

EXPLORING THE POTENTIAL OF A COGNITIVE MINDFULNESS INTERVENTION USING VIRTUAL REALITY AND AI TO ADDRESS ACADEMIC PROCRASTINATION AND ACADEMIC ENGAGEMENT: A BRIEF WAITLIST PILOT RCT

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AIMS

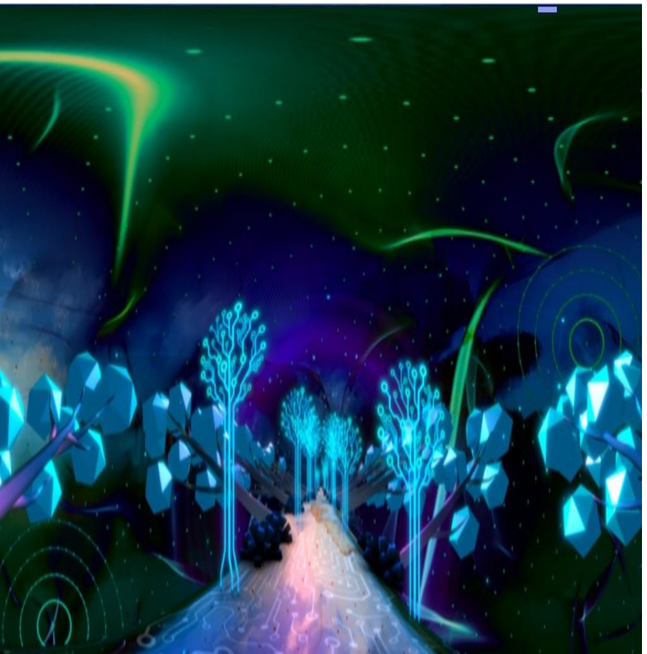
Looking at the effectiveness of an immersive mindfulness and AI app for academic procrastination

- Wait-list-controlled RCT











INTRODUCTION

While still in its early stages, VR pedagogy is gaining popularity in various educational settings. For instance, VR has proven to be a valuable tool for simulating environments that would otherwise be expensive or impractical to recreate in the real world.

In the university context, procrastination is a well-known phenomenon (Rozental et al., 2019). Further, it has been described as a dispositional trait with cognitive, emotional, and behavioural components (George, 2005). While some students thrive from leaving assessments until the last minute (active procrastinators), for others, the level of procrastination can interfere with the completion and submission of assessments (passive procrastinators; Chu and Choi (2005).

In addition to student procrastination, self-efficacy and self-regulation are also affected. For example, in a sample of 138 undergraduate students, self-efficacy, self-regulation, and self-handicapping predicted procrastination. Procrastination has also been associated with student engagement and dropout. Student dropout has been shown to negatively affect students and universities (Faas et al., 2018; Hagedorn, 2012). Bäulke et al., (2021) found that student satisfaction and procrastination were predictors of student drop-out.

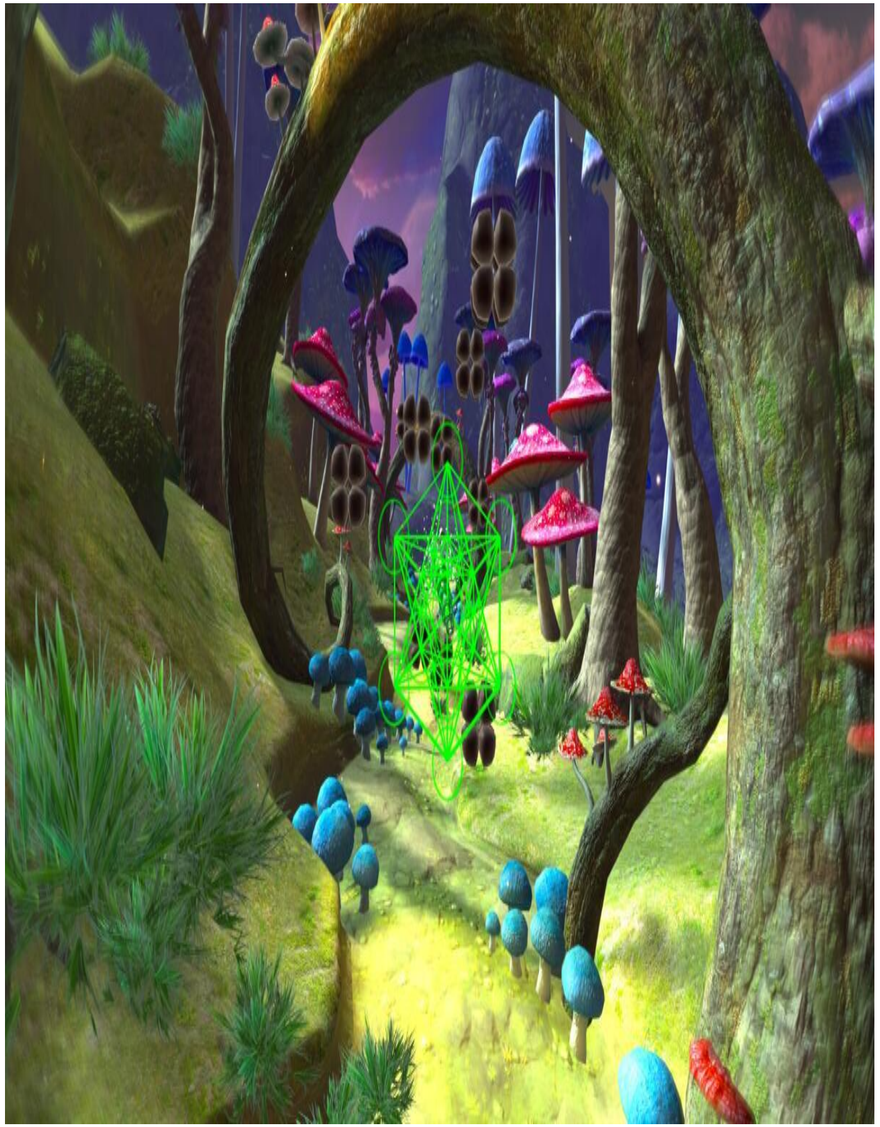


WHAT IS MINDFULNESS?

- Mindfulness is about paying attention —without judgment.

- The overwhelming consensus suggests mindfulness can mitigate negative self-thoughts and shame and increase well-being and efficacy, supporting behavioural change (Bowen & Enkema, 2014). Whilst cognitive behaviour therapy is the preferred intervention for procrastination, mindfulness is slowly gaining momentum in HE to support students' emotional regulation.

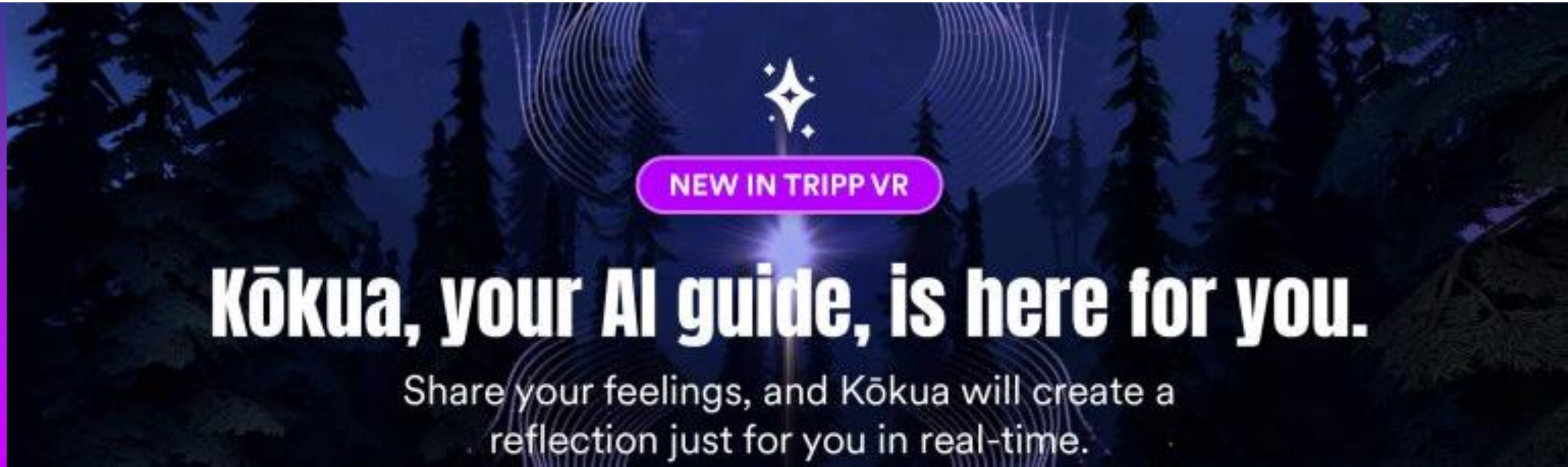
IMMERSIVE MINDFULNESS



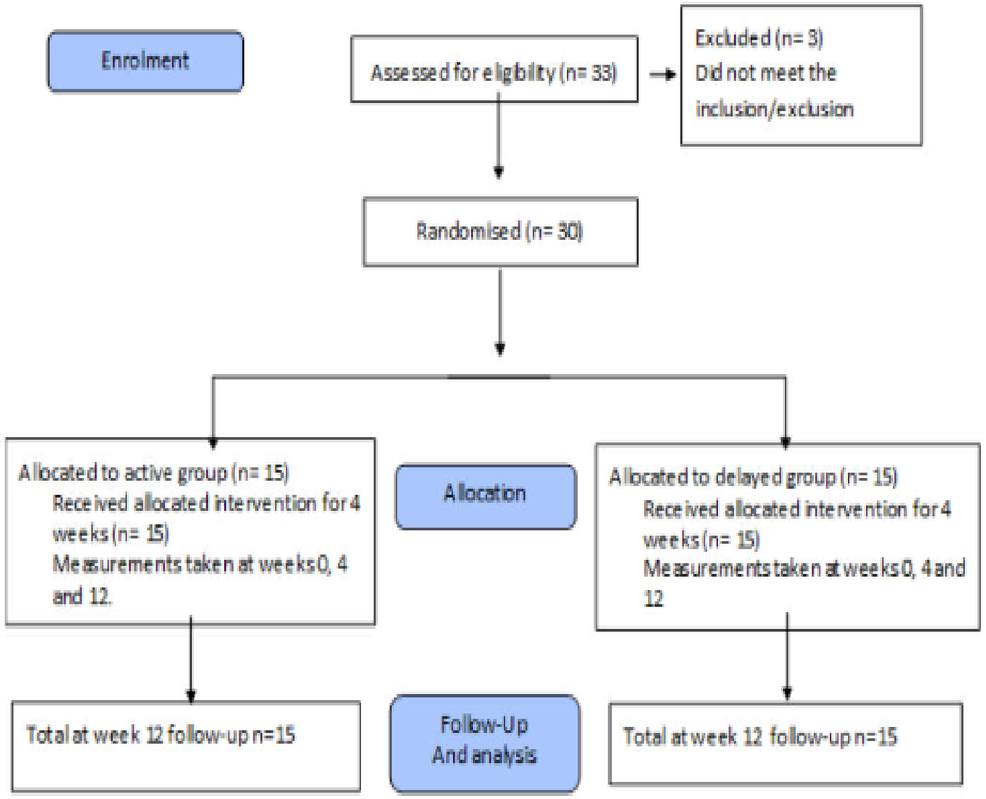
VR creates a sense of presence with visual and auditory cues (under their control). This minimises spectatoring (Seabrook et al., 2020), helping users focus on the present moment. Further, incorporating VR as an adjunct counselling intervention has increased the ease and acceptability of treatment compared with a non-VA intervention in supporting well-being (e.g., Boeldt et al., 2019).

METHODOLOGY

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CONSORT (2010) diagram showing the flow of participants through each stage of the study.

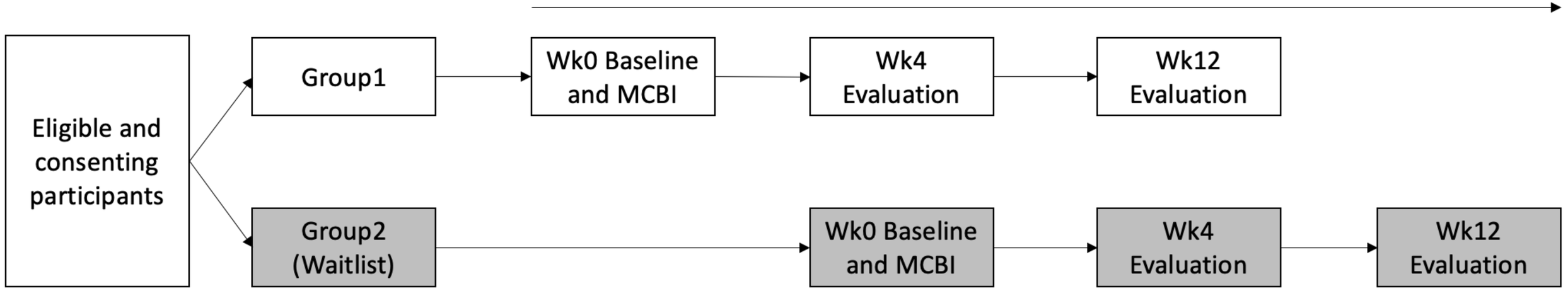


METHODOLOGY

- A mixed-methods approach
  waitlist control RCT
- A content analysis using Mentimeter was conducted on participants' feedback on the VR intervention.
- App was used during sessions
- Heart rate measurements

Measures

- The Perception of Academic Stress Scale (Bedewy & Gabriel., 2015)
- The Academic Procrastination Scale (APS, McCloskey, 2011)
- Academic Engagement Scale (SinApsi, Freda et al., 2021)
- Academic Self-Efficacy Scale (Gafoor & Ashraf., 2006)
- The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al., 2007)



STUDY DEMOGRAPHICS

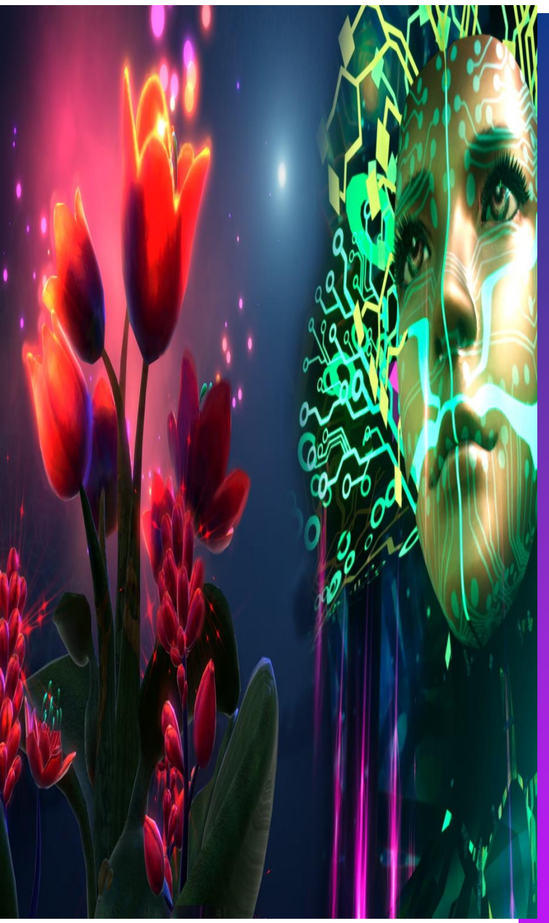


Table 1. Demographic characteristics of participants ($N = 30$).

Variable	Category	*n*	%
Age Group	18–30 years	17	56.7
	31–50 years	10	33.3
	>50 years	3	10.0
Academic Level	Undergraduate students	18	60.0
	Postgraduate students	12	40.0
Gender	Male	20	66.7
	Female	10	33.3
Ethnicity	African Caribbean	15	50.0
	White	9	30.0
	Indian	6	20.0

P < .05*
P< .001**

RESULTS – within study

Table 2. Means and standard deviations for study outcomes across assessment points ($N = 30$).

Outcome variable	Group	Week 0 M (SD)	Week 4 M (SD)	Week 12 M (SD)
Academic Procrastination	Active	27.20 (6.35)	19.40 (5.46)	19.33 (4.37)**
	Delayed	24.13 (4.88)	20.40 (4.59)	19.67 (4.60)*
Perceived Academic Stress	Active	19.20 (3.83)	19.27 (3.80)	11.53 (3.93)**
	Delayed	18.67 (2.69)	17.87 (1.64)	12.00 (4.11)*
Academic Engagement	Active	21.13 (2.50)	24.13 (2.67)	26.07 (2.89)**
	Delayed	20.26 (2.84)	23.07 (4.18)	24.20 (3.41)*
Academic Self-Efficacy	Active	18.07 (2.89)	22.47 (4.17)	22.87 (3.70)**
	Delayed	18.73 (2.93)	21.93 (3.83)	23.40 (2.69)*
Cognitive Mindfulness	Active	22.80 (4.35)	28.80 (2.57)	28.13 (2.67)*
	Delayed	21.53 (2.38)	22.87 (1.73)	27.07 (4.68)**

2- way Anova

A series of 3 (Time: Week 0, Week 4, Week 12) × 2 (Group: active, delayed) mixed-design ANOVAs were conducted to evaluate the impact of the intervention across five academic and psychological outcome measures.

For cognitive mindfulness, the mixed ANOVA revealed a statistically significant Time × Group interaction effect, indicating that the trajectory of mindfulness scores over the 12 weeks differed significantly between the two conditions. Decomposition of this interaction via independent-samples *t*-tests showed no baseline differences between the Active ($M = 22.80$, $SD = 4.35$) and Delayed ($M = 21.53$, $SD = 2.38$) groups at Week 0 ($p > 0.05$). However, a large between-group difference emerged at Week 4, $t(28) = 7.41$, $p < 0.001$, $d = 2.80$, driven by a sharp increase in the Active group ($M = 28.80$, $SD = 2.57$) while the Delayed group showed little change during this period ($M = 22.87$, $SD = 1.73$). By Week 12, the difference in cognitive mindfulness was no longer statistically significant ($p = 0.454$), suggesting the Delayed group reached a similar level following receipt of the intervention.

QUALITATIVE: WEEK 12

When evaluating the helpful aspects of the VR mindfulness, participants highlighted several core benefits. Over a quarter of the sample pointed to the high-quality digital graphics and visual architecture (n = 8, 26.7%), described the immersive laboratory experience as uniquely engaging or "hypnotic" (n = 8, 26.7%), or noted that it directly helped them gain deeper psychological insight (n = 8, 26.7%). The remaining participants explicitly characterised the sessions as relaxing (n = 6, 20.0%).

Conversely, when prompted to identify limitations or areas requiring improvement, the feedback centred heavily on logistical availability. Forty per cent of the sample (n = 12) expressed a desire for the intervention to be more widely available for regular, long-term use. Additionally, a third of the cohort (n = 10, 33.3%) suggested that the duration of the VR intervention sessions should be lengthened, while some noted that the mindfulness exercise structures required an initial acclimation period to engage with effectively (n = 8, 26.7%).



QUALITATIVE: WEEK 12

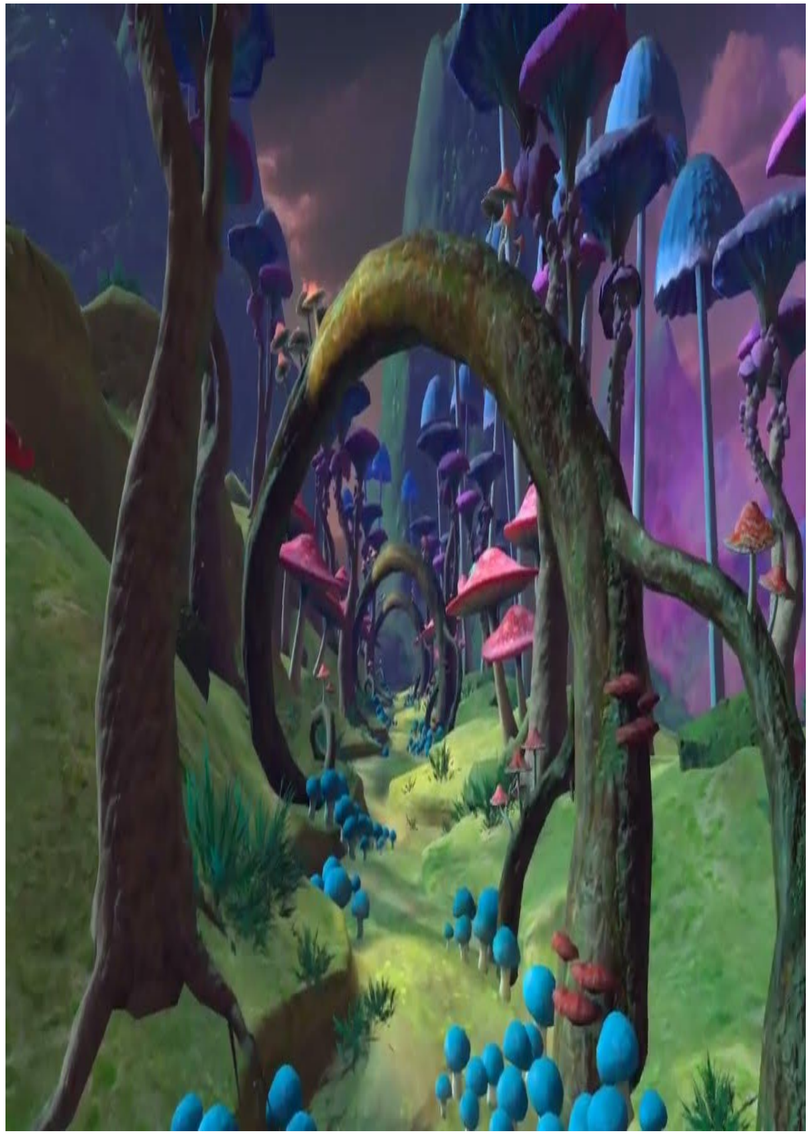
The qualitative feedback aligned with the quantitative improvements observed across student behavioural tracks. Regarding academic procrastination, the participants reported that the intervention successfully enhanced their overall academic confidence and rendered their procrastination habits more manageable ($n = 30$, 100.0%). Similarly, the intervention was perceived as highly supportive of student stress management; the vast majority of participants found that their perceived academic stress became more manageable ($n = 24$, 80.0%), while the remaining cohort reported a meaningful reduction in intrusive, stress-induced thoughts ($n = 6$, 20.0%).

Finally, the VR mindfulness demonstrated a subjective impact on institutional engagement. The majority of the sample reported that the training increased their reflective awareness of their internal problems ($n = 18$, 60.0%), while others felt a heightened sense of intrinsic motivation to actively engage with their formal academic studies ($n = 12$, 40.0%). Concluding the feedback loop, a clear majority suggested that the intervention framework should be made accessible for longer durations ($n = 20$, 66.7%), and a final third recommended that VR mindfulness tools should be formally integrated into university curriculum teaching models and student well-being support services ($n = 10$, 33.3%).



DISCUSSION

The findings from this split-plot repeated-measures design provided preliminary support for the pilot study's primary hypotheses. As anticipated, there was a statistically significant main effect of time across the 12-week intervention framework. For both the active and delayed groups, academic engagement, cognitive mindfulness, and academic self-efficacy significantly increased from baseline to Week 12. Concurrently, academic procrastination and perceived academic stress demonstrated significant post-intervention reductions. The intervention's positive effects persisted even after accounting for participants' varied histories of procrastination and the frequency of their independent use of the Kokua TRIPP app. This analysis suggests that improvements in psychological outcomes were independent of app usage frequency or the duration of participants' procrastination. Support was also observed for physiological stress regulation, with both the active and delayed groups showing a reduction in average heart rate following VR cognitive mindfulness sessions.



CONCLUSION

This preliminary study evaluated the effectiveness of an immersive VR cognitive mindfulness intervention and an AI-based mindfulness application in reducing student academic procrastination and perceived academic stress, while improving academic self-efficacy and academic engagement. Overall, the dual-modality intervention appeared feasible, suggesting associations with positive psychological developments and preliminary physiological improvements. Outcomes suggested reductions in perceived academic stress and academic procrastination, alongside increases in cognitive mindfulness, academic engagement, and academic self-efficacy over the 12-week study period. Methodologically, a significant Time × Group interaction was observed only for cognitive mindfulness, capturing the active cohort's accelerated growth at Week 4 and the delayed cohort's subsequent "catch-up" at Week 12. For the remaining outcomes—procrastination, perceived academic stress, academic engagement, and self-efficacy—no significant Time × Group interaction effects were observed. Rather than indicating an intervention deficit, this lack of interaction may reflect a parallel main effect of time, suggesting that both the active and delayed groups achieved statistically comparable, positive improvements by the conclusion of the trial. While these preliminary findings provide encouraging support for integrating immersive VR cognitive mindfulness and AI-based tools within higher education frameworks, the precise mechanisms driving these concurrent changes require further investigation. Future large-scale randomised trials should investigate these timelines using mediation analyses or structural equation modelling (SEM) to map the exact pathways linking immersive VR engagement to downstream self-efficacy, stress regulation, and procrastination outcomes. Ultimately, a more comprehensive understanding of these psychological and physiological processes, achieved through larger and more diverse student samples, may inform the development of scalable, targeted interventions designed to maximise academic engagement, mitigate chronic procrastination, and bolster long-term student retention.



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THANK YOU

COLLABORATION WELCOME

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