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## Implementation of an Online Mindfulness-Based Intervention for Reducing Stress Amongst Undergraduate Nursing Students

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**Implementation of an Online Mindfulness-Based Intervention for Reducing Stress**

**Amongst Undergraduate Nursing Students**

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### Abstract

*Background & Purpose:* Nurses and nursing students have notoriously high levels of stress, which can lead to burnout, depersonalization, deterioration of mental or physical health or exiting the profession. A pilot educational mindfulness-based intervention was implemented online amongst undergraduate nursing students to decrease stress and increase mindfulness. Mindfulness is an evidence-based self-care skill that has proven effective in reducing stress in student populations and amongst nurses.

*Methods:* Students in an online nursing theory course engaged in the mindfulness-based intervention online. Stress and mindfulness were measured pre-, immediately post-, and 4 weeks post-intervention and were analyzed using linear regression. Students were also surveyed regarding feasibility and challenges with the program.

*Results:* Sixty students participated in the 5-week training and completed pre- and post-test measurements. Students with the highest adherence to the program reported a decrease in stress with mild statistical significance in this sample ( $M=-1.678$ ,  $SE=.943$ ,  $p=.075$ ), while an increase in mindfulness was observed across all adherence levels ( $M=3$ ,  $SE=.846$ ,  $p\leq.001$ ). Twenty-nine students participated at follow-up, and the results were sustained. After five weeks of exposure to mindfulness, a majority of students valued this new skill (58%) and would share it with a colleague (53%) or a future client (60%).

*Conclusion:* Integration of an abbreviated, online mindfulness program is effective at decreasing students' stress and increasing mindfulness. A slightly longer version of this intervention should be considered. Digital delivery addresses an important health equity concern for nursing students, who must be better equipped with self-care tools to effectively cope with stress.

*Keywords:* mindfulness, nursing education, self-care, stress, technology and informatics.

Implementation of an Online Mindfulness-based Intervention for Reducing Stress amongst  
Undergraduate Nursing Students

High levels of stress are a distressing reality for both nursing students and nursing professionals (Bamber & Schneider, 2016; Janssen, et al., 2013; van der Heijden & Engels, 2018; van der Riet, et al., 2018). Prolonged stress is exhausting and frustrating, often leading to burnout, depersonalization, deterioration of mental or physical health, or leaving the job or the profession altogether (Hinderer et al., 2014; Khamisa, et al., 2016; NSI Nursing solutions, 2018). Nursing students focus much of their attention on helping clients cope with illness, but are given inadequate experiential training in self-care skills to cope effectively with their own stress.

Mindfulness, a skill that involves a heightened, non-judgmental awareness to the present moment (Kabat-Zinn, 2006), has been shown to be effective in reducing stress levels for a wide variety of clinical and non-clinical populations, including nurses and nursing students (Boettcher, et al., 2014; Chiesa & Serreti, 2009; Regehr et al., 2013). The technique can be taught using an online format, which will enhance accessibility and feasibility (Jayawardene et al., 2017; Spijkerman, et al., 2016). This report details the implementation and evaluation of an online mindfulness-based intervention for nursing students, which took place at a college in Ontario, Canada in the fall of 2019.

### **Background**

Stress is an overactivation of either or both the sympathetic-adrenal medullary system (SAM) and the hypothalamic-pituitary adrenocortical axis (HPA) (Cohen & Kessler, 1997), resulting in a disruption of balance, or homeostasis (Chrousos et al., 1988; Schneiderman et al., 2005). Low or moderate levels of stress are adaptive mechanisms and can have very positive effects, such as heightened alertness and attention span (Chrousos et al., 1988; Schneiderman et

al., 2005), but higher levels are associated with negative responses. Negative psychological manifestations of stress include depression, anxiety, stress disorders, eating disorders, sleep problems, substance abuse, and accidents (Schneiderman et al., 2005). Prolonged stress can also cause damage to the nervous, cardiovascular, endocrine, and immune systems, and significantly contribute to cardiovascular disease, susceptibility to contagious illnesses, obesity, migraines, uncontrolled diabetes, muscle strain, and cognitive impairment (Lundberg, 2005; Schneiderman et al., 2005; Sharma & Rush, 2014). Any of these sequelae can contribute to poor quality of life (Sharma & Rush, 2014).

Stress amongst university students is a well-known and long-studied phenomenon (Bamber & Schneider, 2016). Over 50% of students report overwhelming levels of stress (Bamber & Schneider, 2016; Regehr, et al., 2013), and cite reasons such as heavy workloads, rigorous criteria for advancing through the program, and financial constraints (Li et al., 2018). Specifically, in Canada, where this project took place, the Canadian Broadcasting Company recently reported on a survey of a university in Ontario, which found 88% of students feeling “generally overwhelmed” (Regehr et al., 2013, p. 2). High stress levels amongst students is associated with mental health sequelae such as depression and anxiety, further exacerbating poor academic performance and contributing to attrition from the program (Li et al., 2018; Regehr et al., 2013).

Once nursing students graduate, they are entering a profession that is also extremely stressful, requiring complex decision-making with the simultaneous expectation of demonstrating compassion and sensitivity (Burton et al., 2016). Other work stresses include staff shortages, extended work hours, pressure to meet targets, multiple demands on the nurse’s time and emotions, and lack of organizational support (Janssen, et al., 2018; van der Riet, et al.,



2018). A central role of the nurse is to assist clients and their families to cope with the stress of acute or chronic illness. Yet, nurses themselves are often unable to manage their own stress levels, and experience high levels of burnout (20-60% in the first years of practice) and attrition to the profession.

Nurses also commonly display poor health and poor work performance, including dangerous medication errors and other risks to patient safety (Burton et al., 2016; Li et al., 2017; Lo et al., 2018; Rudman & Gustavsson, 2012). Emotional distress and burnout are further associated with illness, suicidal ideation, family conflict, sleep issues, and drug and alcohol abuse (Lo et al., 2018).

Nursing students experience the two-fold blow of the stress to succeed academically, as well as the stress of the healthcare professional, which they experience in the clinical environment (Li et al., 2017). In clinical, the duality of the student and the healthcare professional roles converges and can be extremely difficult to manage (Rudman & Gustavsson, 2012). The undergraduate nursing experience is often fraught with experiences of transition shock, reality shock, and a “crisis of competence” (Rudman & Gustavsson, 2012). In a longitudinal study of 1702 nursing students, there was an increase of burnout by 38% across three years, and those who were experiencing burnout displayed poorer mastery of required knowledge and skills, as well as a higher likelihood of leaving the profession within one year of graduation (Rudman & Gustavsson, 2012).

Some students turn to therapy, including the well-researched modality of cognitive-behavioral therapy (Heber et al., 2017), to help mitigate overwhelming stress levels. However, students are notoriously unlikely to seek help, citing reasons such as lack of time (47%) and preference for dealing with stress alone (73%) (Regehr et al., 2013). It is imperative that nursing

students be fortified with self-care skills which they can employ both during their student years and in their future careers as nurses.

Mindfulness-based interventions (MBIs) have been researched extensively in recent years and are proven to be as effective as the standard-of-care cognitive-behavioral therapy (CBT) in reducing stress and psychological distress in many clinical populations, but also in healthy, non-clinical populations, including health care students and health care professionals (Boettcher, et al., 2014; Chiesa & Serreti, 2009; Regehr et al., 2013). While some stressed individuals may seek out CBT, it is not effective for everyone, and there remains a need for self-care skills that one can easily and effectively utilize (Boettcher et al., 2014; Cavanagh et al., 2014). Mindfulness is thought to be “intrinsically transdiagnostic,” in that it helps shift dysfunctional mental processes such that individuals experience relief from a wide variety of symptoms and conditions (Boettcher et al., 2014).

Mindfulness, defined by John Kabat-Zinn, has its roots in Buddhist teaching, but is essentially a human capacity, which each person exhibits to some degree (Creswell, 2017; Kabat-Zinn, 2006). Mindfulness is defined by Kabat-Zinn 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” (2006, p. 145). Instead of being mindful, the mind’s tendency is often to self-criticize, perseverate on either the past or the future, and wander (Creswell, 2017). Mindfulness involves training the mind such that a person becomes both more attentive to the present moment, including body sensations, emotional reactions, mental talk, and sensory input. Instead of resisting negative feelings and thoughts, the individual develops an attitude of curiosity and acceptance toward these experiences (Creswell, 2017). This is not simply an acquiescence to one’s state as though it can never change. Rather, it is “one of inviting

in experiences, even if difficult” (Creswell, 2017). In fact, the practice of mindfulness over time is effective in reducing deep-seated unpleasant bodily and mental sensations, but not by directly trying to change them. This paradox was described by Carl Rogers, a famous psychologist: “The curious paradox is that when I accept myself as I am, then I change” (Rogers, 1961). One theory regarding the mechanism by which this occurs is discussed below under the heading “Theoretical Framework/Evidence-Based Practice Model.”

John Kabat-Zinn developed an eight-week program entitled Mindfulness-Based Stress Reduction (MBSR), which has been widely researched, with multiple studies and meta-analyses demonstrating effectiveness in reducing stress, depression and anxiety, and burnout, as well as improving well-being, resilience, and quality of life (Creswell, 2017). Some studies utilized MRI and noted changes in the brain due to mindfulness training, such as increased insular cortex activity, responsible for “present-moment awareness...and processing of emotional cues” (Young et al., 2018, p. 427, 429). Other brain changes noted in studies include decreased amygdala response to emotional stimuli and greater grey matter density (van der Riet, et al., 2018), associated with greater emotional intelligence (Takeuchi, et al., 2010).

Notwithstanding its many benefits, MBSR requires a significant time and financial commitment, and therefore is not accessible to most individuals. In the last one to two decades, briefer and self-help mindfulness-based interventions including web-based or app-based iterations have been studied, with similar effectiveness (Cavanagh et al., 2014; Gilmartin et al., 2017; Heber et al., 2017; Jayawardene, et al., 2017; Spijkerman, et al., 2016). Online delivery has many advantages over face-to-face iterations of mindfulness-based training. It is less costly, more convenient for both the users and the facilitators (available 24/7) and allows the user to remain anonymous and therefore possibly more engaged in the program (Spijkerman et al.,

2016). It also reduces the stigma associated with seeking professional therapy and promotes a sense of self-efficacy, as online modes are more directed by the user (Cavanagh, et al., 2014). The lack of a group context and a professional with whom to interact has potential disadvantages (Cavanagh, et al., 2014), but can be mitigated by the way in which the online delivery is designed.

Additionally, tools for measuring mindfulness itself have been developed and validated, and many studies have incorporated this outcome measure in order to further strengthen the association between the intervention and the outcome measures (Burton et al., 2016). The literature review analyzed the research regarding mindfulness-based interventions for reducing stress using brief online versions of mindfulness training, amongst non-clinical populations, with special attention to student and healthcare professional populations, especially nurses.

### **Problem Statement**

Nursing students frequently experience high levels of stress and are entering an inherently stressful profession. Mindfulness is a self-care skill with strong evidence for reducing stress in all populations, including nonclinical groups such as university students and nurses. This project offered a pilot educational online, mindfulness-based intervention for nursing students with the goal of reduced stress, and corresponding increased mindfulness.

### **Organizational Gap Analysis of Project Site**

The Bachelor of Science in Nursing (BScN) curriculum at the practice site, a community college in Ontario, Canada, did not include any experiential training in self-care for students who will be future nurses. Stress is pervasive amongst Canadian students, with as many as 88% feeling “generally overwhelmed” as reported in a recent study (Regehr et al., 2013). Amongst

students at the institution where this project was implemented, both Student Success staff and Student Services (counseling) staff report that high levels of stress are extremely common (K. Jongedijk and A. Bernardo, personal communication, March 2019). These factors clearly supported the need for this project.

### **Review of the Literature**

In review of literature examining evidence for this project, the search strategy included the following databases: PsychInfo, CINAHL, and Social Sciences Citation databases. The search was conducted to specifically appraise the evidence for an electronic delivery of a mindfulness intervention, in non-clinical populations, using the following search words: *mindfulness* (or *MBSR* or *mindfulness based stress reduction* or *mindfulness intervention*), AND *online* (or *internet* or *web* or *social media* or *digital* or *apps* or *applications* or *smartphone* or *mobile*) AND *systematic review* (or *review* or *meta-analysis*) as part of the title. Inclusion criteria included a systematic review or meta-analysis, which analyzes studies with a mindfulness-based intervention, where the delivery of the intervention is digital (online, app-based, etc.). Inclusion criteria also included English language and reviews from 2013 to 2019.

Exclusion criteria included studies in which the mindfulness intervention was not delivered electronically, or the target population was under 18 years old. Reviews which focused on a clinical population or which did not report on either the outcome of stress or mindfulness were also excluded. This search yielded 24 results, after removing duplicates. Based on the inclusion/exclusion criteria, two reviews remained (Jayawardene et al., 2017; Spijkerman, et al., 2016), and two additional were found using a hand search of references pages from relevant articles. One of the additional reviews compared mindfulness studies with other stress-reducing interventions delivered online using a meta-analysis (Heber et al., 2017). The final review did

not focus solely on online delivery, but rather is a systematic review on “brief” ( $\leq 4$  hours total) delivery of a mindfulness intervention (Gilmartin et al., 2017). It was included because several of the studies in the review were delivered online, and because the trend in online delivery of mindfulness-based interventions is toward greater feasibility, and thus, briefer iterations (Gilmartin, et al., 2017; Kemper, 2017). Thus, a total of 3 meta-analyses and 1 systematic review were included for this literature review.

### **Synthesis of Included Reviews**

The research studies that were analyzed by each reviewer overlapped, but slight differences in inclusion criteria contributed to the variation in included studies. Jayawardene et al.’s (2017) review most closely matches the scope of this project, as it included 8 RCTs in which a mindfulness intervention was delivered online as a “preventative” intervention. Spijkerman et al.’s (2016) review included 15 RCTs, also focused on online delivery of a mindfulness intervention, but included healthy and non-healthy populations, and was conducted earlier. Jayawardene et al. (2017) included two studies that were not included in Spijkerman et al. (2016).

Although the healthy population is the focus of this project, Spijkerman et al.’s (2016) review was included because they separated healthy vs. non-healthy populations in their subgroup analysis and found no significant differences. Heber et al.’s (2017) review was broader, including other stress reduction strategies that are delivered online, including CBT and others. Heber et al. (2017) separated the effect size of each type of intervention on the outcome of stress, although mindfulness meditation in this review is renamed a “third-wave cognitive behavior intervention” (TWC) and the category does include a few studies that are not strictly a mindfulness intervention. Still, Heber et al.’s (2017) review is useful in assessing the stress-

reducing capacity of TWC's (primarily mindfulness), delivered online, as compared with other interventions. Gilmartin et al.'s (2017) systematic review analyzed the effectiveness of brief mindfulness interventions specifically for healthcare providers, and included RCTs and other study designs, with a total of 14 studies, five of which tested an online or app-based brief mindfulness intervention.

### **The Mindfulness Intervention**

Each of these reviews noted high heterogeneity in the intervention itself across the studies in terms of overall length, dosage (requirement per day/week), and delivery (in person, online, via CDs, application-based, etc.). Spijkerman et al.'s (2016) review included several studies that employed an eight-week MBSR program, while in Jayawardene et al.'s (2017) and Gilmartin et al.'s (2017) review, the intervention was mostly modified and shorter.

Heber et al. (2017) isolated the interventions by length and found that shorter or medium-length interventions (two to eight weeks) held a moderate effect size, whereas longer interventions led to a low effect size. Spijkerman et al. (2016) found that the studies with a greater number of sessions had a larger effect size, but not after removing an outlier, which was a study with a very long intervention and a low effect size.

Common to all studies was an element of experiential learning, i.e. participants were not merely learning *about* mindfulness, but rather practicing the skill throughout the intervention (Heber et al., 2017; Gilmartin et al., 2017; Jayawardene et al., 2017; Spijkerman et al., 2016). Also common in many of the studies was the element of personal reflection in a group, i.e. via a discussion board, which is an important element in face-to-face versions. Including this component likely contributes to the comparable effects of the online delivery with face-to-face

delivery (Heber et al., 2017; Gilmartin et al., 2017; Jayawardene et al., 2017; Spijkerman et al., 2016).

### **Effectiveness of the Intervention**

Effect sizes are in moderate range for stress according to these meta-analyses. Effect size for stress reduction is moderate and remarkably similar across the meta-analyses ( $g=.43-.54$ ), but with high heterogeneity ( $I^2=64.964-85.18$ ). This heterogeneity indicates variability in the studies' results but decreases significantly after removing low quality studies ( $I^2=35.44-69.41$ ). Also, these results are similar to meta-analyses of mindfulness interventions in healthy populations that are carried out in face-to-face contexts (Jayawardene et al., 2017; Spijkerman et al., 2016).

Also, Heber et al. (2017) found the effect size for web-based mindfulness interventions to be slightly higher ( $d=.53$ ) as compared with studies included in the review which employed an online CBT intervention ( $d=.40$ ). Two of the three meta-analyses did a subgroup analysis to determine whether the presence of guidance by the facilitator affected effect sizes. Studies where the intervention was guided demonstrated an increased effect size on stress to the high range ( $g=.64-.89$ ) and mindfulness to the moderate range ( $g=.43-.46$ ), though heterogeneity increased slightly in both outcome measures<sup>1</sup>. Guidance in the studies took several forms, with some in the form of reminders and encouragements, either automated or personal/tailored, and others in the form of interaction on a discussion board or other medium with a therapist or professional (Heber et al., 2017; Spijkerman, et al., 2016). Effect sizes for mindfulness are more modest ( $g=.276-.32$ ), with low heterogeneity ( $I^2=0-12.23$ ) (Jayawardene et al., 2017; Spijkerman et al.,

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<sup>1</sup> However, Spijkerman et al. (2016) caution that this analysis was underpowered.



2016). Also, the correlation between stress and mindfulness was high ( $r=0.77$ ) (Jayawardene et al., 2017).

The effect size for stress and mindfulness outcomes increased at follow-up, for studies that included a follow-up measure in their design (Heber et al., 2017; Jayawardene et al., 2017). However, only a few studies conducted follow-up and the follow-up period was inconsistent, ranging from one month to six months (Heber et al., 2017). Also, heterogeneity increased greatly in the analysis of these effect sizes in one review (Heber et al., 2017), and thus, while this is encouraging, the results are indeterminate. Also, it is difficult to ascertain whether participants simply sustained results of their engagement in the intervention or continued to engage in mindfulness meditation that they learned, and thus sustained or increased the effects.

### **Appraisal of the Research**

Each review critiqued the quality of the research studies using a different tool or checklist, and reported the quality of included studies on average was in the “moderate” range (Gilmartin, et al., 2017; Jayawardene et al., 2017). Common issues in the studies included insufficiently describing dropouts and adherence (Gilmartin, et al., 2017; Jayawardene et al., 2017), and insufficiently handling missing data (Heber et al., 2017). Heber et al. (2017) also found inadequate description of allocation concealment, although this was not corroborated by Spijkerman et al. (2016) and Jayawardene et al.’s (2017) critical appraisal.

Gilmartin et al. (2017) reported some issues with blinding, although the most relevant studies to this project did not suffer this bias (Jayawardene et al., 2017). There was consistent use of intent-to-treat analysis (Jayawardene et al., 2017; Spijkerman et al., 2016), and because attrition is often high (Spijkerman et al., 2016), this indicates that results for participants who complete the program may actually be higher than reported. Significantly, Spijkerman et al.

(2016) and Heber et al.'s (2017) review recalculated effect sizes and heterogeneity, omitting the lowest quality studies. Spijkerman et al.'s (2016) review found a slight drop in effect sizes, to perhaps a truer effect size, since heterogeneity also dropped (.54 to .40; 95% CI [.27-.82] to 95% CI [.20-.59];  $I^2=85.18$  to 69.41), while Hebert et al. (2016) found a much more dramatic drop in effect size, as well as in heterogeneity (.74 to .30; 95% CI [.59-.89] to 95% CI [.21-.40];  $I^2=68.01$  to 35.44).

Jayawardene et al. (2017) did not delete lower quality studies or recalculate effect sizes and heterogeneity, but they did ascertain using a funnel plot as well as Duval and Tweedie's trim-and-fill method that the heterogeneity is not indicative of a publication bias (i.e. missing studies). Spijkerman et al. (2016) and Heber et al.'s (2016) review employed similar calculations and found the likelihood of a publication bias to be nil.

Engagement and attrition in internet-based self-help programs are common issues (Cavanagh et al., 2014), with up to 69% loss (Morledge et al., 2013). Spijkerman et al. (2016) reported adherence rates in the studies they included at 40-92%, though all reviewers commented that adherence was notoriously not reported in many of the included studies (Gilmartin et al., 2017; Heber et al., 2017; Jayawardene et al., 2017; Spijkerman et al., 2016). Heber et al. (2017) found that including guidance in some capacity in the intervention increased adherence in studies where adherence was reported.

### **Appraisal of the Reviews**

The Measurement Tool to Assess Systematic Reviews 2 (AMSTAR 2) was designed to assist health care professionals to critically appraise the quality of systematic reviews that include RCTs as well as other research designs (Shea et al., 2017). It does not give a score, but rather guides the practitioner, and highlights certain elements of the questionnaire as more

critical than others. Using this tool for each of these reviews, this author did not find any critical flaws, other than Gilmartin et al.'s (2017) failure to discuss the impact of risk of bias in their final discussion of the results.

However, some of the critical areas were met only “partially” (Shea et al., 2017). Specifically, the literature search strategy could have been even more robust for all four reviews to include searching grey literature and consulting experts in the field. Additionally, while all four reviews assessed the studies for risks of bias, none reported on the lack of multiple measures or analyses of certain outcomes. That is, many of the studies in all four reviews only measured the outcome of stress using one validated tool rather than corroborating the measurement with other tools or measures.

Lastly, while all three meta-analyses used appropriate techniques for calculating effect sizes, and reported on heterogeneity, they did not fully explore the causes of the heterogeneity, other than to recalculate excluding studies that are of poorer quality and/or outliers. Thus, although no critical flaws are present, the quality of all four reviews is deemed as moderate. Overall, they provide an accurate summary of the studies included in each review.

### **Evidence Based Practice: Verification of Chosen Option**

Based on this analysis of the literature, a medium-length (five weeks) mindfulness-based online intervention (MBOI) was implemented amongst nursing students. To closely follow the evidence of best practice, the teaching methodology included experiential learning, personal reflection within a group, and guidance from a facilitator.

### **Theoretical Framework/Evidence Based Practice Model**

Two theoretical frameworks underpinned this project. The Theory of Positive Appraisal, articulated by Lazarus and Folkman (1984), describes the process by which stress can be ameliorated using cognitive reappraisal. Kolb's Theory of Experiential Learning (1984) guided the design of the intervention in order to support acquisition of a new skill by the students.

#### **Theory of Positive Reappraisal**

Stress, according to Lazarus and Folkman (1984), is best understood through the perspective of the person experiencing it. The same event may cause an extreme stress response in one person, and a mild response in another. In Lazarus and Folkman's (1984) framework, a cognitive process known as the "primary appraisal" determines how difficult that event is likely to be for that person (irrelevant, benign positive, or harmful/negative) (Matthieu & Ivanov, 2006). Then, in the "secondary appraisal," a person evaluates all available internal and external coping resources, to address the triggering event (Garland et al., 2009; Matthieu & Ivanoff, 2006). This cognitive appraisal will determine the degree of distress that a person will experience.

The degree to which a person feels the crippling emotional stress response, and all of its potentially harmful sequelae, is also not fixed, but can be shifted and ameliorated through an adaptive coping response known as "positive reappraisal" (Garland et al., 2009; Lazarus & Folkman, 1984). For example, through cognitive behavioral therapy (CBT), a person shifts their thinking about certain events and either recognizes coping resources they didn't realize they possessed or learns new positive coping strategies. They may even see a negative event or experience as also having some potential benefits. Shapiro et al. (2006) studied mechanisms of mindfulness and posited the very similar idea of "reperceiving" (p. 377), facilitated by the

“cognitive and emotional flexibility” (p. 381) that the exercise of mindfulness affords.

Individuals who achieve a more positive reappraisal (either or both primary and secondary), in turn can experience more emotional regulation, and decreased distress (Troy et al., 2010).

Mindfulness practice, unlike CBT, is not focused on a conscious effort to adjust one’s cognitive appraisal. It is also much more than a relaxation technique (Garland et al., 2009). In mindfulness, an individual is able to achieve metacognition, i.e. a realization that thoughts and emotions are simply thoughts and emotions, rather than facts. This is achieved by paying attention purposefully and non-judgmentally to one’s thoughts and emotional responses (Ma et al., 2018). This “step back,” or “decentering” (Garland et al., 2009, p. 37) *allows for* the cognitive reappraisal, which is core to Lazarus and Folkman’s theory (Lazarus & Folkman, 1984).

Furthermore, in attending to one’s feelings and emotions *without* trying to change them, the strength and grip of those thought patterns and feelings relaxes (Ma et al., 2018), and the individual experiences an “attentional broadening” (Garland et al., 2009). An individual begins to either appraise the event as more benign or sometimes even beneficial. Or, they discover coping strategies or abilities that were not previously accessed. In a study measuring academic self-efficacy amongst students experiencing an inherently stressful incident of failure, positive reappraisal was found to be a significant mediator, linking mindfulness with greater academic self-efficacy (Hanley et al., 2015).

Specifically, there is a reduced tendency to engage in “negative, global self-appraisals” (Hanley et al., 2015, p. 333) in response to a specific incidence of failure in a person who demonstrates higher levels of mindfulness (Hanley, et al., 2015). The diagram in Appendix A, based on Lazarus and Folkman’s theory (1984), depicts the mechanism by which mindfulness

results in positive reappraisal.

### **Theory of Experiential Learning**

Learning, according to Kolb (1984), is an inherently experiential endeavor. It is only when ideas are “formed and re-formed through experience” (p. 144) that they become truly acquired by the person, i.e. learned. It is a process, and a continuous, lifelong endeavor (Kolb, 1984). In the course of a person’s life, one encounters experiences that are different from predicted based on previous learning (i.e. a program that is more stressful than expected), and a person may try different ways of dealing with their experience. Learning, according to Kolb (1984), “stems from the resolution of these conflicts” (p. 146).

The process of learning must also be holistic, because a person cannot separate their cognition from other parts of themselves, including their feelings, perceptions, and behavior (Kolb, 1984). Especially when learning a skill such as mindfulness, the learning must lead to a self-actualization, i.e. an embodiment of the skill. The way one experiences it and feels about it when doing it is of paramount importance to the way the skill is eventually embodied or rejected (Kolb, 1984). Once something is learned, it bridges all contexts of a person’s life, from work to school to family and friends (Kolb, 1984).

Mindfulness in particular is a skill that one can practice and acquire in any context and then transfer the skill easily to another context. For example, one can learn to be mindful while eating, having sex, or talking with one’s partner, and then exercise this same ability in academic and professional contexts. Learners engage in a cyclical process (1984). They must be able to immerse themselves fully in new experiences (concrete experiences [CE]), reflect on them using various perspectives (reflective observation [RO]), integrate their observations (abstract conceptualization [AC]), and then use their new knowledge in the way they deal with the world

they encounter (active experimentation [AE]) (Kolb, 1984). The diagram in Appendix B depicts these dimensions of experiential learning.

For a method to be defined as experiential, the following key components are crucial: a mixture of content and process; a clear explanation to students as to the purpose of the learning; ample opportunity for reflection without judgment including re-examination of values; and an immersion in the learning experience such that it takes the learner out of their comfort zone, but resonates such that the learner is emotionally invested (Schwartz, 2012). The program designed in this project included these elements. The meditations chosen included a mixture of content and practice, a clear presentation of the value and purpose of the skill, and interaction with the group and with the facilitator online such that there was ample opportunity to reflect, examine one's experiences with mindfulness, and integrate learning into one's life across many contexts.

### **Methods**

The goal of this pilot project was to determine whether nursing students who are bridging from a Registered Practical Nurse (RPN) to a Registered Nurse (RN) at a community college in Ontario, Canada, experience a statistically significant ( $p < .05$ ) decrease in perceived levels of stress, and a statistically significant ( $p < .05$ ) increase in mindfulness after experientially learning the self-care skill of mindfulness practice through a brief, guided, group-based online program. The long-term goals are for these future nurses to use this skill in their practice and thus experience lower levels of stress and its dangerous sequelae, and for this project to morph into one that is offered regularly to all nursing students at this community college.

The design of this pilot educational intervention project involved an online, medium-length mindfulness training program offered to nursing students within an undergraduate nursing theory course. Students' perceived stress and levels of mindfulness were assessed pre- and post-

intervention, and at four weeks follow-up, and compared using descriptive and inferential statistical analysis.

### **Implementation Plan/Procedures**

The Plan-Do-Check-Act is a model for change management that focuses on not only planning and implementing change (Plan and Do), but also analyzing the outcomes and continuous improvement of the program (Check and Act) (MindTools, 2019). The model describes an iterative and cyclical process in which the phases are engaged in repeatedly in order to achieve continuous improvement, rather than simply planning and running a new program (MindTools, 2019).

In this project, the “Plan” phase represents the proposal development and all of the networking within the organization necessary to plan the various elements of this intervention. The “Do” phase represents the implementation of this intervention for the first time, in Fall 2019. The “Check” phase represents the data analysis and interpretation, which took place in early 2020, and presenting of these results and key observations to stakeholders at this community college. The “Act” phase represents future iterations of this project at the college. The following sections provide detail of this project, for each stage of this model. An overview of the timeline for this project can be found in Appendix C.

#### ***Plan: Population and Recruitment***

At this community college, students upgrading from an RPN to an RN are taking classes at a campus in Ontario, Canada, toward their BScN degree. This includes one year at the college, and then two years at a partner university. There are approximately 110 RN students in this program yearly. The course chosen for this project was the nursing theory course, which is



taught primarily online, with 3 face-to-face sessions. This course emphasizes the therapeutic use of self in the nurse-client relationship. Self-care is necessary to achieve this outcome, and therefore, this course was deemed a good fit by both this project's author, and the instructor of this course. There were no exclusion criteria. The recruitment took place in-person, as this course met face-to-face at three points in the semester. Those who missed this session were recruited using announcements on Blackboard.

***Plan: Project Site***

The program is very busy and stressful for many students. To help students achieve success in the program, the college currently offers students some key supports. Students had access to free, confidential counseling through Student Services. They offer counseling for both academic and non-academic issues, in addition to workshops designed to help students better manage the stress and demands of student life.

The college has a department called Student Success, which offers a set of peer-led clubs (with paid, trained, and qualified peers who are in year three or four of the program) focused on various aspects, which are particularly difficult for students, such as anatomy, pathophysiology, etc. However, this program is not supported by this department due to budget constraints (K. Jongedijk, personal communication, May 2, 2019).

Mindfulness as an effective stress-reduction self-care skill is currently offered by Counseling Services periodically in the form of a face-to-face workshop, with each iteration lasting 8 weeks (once per week for 2 hours). Very few RN students take advantage of this program, and fewer stay in the program to its completion. The program is very intensive, and students rarely feel able to engage in any non-mandatory time commitments. One of the

counselors is a certified mindfulness instructor. She offered to partner in this project by consulting with this author regarding the initial recruitment presentation and demonstration of mindfulness and connecting with students in the course throughout their experience with mindfulness.

In addition to this valuable support from the Counseling department, this project benefited from the strong support of the Chair of the BScN nursing program, the Associate Dean of Nursing, and a Student Success staff member who has had personal experience with mindfulness training. The technical requirements of this project were supported via the Learning Management System, Blackboard, which was in turn supported by a technical team.

***Plan: Protection of Human Subjects***

This project received full approval by the Research Ethics Board at this college as of June 5, 2019 and was amended to incorporate final adjustments to the protocol on August 22, 2019. See Appendix D for the approval letter. The information letter and consent form are also attached in Appendix E and F, respectively. On this basis, the Human Research Protection Office at the University of Massachusetts, Amherst, determined that an application to the Institutional Review Board (IRB) was not required.

Mindfulness has been used widely in research studies as well as in practice settings worldwide with great benefits. During the course of mindfulness exercises, however, it is possible or even likely that a person will encounter unpleasant sensations and feelings (Creswell, 2017). This is inherent in the underpinning notion of mindfulness, as participants are encouraged to acknowledge and pay attention to their present experience, including uncomfortable thoughts and feelings, compassionately (Kabat-Zinn, 2018). The result is most often greater relaxation, relief from stress, and increased wellbeing (Creswell, 2017).

Although not documented in any of the research this author reviewed, including many systematic reviews, there is a theoretical risk that an individual may find themselves encountering thoughts or emotions, perhaps related to trauma that is resurfacing, which may become overwhelming (Creswell, 2017). Participants were made aware of this in the information letter and encouraged to seek counseling should they feel a need. This counseling is readily available and without charge at this college. Contact information for the counseling services was available both in the information letter, which students will read on SoGoSurvey®, and also within the Blackboard course.

The author of this project was not involved in teaching this course and had no influence on students' grades. To protect confidentiality, the students used a unique identifier in SoGoSurvey®, and no identifiable information was collected from students. Thus, key potential ethical concerns were addressed for the participants of this project.

***Do: Implementation Plan/Procedure***

This pilot educational intervention project offered mindfulness training in a fully online/application-based format, over five weeks, with students engaging in mindfulness practice 5-10 minutes per day, for an ideal total of 25 times, over the five-week period, with a minimum of 10 sessions. The introduction to this intervention took place during week one of the undergraduate nursing theory course. It consisted of a 20-minute introduction to mindfulness using short video or audio clips by an expert in the field, a short, guided mindfulness meditation, and an introduction to this project.

The online intervention included a psycho-education component using material on Blackboard as well as material embedded within the meditations, and an experiential learning component, i.e. actually engaging in the meditation practice. Students downloaded and used the

application HeadSpace© and Smiling Mind© on their phones, and then chose each day from a repository of free meditations on both apps. Students then blogged weekly on Blackboard, in response to specific questions, which guided students in reflecting on their practice and asked them questions regarding challenges. See Appendix G for these blog questions. They also communicated with each other through responses to each other's blogs. The author of this project, as well as the mindfulness expert, also interacted with students, offering guidance, reminders, motivation, and feedback through announcements, comments, and private messages.

### ***Check: Measurement Instruments***

In order to measure the outcomes, the following instruments were used:

1) *The Perceived Stress Scale (PSS)* (Cohen et al., 1983). As discussed in the section above, "Theoretical Framework," stress is a function of a person's self-appraisal of their situation and coping resources, rather than an objective measure of stressful life events (Lazarus and Folkman, 1984). This scale, which focuses on common ways in which stress is experienced rather than measuring stressful life events, demonstrates strong reliability and validity (Cohen et al., 1983; Lee, 2012). It is also the most commonly used scale to measure stress in the research on mindfulness interventions where stress is the outcome of interest (Janssen et al., 2018; Jayawardene, et al., 2017; Sharma & Rush, 2014). Of relevance to this project, the most common cohort in research studies of the validity and reliability of the PSS scale, is college students (Lee, 2012; Roberti et al., 2011). In a recent systematic literature review, the 10-item PSS was found to be superior in its psychometric properties over the original 14-item PSS (Lee, 2012; Roberti et al., 2011) and therefore, it was selected for this project (See Appendix H). The scale can be used without permission for nonprofit purposes (American Sociological Association,

2019), and was transcribed for this project within SoGoSurvey©, a cloud-based platform for designing and analyzing surveys and assessments (SoGoSurvey©, 2020).

2) *Five Facet Mindfulness Questionnaire (FFMQ)* (Baer et al., 2008; Baer, n.d.):

This is a self-report scale that measures various facets of mindfulness, namely “observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience” (Baer et al., 2008). It is considered a synthesis of several of the most widely used mindfulness scales, based on a factor analysis of each (Janssen et al., 2018). It demonstrates strong reliability (Gu et al., 2016), and in a recent systematic review of instruments to measure mindfulness, the FFMQ was found to have the highest ratings in terms of “internal consistency and construct validation by hypothesis testing” (Park, Reilly-Spong, & Gross, 2013). Because the FFMQ measures 5 subscales rather than the more “one-dimensional,” yet frequently used Mindfulness Attention Awareness Scale (MAAS), it is more likely to detect growth in mindfulness especially if growth is experienced in some aspects of mindfulness, but not all.

Using the FFMQ, the author of this project was able to detect a statistical difference in mindfulness, broken down by the five dimensions of this scale. The MAAS is also thought to be a better measure of trait mindfulness (a general disposition and habit) than state mindfulness (Bamber & Schneider, 2016), and in this short experience with mindfulness, the students are unlikely to experience a significant change in trait mindfulness. The FFMQ is a 39-item scale, although a shorter 15-item scale has been studied in a population of individuals with recurrent depression with good convergent validity (Gu et al., 2016). The shorter version was also used by Baer et al. (2012) in a stress-reduction study, in order to reduce participant burden. They found that internal

consistency between the subscales was adequate despite the abbreviation of items (alpha ranging from .80 to .85). Although the full, 39-item scale has been used more widely in research studies (Medvedev et al., 2018), paired with the PSS-10, it is very tedious and lengthy. Also, this pretest took place on students' orientation day to the program, and although this was in the morning, students find it to be an overwhelming and long day. Thus, the 15-item FFMQ was used (See Appendix I). This author contacted Ruth Baer, creator of this tool, who confirmed that use of the tool is free (R. Baer, personal communication, February 19, 2019).

3) *Survey*: A survey collected additional information post-intervention such as age, gender, level of adherence, challenges with adherence or meditations, value of group learning and facilitator support, attitudes regarding mindfulness, and comments regarding feasibility of this project for the future (See Appendix J).

### ***Check: Data Collection Procedures***

The data collection was undertaken as follows: During the introductory session, the students were directed to a link to SoGoSurvey©, where they read an information letter about this project, and then had the opportunity to give or withhold consent to the data being used for the purposes of this project. They created a unique identifier, in order to make it impossible to match any data to any specific student, or to know who consented to the data being used for this project, and who did not. They then completed the pretest, which consisted of two scales (PSS-10 and FFMQ-15).

Anyone who missed this session was provided this link to SoGoSurvey© through a Blackboard announcement. Then, students began the intervention, and engaged in it for five weeks. At the end of five weeks, students met face-to-face again, had a debriefing session and

completed the posttest scales, as well as the survey, using a SoGoSurvey© link again. Four weeks later, students were prompted to complete the follow-up measurements (PSS-10 and FFMQ-15), using a link provided on Blackboard.

Each student's score for the PSS-10 and the FFMQ-15 were calculated automatically by SoGoSurvey©, based on proper coding of each question by the author according to each tool's scoring system. An excel spreadsheet was used to calculate the scores for each of the five facets of the FFMQ-15.

***Check: Data Analysis***

Only data for those students who gave consent were used for statistical analysis for this project. A series of random intercept linear regression models were run, using the statistical tool STATA (StataCorp, 2019), as follows:

- 1) To understand changes in stress and mindfulness over time, pre- and post-intervention, and at follow-up: time was the independent variable and dependent variables are PSS-10, FFMQ-15, and each of the five FFMQ facets of mindfulness.
- 2) To understand to whether the intervention has a stronger impact for certain adherence levels: Added adherence as an independent variable to each of the models above.
- 3) To understand whether the intervention has a stronger impact for certain gender or age groups: Created an interaction term between time and the independent variables of gender and age.

In addition, a correlation model was run:

- 4) To determine the strength of the correlation between the change in stress and the change in mindfulness from pretest to posttest.

Lastly, the data regarding student satisfaction and future feasibility was organized and presented using bar graphs as appropriate.

### ***Act***

Results were shared in aggregate form with the students via Blackboard. The results were also shared with the Associate Dean, the Chair of the BScN program, the faculty in the nursing department, and the counseling department. This project will also be shared at several upcoming nursing conferences and scholarship days, in face-to-face as well as virtual formats. Feedback has resulted in incorporation of this intervention into this course for the foreseeable future, with some adjustments in the length and timing of the intervention (see *Discussion*).

### **Results**

The recruitment session took place in person during the orientation day of the fall term, 2019. The students who participated were 75% female (n=45) and the majority were in the 20-30 years of age category (n=44), with the remainder aged 31-50 (n=16). Students self-reported their adherence level, and although this was a mandatory exercise in the course, the anonymous nature of the survey allowed students more freedom to report honestly. Twenty-eight percent of students reported completing  $\leq 20$  sessions (n=17), and 72% completed  $\geq 21$  sessions (n=43) (See Table 1).



**Table 1***Sample characteristics*

Characteristic	Percentage	n
Age		
20-30	73%	44
31-50	27%	16
Gender		
Male	22%	13
Female	75%	45
Prefer not to say	3%	2
Adherence level		
≤20 sessions	28	17
≥21 sessions	72	43

Note: Total sample n=60

The pretest data was collected at the recruitment session, which included measurement of both stress (PSS-10) and mindfulness (FFMQ-15). Mean pretest PSS-10 scores were high ( $M=20.42$ ,  $SD=5.42$ ) as compared with norms according to a US poll (Cohen & Williamson, 1988; see Discussion). FFMQ-15 scores were similar to pre-intervention scores found by Gu et al. (2016) in their research on the FFMQ-15 ( $M=47.6$ ,  $SD=7.48$ ) (See Table 2). In the Q&A period, several students expressed excitement about learning this skill, and noted that they never had the opportunity to learn a self-care skill for stress reduction in their nursing education to date. The students then engaged in the intervention as part of their course requirements, blogging weekly in response to reflective questions (see Appendix G).

**Table 2**

*Pretest scores for PSS-10<sup>a</sup> and FFMQ-15<sup>b</sup>*

Outcome Measure	Mean	SD
PSS-10	20.42	5.42
FFMQ-15	47.6	7.48

<sup>a</sup>PSS-10 = Perceived Stress Scale, 10 items

<sup>b</sup>FFMQ-15 = Five Facet Mindfulness Questionnaire, 15 items

The posttest data was collected at the debriefing session, which took place after the 5-week online intervention. The posttest included an additional survey, which collected information re: age, gender, adherence, and satisfaction with the experience, including some open-ended questions. There were 60 students (n=60) who participated in both the pretest and the posttest, consented to the use of their data for this project, and whose unique identifiers matched<sup>2</sup>. Follow-up was then conducted 4 weeks later, measuring stress and mindfulness, using a link provided on Blackboard, and 29 students participated (n=29).

Using random intercept linear regression models, changes in stress and mindfulness between pretest, posttest, and follow-up were analyzed using time as the independent variable. Although mean stress scores lowered, the change was not statistically significant, either at

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<sup>2</sup> Note: There was significant attrition in usable data due to duplicate unique identifiers, and unique identifiers that didn't match between pretest, posttest, and follow-up. The students were asked to create a 4-digit unique identifier, starting with the first two letters of their mother's first name, and the last two numbers of their mother's date of birth. It is possible that students were confused or unclear re: the instructions or their mother's year of birth or other factors. The loss of data due to these factors was n=34. Sending each student their own link to the survey would be preferable in future, or a dual method of identifying/matching students while maintaining anonymity.

posttest ( $M=-1.02$ ,  $SE=.805$ ,  $p=.207$ ) or follow-up<sup>3</sup> ( $M=-1.448$ ,  $SE=1.193$ ,  $p=.225$ ) (see Table 3).

The increase in mindfulness, however, was significant at posttest ( $M=3$ ,  $SE=.846$ ,  $p=.000$ ) and was maintained at follow-up ( $M=3.034$ ,  $SE=1.209$ ,  $p=.012$ ). In particular, the facets of mindfulness which increased most notably at posttest were “describing,” “acting with awareness,” and “non-judging,” and at follow-up, the “acting with awareness” and “non-judging” facets remained elevated (See Table 3).

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<sup>3</sup> Note that for greater accuracy in understanding change at follow-up, scores are reported from models which compared the 29 participants who completed follow-up with the same 29 participants at pretest, not the entire sample.

**Table 3**

*Change in stress and mindfulness after intervention*

Outcome measure	Time	Model 1 <sup>c</sup>		Model 2 <sup>d</sup>	
		$\beta$	SE	$\beta$	SE
PSS-10 <sup>a</sup>	Posttest	-1.02	.805	-1.414	1.193
	Follow-up	-1.247	1.04	-1.448	1.193
FFMQ-15 <sup>b</sup> (total)	Posttest	3***	.846	2.621*	1.209
	Follow-up	3.331**	1.112	3.034**	1.209
Observing	Posttest	.35	.294	.345	.405
	Follow-up	.547	.384	.621	.405
Describing	Posttest	.717**	.244	.793*	.377
	Follow-up	.490	.324	.517	.377
Acting with awareness	Posttest	.717†	.286	.552	.433
	Follow-up	.793†	.373	.621	.433
Non-judging	Posttest	1.083***	.280	.724†	.411
	Follow-up	.978**	.368	.724†	.411
Non-reactivity	Posttest	.1333	.252	.207	.366
	Follow-up	.516	.328	.552	.366

Note: Expected result of the intervention is a decrease (negative value) in  $\beta$  for the PSS-10 score and an increase (positive value) for the FFMQ-15 scores.

<sup>a</sup>PSS-10 = Perceived Stress Scale, 10 items

<sup>b</sup>FFMQ-15 = Five Facet Mindfulness Questionnaire, 15 items

<sup>c</sup>Model 1 compared 60 pretest participants, 60 posttest participants, and 29 follow-up participants

<sup>d</sup>Model 2 compared 29 pretest participants, 29 posttest participants, and 29 follow-up participants.

† $p \leq .10$ . \* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$

When comparing those who were strongly adherent ( $\geq 21$  sessions) and those who were weakly adherent ( $\leq 20$  sessions) with pretest scores, a significant difference in both stress and mindfulness was noted at posttest for those who were strongly adherent but not for those who were weakly adherent. The decrease in stress for the strongly adherent was mildly significant at the  $p \leq .10$  level ( $M = -1.678$ ,  $SE = .944$ ,  $p = .075$ ), and the decrease in mindfulness for the strongly adherent was highly significant at the  $p \leq .001$  level ( $M = 3.752$ ,  $SE = 1.044$ ,  $p = .000$ ) (See Table 4). This breakdown of the sample by adherence level was not done at follow-up due to the smaller sample size.

**Table 4**

*Difference in stress and mindfulness at posttest, by adherence level*

Outcome measure	Adherence level	$\beta$	SE
PSS-10 <sup>a</sup>	$\leq 20$ sessions	.656	1.342
	$\geq 21$ sessions	-1.678 <sup>†</sup>	.944
FFMQ-15 <sup>b</sup> (total)	$\leq 20$ sessions	1.098	1.553
	$\geq 21$ sessions	3.752***	1.044
Observing	$\leq 20$ sessions	.532	.513
	$\geq 21$ sessions	.278	.349
Describing	$\leq 20$ sessions	.727	.461
	$\geq 21$ sessions	.713*	.302
Acting with awareness	$\leq 20$ sessions	.079	.496
	$\geq 21$ sessions	.968**	.338
Non-judging	$\leq 20$ sessions	.289	.499
	$\geq 21$ sessions	1.40***	.331
Non-reactivity	$\leq 20$ sessions	-.203	.436
	$\geq 21$ sessions	.267	.295

Note: Expected result of the intervention is a decrease (negative value) in  $\beta$  for the PSS-10 score and an increase (positive value) for the FFMQ-15 scores.

<sup>a</sup>PSS-10 = Perceived Stress Scale, 10 items

<sup>b</sup>FFMQ-15 = Five Facet Mindfulness Questionnaire, 15 items

<sup>†</sup> $p \leq .10$ . \* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$

Age and gender played an inconsistent role on the outcome variables. Stress decreased more for the older participants than for younger participants, and this was mildly statistically significant ( $M=-3.278$ ,  $SE=1.897$ ,  $p=.084$ ) (See Table 5). There were no significant differences

in the change in mindfulness between the two age categories as compared with pretest (See Table 6). Although pretest stress was significantly higher for females than males ( $M=3.045$ ,  $SE=1.510$ ,  $p=.044$ ), gender did not have a statistically significant effect on the change in stress or mindfulness from pretest to posttest (see Table 5 and 6). Follow-up data was not analyzed with age or gender as interaction variables because the sample size was not sufficient to yield meaningful data.

**Table 5**

*Influence of age and gender on stress*

Interaction variables on PSS-10 <sup>a</sup>	$\beta$	SE
post	.399	1.848
age 31-50 (ref: age 20-30)	1.25	1.503
female (ref: male)	3.045*	1.510
age 31-50*post	-3.278†	1.897
female*post	-.662	1.905
constant	17.591***	1.456

<sup>a</sup>PSS-10 = Perceived Stress Scale, 10 items

† $p \leq .10$ . \* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$

**Table 6**

*Influence of age and gender on mindfulness*

Interaction variables on FFMQ-15 <sup>a</sup>	$\beta$	SE
post	2.992	2.016
age 31-50 (ref: age 20-30)	2.858	2.009
female (ref: male)	-1.329	2.017
age 31-50*post	1.892	2.080
female*post	-.762	2.090
constant	47.826***	1.946

<sup>a</sup>FFMQ-15 = Five Facet Mindfulness Questionnaire, 15 items

†p ≤ .10. \*p ≤ .05. \*\*p ≤ .01. \*\*\*p ≤ .001

Overall, PSS-10 scores did not decrease significantly, but it is important to note that there was a statistically significant negative correlation between the change observed in stress and mindfulness. The strength of this correlation was moderate (-0.572, p≤.0001). Larger increases in mindfulness were associated with larger decreases in stress.

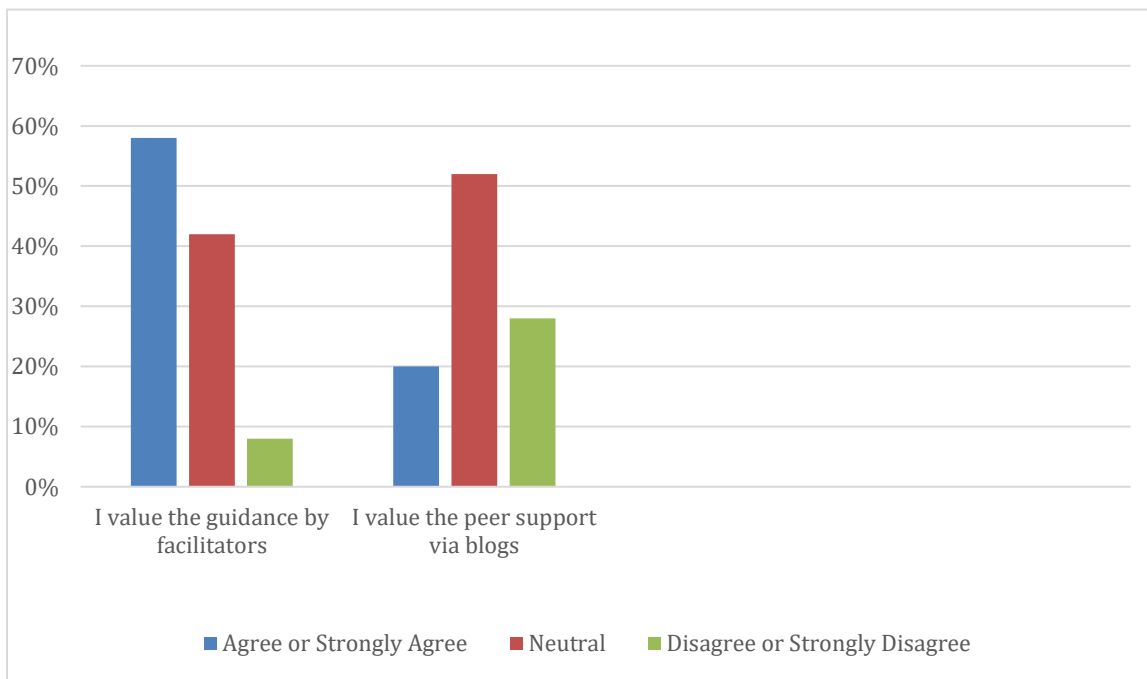
Students were also surveyed regarding whether the support provided by the project author and mindfulness expert through announcements and interaction on the discussion board were useful in staying on track and feeling engaged in the process. Fifty-eight percent (58%) selected “agree” or “strongly agree.” Students were also surveyed regarding how much they valued the aspect of group learning, namely the ability to read each other’s blog posts and comment on each other’s posts. Only 20% indicated by selecting “agree” or “strongly agree” that they value this element (See Figure 1). When asked about satisfaction with the self-care skill of mindfulness,



58% indicated they now value mindfulness, 53% indicated they are likely to share it with a colleague in future, and 60% indicated they are likely to share it with a client in future (See Figure 2).

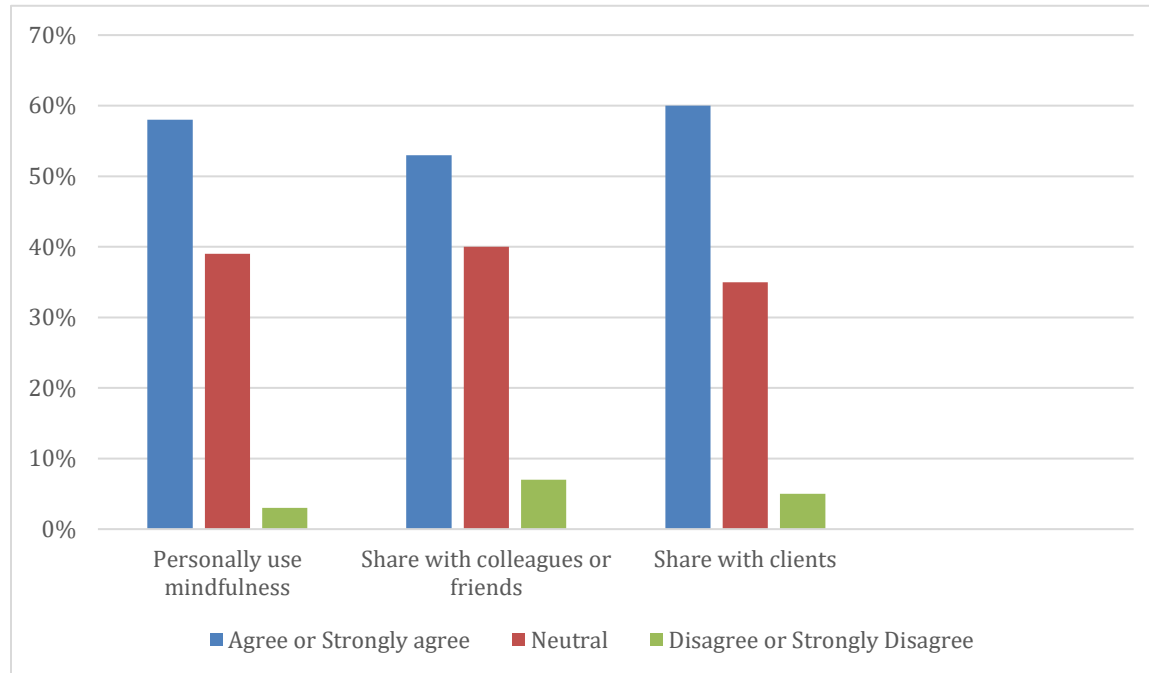
**Figure 1**

*Participants' appreciation of guidance and peer support*



**Figure 2**

*Participants' likelihood to use mindfulness*



Open-ended questions on the survey yielded qualitative data regarding challenges and facilitators that students experienced while engaging in this online intervention. These were categorized into themes, and included time management (40%), focusing/concentrating while doing the meditations (37%), and lack of motivation (8%). Much less frequent barriers included the mandatory element, and upsetting thoughts experienced while meditating. Facilitators were also categorized into themes, and included external motivation (needing to meditate to be get the marks and complete the blogs – 27%), internal motivation (feeling like it is helping – 15%), and, most notably, reminders/time management strategies such as alarms/calendar alerts or notifications from the apps (40%). Two students mentioned wanting more peer support, either in the form of doing it with a friend or in a group setting.

### Discussion

This abbreviated online educational mindfulness intervention successfully engaged nursing students in practicing a self-care skill over a 5-week period. The program was designed to include guidance from the project author as well as a counselor, and interaction between students, based on principles of experiential learning. This pilot demonstrated a significant increase in mindfulness at posttest and follow-up. Perceived stress scores did decrease, but the sample may have been too small to reach statistical significance. However, the negative statistically significant correlation between mindfulness and stress was as expected according to the theory of cognitive reappraisal. The attentional broadening experienced as a result of greater mindfulness *was* associated with a decrease in stress in this sample.

The results of the linear regression model with the interaction of adherence suggests that the intervention may have been too abbreviated to demonstrate a significant decrease in stress. Those with higher levels of adherence did experience a greater decrease in stress and a greater increase in mindfulness. Therefore, although the literature review supported an abbreviated mindfulness-based intervention of 4-8 weeks, this 5-week intervention may be slightly too short.

The baseline higher-than-normal stress scores in this sample may also point to the need for a more sustained intervention. There is no guide for cut-off scoring for the PSS-10, but norms for healthy adults of various ages are reported to range from a mean of 11.9 (SD=6.9; age 55-64 years) to 14.2 (SD=6.2; age 18-29 years), with females at the higher end of this range at a mean of 13.7 (SD=6.6) (Cohen & Williamson, 1988). These nursing students' pre-test mean at 20.42 (SD=5.42) indicates a significantly more stressed population which may require a higher dose of the intervention to demonstrate more significant reduction in stress.

A history bias, in which other factors may be contributing to a change in the outcome measure other than the intervention (Knapp, 2016), likely masked some of the results on stress in this pilot study. Pretest occurred on the first day of classes, right after summer vacation. Posttest occurred five weeks into the semester, and follow-up was 9 weeks into the semester, both much more stressful points in the semester for students than the first day of classes. It is hypothesized that stress scores could have increased, perhaps significantly so, in the absence of this intervention. A design with randomization to an intervention or control group would best mitigate this bias in a future study and allow greater understanding of the effect of this intervention on nursing students' stress.

The increase in mindfulness was observed mainly in the facets of “describing”, “acting with awareness”, and “non-judging.” There were no significant changes in “non-reactivity” or “observing.” “Non-reactivity” may be more associated with trait mindfulness rather than state mindfulness, and state mindfulness is unlikely to shift appreciably after a short intervention (Bamber & Schneider, 2016). Many studies indicate that the construct validity of the “observing” facet is weakest, and some suggest ignoring it or even removing it from FFMQ scores (Baer et al., 2006).

Older students responded more to the intervention with decreased stress and increased mindfulness. This may be due to increased capacity for reflection and metacognition with respect to coping with stress. Reflection and metacognition are key elements of experiential learning, specifically the phases of reflective observation and abstract conceptualization (Kolb, 1984). Younger students may need more guidance to draw on life experiences, increase their self-awareness, and conceptualize the ways in which mindfulness affects their thought processes and emotions.

Students' blogs were replete with appreciation for this skill, and amazement at the effects students notice on their mindset, ability to cope with stress, self-efficacy, ability to accept others and deal with conflict, and overall mood and outlook. Despite this, satisfaction scores on the survey were good but not as high as expected. Based on the open-ended qualitative data, this is likely due to the commonly faced challenges such as finding time for one more thing, and difficulty concentrating on the meditation due to mental and environmental distractions. Many students admitted they would not have made time to learn this skill if it had not been mandatory. The lack of willingness to make time for learning stress-reducing strategies amongst individuals who are already feeling stressed is a common barrier to self-care. Based on blogs and survey results, students essentially fell into 3 groups: those who did the meditations because it was required and for whom this obligatory element overshadowed any benefits; those who absolutely loved this experience, told others about it, and hope/intend to continue; and those who started unenthusiastically or cynically, but along the way found it surprisingly beneficial. More research is needed to understand factors that affect individuals' openness to and likelihood to benefit from this self-care skill.

The cost of untreated stress in students and amongst nurses in the workplace is nearly impossible to measure. However, many of the sequelae of stress are very costly - most notably burnout, resulting absenteeism, decreased work productivity and quality including dangerous medication errors, and attrition from nursing programs and from the nursing profession (Burton et al., 2016; Heber et al., 2017; Li et al., 2017; Lo et al., 2018). One meta-analysis estimates the costs of poor health outcomes that are related to workplace stress at 5-8% of total healthcare spending (Goh, Pfeffer, & Zenios, 2015).

Of course, the contributors to these poor health outcomes are multifaceted but stress is a significant contributor. Looking at costs from another angle, the 2016 National Healthcare Retention & RN Staffing Report cites costs for turnover of one nurse at \$38,000 to \$61,000. An average hospital spends \$4.4 to \$7 million annually in nurse turnover costs (University of New Mexico, 2016). Preventable medication errors in the US cost \$2.7 to \$5.1 billion annually (Lahue, Pyenson, Iwasaki, Blumen, Forray & Rothschild., 2012).

Amongst students, the sequelae of stress include poor performance and attrition from the program. Attrition from BScN nursing programs in the US is approximately 50%, with higher rates amongst minority students and students with economic hardship, who are working more than 16 hours per week (Harris, Rosenberg, & O'Rourke, 2014). Training new nurses, including diverse nurses, is imperative to meet the demands of the changing population. While it may not be possible to place a dollar value on losing these students to the profession, it is clear that failing to address the extreme stress that student nurses experience is sabotaging efforts to address the nursing shortage by training new nurses.

The costs of this project were also difficult to measure but were estimated at approximately \$4045.00, and included the time commitment by the project author, a research assistant, and other support persons, and some minor expenses (See Appendix K). Thus, a cost-benefit analysis demonstrates this intervention as preventative of many negative and costly outcomes, thus clearly cost-effective.

### **Conclusion**

Nursing students urgently require skills in self-care to effectively cope with the high levels of stress that are inherent in both the student experience and the nursing profession. This report evaluates a pilot educational mindfulness intervention, which was delivered online at a

community college in Ontario, Canada for undergraduate nursing students in a bridging program from RPN to RN.

Using principles of experiential learning, students practiced this skill and received guidance and peer support throughout the intervention. The reappraisal of stress as a result of the attentional broadening afforded by the mindfulness practice was evidenced in the results. The intervention effectively increased mindfulness and this was correlated with a decrease in stress, mirroring the results of current research. Although the decrease in stress was not as marked as expected, some factors in the design could be modified to improve the intervention's effectiveness.

This intervention is highly feasible compared with traditional delivery of MBSR. This project can be replicated easily in other nursing schools by including this experiential learning intervention as one part of a course. It fits especially well in a course which focuses on the nurse-client therapeutic relationship, since the therapeutic use of self requires the nurse to have effective stress management self-care skills. It could alternatively be placed in a course that covers role transition or socialization into the nursing profession. This project will be repeated with some minor changes in the coming year within the same program and course, and the intention is to keep it permanently in this course, so that all nursing students in this program will be equipped with an evidence-based self-care skill that will serve them throughout their student years and nursing career.

### References

American Sociological Association. (2019). ASA Permission Guidelines.

<http://www.asanet.org/research-and-publications/journal-resources/reprint-permissions>

Baer, R.A. (n.d.) Five facet mindfulness questionnaire (FFMQ) [PDF document].

<http://www.ruthbaer.com/academics/FFMQ.pdf>

Baer, R.A., Carmody, J., & Hunsinger, M. (2012). Weekly change in mindfulness and perceived stress in a mindfulness-based reduction program. *Journal of Clinical Psychology, 68*(7), 755-765. doi:10.1002/jclp.21865

Baer, R.A., Smith, G.T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J.M.G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329-342. doi: 10.1177/1073191107313003

Bamber, M., & Schneider, J. (2016). Mindfulness-based meditation to decrease stress and anxiety in college students: A narrative synthesis of the research. *Educational Research Review, 18*, 1-32. doi: 10.1016/j.edurev.2015.12.004

Beck, C.T. (2011). Secondary traumatic stress in nurses: A systematic review [Abstract]. *Archives of Psychiatric Nursing, 25*(1), 1-10. doi: 10.1016/j.apnu.2010.05.005

Boettcher, J., Åström, V., Pahlsson, D., Schenström, O., Andersson, G., & Carlbring, P. (2014). Internet-based mindfulness treatment for anxiety disorders: A randomized controlled trial. *Behaviour Therapy, 45*(2), 241-253. doi: 10.1016/j.beth/2013/11/003

Burton, A., Burgess, C., Dean, S., Koutsopoulou, G.Z., & Hugh-Jones, S. (2017). How effective are mindfulness-based interventions for reducing stress among healthcare professionals?



- A systematic review and meta-analysis. *Stress and Health*, 33, 3-13. doi: 10.1002/smi.2673
- Carleton College (2018). *Service-learning and experiential education*.  
<https://serc.carleton.edu/introgeo/service/experiential.html>.
- Cavanagh, K., Strauss, C., Forder, L., & Jones, F. (2014). Can mindfulness and acceptance be learnt by self-help? A systematic review and meta-analysis of mindfulness and acceptance-based self-help interventions. *Clinical Psychology Review*, 34, 118-129. Doi: 10.1016/j.cpr.2014.01.001
- Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *Journal of Alternative and Complementary Medicine*, 15(5), 593-600. doi: 10.1089/acm.2008.0495
- Chrousos, G.P., Loriaux, D.L., & Gold, P.W. (1988). *Mechanisms of physical and emotional stress*. New York: Springer US
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behaviour*, 24(4), 385-396. doi: 10.2307/2136404
- Cohen, S., Kessler, R.C., & Gordon, L.U. (Eds.). (1997). *Measuring stress: A guide for health and social scientists*. New York: Oxford University Press
- Cohen, S., & Williamson, G. Perceived stress in a probability sample of the United States. In S. Spacapan and S. Oskamp (Eds). *The Social Psychology of Health* (p. 31-67). Sage, Newbury Park, CA
- Creswell, J.D. (2017). Mindfulness Interventions. *Annual Review of Psychology*, 68, 491-516. doi: 10.1146/annurev-psych-042716-051139

- Garland, E., Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore (NY)*, 5(1), 37-44. doi: 10.1016/j.explore.2008.10.001
- Gilmartin, H., Goyal, A., Hamati, M.C., Mann, J., Saint, S., & Chopra, V. (2017). Brief mindfulness practices for healthcare providers- A systematic literature review. *J Med Internet Res.*, 19(2). doi: 10.2196/jmir.5774
- Goh, J., Pfeffer, J., & Zenios, S.A. (2015). The relationship between workplace stressors and mortality and health costs in the United States. *Management Science*, 62(2), 303-306. doi: 10.1287/mnsc.2014.2115
- Gu, J., Strauss, C., Crane, C., Barnhofer, T., Karl, A., Cavanagh, K., & Kuyken, W. (2016). Examining the factor structure of the 39-item and 15-item versions of the five facet mindfulness questionnaire before and after mindfulness-based cognitive therapy for people with recurrent depression. *Psychological Assessment*, 28(7), 791-802. doi: 10.1037/pas0000263
- Hanley, A.W., Palejwala, M.H., Hanley, R.T., Canto, A.I., & Garland, E.L. (2015). A failure in mind: Dispositional mindfulness and positive reappraisal as predictors of academic self-efficacy following failure. *Personality and Individual Differences*, 86, 332-337. doi: 10.1016/j.paid.2015.06.033
- Harris, R.C., Rosenberg, L., & O'Rourke, G. (2014). Addressing the challenges of nursing student attrition. *Journal of Nursing Education*, 53(1), 31-37. doi: 10.3928/01484834-03
- Heber, E., Ebert, D.D., Lehr, D., Cuijpers, P., Berking, M., Nobis, S., & Riper, H. (2017). The benefit of web- and computer- based interventions for stress: A systematic review and meta-analysis. *Journal of Medical Internet Research*, 19(2). doi: 10.2196/jmir.5774

- Hinderer, K.A., VonRueden, K.T., Friedmann, E., McQuillan, K.A., Gilmore, R., Kramer, B., & Murray, M. (2014). Burnout, compassion fatigue, compassion satisfaction, and secondary traumatic stress in trauma nurses. *Journal of Trauma Nursing, 21*(4), 160-169. doi: 10.1097/JTN.0000000000000055
- Janssen, M., Heerkens, Y., Kuijer, W., van der Heijden, B., & Engels, J. (2018). Effects of mindfulness-based stress reduction on employees' mental health: A systematic review. *PLOS One, 13*(1). doi: 10.1371/journal.pone.0191332
- Jayawardene, W.P., Lohrmann, D.K., Erbe, R.G., Torabi, M.R. (2017). Effects of preventive online mindfulness interventions on stress and mindfulness: A meta-analysis of randomized controlled trials. *Preventive Medicine Reports, 5*, 150-159. doi: 10.1016/j.pmedr.2016.11.013
- Kabat-Zinn, J. (2006). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10*(2), doi: 10.1093/clipsy.bpg016
- Khamisa, N., Peltzer, K., Ilic, D., & Oldenburg, B. (2016). Work related stress, burnout, job satisfaction and general health of nurses: A follow-up study. *International Journal of Nursing Practice, 22*(6), 538-545. <https://onlinelibrary-wiley-com.silk.library.umass.edu/doi/full/10.1111/ijn.12455>.
- Knapp, T. (2016). Why is the one-group pretest-posttest design still used? *Clinical Nursing Research, 25*(5). <https://doi.org/10.1177/1054773816666280>
- Kolb, D. (1993). The process of experiential learning. In Thorpe, M., Edwards, R., & Hanson, A. (Eds). *Culture and processes of adult learning* (p. 138-156). <https://www.learn.ed.ac.uk/bbcswebdav/courses/MEED110132016-7SV1SEM1/kolb.pdf>.

Lahue, B.J., Pyenson, B., Iwasaki, K., Blumen, H.E., Forray, S., & Rothschild, J.M. (2012).

National burden of preventable adverse drug events associated with inpatient injectable medications: Healthcare and medical professional liability costs. *American Health and Drug Benefits*, 5(7), 1-10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4031698/>

Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Pub Co.

Lee, E.H. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian Nursing Research*, 6(4), 121-127. doi: 10.1016/j.anr.2012.08.004

Li, C., Yin, H., Zhao, J., Shang, B., Hu, M., Zhang, P., & Chen, L. (2018). Interventions to promote mental health in nursing students: A systematic review and meta-analysis of randomized controlled trials. *Journal of Advanced Nursing*, 74(12), 2727–2741. doi: 10.1111/jan.13808

Lo, K., Waterland, J., Todd, P., Gupta, T., Bearman, M., Hased, C., & Keating, J.L. (2018). Group interventions to promote mental health in health professional education: A systematic review and meta-analysis of randomised controlled trials. *Advances in Health Science Education*, 23, 413-447. doi: 10.1007/s10459-017-9770-5

Lundenberg, U.F. (2005). Stress hormones in health and illness: The roles of work and gender. *Psychoneuroendocrinology*, 30(10), 1017-1021. doi: 10.1016/j.psyneuen.2005.03.014

Matthieu, M.M., & Ivanoff, A. (2006). Using stress, appraisal, and coping theories in clinical practice: Assessments of coping strategies after disasters. *Brief Treatment and Crisis Intervention*, 6(4), 337-348. doi: 10.1093/brief-treatment/mhl009

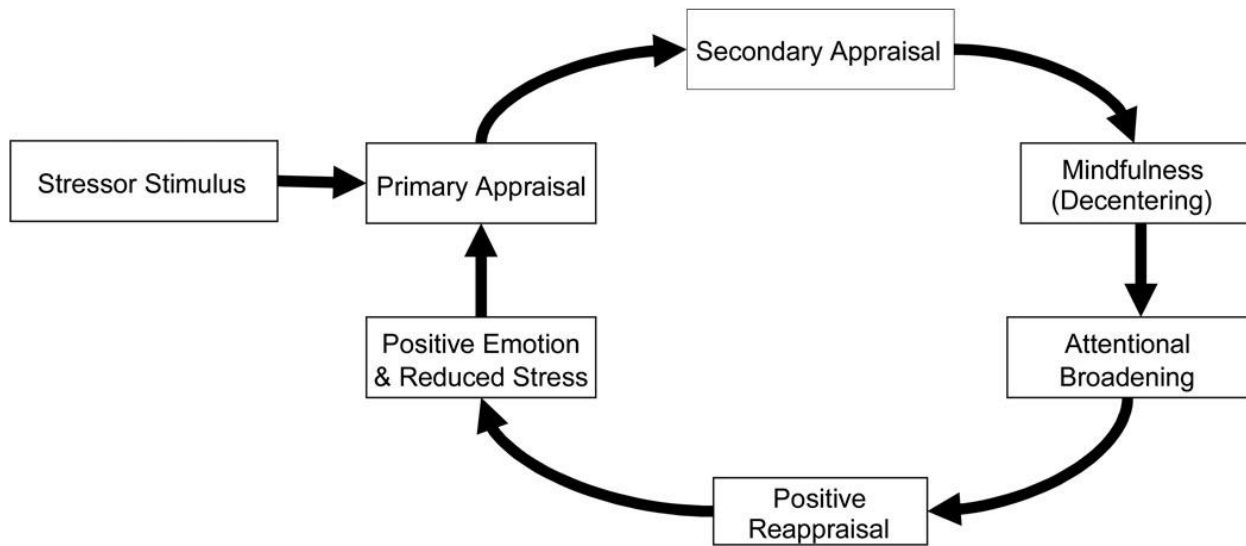
- Ma, Y., She, Z., Fung-Ying Siu, A., Zeng, X., & Liu, X. (2018). Effectiveness of online mindfulness-based interventions on psychological distress and the mediating role of emotion regulation. *Frontiers in Psychology, 9*. doi: 10.3889/fpsyg.2018.02090
- Medvedev, O.N., Titkova, E.A., Siegert, R.J., Hwang, Y.S., & Krägeloh, C.U. (2018). Evaluating short versions of the five facet mindfulness questionnaire using Rasch analysis. *Mindfulness, 9*(5), 1411-1422
- Mind Tools.(2019). Plan-Do-Check-Act (PDCA).  
[https://www.mindtools.com/pages/article/newPPM\\_89.htm](https://www.mindtools.com/pages/article/newPPM_89.htm)
- NSI Nursing Solutions. (2018). 2018 National Health Care Retention and RN Staffing Report.  
<http://www.nsinursingsolutions.com/files/assets/library/retention-institute/nationalhealthcarernretentionreport2018.pdf>
- NSSE. (2019). Survey Incentive FAQ. [http://nsse.indiana.edu/html/survey\\_incentive\\_FAQ.cfm](http://nsse.indiana.edu/html/survey_incentive_FAQ.cfm)
- Park, T., Reilly-Spong, M., & Gross, C.R. (2013). Mindfulness: A systematic review of instruments to measure an emergent patient reported outcome (PRO). *Quality of Life Research, 22*(10). doi: 10.1007/s11136-013-0395-8
- Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of Affective Disorders, 148*(1), 1-11. doi: 10.1016/j.jad.2012.11.026
- Roberti, J.W., Harrington, L.N., & Storch, E.A. (2011). Further psychometric support for the 10-item version of the perceived stress scale. *Journal of College Counselling, 9*(2). doi: 10.1002/j.2161-1882.2006.tb00100.x
- Rogers, C.R. (1961). *On becoming a person: A therapist's view of psychotherapy*. Boston: Houghton Mifflin Co.

- Rudman, A., & Gustavsson, J.P. (2012). Burnout during nursing education predicts lower occupational preparedness and future clinical performance: A longitudinal study. *International Journal of Nursing Studies*, 49(8), 988-1001. doi: 10.1016/j.ijnurstu.2012.03.010
- Schneiderman, N., Ironson, G., & Siegel, S.D. (2005). Stress and health: Psychological, behavioural, and biological determinants. *Annual Review of Clinical Psychology*, 1(1), 607-628. doi: 10.1146/annurev.clinpsy.1.102803.144141
- Schwartz, M. (2012). *Best practices in experiential learning*. <https://www.ryerson.ca/content/dam/lt/resources/handouts/ExperientialLearningReport.pdf>.
- Shapiro, S.L., Carlson, L.E., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 373-386. doi: 10.1002/jclp.20237
- Sharma, M., & Rush, S.E. (2014). Mindfulness-based stress reduction as a stress management intervention for healthy individuals: A systematic review. *Journal of Evidence-Based Complementary and Alternative Medicine*, 19(4), 271-286. Doi: 10.1177/2156587214543143
- Shea, B., Reeves, B., Wells, G., Thuku, M., Hamel, C., Moran, J...Henry, D. (2017). AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*, 358, j4008. doi: <https://doi.org/10.1136/bmj.j4008>
- SoGoSurvey© (2020). SoGoSurvey. <https://www.SoGoSurvey.com/>.
- Spijkerman, M., Pots, W., & Bohlmeijer, E. (2016). Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta-analysis of randomised

- controlled trials. *Clinical Psychology Review*, 45, 102-114. doi: 10.1016/j.cpr.2016.03.009
- StataCorp (2019). *Stata Statistical Software: Release 16*. College Station, TX: StataCorp, LLC.
- Takeuchi, H., Taki, Y., Sassa, Y., Hashizume, H., Sekiguchi, A., Fukushima, A., & Kawashima, R. (2010). Regional gray matter associated with emotional intelligence: Evidence from voxel-based morphometry. *Human Brain Mapping*, 32(9). doi: 10.1002/hbm.21122
- Troy, A.S., Wilhelm, F.H., Shallcross, A.J., & Mauss, I.B. (2010). Seeing the silver lining: Cognitive reappraisal ability moderates the relationship between stress and depressive symptoms. *Emotion*, 10(6), 783-795. doi: 10.1037/a0020262
- University of New Mexico. (2016). The high cost of nurse turnover. <https://rnbsnonline.unm.edu/articles/high-cost-of-nurse-turnover.aspx>
- van der Riet, P., Levett-Jones, T., & Aquino-Russell, C. (2018). The effectiveness of mindfulness meditation for nurses and nursing students: An integrated literature review. *Nurse Education Today*, 65, 201-211. doi: 10.1016/j.nedt.2018.03.018
- Young, K.S., Maj van Velden, A., Craske, M.G., Pallesen, K.J., Fjorback, L., Roepstorff, A., Parsons, C.E. (2017). The impact of mindfulness-based interventions on brain activity: A systematic review of functional magnetic imaging studies. *Neuroscience and Biobehavioral Reviews*, 84, 424-433. doi: 10.1016/j.neubiorev.2017.08.003

**Appendix A**

Mindfulness and Stress Reduction through Positive Reappraisal

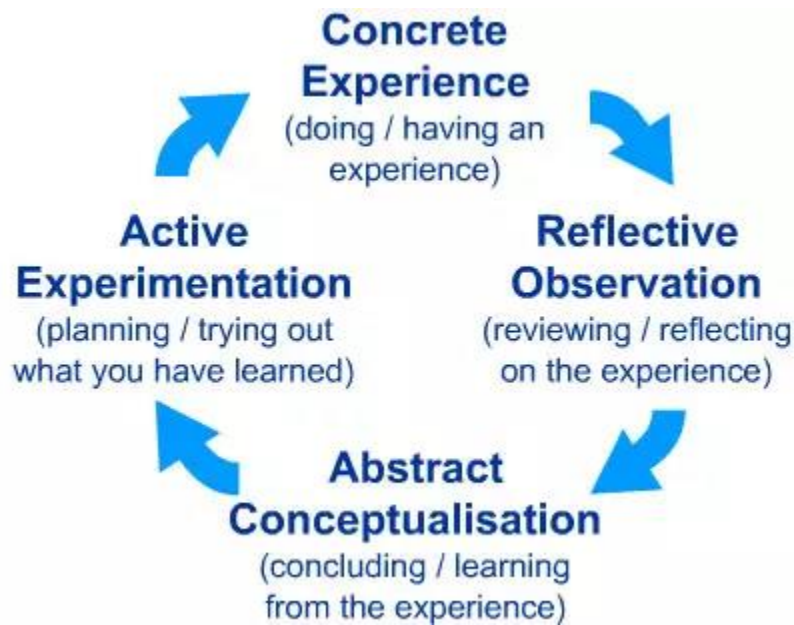


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## Appendix B

### Dimensions of Experiential Learning



Reproduced from “Kolb’s learning cycles and experiential learning cycle” by Simply Psychology, 2017, [simplypsychology.org](https://www.simplypsychology.org/learning-kolb.html). <https://www.simplypsychology.org/learning-kolb.html>. Reprinted courtesy of the Copyright Holder under a Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 Unported License CC BY-NC-ND 3.0 (<https://creativecommons.org/licenses/by-nc-nd/3.0/>).

## Appendix C

## Project Timeline

<b>Task</b>	<b>Spring/ Summer 2019</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan / Feb</b>	<b>Apr</b>
IRB approval at GBC and UMass	X						
Preparation of online modules/design in Blackboard	X						
Recruitment of eligible participants		X					
Pretest		X					
Intervention (5 weeks)		X	X				
Posttest including survey			X				
Follow-up tests				X			
Analysis of outcomes				X		X	
Results presented to student participants							X
Results presented to stakeholders							X

**Appendix D**

## Research Ethics Board Approval Letter

Applied and Institutional Research

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Research Ethics Board

June 20, 2019

Re: REB File # 6004674

Title: Evaluation of an online delivery of a Mindfulness-based Intervention for Reducing Stress amongst Undergraduate Nursing Students

Approval Date: June 5, 2019

Amendment Date: August 22, 2019

Expiry: August 28, 2020

Ethics Approval

(Amendment)

Dear Joy Garmaise,

We are writing to advise you that the Research Ethics Board (REB) has granted amendment of your approval to the above-named research study, for a period of one year.

Please note this amended approval is based on the following:

- a) Any unanticipated problems that increase risk to the participants must be reported to the REB immediately.
- b) The study is approved for one year: if needed, apply for a renewal before the expiry date.
- c) This approval is based on your original application, amendment application, and response to our clarification document.
- d) A study completion form must be submitted to the REB upon completion of the project.

The following documents have been approved for use in this study: informed consent and information letter.

Please quote your REB file number on future correspondence.

Best wishes for the successful completion of your project.

Yours sincerely,



██████████, MSc, LLB, DM

Chair, Research Ethics Board

██████████

cc: Applied and Institutional Research, ██████████

It is the responsibility of the Principal Researcher to keep the file complete and up-to-date at all times.

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<sup>4</sup> Please note that any identifying information has been blacked out in this report.

**Appendix E**

## Information Letter

[REDACTED]  
[REDACTED]  
For further information:

Primary Investigator: Joy Garmaise

Tel: [REDACTED] x3060

Email: jgarmais@[REDACTED]

Sept 1, 2019

**Evaluation of an Online Mindfulness-based Intervention for Reducing Stress amongst Undergraduate Nursing Students****Information Letter**

Dear Potential Participant,

You are invited to take part in the research translation project identified above which is being conducted by Joy Garmaise from the School of Nursing [REDACTED]. This project fulfills part of the requirements for a Doctor of Nursing Practice degree, which is a terminal degree focused on translation of research into practice.

This research translation project examines the effectiveness of an online delivery of a mindfulness-based intervention. Mindfulness is a self-care skill which has proven effectiveness in reducing stress for nursing students and health care professionals. As part of your NURS1074 course, you will be learning this skill. This project will evaluate its effectiveness in reducing stress and increasing mindfulness by measuring those outcomes before and after you learn this skill.

**Who can participate in the project?**

All students who are registered in NURS1074 are invited to participate in this project. To be clear, all students in the course will be learning the skill of mindfulness and completing course requirements related to this skill, including a pretest, posttest, and follow-up measurements of

stress and mindfulness. However, your consent is required in order for Joy Garmaise to use this data for the purposes of her Doctor of Nursing Practice project and degree requirements.

### **What choice do I have?**

Participation is **entirely voluntary**. You may withdraw at any time without any consequence whatsoever. Choosing not to give consent for Joy Garmaise to use the data for her Doctor of Nursing Practice project will not have any impact on your grade in this course.

Data will be collected using an online survey program called SoGoSurvey©. Data uploaded to SoGoSurvey© is open to access by American regulatory bodies. However, you will be using an identifier which you create, and NOT your name or other personal info. Your information will then be recoded using participant numbers only, and this information will be kept confidential. All information collected will be stored securely in [REDACTED] secure data storage system, and kept for a period of five years. At no time will any individual be identified in any reports resulting from this study. Your data cannot be deleted once entered in SoGoSurvey©, but it will not be attached to your name or any other personal identifiers. To withdraw, you simply indicate that you do not consent when you complete the next measurement (i.e. at posttest or follow-up).

### **What will I be asked to do?**

**A pretest (15 min), a posttest (20 min), and a follow-up test (15 min). Details are as follows:**

- Complete a pretest online using SoGoSurvey©, which will measure stress level, and mindfulness, during Week 1 of the course, i.e. Sept 4, 2019.
- Complete a posttest consisting of the same measures, plus a qualitative survey, using SoGoSurvey©, within one week of completion of the 5-week mindfulness intervention, i.e. week of Oct. 7, 2019.
- Complete the follow-up test online, identical to the pretest, using SoGoSurvey©, 4 weeks later for follow-up, i.e. week of Nov. 4, 2019.
- 

### **What are the risks and benefits of participating?**

There are no known risks or benefits associated with completing these outcome measures. It is theoretically possible that a very stressed student may become more acutely aware of their stress level as a result of completing the stress measurement tool.

Should a student feel distressed, they are strongly encouraged to seek counseling, offered as a free service to students at [REDACTED]. The contact info is: [REDACTED] Rm. 225; Phone: [REDACTED] ext. 5370; Email: letstalk@ [REDACTED]

**How will the information collected be used?**

The results of this study will be shared with students toward the end of the course, with no personal identifiers of any student. Data analysis will also be presented in a final report by Joy Garmaise for the purpose of her Doctor of Nursing Practice degree requirements. Results may also be published in an academic journal.

**What do I need to do to participate?**

Please read this Information Letter and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have any questions, please contact the Principal Investigator, Joy Garmaise.

The consent form itself is found on the following screen.

Thank you for considering this invitation,

Joy Garmaise, DNP (candidate), MN, RN

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This project has been approved by the [REDACTED] Research Ethics Board,

Approval No. File # 6004674

Should you have any concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted please get in touch with the Chair of the REB at ResearchEthics@[REDACTED].

**Appendix F**

## Consent Form

[REDACTED]  
[REDACTED]  
For further information:

Primary Investigator: Joy Garmaise

Tel: [REDACTED] x3060

Email: jgarmais@[REDACTED]

Sept 1, 2019

**Evaluation of an online Mindfulness-based Intervention for Reducing Stress amongst Undergraduate Nursing Students****Consent Form**

I have read and understood the information on the research project **Evaluation of an Online Mindfulness-based Intervention for Reducing Stress amongst Undergraduate Nursing Students** which is to be conducted by **Joy Garmaise** and all questions have been answered to my satisfaction.

I agree to voluntarily participate in this research and give my consent freely. I understand that the project will be conducted in accordance with the Information Letter, a copy of which I have retained for my records.

I understand I can withdraw from the project at any time, without penalty, and do not have to give any reason for withdrawal.

Note regarding data collection: Data will be collected using an online survey program called SoGoSurvey©. Data uploaded to SoGoSurvey© is open to access by American regulatory bodies. However, you will be using an identifier which you create, and NOT your name or other personal info. Your information will then be recoded using participant numbers only, and this information will be kept confidential. All information collected will be stored in [REDACTED]'s secure data storage system, and kept for a period of five years.

I consent to the use of my data in the pretests, posttests plus survey, and follow-up tests online, for the purposes of Joy Garmaise's Doctor of Nursing Practice project.

**(Student will click on "Yes" or "No" in SoGoSurvey© before beginning the data collection).**

This project has been approved by the [REDACTED] Research Ethics Board,

Approval No. 6004674

Should you have any concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted please get in touch with the Chair of the REB at ResearchEthics@[REDACTED].



## Appendix G

### Blog Questions

Here you will reflect on your mindfulness practice and be able to read about how others are doing.

#### Introductory blog (in-class):

\*\*\*Have you ever heard of or practiced mindfulness or any other kind of meditation? What do you anticipate this experience will be like for you? \*\*\*

#### Questions for Week 1 blog - answer all 3.

- 1) Which meditations did you complete this week? (list the app and the name of the meditations). Since Week 1 started on Wednesday, if you completed only 3-4 meditations, that is ok. You can do more in the following weeks.
- 2) What did you learn about yourself or about mindfulness this week?
- 3) What do you find particularly inspiring or challenging about this practice?

#### Questions for Week 2, 3, and 4 blog - Answer question #1 each week, and then choose two other questions to answer (total of 3 questions each week):

- 1) Which meditations did you complete this week? (list the app and name of the meditations)
- 2) Which small (or big!) changes are you noticing in your life, your body, your reactions or functioning, your choices, or relationships as a function of starting to practice mindfulness?

3) Have you talked to anyone about this new skill you are learning? What was that conversation like?

4) What do you find inspiring or challenging about this new practice? Are you able to try being more aware, non-judgmentally, at other times in your day other than when you are doing the meditation?

5) In what ways can you imagine this self-care skill being useful in your future after this 5 week exercise - either as a student or as an RN?

6) For week 4 only: How does your learning style affect your experience with learning mindfulness in this course?

\*\*Added for Weeks 3 and 4: Please read and comment on at least 2-3 of your peers' blog posts as well. Encourage each other and let them know if their experience helps you reflect on your own practice as well.\*\*

## Appendix H

### PERCEIVED STRESS SCALE (PSS-10)

*The following questions ask about your feelings and thoughts during THE PAST MONTH. In each question, you will be asked HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are small differences between them, and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the exact number of times you felt a particular way, but tell me the answer that in general seems the best.*

*For each statement, please tell me if you have had these thoughts or feelings: never, almost never, sometimes, fairly often, or very often. (Read all answer choices each time)*

	Never	Almost Never	Sometimes	Fairly Often	Very Often
<b>B.1. In the past month, how often have you been upset because of something that happened unexpectedly?</b>	0	1	2	3	4
<b>B.2. In the past month, how often have you felt unable to control the important things in your life?</b>	0	1	2	3	4
<b>B.3. In the past month, how often have you felt nervous or stressed?</b>	0	1	2	3	4
<b>B.4. In the past month, how often have you felt confident about your ability to handle personal problems?</b>	0	1	2	3	4
<b>B.5. In the past month, how often have you felt that things were going your way?</b>	0	1	2	3	4

<b>B.6. In the past month, how often have you found that you could not cope with all the things you had to do?</b>	0	1	2	3	4
<b>B.7. In the past month, how often have you been able to control irritations in your life?</b>	0	1	2	3	4
<b>B.8. In the past month, how often have you felt that you were on top of things?</b>	0	1	2	3	4
<b>B.9. In the past month, how often have you been angry because of things that happened that were outside of your control?</b>	0	1	2	3	4
<b>B.10. In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them?</b>	0	1	2	3	4

Perceived Stress Scale Scoring

Each item is rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress.

PSS-10 scores are obtained by reversing the scores on the four positive items: For example, 0=4, 1=3, 2=2, etc. and then summing across all 10 items. Items 4, 5, 7, and 8 are the positively stated items.

Your Perceived Stress Level was \_\_\_\_\_

Scores around 13 are considered average. In our own research, we have found that high stress groups usually have a stress score of around 20 points. Scores of 20 or higher are considered high stress, and if you are in this range, you might consider learning new stress reduction techniques as well as increasing your exercise to at least three times a week. High psychological stress is associated with high blood pressure, higher BMI, larger waist to hip ratio, shorter telomere length, higher cortisol levels, suppressed immune function, decreased sleep, and increased alcohol consumption. These are all important risk factors for cardiovascular disease.

### Appendix I

#### FFMQ-15: 15-item Five Facet Mindfulness Questionnaire

Instructions: Please use the 1 (never or very rarely true) to 5 (very often or always true) scale provided to indicate how true the below statements are of you. Circle the number in the box to the right of each statement which represents your own opinion of what is generally true for you. For example, if you think that a statement is often true of you, circle '4' and if you think a statement is sometimes true of you, circle '3.'

	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
1. When I take a shower or a bath, I stay alert to the sensations of water on my body.	1	2	3	4	5
2. I'm good at finding words to describe my feelings.	1	2	3	4	5
3. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	1	2	3	4	5
4. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	1	2	3	4	5
5. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	1	2	3	4	5
6. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	1	2	3	4	5
7. I have trouble thinking of the right words to express how I feel about things.	1	2	3	4	5
8. I do jobs or tasks automatically without being aware of what I'm doing.	1	2	3	4	5

9. I think some of my emotions are bad or inappropriate and I shouldn't feel them.	1	2	3	4	5
10. When I have distressing thoughts or images I am able just to notice them without reacting.	1	2	3	4	5
11. I pay attention to sensations, such as the wind in my hair or sun on my face.	1	2	3	4	5
12. Even when I'm feeling terribly upset I can find a way to put it into words.	1	2	3	4	5
13. I find myself doing things without paying attention.	1	2	3	4	5
14. I tell myself I shouldn't be feeling the way I'm feeling.	1	2	3	4	5
15. When I have distressing thoughts or images I just notice them and let them go.	1	2	3	4	5

Scoring Information:

\*Observing items: 1, 6, 11.

Describe items: 2, 7R, 12.

Acting with awareness items: 3R, 8R, 13R.

Non-judging items: 4R, 9R, 14R.

Non-reactivity items: 5, 10, 15.

Reverse-phrased items are denoted by 'R' after the item number, e.g. 14R.

\*Refer to the background information regarding recommendations for omitting the observing subscale score from comparisons of total scale/subscale scores before and after mindfulness interventions.

**Appendix J**

## Survey

- 1) My age is: \_\_\_\_\_ (option to skip)
- 2) My gender is: \_\_\_\_\_ (option to skip)
- 3) How many meditations did you complete? \_\_\_\_\_
- 4) My previous experience with meditation (of any kind):
  - a) None
  - b) Minimal
  - c) Substantial
- 5) What helped you keep up with the meditations? OR what do you think could have helped?
- 6) What challenges did you experience while doing the meditations?
- 7) The support provided by the facilitator(s) through announcements and interaction on the discussion board were useful in staying on track and feeling engaged in the process:  
(Likert scale: Strongly disagree, disagree, neutral, agree, strongly agree)
- 8) The aspect of group learning (through the discussion board) was useful in learning the skill of mindfulness:  
(Likert scale: Strongly disagree, disagree, neutral, agree, strongly agree)
- 9) I value mindfulness meditation for personal use in reducing stress, more than I did before this project.  
(Likert scale: Strongly disagree, disagree, neutral, agree, strongly agree)
- 10) I am likely to share what I have learned about mindfulness with peers and future colleagues. (Likert scale: Strongly disagree, disagree, neutral, agree, strongly agree)

- 11) I am likely to share what I have learned about mindfulness with clients as appropriate in the course of my nursing practice. (Likert scale: Strongly disagree, disagree, neutral, agree, strongly agree)
- 12) Please share any comments/suggestions re: future implementation of an online mindfulness-based intervention amongst nursing students at [REDACTED].



**Appendix K**

Budget for Mindfulness Project

<b>Item</b>	<b>Details re: item</b>	<b>Cost</b>	<b>Total Cost</b>
<b>Time required by project author</b>	REB process/create consent forms - ~7 hours	7 hours x \$50/hr = \$350	<p><b>Total cost: 66 hours x \$50/hr = \$3300<sup>5</sup></b></p> <p><b>Future iterations may require fewer hours especially in Blackboard setup.</b></p>
	Student Recruitment	5 hours x \$50/hr - \$250	
	Create Blackboard module and set up the program including pretests, posttests, instructions, discussion spaces, etc.	20 hours x \$50/hr = \$1000 Note: this time would be much shorter (~ 2 hours) in future iterations unless format needs to change significantly	
	Engage learners during intervention weekly or more	10 hours x \$50/hr = \$500	
	Analyze data using statistical tests and synthesis of qualitative data from surveys	12 hours x \$50/hr = \$600	
	Prepare results for dissemination to various audiences	Unknown – depends on extent of dissemination. At least 12 hours. 12 hours x \$50/hr = \$600	

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<sup>5</sup> Note: Project author will be given 28 hours in regular workload for the semester to complete this project. The remaining hours will be in addition to full-time work requirements and will not be paid to the author in this iteration but are recorded here so as to realize full costs of this program for future iterations.

<b>Item</b>	<b>Details re: item</b>	<b>Cost</b>	<b>Total Cost</b>
<b>Time required by Research Assistant</b>	Assistance with recruitment	5 hours; Volunteer time	<b>\$ 0<sup>6</sup></b>
	Analyze data using statistical tests and synthesis of qualitative data from surveys	5-10 hours; Volunteer time	
<b>Time required by Blackboard and/or e-Learning team</b>	Help with Blackboard setup	5 hours x \$50/hr = \$250	<b>\$250</b>
<b>Institute for Social Services Research (ISSR) consultations to help with statistical analysis</b>	Consultation sessions re: statistical analysis	5 hours. Cost unknown – paid by UMass Amherst for graduate students.	<b>Unknown</b>
<b>Mindfulness expert</b>	Assist with recruitment, review content during the “Plan” phase, and answer specific mindfulness-related questions by learners during the “Do” phase	8 hours x \$50/hr = \$400	<b>\$400</b>
<b>Purchases/Accounts Payable</b>	Statistical Package Student Use	\$45 per 6 months	<b>\$45</b>
	Small gag gift or candy for student recruitment session(s)	\$150	<b>\$150</b>
<b>Total cost</b>			<b>\$4045</b>

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<sup>6</sup> Research Assistant may need to be paid in future iterations. In this case, a cost of \$20 x 15 should be budgeted = \$300