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An Analysis of the Impact and Efficacy of an Online Mindfulness-based Intervention as a Support for First-year University Students.

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Abstract.

As a result of the COVID-19 pandemic, many university courses transitioned to online delivery, therefore, educators and students faced new challenges associated with the delivery of modules and the provision of necessary student supports. Given the scale of this transition, it is likely that many universities will continue to teach remotely far beyond the reach of any pandemic specific restrictions. This study sought to explore the impact and efficacy of a five-week online mindfulness course to a cohort of first-year university students (*n* = 25) at Technological University Dublin (TU Dublin), Ireland. Results demonstrated that participation in the course led to decreased levels of perceived stress for students and increased levels of resilience. Students who took the course reported that it provided emotional support, aided them in finding a healthy work-life balance and that ultimately, they felt the course broadened their perspective and helped them be more aware of positive coping mechanisms.

Keywords: Education; Mindfulness; Online learning; Student support.

1. Introduction.

The COVID-19 pandemic necessitated an abrupt transition to remote learning meaning that universities were faced with the unique challenge of providing pastoral care to students in a virtual setting. As we transition to post-pandemic living blended learning has remained prevalent (Ashour, El-Refae & Zaitoun, 2021; Lim, Leow, Ong, Pang & Lim,2021; Krägeloh et al., 2018; Munir, 2022; Ortiz-Rodríguez, Telg, Irani, Roberts & Rhoades., 2005; Singh, Steel & Singh, 2021). One well-established student social-emotional support is mindfulness-based intervention (MBI) (Johnson, Park & Chaudhuri, 2020; Lindsay et al., 2019; Lindsay et al., 2018; Parsons,

Gardner, Parry & Smart, 2022; Yuan, 2020). Although MBIs are well-established, there is limited research on the use of videoconferencing for delivery and even less research investigating the efficacy of videoconference-based MBI supports for university students. As such, using a mixed method design, the current study aimed to assess the efficacy of an online five-week mindfulness course delivered to a sample of first-year Irish university students from TU Dublin through the videoconferencing platform Microsoft Teams. While COVID-19 and its impact was not the focus of this research, the pandemic was an important contextual factor as unlike traditional online courses where participants are able to opt-in or out of distance learning, in this instance students had no choice in the matter.

2. Literature review.

Mindfulness relates to awareness of oneself and one's surroundings and was developed to help individuals accept their present state (Kabat-Zinn, 2003). Mindfulness has also proven to be an effective emotion regulatory tool, with those who practice mindfulness consistently showing improvements in mental health over time marked by decreased feelings of anxiety and negative thoughts (Finkelstein-Fox, Park & Riley, 2019; Gu, Strauss, Bond & Cavanagh, 2015; Guendelman, Medeiros & Rampes, 2017; Sun, Gao, Kan & Shi, 2020). Further, long-term impacts include improved emotional and problem-focused coping strategies (Kinnunen et al., 2019; Solhaug et al., 2019). Research on the efficacy of MBIs supports the practice, showing similar, or greater, outcomes when compared to other evidence based interventions (Goldberg, Riordan, Sun & Davidson, 2022). Due to its perceived benefits, mindfulness has grown in popularity and MBIs are now commonly utilised across a wide range of clinical and non-clinical populations to encourage individual wellbeing (Johnson et al., 2020; Lindsay et al., 2019; Lindsay et al., 2018; Parsons et al., 2022; Yuan, 2020).

2.1 Mindfulness, stress management and resilience.

Resilience is complex, but ultimately describes the process by which individuals manage stressors, overcome disadvantages, and bounce back from adverse life experiences (Agaibi & Wilson, 2007). Historically, resilience was studied in the context of extreme life trauma; however, more recently resilience has been considered in relation to mild daily life stressors. Since this shift, a positive correlation has been found between mindfulness and resilience (Pidgeon & Keye, 2014). Specifically, it has been found that participation in MBIs can lead to increased

levels of perceived resilience, decreased levels of distress and decreased likelihood for emotional burnout (Galante et al., 2018; Crowder & Sears, 2017; Klein et al., 2019; Cejudo et al., 2019). Furthermore, in examining the mindfulness model of resilience, Sünbül and Güneri (2019) not only found mindfulness to be a significant predictor of self-compassion, but found the model explained 21% of the variance in resilience scores amongst participants..

2.2 Mindfulness training in university education.

The transition into higher education is often a period of heightened stress for students as they are introduced to new academic challenges and tasked with navigating new social situations (Acharya, Jin & Collins., 2018; Auerbach et al., 2018; Chan et al., 2019; Misra & McKean, 2000). Consequently, during this transition period, students have reported higher prevalence of mental illness, often exacerbated by increased levels of responsibility (Acharya et al., 2018; Auerbach et al., 2018; Chan, Moore, Derenne & Fuchs., 2019; Misra & McKean, 2000). To counteract this, providing students with additional support (e.g., peer mentoring, head start programmes, and resilience and mindfulness interventions) during this critical period has become increasingly common and has been demonstrated to ease transition related stress (Chandler, Kalmakis, Chiodo & Helling, 2020; Lane, 2020; Patterson Silver Wolf et al., 2021; van Herpen et al., 2020). In addition to mediating student stress, these precautionary supports have proven to increase student retention rates amongst high-risk groups, promote general wellbeing and in some cases promote academic performance (Chandler et al., 2020; Lane, 2020; Patterson Silver Wolf, Taylor, Maguin & Asher BlackDeer, 2021; Van Herpen, Meeuwisse, Hofman & Severiens, 2020).

There has been a wealth of research exploring the impact of brief mindfulness based interventions on the wellbeing of university students (Chiodelli et al., 2020; Dawson et al., 2019. In a large systematic review, Chiodelli and colleagues (2020) found that across all 19 articles reviewed, MBIs were successful in promoting mental health and reducing stress in academic settings. Specifically, the use of MBIs with university students has proven to reduce levels of anxiety, depression, rumination and overall distress, with the effects lasting over a prolonged period (Dawson et al., 2019) and there is also limited evidence to suggest that MBIs can positively impact academic performance (Bóo et al., 2020). Regarding the role mindfulness may have on students transition into higher education, Finkelstein-Fox and colleagues (2018) found that while prior experience of mindfulness did not specifically predict students' success, having prior experience was found to act as a protective factor for students who had difficulty regulating their emotions leading to decreased levels of depression and anxiety. Evaluations of students'

perception of mindfulness mirror these findings and students reported not only feeling better able to identify, but to manage emotions (Bamber & Schneider, 2020). Students also noted an improved ability to focus, thus increasing their productivity. That said, students also identify some minor barriers to engagement (e.g., time & uncertainty), ultimately suggesting that mindfulness interventions should be tailored to fit their specific needs (Bamber & Schneider, 2020).

Given the positive benefits that have been widely reported, recently there has been increased interest in holistic integration of mindfulness practice into the policies and procedures of third level institutions (Weare, 2019). In essence, this involves less focus on discrete measurable outcomes and a shift towards placing the student at the heart of the learning experience and focusing on maximising positive outcomes (Weare, 2019).

2.3 Online delivery of mindfulness training.

The COVID-19 pandemic necessitated an unprecedented shift in the landscape of teaching and education globally, meaning educators and students had to adjust and find new ways to facilitate learning and assessment (Bansak & Starr, 2021; Salta, Paschalidou, Tsetseri & Koulougliotis., 2021). Although the dramatic pivot towards distance learning was new, the administration of online mindfulness interventions is not a new concept. Specifically digitalised methods for the delivery of mindfulness interventions (e.g. online courses or smartphone applications) have become increasingly popular (Bostock, Crosswell, Prather & Steptoe, 2019; Cavanagh et al., 2018; Mrazek et al., 2019). Digitalised methods of brief mindfulness intervention delivery have unique advantages over traditional delivery methods as they have been proven to increase accessibility while also providing participants with unique opportunities for personalisation of such courses (Mrazek et al., 2019). That said, recent research addressing the digitalisation of course delivery suggests that course adaptation should be determined based on the needs of the demographic group involved and the desired outcome of the course while maintaining course integrity (Loucks et al., 2022).

Cavanagh and colleagues (2018) specifically examined the impact of an online based mindfulness intervention They found that students randomly assigned to a two-week online mindfulness course had reduced levels of perceived stress and pervasive thought patterns when compared to a control (Cavanagh et al., 2018). Similarly, Bostock and colleagues (2019) examined the effectiveness of smartphone applications for the delivery of mindfulness

interventions. Again, there was a significant positive difference between the experimental (e.g., those with access to the mindfulness application) and the control group with all positive outcomes sustained over a 16-week period

Alternative methods for the virtual delivery of mindfulness trainings (e.g., via videoconferencing) have also been explored. The benefit of such programmes compared to other digital methods include increasing accessibility while maintaining some element of face-to-face instruction (Krägeloh et al., 2018). Krägeloh et al. (2018) further explored the efficacy of videoconferencing as a delivery method and found this delivery method to be successful, with significant positive improvement sustained at a three-week follow-up. Similarly, in a more recent study, Lim et al. (2021) examined differences between participants who were randomly assigned to a mindfulness based intervention under two conditions, in person and online. Increases in self-reported sleep quality and significant decreases in perceived stress scores were reported for participants in both groups. Additionally, it was noted that attendance was equivalent across both groups, although those who participated in the videoconference course engaged with slightly more daily practice outside of the lessons than their peers who completed the course in-person.

These results suggest that videoconferencing provides a promising alternative to face-to-face workshop delivery. This may be particularly beneficial in college settings given the recent increase in hybrid teaching practices and may ensure accessibility to mindfulness based interventions in situations where traditional mindfulness training is not available (Ashour et al., 2021; Lim et al., 2021; Krägeloh et al., 2018; Munir, 2022; Ortiz-Rodríguez et al., 2005; Singh et al., 2021).

2.4 Limitations of mindfulness training.

The terms mindfulness and meditation are often used interchangeably (Misitzis, 2020; Van Dam et al., 2018), however there is not one true definition of mindfulness (Bodhi, 2011; Gethin, 2011; Van Dam et al., 2018). That said, mindfulness is often considered in relation to attention, awareness, openness and discernment (Van Dam et al., 2018). Similarly, there is debate relating to the methodological assessment of mindfulness. These concerns are particularly notable when considering construct validity and the possibility for replicability (Van Dam et al. 2018). There has also been research suggesting there may be limitations as to how influential mindfulness practice may be at alleviating stress, anxiety, and physical pain (Dimidjan & Segal,

2015; Van Dam et al., 2018).

2.5 Research questions.

This study sought to evaluate the impact of an online five-week MBI for a cohort of Irish first-year university students. Further, while the study implemented a mixed method design, there was a particular focus on the qualitative element, which aimed to amplify and share the student experience. Specifically, the study sought to address the following questions:

1. Does the provision of MBI to first year university student's lead, on average, to decreased levels of perceived stress?
2. Does the provision of MBI to first year university students lead, on average, to increased levels of perceived resilience?
3. What are the perceived benefits and barriers for first year university students with respect to participating in MBI?

3. Methodology.

A mindfulness course consisting of a series of five, one hour, mindfulness workshops was offered to all first-year students at Technological University Dublin in semester one (autumn) of the 2020/2021 academic year. Due to constraints caused by the coronavirus pandemic, the course was offered online through Microsoft Teams. There were five iterations of the course, each of which had a maximum of 20 places. To ensure consistency, each of the five courses were offered across the same five weeks during the term, the same mindfulness teacher delivered all twenty-five sessions, and the same content was covered in each of the five courses. However, to accommodate students' varying schedules, the times at which the courses were offered varied. The courses were delivered by an expert mindfulness teacher with a background in cyber psychology, hired by 'The Sanctuary', which is a registered charity in Dublin City, Ireland that specialises in the delivery of MBI. Relevant adaptations were made from traditional face-to-face delivery to facilitate online delivery. Most notably, these adaptations included exercises within the course to address relevant issues such as '*zoom fatigue*' which students might have been experiencing as a result of the transition to distance learning (Bailenson, 2021; Bullock et al., 2022). Furthermore, to aide in facilitation of the course and the development of a strong group dynamic, the teacher requested that participants left their

cameras on for all sessions.

3.1 Sampling strategy.

The courses were not streamed i.e., any first-year student, in any course of study could apply to attend any of the sessions. This resulted in a multidisciplinary mix of first-year students within each group. First-year in this context referred to any student in the first year of their programme, meaning that any student, undergraduate or postgraduate and regardless of age or previous academic experience, could participate provided they were in their first year of study. The courses were advertised to all first-year students via social media and via email. Additionally, lecturing staff were asked to promote the course to first-year students. Advertisements contained a participant information sheet and a registration link. Students who registered their interest were then separately contacted and asked to complete a consent form. Once consent was confirmed, participants were sent a demographic questionnaire which included questions regarding motivations for participation and personal goals. Consenting participants were also sent two pre-test measures, the Perceived Stress Scale (PSS) and the Brief Resilience Scale (BRS). One week after the final mindfulness session, participants were asked to complete the PSS and BRS a second time along with a post-course evaluation.

3.2 Ethical Approval

The study was reviewed and approved by the TU Dublin Blanchardstown Campus Ethics Committee. The participants provided written informed consent to participate in this study.

3.3 Participants.

There were 8,439 first year students registered at TU Dublin for the first semester of the 2021-2022 academic year. 156 students registered an interest in the mindfulness course and were emailed a participant information sheet, demographic form and consent form. Of these, 57 completed the consent and demographic forms and were registered to attend course. 25 completed the mindfulness course. All 25 of the participants who completed the course re-took the PSS. However, only 22 of these participants completed the BRS and only 21 completed the post-intervention questionnaire, despite reminders to do so. With respect to sex, 18 participants (72%) were female, and 7 participants (28%) were male. One participant was aged 17, 15 participants were aged 18-24, 7 participants were aged 25-34 and one participant was aged 35-44.

Two focus groups were held following the completion of the course to elicit student feedback. Six students who completed the mindfulness course participated in focus group A and four non-participating students (i.e., those who registered interest but did not complete the course) participated in focus group B. Students were selected for participation in the focus groups on a first-served basis and each participant received a €20 shopping voucher following the completion of the interview.

3.4 Sample size.

There is ample evidence to suggest that MBI can yield generic benefits including higher levels of emotional awareness, improvements in mental health and stress management. Therefore, the aim of this study was to recruit as many participants as possible, so an a-priori sample size calculation was not conducted. It was hoped that a sufficient number of students would participate in the study to achieve power of .8 or greater and there was no desire to limit numbers after this level of power was achieved. Rather we hoped to be able to accommodate as many students as possible given the expected advantage to participation.

3.5 The brief resilience scale (BRS).

Unlike alternative resilience measures which assess protective factors and personal characteristics which may indicate resilience, the BRS is unique in that it is the first resilience measure to assess resilience as an individual's ability to "*bounce back*" from or adjust to a stressful situation (Smith et al., 2008). The BRS is a short measure consisting of just six items. The BRS was tested with four different normative samples to demonstrate general validity (Smith et al., 2008).

3.6 The perceived stress scale (PSS).

Developed as a tool to assess the perception of stressful experiences, the PSS has become the most widely utilised tool to assess the relative stressfulness of life events and the perceived effectiveness of different stress management courses (Cohen, Kamarck & Mermelstein, 1983). The PSS is another short measure, made up of only a 14-item scale (Cohen et al., 1983). Three normative samples were used in the development of the PSS (Cohen et al., 1983).

4. Findings.

4.1 Quantitative Findings.

For quantitative analysis, Lakens' (2013) article was consulted to ensure that the most relevant means of assessing effect size was employed. With respect to the Perceived Stress Scale, a paired t-test demonstrated that there was a significant difference between the results from the pre-test scores (M = 22.4; SD = 6.6) and post-test scores (M = 16.9; SD = 6.4), t(24df) = 4.61, $p < .001$. Effect size was large ($d_{av} = 0.84$).

With respect to the Brief Resilience Scale, a dependent t-test also demonstrated that there was a significant difference between the results from the pre-test (M = 17.09; SD = 4.22) and post-test (M = 19.91; SD = 4.74), t(21df) = -3.29, p = .004. Effect size was medium ($d_{av} = .63$).

4.2 Qualitative results.

Following Braun and Clarke's theoretical framework for thematic analysis, reflexive thematic analysis (RTA) was chosen to assess, organise, describe, and interpret the qualitative data arising from a series of two focus groups (Clarke & Braun, 2017; Braun & Clarke, 2006). Each focus group employed a semi-structured approach and themes were identified for discussion with students based on pre-existing literature surrounding mindfulness and the aims of the current study. The analysis of qualitative data employed an inductive and systematic analytic approach, assuming a direct relationship between participants' language and their intended meaning (i.e., it was assumed that coding and theme development reflect the explicit content of the data). Finally, a dual-coder methodology was used as per Clark and Braun's recommendation for best practice. During this collaborative process, coders placed a particular emphasis on '*meaning*' and both the themes and sub-themes which have been highlighted are those which both coders feel best represent the data in a complete way.

Each focus group was considered individually, allowing maximum opportunity to amplify the student voice and honour the student experience. Details as they pertain to each focus group are discussed further overleaf.

4.3 Focus group A results.

Table 1: Participant Information for Focus Group A.

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6
Male/Female	Female	Female	Female	Female	Female	Male
Age	31	35	20	18	19	18
Course	Social Care	Public Health Nutrition	Engineering	Energy Engineering	Early Years Childhood and Education	International Business and Languages
Pseudonym	Molly	Eliza	Karla	Carrol	Dawn	Jude

4.3.1 Reason for participation.

Throughout the data, students expressed a broad range of interest and desire to "*give this a whirl*" (Eliza). Four students also stated that the course might be particularly beneficial to them as they tried to manage university related stress. Further, mental health and anxiety were discussed by students as strong influencing factors towards participation with two students sharing explicitly that they chose to participate in the course because they "*saw it helped with anxiety*" (Dawn). While two students noted that they had no prior knowledge of mindfulness, previous experience was a strong motivating factor. Four students cited previous experience of mindfulness as one of the most influential factors in their decision to participate noting that they had a particular interest in the course because it felt familiar and they were looking to participate in "*something that [they were] used to*" (Karla).

4.3.2 Ineffective advertising.

The mindfulness course was advertised to students via email and five of six students noted issues with the way the course was advertised to them. Particularly, two students noted that students get "*bombarded with emails*" (Eliza) making it easy for them to dismiss an email without giving the content much attention. Furthermore, students cited potential confusion over the language used in the advertisement, commenting that they "*don't know if people know what mindfulness is*" (Eliza) and cited the overrepresentation of mindfulness in the media as a possible source of confusion. Ultimately, students were very vocal about potential improvements for advertisement and argued that future campaigns should emphasise student engagement and use a wider variety of methods to reach students (e.g., "*posters*" – Karla, or "*talks*" – Molly).

4.3.3 Perceived benefits.

The mindfulness course was multi-faceted, and participation had a positive impact across several aspects of students' lives and the course was an experience of "*learning for good*" (Carrol). For one student, Molly, participating in the training empowered her to be "*more productive*" and "*happier*". A further three students argued that the course helped them "*be more aware of things*" (Jude), suggesting that the course helped with self and emotional awareness. Perceived mental health benefits were mentioned by three students, while four students commented on the positive impact the course had on their experience in university. Not only did the mindfulness course help students "*deal with stress*" (Karla) broadly but participating in the course helped students "*get into the exams and [feel] ready to do them*" (Dawn). The course also encouraged a healthy work-life balance, and encouraged students to "*live in the present*" (Carrol). Finally, taking into consideration the context of the research, students also highlighted how the course helped them manage challenges associated with the COVID-19 pandemic. The pandemic was a particularly uncertain time for everyone; however, all six students explained that the "*mindfulness course really helped [them] to face a lot of [this] stress*" (Carrol).

4.3.4 Timing.

While generally beneficial, the most pressing area of debate for students relating to the course was the issue of timing. While two students noted that they liked the frequency and the freedom to "*pick a time for themselves*" (Karla), students were not without criticism. All students noted that they wish the course "*went on longer*" (Jude). As one student, Eliza, explained "*it took probably two weeks to properly get into it*" so by the time she felt that she had settled into the course it was nearly halfway over. As a result, three students made the suggestion of an "*8-week*" (Jude, Molly & Eliza) course to allow students more time to find their "*stride*" (Eliza) and make it more likely that students would "*make a habit of it*" (Eliza).

4.3.5 Virtual vs in-person delivery.

Given the unexpected shift to virtual delivery, it is important to consider how structure may have impacted on student's experience. All students agreed that the "*online delivery was good*" (Karla) and felt "*safer*" (Molly) than a traditional classroom setting. Not only are students more "*accustomed to online now*" (Eliza), but "*there's so many variables that could maybe stop you from going*" (Eliza) to an onsite course, suggesting that online delivery is often more accessible. Virtual delivery, however, was not without its flaws and as Karla noted there is an increased

possibility for student disengagement online as you "*can just mute your mic … then just sit back and say nothing*". Ultimately, since students did not experience in-person delivery of the course, the two delivery methods are difficult to compare. However, most students did share that they would have attended "*either way*" (Jude).

4.4 Focus group B results.

Focus group B represents a group of first-year students (n = 4) who had not participated in the mindfulness training. This group of students included two male and two female students across a range of academic disciplines. Demographic details for each participant, as well as their chosen pseudonym, are outlined in table 2. Four themes were identified for this group: (1) interested yet didn't participate; (2) reasons for non-participation; (3) perceived benefits; (4) potential improvements.

Table 2: Participant Information for Focus Group B.

	Participant 1	**Participant 2**	**Participant 3**	**Participant 4**
Male/Female	Male	Female	Female	Male
Age	34	*Not Specified*	34	*Not Specified*
Course of Study	Cybersecurity	*Not Specified*	Environmental Health	*Not Specified*
Pseudonym	Peter	Lucy	Fiona	Patrick

4.4.1 Interested yet didn't participate.

Even though they chose not to participate, all four students expressed some interest in the course. Curiosity seemed to be a driving factor for these students and they explained that they "*wanted to learn what [mindfulness] was …[because] you never get to hear the full overview of it*" (Patrick). Other students cited more personal reasons for wanting to become involved in the course such as "*want[ing] to be involved inside like a group inside the college*" (Lucy). All students also noted that if a similar course was offered again, they would "*absolutely*" (Fiona) want to participate.

4.4.2 Reasons for non-participation.

Students' interest in the course starkly contrasts with their decision not to participate. Students cited several reasons for what ultimately deterred them from participating; however, the two most important reasons that students cited for not participating were insufficient advertising and simply being too busy. Regarding advertisement, while the email had "*a lot of information*"

(Peter), Peter also pointed out that "*mindfulness … can be a bit scary … because people … don't understand what really it is*". Another student, Lucy, highlighted that the way students communicate is rapidly changing and argued that email may not be the best way to advertise as "*not everybody goes to ones that are sent through their emails*". Keeping this in mind, students suggested more updated and visual advertising campaigns in future (e.g., a "*short video*" – Peter). Students stated they were busy and that there was conflict with other university work and the group emphasised that they "*need to prioritise*" (Peter) their time which unfortunately meant that they could not attend the mindfulness sessions.

4.4.3 Perceived benefits.

While students did not attend the course they still recognised many possible benefits of participation such as helping them "*to just calm down*" (Lucy) and "*relax*" (Fiona). One of the biggest potential benefits identified by students was the potential to help manage stress or anxiety associated with university. They argued that the mindfulness course would have helped them "*get out of college stress*" (Lucy) when everything was "*building up*" (Patrick). Finally, students also felt the course would have helped them with the transition into college and the "*adjustment to new life*" (Lucy).

4.4.4 Potential improvements.

Unlike participants in focus group A, three of four students in focus group B stated that they would have "*preferred it to be face-to-face*" (Lucy) as it would allow them to "*meet the people with the same idea of what they like*" (Peter). An additional piece of advice given was to change "*the time*" (Lucy) because time is students "*biggest enemy*" (Lucy). More specifically, students suggested to change the course to "*a Friday evening or weekends*" (Peter) or to try polling students' availability to accommodate their academic schedules. Finally, it was suggested to have "*one or two courses running at different times of the year*" so that students had multiple opportunities to attend the course.

5. Discussion.

In line with findings of previous mindfulness research, results of the current study support the idea that participation in a brief mindfulness intervention can be beneficial in the reduction of stress, increased awareness and increased levels of resilience (Johnson et al., 2020; Lindsay et al., 2019; Lindsay et al., 2018; Parsons et al., 2022; Yuan, 2020). This is particularly indicated

by quantitative results which found both a significant decrease in students' level of perceived stress ($p < .001$) and a significant increase in students perceived level of resilience ($p = .004$) after course completion. Specifically, these findings support previous research which found mindfulness training to be particularly beneficial for university students (Dawson et al., 2019). While this research was not the first to utilise videoconferencing technology, considering the unique population and research context for the study, it has expanded on existing research and corroborates studies by Krägeloh et al. (2018) and Lim et al. (2021) who found mindfulness training delivered via videoconferencing platforms to be as effective as traditional face-to-face delivery methods. This is particularly promising considering the shift towards blended learning that has arisen in post-pandemic society (Ashour et al., 2021; Munir, 2022; Ortiz-Rodríguez et al., 2005; Singh et al., 2021; Saeed, Bader, Al-Naffouri & Alouini2020).

It is important to consider the student perception of videoconferencing as a method of course delivery. Overall, participating students did not have much preference for one delivery method over another. Instead, they agreed that while the "*online delivery was good*" (Karla) and felt "*safer*" (Molly), they did not feel their experience would change much were the course to be offered in-person. Conversely, non-participating students argued overall in favour of the course being in-person believing this would increase their opportunity to interact with peers. There is a slight dichotomy here such that the overall belief that there would not be much difference between delivery methods aligns with previous research findings (Bostock et al, 2019; Cavanagh et al., 2018; Krägeloh et al., 2018; Lim et al., 2021; Mrazek et al., 2019). However, non-participants preference for face-to-face instruction aligns with recent research findings that the majority of students, when asked, have a preference for traditional in-person learning (Alawamleh, Al-Twait & Al-Saht., 2020; Bali & Liu, 2018).

While students generally spoke favourably about the course, particularly in relation to the course content, there were several limitations that were identified. Regarding advertisement, while content of the advertisements was deemed sufficient, there were some issues with respect to clarity. Specifically, since "*mindfulness is everywhere now*" (Karla), two students noted that determining what the term mindfulness refers to can be difficult. Although the practices of mindfulness and meditation have a long-standing history, recently mindfulness has gained in popularity and become prevalent on social media, in schools and in workplaces globally (Misitzis, 2020). Consequently, it is possible that the term mindfulness has become muddled, leading to confusion as to what a mindfulness course might involve. To counteract potential confusion, it is suggested that advertisements are clear and provide students with a brief

definition of mindfulness as well as an outline as to the content of a proposed course. Furthermore, it may be beneficial to include testimonial statements from past participants.

Students also had concerns with the means of advertisement, particularly that advertisement relied heavily on communication via email. Whilst is a popular method of communication for many educators (Turville, 2019), students stated that they get "*bombarded with emails*" (Eliza) often leading to information overload. In this regard, recent research has demonstrated that when given the choice only 19% of university students learning via an online setting opt to communicate via email (Schutte & Andrianatos, 2018). With this in mind, it is suggested that alternative communication and advertisement techniques be considered (e.g., on campus lectures, social media advertisement or posters).

Considering timing, feedback was mixed amongst students and there was a clear divide between participating students who wanted a longer course and non-participating students who noted they were too busy to attend. Considering the desire for a lengthier course, participating students felt that it took time to properly settle into the course so having an extended course would allow students "*make a habit of it*" (Eliza). The recognition of time as a factor in habit formation mirrors recent research on the importance of repetition during social-emotional and psychological learning (Fiorella, 2020; Harvey at al., 2021). To address students' concerns there are two proposed solutions: (1) the course could be extended from five-weeks to eight-weeks; or (2) the course could be kept at five-weeks, however, session length could be extended to ninety minutes. With respect to non-participants, students emphasised that they "*need to prioritise*" (Peter) their time. The sense of feeling overwhelmed with little free time is common amongst university students and research has shown time management as a key component in perceived stress levels amongst students (Khatib, 2014; Misra & McKean, 2000). In future, to make the course more accessible and potentially more enticing, it is suggested that timing of the course be adjusted (e.g., evening or weekend options) to accommodate students busy schedules. Alternatively, some elements of the course could be converted to a self-paced online module, following the model used by Cavanagh et al. (2018). While this solution contradicts suggestions to lengthen the course, providing students with additional exercises ultimately allows for more engagement possibilities during any given week.

Taken collectively, results of this study support existing research and suggest that a brief mindfulness intervention can be effectively delivered via online videoconferencing to university students and that doing so can serve as an effective means to reduce perceived stress and

increase resilience. Further research is recommended to explore optimal delivery methods as well as optimal timing so that courses can be structured to best fit student's needs.

5.1 Limitations.

Regrettably, the most notable limitation was difficulty with participant recruitment and the study's small sample size. While the study utilised convenience sampling and the mindfulness training was available to all first-year students at TU Dublin, recruitment for the course was lower than anticipated which could have been a result of ineffective course advertising. Limited sample size also impacts the ability to generalise based on the findings from this study. Finally, this study adopted a quasi-experimental design. Since the non-participant group did not complete the PSS or BRS, there was no control group by which to compare post-test participant scores making it impossible to directly attribute any change in PSS or BRS to the mindfulness course alone. Further research is strongly recommended to assess the generalisability of the results to a wider and more diverse population.

6. Conclusion.

As mindfulness has grown in popularity, extensive research has been conducted to show the positive impact of brief mindfulness interventions. Similarly, as technology has advanced, research has shown virtual mindfulness intervention to be equally as effective compared to face-to-face delivery. Given the positive results of the current study with a small sample size, further confirmatory research is recommended particularly to explore the impact of mindfulness intervention on first-year students' transition into higher education and to further explore the efficacy of MBI delivery via videoconferencing.

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