom-based training in reduction of perceived stress (Krusche et al., 2012). Furthermore, most of these commercial e-learning platforms and their related mobile applications have built-in data analytics capabilities, which can be useful in tracking usage and intervention.

Upon completion of mindfulness training, teachers can in turn, act as ambassadors of mindfulness and agents of change through mindful teaching in class and through teaching mindfulness to students directly (Zenner et al., 2014). Further research can then not only explore the effects on teachers and on students separately, but also the combined synergistic effects on teachers and students (Roeser et al., 2012).

By addressing the positive relationships between mindfulness of teachers and student outcomes revealed in this research, school's administration will be able to justify the allocation of limited resources to improve the level of

mindfulness for teachers and consequentially, improve teaching quality and students' academic performance in a practical manner. As mindfulness programmes are systematically implemented and made available to teachers and students over time, we can look forward to educational institutions where teachers thrive professionally and students develop holistically. In the same vein, we believe that mindfulness training programmes may be offered to leaders and employees in any organisation, potentially resulting in overall organisational performance.

4.2.1 Mindfulness Programmes in Schools and Organisations

What then are some of the considerations in the event that schools and organisations who are considering to implement mindfulness programmes in schools and workplaces? The following sections aim to provide some useful suggestions for schools and organisations in this regard.

4.2.1.1 Recruitment

The success of the mindfulness programme is first and principally contingent on providing proper education of what mindfulness is and debunking any myth that potential participants may have. This can be followed by presenting evidence-based research in efficacies of mindfulness, although caution is advised not to misrepresent mindfulness as a panacea for all conditions.

In addition, even though mindfulness has its roots in Buddhist philosophy, its practice is essentially non-secular in nature. There may be certain religions that view meditation, a key component of mindfulness practice, as prohibited activities. To this end, mindfulness programme organisers will need to explain

carefully that meditation is basically training of the mind at its core. There are also other informal mindfulness practices that do not involve meditation. Often, this can be done through a teaser and experiential session conducted by a certified trainer. Overall, the purpose of proper education is to alleviate the fears of participants, thereby increasing their acceptance of mindfulness training.

4.2.1.2 Implementation

The next consideration is to assess the infrastructure required to implement the programme. This is dependent on the choice of delivery medium, duration and frequencies of training sessions. Three training formats and their respective advantages and challenges are discussed here briefly.

Most mindfulness programmes are conducted by a trainer, face to face with a class of say 20 participants. This group format is suitable when employees are able to set aside a common time, typically of 1.5 to 2 hours duration, to attend the programme as a group. The interactions among the participants and opportunities for mutual sharing is one of the key advantages of group format. However, this option may not be completely feasible in the case of employees having different work schedules such as those working on shifts.

To address this limitation, another format which is gaining acceptance in recent years is the online delivery format. Participants in this case are able to access lessons and guided meditations via the internet at any time, and a large number of them can participate at the same time. Additionally, online platforms such as learning management systems of educational institutions have built-in analytics function which can be useful for research purpose.

Thirdly, with the proliferation of mobile communication devices, mindfulness mobile applications are gaining popularity. Clearly, the key advantage is the portability of the mobile device and the on-demand feature of mobile applications, especially in current times where students, academics and employees are generally technologically savvy. In implementing online mindfulness programmes, Jayewardene et al. (2016) warned against potential drop-outs, since motivation and adherence to the programme is likely to be low when participants do not suffer from medical conditions that need to be addressed by the intervention.

4.2.1.3 Post-programme administration

As with all training programmes, it is imperative to request for participants' feedback at the end of the programme. The information received can serve to improve future intakes as well as to validate the programme. Appropriate instruments to measure effects of interest to schools and organisations are also recommended before and after training.

4.3 Strengths, Limitations and Future Direction

Firstly, the present research used a cross-sectional design and hence, no inference with regards to causality among the variables could be established. This, however, is mitigated in the current research as the independent and dependent variables were collected in multi-wave and several months apart. Future research in educational institutions can consider randomised controlled trials with appropriate mindfulness interventions so as to determine the causality between independent and dependent variables. The choice of interventions can be via e-learning mode so as to leverage on the existing Internet & Communications Technology (ICT) infrastructure that such institutions would typically possess.

We contend that both studies in this research were conducted with teachers and students within an educational institution in Singapore, and as such, our results may be limited in its generalisability to the general population or other countries. Replications of these studies are thus encouraged in other student populations across different geographical regions. In addition, future studies could examine possible linkages between understudied relationships, such as between doctors and patients, coaches and clients as well as social workers and clients, amongst other human service professions.

As part of the recruitment of teachers as participants, the Principal Investigator explained and disclosed completely the objectives of both Studies 1 and 2 to all teachers working in the Business School which was the research site for this study. Of the total 173 eligible teachers, 66 teachers agreed to participate in Study 1 while 130 teachers agreed to participate in Study 2. Since participation was entirely voluntary, teachers who did not consent to the research were not

required to provide reasons for non-participation. Nevertheless, it is plausible that among the reasons, some teachers might feel that they were not mindful, and hence did not want to participate in a research that could potentially link their lack of mindfulness to poor student engagement, feedback and academic results. Conversely, teachers who are mindful and are proponents of mindfulness might self-select themselves into the research.

Moreover, for teachers who indicated consent, they were informed that they will be surveyed just prior to the commencement of their tutorials pertaining to their mindfulness states. Among them, there were teachers who were late for tutorials and did not wish to participate in the survey, even though they had given prior consent. Further, there were teachers who finished tutorials early and hence dismissed the students earlier than the scheduled ending times, before student research assistants could return to survey the students in those tutorials. Collectively, these could potentially exclude of teachers who were not mindful, resulting in a bias in our samples of teachers.

Another limitation relating to Study 1 was the scale used for decentering. The original items were rated on a 5-point Likert scale (1 = *Never*, 5 = *Always*). However, since we are measuring how people feel at a particular moment, it would be more appropriate to rate their level of agreement or intensity of feeling, instead of frequency.

We did not find any relationship between self-reported teacher state mindfulness and student engagement. One plausible explanation could be due to social desirability (Bergomi et al., 2013), where in this research, teachers might be inclined to respond in such a manner to reflect that they were more mindful than they actually were. This could potentially result in range restriction, thus

undermining any potential correlations between the predictors and dependent variables. However, this was not considered to be a serious threat since the likelihood of a significant relationship to be found in a sample including unmindful teachers will be higher than a sample excluding unmindful teachers, as was the case with this study. In this regard, we suggest future studies to consider developing and using suitable scale that be used by third parties to reliably measure the facets of one's mindfulness. One promising measure for use in the classroom context, the Teacher Mindfulness in the Classroom – Student Reports, has been recently been developed by Rickert (2016).

In addition, even in the absence of social desirability, the level of mindfulness of the teachers in this research might or might not be present consistently throughout the entire tutorial session. To address this limitation, it would be ideal if future research could explore different times at which teachers are surveyed, such as mid-way or at the end of the tutorials, or a combination of both. Repeated measures of the same test may also be collected different times to ascertain the test-retest reliability of the scale. Alternatively, in situations where there are different forms of the same instrument or two different instruments measuring the same construct, the degree of consistency between the two instruments may also be computed.

In Study 1, recall that students were surveyed with respect to their perception of their teacher's state mindfulness (as an independent variable) and their own engagement in class (as dependent variable). It was possible that confounding variables were present that affected both StRM (independent variable) and three facets of UWES-S (dependent variables). For example,

students might generally love certain teachers and hence responded positively about them.

For future replications of this study, students in the same class could be randomly assigned into two groups, with one group responding to teacher mindfulness while the other responding to students' engagement so as to address the potential issue of same source bias.

Another research design to be considered for future studies in interpersonal research is to combine multiple experiments into a 2x2 factorial experimental design, containing two levels for each of the two factors. The two factors could be represented by students with and without mindfulness training, taught by teachers with and without mindfulness training. The advantage of such a design is the ability to examine the main effect of each factor as well as the interactions of mindfulness of teachers on each group of students.

Future research may also be directed at uncovering other mediators and moderators that could explain the relationships between the second or third person-rated teacher state and trait mindfulness and predicted outcomes. For example, the study found that the conditional effect of teaching experience on teaching quality was significant, and that it was associated less strongly with teaching quality at higher level of mindfulness. Further research to understand the underlying reasons would be enlightening. Moderators relating to students such as their learning styles can also potentially be interesting.

Our studies also revealed that in most cases, there were significant variances across module topics and module groups. Any replication of studies in this area could explore the effects arising from the nature of the modules, for example, qualitative/quantitative and examinable/project-based modules.

Finally, another direction for future research is to examine other dependent variables of interest to school's administration, such as students' trust in teachers, their motivation and their sense of belonging to the school.

In summary, it is hoped that this study will encourage management and education scholars to pursue this exciting and promising area of research in interpersonal effects of mindfulness.

4.4 Conclusion

Research on mindfulness had in recent years has experienced exponential growth, and were predominantly centred on the efficacies of related interventions. The results of this research will add to existing and growing body of theoretical knowledge in mindfulness, particularly in a promising area which spans across education, management and other-rated interpersonal effects of mindfulness.

Two cross-sectional studies were among the firsts in Singapore to examine the relations of teacher mindfulness to classroom and student outcomes. The studies, conducted at a tertiary institution in Singapore, yielded promising and significant results. Using HLM, FFMQ was found to be a positive and significant predictor of academic performance. In addition, the relation between student-rated teacher mindfulness, both at class and teacher levels, and teaching quality was statistically significant. At the teacher level, the association between students' perception of teacher mindfulness and feedback was found to be fully mediated by students' engagement. The effect of mindfulness was also found to be stronger in male and less experienced teachers.

The findings from the two present studies provided strong support and rationale in making mindfulness programmes accessible to teachers. Not only will they help teachers manage the stresses associated with teaching as evidenced by numerous prior studies, it is expected to improve their overall teaching quality. Most of all, their being more mindful will be associated with better students' engagement and academic performance as established in the present study.

Tertiary institutions are particularly well-positioned to implement mindfulness programmes, such as online version by leveraging on their existing learning management systems. Implementation costs are expected to be low

while the reach of the training programme can be extended to a large number of teachers and students concurrently and at any time.

In conclusion, it is hoped that the present study will be a significant step in propelling further research to develop mindful schools where teachers are less stressful and to provide a conducive environment where students can perform better academically. On a broader perspective, to move a step closer towards improving organisational performance through mindful interactions between leaders and employees within organisations.

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APPENDICES

APPENDIX A

5-Item State Mindfulness Attention Awareness Scale

Not at all			Somewhat			Very Much
0	1	2	3	4	5	6

Experiences at Time of Signal

Instructions: Using the 0-6 scale shown, please indicate to what degree were you having each experience described below *when you were paged.* Please answer according to what *really reflected* your experience rather than what you think your experience should have been.

	not at all			some what			very much
1. I was finding it difficult to stay focused on what was happening.	0	1	2	3	4	5	6
2. I was doing something without paying attention.	0	1	2	3	4	5	6
3. I was preoccupied with the future or the past.	0	1	2	3	4	5	6
4. I was doing something automatically, without being aware of what I was doing.	0	1	2	3	4	5	6
5. I was rushing through something without being really attentive to it.	0	1	2	3	4	5	6

MAAS Scoring

To have high scores reflect higher state mindfulness, reverse score all items then average all 5 values.

APPENDIX B

Experiences Questionnaire (EQ) - Decentering Subset

For each item, please indicate to what extent you are feeling this way right now (that is, in the present moment). Use the following scale to record your answers.

Never	Rarely	Sometimes	Very Often	Always
1	2	3	4	5

EQ03 I am better able to accept myself as I am.

EQ15 I can observe unpleasant feelings without being drawn into them.

EQ09 I notice that I don't take difficulties so personally.

EQ14 I can treat myself kindly.

EQ10 I can separate myself from my thoughts and feelings.

EQ16 I have the sense that I am fully aware of what is going on around me and inside me.

EQ06 I can slow my thinking at times of stress.

EQ17 I can actually see that I am not my thoughts.

EQ18 I am consciously aware of a sense of my body as a whole.

EQ12 I can take time to respond to difficulties.

EQ20 I view things from a wider perspective.

APPENDIX C

International Positive and Negative Affect Schedule Short Form (I-PANAS-SF)

This scale consists of a number of words and phrases that describe different feelings and emotions. For each item, please indicate to what extent you are feeling this way right now (that is, in the present moment). Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

	very slightly or not at all				extremely
1. nervous	1	2	3	4	5
2. determined	1	2	3	4	5
3. alert	1	2	3	4	5
4. active	1	2	3	4	5
5. ashamed	1	2	3	4	5
6. afraid	1	2	3	4	5
7. attentive	1	2	3	4	5
8. inspired	1	2	3	4	5
9. hostile	1	2	3	4	5
10. upset	1	2	3	4	5

APPENDIX D

Utrecht Work Engagement Scale Short Form – Student

The following 9 statements are about how you felt during this tutorial. Please read each statement carefully and indicate which best describes how you felt during this tutorial.

Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

Vigor

1. In this tutorial, I felt bursting with energy.
2. In this tutorial, I felt strong and vigorous.
3. I feel like coming to this tutorial again.

Dedication

4. This tutorial inspired me.
5. I am enthusiastic about this tutorial.
6. I am proud of this tutorial.

Absorption

7. I am immersed in this tutorial.
8. I feel happy when I am studying intensively in this tutorial.
9. I get carried away when I am in this tutorial.

APPENDIX E

Adapted State Mindfulness Awareness Attention Scale

Not at all			Somewhat			Very Much
0	**1**	**2**	**3**	**4**	**5**	**6**

1. The tutor did not stay focused on what was happening in class.
2. The tutor was instructing without really paying attention.
3. The tutor seemed absent-minded.
4. The tutor was teaching on "auto-pilot", without being really aware of what he/she was doing.
5. The tutor was rushing through class without being really attentive to what was going on.

APPENDIX F

Short Form Five Facet Mindfulness Questionnaire

Below is a collection of statements about your everyday experience. Using the 1–7 scale below, please indicate, in the box to the right of each statement, how frequently or infrequently you have had each experience in the last month. Please answer according to what really reflects your experience rather than what you think your experience should be.

Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Every time
1	**2**	**3**	**4**	**5**	**6**	**7**

1	I'm good at finding the words to describe my feelings	*DS*	
2	I can easily put my beliefs, opinions, and expectations into words	*DS*	
3	I watch my feelings without getting carried away by them	*NR*	
4	I tell myself that I shouldn't be feeling the way I'm feeling	*/NJ*	
5	It's hard for me to find the words to describe what I'm thinking	*/DS*	
6	I pay attention to physical experiences, such as the wind in my hair or sun on my face	*OB*	
7	I make judgments about whether my thoughts are good or bad.	*/NJ*	
8	I find it difficult to stay focused on what's happening in the present moment	*/AA*	
9	When I have distressing thoughts or images, I don't let myself be carried away by them	*NR*	
10	Generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing	*OB*	
11	When I feel something in my body, it's hard for me to find the right words to describe it	*/DS*	
12	It seems I am "running on automatic" without much awareness of what I'm doing	*/AA*	
13	When I have distressing thoughts or images, I feel calm soon after	*NR*	
14	I tell myself I shouldn't be thinking the way I'm thinking	*/NJ*	
15	I notice the smells and aromas of things	*OB*	
16	Even when I'm feeling terribly upset, I can find a way to put it into words	*DS*	
17	I rush through activities without being really attentive to them	*/AA*	
18	usually when I have distressing thoughts or images I can just notice them without reacting	*NR*	
19	I think some of my emotions are bad or inappropriate and I shouldn't feel them	*/NJ*	
20	I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow	*OB*	
21	When I have distressing thoughts or images, I just notice them and let them go	*NR*	

22	I do jobs or tasks automatically without being aware of what I'm doing	*/AA*	
23	I find myself doing things without paying attention	*/AA*	
24	I disapprove of myself when I have illogical ideas	*/NJ*	

APPENDIX G

Wong and Law's Emotional Intelligence Scale

Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

Self-Emotions Appraisal (SEA)

1. I have a good sense of why I have certain feelings most of the time.
2. I have good understanding of my own emotions.
3. I really understand what I feel.
4. I always know whether or not I am happy.

Others-Emotions Appraisal (OEA)

5. I always know my friends' emotions from their behavior.
6. I am a good observer of others' emotions.
7. I am sensitive to the feelings and emotions of others.
8. I have good understanding of the emotions of people around me.

Use of Emotion (UOE)

9. I always set goals for myself and then try my best to achieve them.
10. I always tell myself I am a competent person.
11. I am a self-motivating person.
12. I would always encourage myself to try my best.

Regulation of Emotion (ROE)

13. I am able to control my temper so that I can handle difficulties rationally.
14. I am quite capable of controlling my own emotions.
15. I can always calm down quickly when I am very angry.
16. I have good control of my own emotions.

APPENDIX H

Empathic Concern Scale

Very untrue of me	Untrue of me	Somewhat untrue of me	Neutral	Somewhat true of me	True of me	Very true of me
1	2	3	4	5	6	7

1. When I see someone being taken advantage of, I feel kind of protective toward them.
2. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (-)
3. I often have tender, concerned feelings for people less fortunate than me.
4. I would describe myself as a pretty soft-hearted person.
5. Sometimes I don't feel sorry for other people when they are having problems. (-)
6. Other people's misfortunes do not usually disturb me a great deal. (-)
7. I am often quite touched by things that I see happen.

APPENDIX I

Fear of Compassion Scale - Self Subscale

For each item, please indicate to what extent you are feeling this way right now (that is, in the present moment). Use the following scale to record your answers.

Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

1. I worry that if I start to develop compassion for myself I will become dependent on it
2. I fear that if I become too compassionate to myself I will lose my self-criticism and my flaws will show
3. I fear that if I develop compassion for myself, I will become someone I do not want to be
4. I fear that if I am more self compassionate I will become a weak person
5. I fear that if I am too compassionate towards myself bad things will happen
6. I fear that if I become kinder and less self-critical to myself then my standards will drop
7. I fear that if I become too compassionate to myself others will reject me
8. I would rather not know what being 'kind and compassionate to myself' feels like
9. I fear that if I start to feel compassion and warmth for myself, I will feel overcome with a sense of loss/grief
10. When I try and feel kind and warm to myself I just feel kind of empty
11. I have never felt compassion for myself, so I would not know where to begin to develop these feelings
12. I feel that I don't deserve to be kind and forgiving to myself
13. If I really think about being kind and gentle with myself it makes me sad
14. Getting on in life is about being tough rather than compassionate
15. I find it easier to be critical towards myself rather than compassionate

APPENDIX J

Psychological Inflexibility

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
2.	I'm afraid of my feelings.	1	2	3	4	5	6	7
3.	I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
4.	My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
5.	Emotions cause problems in my life.	1	2	3	4	5	6	7
6.	It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
7.	Worries get in the way of my success.	1	2	3	4	5	6	7

This is a one-factor measure of psychological inflexibility, or experiential avoidance. Score the scale by summing the seven items. Higher scores equal greater levels of psychological inflexibility.

APPENDIX K

Teaching Quality
(Extracted from Standard Student Feedback Conducted by Nanyang Polytechnic)

	1 Strongly Agree	2	3	4 Strongly Disagree
1. He/She encourages active student participation through creative tutorial facilitation and good case examples.				
2. He/She comes well prepared for tutorial.				
3. He/She has good knowledge of the module and imparts theory and concepts using effective teaching techniques and relevant examples.				
4. He/She is good at classroom management.				
5. He/She provides ample time outside classroom for consultation.				
6. He/She provides useful feedback to students on overall progress.				
7. My overall rating of this tutor for teaching is …..	1 Very Good	2	3	4 Poor

APPENDIX L

Correlation Matrix for Trait Study Variables

Correlations

		DS	NR	NJ	OB	AA	FFMQ	SEA	OEA	UOE	ROE	WLEIS	EmpCon	FearCom	PsyInflex	TAStRM	TATeRM	TAFdbk	TAModSc
DS	Pearson Correlation	1	.348**	.227**	.164	.362**	.719**	.405**	.302**	.236**	.357**	.428**	-.093	-.313**	-.294**	.091	.265*	.015	.100
	Sig. (2-tailed)		.000	.009	.062	.000	.000	.000	.000	.007	.000	.000	.291	.000	.001	.476	.028	.868	.264
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
NR	Pearson Correlation	.348**	1	-.117	.219*	.131	.535**	.350**	.159	.393**	.541**	.480**	-.054	-.099	-.312**	.042	-.022	.059	.164
	Sig. (2-tailed)	.000		.185	.013	.138	.000	.000	.073	.000	.000	.000	.540	.266	.000	.744	.856	.520	.065
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
NJ	Pearson Correlation	.227**	-.117	1	-.181*	.280**	.438**	.085	.024	.060	-.007	.048	.082	-.211*	-.274**	-.066	.248*	.029	-.009
	Sig. (2-tailed)	.009	.185		.039	.001	.000	.335	.784	.497	.938	.589	.352	.016	.002	.607	.040	.747	.917
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
OB	Pearson Correlation	.164	.219*	-.181*	1	.141	.470**	.219*	.098	.102	.120	.172	.010	-.056	-.080	.103	-.023	.128	.284**
	Sig. (2-tailed)	.062	.013	.039		.110	.000	.012	.267	.247	.176	.051	.908	.526	.367	.424	.848	.151	.001
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
AA	Pearson Correlation	.362**	.131	.280**	.141	1	.691**	.321**	.022	.097	.251**	.219*	.049	-.162	-.396**	.168	.421**	.005	-.155
	Sig. (2-tailed)	.000	.138	.001	.110		.000	.000	.807	.271	.004	.012	.578	.065	.000	.189	.000	.952	.081
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
FFMQ	Pearson Correlation	.719**	.535**	.438**	.470**	.691**	1	.479**	.203*	.304**	.433**	.462**	.003	-.292**	-.478**	.136	.328**	.082	.129
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.021	.000	.000	.000	.969	.001	.000	.289	.006	.361	.151
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
SEA	Pearson Correlation	.405**	.350**	.085	.219*	.321**	.479**	1	.365**	.500**	.516**	.754**	.065	-.260**	-.434**	.245	.144	.065	.167
	Sig. (2-tailed)	.000	.000	.335	.012	.000	.000		.000	.000	.000	.000	.466	.003	.000	.052	.239	.468	.059
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
OEA	Pearson Correlation	.302**	.159	.024	.098	.022	.203*	.365**	1	.448**	.266**	.706**	.259**	-.071	-.056	.124	.119	.179*	.025
	Sig. (2-tailed)	.000	.073	.784	.267	.807	.021	.000		.000	.002	.000	.003	.425	.526	.334	.329	.044	.780
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
UOE	Pearson Correlation	.236**	.393**	.060	.102	.097	.304**	.500**	.448**	1	.476**	.793**	.248**	-.147	-.376**	-.097	-.019	.038	.244**
	Sig. (2-tailed)	.007	.000	.497	.247	.271	.000	.000	.000		.000	.000	.004	.094	.000	.447	.878	.673	.005
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
ROE	Pearson Correlation	.357**	.541**	-.007	.120	.251**	.433**	.516**	.266**	.476**	1	.765**	.103	-.079	-.426**	.234	.150	.113	.168
	Sig. (2-tailed)	.000	.000	.938	.176	.004	.000	.000	.002	.000		.000	.245	.371	.000	.065	.219	.205	.057
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
WLEIS	Pearson Correlation	.428**	.480**	.048	.172	.219*	.462**	.754**	.706**	.793**	.765**	1	.229**	-.172	-.416**	.174	.129	.138	.196*
	Sig. (2-tailed)	.000	.000	.589	.051	.012	.000	.000	.000	.000	.000		.009	.051	.000	.173	.290	.122	.027
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
EmpCon	Pearson Correlation	-.093	-.054	.082	.010	.049	.003	.065	.259**	.248**	.103	.229**	1	-.201*	-.205*	.072	.047	-.016	.049
	Sig. (2-tailed)	.291	.540	.352	.908	.578	.969	.466	.003	.004	.245	.009		.022	.019	.573	.699	.862	.579
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
FearCom	Pearson Correlation	-.313**	-.098	-.211*	-.056	-.162	-.292**	-.260**	-.071	-.147	-.079	-.172	-.201*	1	.500**	-.054	-.396**	.052	-.082
	Sig. (2-tailed)	.000	.266	.016	.526	.065	.001	.003	.425	.094	.371	.051	.022		.000	.675	.001	.564	.359
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
PsyInflex	Pearson Correlation	-.294**	-.312**	-.274**	-.080	-.396**	-.478**	-.434**	-.056	-.376**	-.426**	-.416**	-.205*	.500**	1	-.030	-.435**	-.129	-.160
	Sig. (2-tailed)	.001	.000	.002	.367	.000	.000	.000	.526	.000	.000	.000	.019	.000		.817	.000	.147	.072
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	63	69	127	128
TAStRM	Pearson Correlation	.091	.042	-.066	.103	.168	.136	.245	.124	-.097	.234	.174	.072	-.054	-.030	1	.056	.551**	-.042
	Sig. (2-tailed)	.476	.744	.607	.424	.189	.289	.052	.334	.447	.065	.173	.573	.675	.817		.667	.000	.746
	N	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	62	63	63
TATeRM	Pearson Correlation	.265*	-.022	.248*	-.023	.421**	.328**	.144	.119	-.019	.150	.129	.047	-.396**	-.435**	.056	1	-.107	-.079
	Sig. (2-tailed)	.028	.856	.040	.848	.000	.006	.239	.329	.878	.219	.290	.699	.001	.000	.667		.381	.523
	N	69	69	69	69	69	69	69	69	69	69	69	69	69	69	62	69	69	68
TAFdbk	Pearson Correlation	.015	.059	.029	.128	.005	.082	.065	.179*	.038	.113	.138	-.016	.052	-.129	.551**	-.107	1	.077
	Sig. (2-tailed)	.868	.520	.747	.151	.952	.361	.468	.044	.673	.205	.122	.862	.564	.147	.000	.381		.391
	N	127	127	127	127	127	127	127	127	127	127	127	127	127	127	63	69	127	125
TAModSc	Pearson Correlation	.100	.164	-.009	.284**	-.155	.128	.167	.025	.244**	.168	.196*	.049	-.082	-.160	-.042	-.079	.077	1
	Sig. (2-tailed)	.264	.065	.917	.001	.081	.151	.059	.780	.005	.057	.027	.579	.359	.072	.746	.523	.391	
	N	128	128	128	128	128	128	128	128	128	128	128	128	128	128	63	68	125	128

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Note: DS = Describe, NR = Non-react, NJ = Non-judging, OB = Observe, AA = Act wit awareness, FFMQ = Five Facets Mindfulness Questionnare, SEA = Self-Emotions Appraisal, OEA = Others-Emotions Appraisal, UOE = Use of Emotion, ROE = Regulation of Emotion, WLEIS = Wong & Law's Emotional Intelligence Scale, EC = Empathic Concern, FearCom = Fear of Compassion (Self), PsyInflex = Psychological Inflexibility, TAStRM = Teacher Average Student-rated State MAAS, TATeRM = Teacher Average Teacher-rated State MAAS, CAFdbk = Class Average Feedback; TAFdbk = Teacher Average Feedback; TAModSc = Teacher Average Module Score

APPENDIX M

SMU
SINGAPORE MANAGEMENT UNIVERSITY

15 March 2016

Moses KOH Tong Por
Lee Kong Chian School of Business

Dear Moses,

IRB APPROVAL OF RESEARCH
CATEGORY 2: Expedited Review
Title of Research: Relation of Teachers' Mindfulness with Classroom and Student Outcomes: Examining Potential Mediating Mechanisms
SMU-IRB Approval Number: IRB-16-001-A025(316)

Thank you for your IRB application for the above research that we received the latest revised application on 10 March 2016.

I am pleased to let you know that, based on the description of the research in your IRB application, the IRB has determined that your research falls under Category 2 and has approved your application.

Please note the following:

1. Indicate the above SMU-IRB approval number in all your correspondence with the IRB on this research.

2. If any adverse events or unanticipated problems involving human subjects occur during the course of the research project, you must complete in full the SMU-IRB Adverse Events Report Form (see SMU-IRB website) and submit it to the SMU-IRB within 24 hours of the event.

3. If you plan to modify your original protocol that was approved by the SMU-IRB, you must complete in full the SMU-IRB Protocol Modification Request Form (see SMU-IRB website) and submit it to the SMU-IRB to seek approval before implementing any modified protocol.

4. This IRB approval for your research is valid for one year (12 months) from the date of this letter. If you plan to extend your research project beyond one year from the date of the IRB approval, you must submit a request to renew the research protocol using the Continuation Review Form (see SMU-IRB website) or Protocol Modification Request Form ***prior to the IRB approval expiry date***.

5. Please be reminded to be in compliant with Singapore's Personal Data Protection laws in carrying out your research activities.

If you have any queries, please contact the IRB Secretariat at irb@smu.edu.sg or telephone +65 6828-1925.

Yours Sincerely,

Don Ferrin
Chairman
Institutional Review Board

Administration Building 81 Victoria Street Singapore 188065
Tel: +65 6828 0100 Fax: +65 6828 0101 www.smu.edu.sg Reg. No. 200000267Z

SMU
SINGAPORE MANAGEMENT UNIVERSITY

3 May 2016

Moses KOH Tong Por
SMU Student
Lee Kong Chian School of Business

Dear Moses,

IRB PROTOCOL MODIFICATION REQUEST APPROVAL
CATEGORY 2: EXPEDITED REVIEW
Title of Research: Relation of Teachers' Mindfulness with Classroom and Student Outcomes: Examining Potential Mediating Mechanisms
SMU-IRB Approval Number: IRB-16-001-A025(316)
SMU-IRB Modification Number: IRB-16-001-A025-M1(516)

Thank you for your IRB Protocol Modification Request application for the above research in which we received the latest revised application on 3 May 2016.

I am pleased to let you know that, the IRB has approved your application for the modification based on the description of modified research protocol stated in your Modification Request form.

Please note the following:

1. Indicate the above SMU-IRB approval number and SMU-IRB modification number in all your correspondence with the IRB on this research.

2. If any adverse events or unanticipated problems involving human subjects occur during the course of the research project, you must complete in full the SMU-IRB Adverse Events Report Form (see SMU-IRB website) and submit it to the SMU-IRB within 24 hours of the event.

3. If you plan to modify your original protocol that was approved by the SMU-IRB, you must complete in full the SMU-IRB Protocol Modification Request Form (see SMU-IRB website) and submit it to the SMU-IRB to seek approval before implementing any modified protocol.

4. This IRB approval for your modified protocol is valid one year from the date of this letter. If you plan to extend your research project beyond one year from the date of the IRB approval, you must submit a request to renew the research protocol using the Continuation Review Form (see SMU-IRB website) or Protocol Modification Request Form ***prior to the IRB approval expiry date***.

5. Please be reminded to be compliant with Singapore's Personal Data Protection laws in carrying out your research activities.

If you have any queries, please contact the IRB Secretariat at irb@smu.edu.sg or telephone +65 6828-1925.

Yours Sincerely,

Don Ferrin
Chairman
Institutional Review Board

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