

Gamified Reflection: A Minigame-Based Intervention to Prevent Burnout in Students

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ABSTRACT

This paper researches the potential of the application *Burnout Quest* to support university students in learning and applying preventive strategies against burnout. Rather than addressing burnout once it has occurred, *Burnout Quest* aims to build early awareness and strategy use through interactive, metaphor-based minigames. The mobile prototype incorporates psychological skills such as boundary-setting and self-compassion in a game-based format designed to encourage reflection. A mixed-methods evaluation with 15 students involved pre- and post-session questionnaires measuring state anxiety and confidence in strategy use, as well as qualitative feedback on the app's gamified features. Results showed a significant decrease in anxiety and a large increase in self-reported confidence after a single session. Thematic analysis further revealed that metaphors, narrative framing, and visual feedback helped users reflect on their own behaviours and emotional patterns. These findings suggest that lightweight gamified tools like *Burnout Quest* may offer effective, engaging support for students to proactively manage academic stress and prevent burnout.

Keywords

Burnout, gamification, serious games, Human-Computer Interaction, preventive strategies, mental health, young adults

1 INTRODUCTION

Burnout is a psychological syndrome characterised by emotional exhaustion, cynicism, and reduced efficacy, typically resulting from prolonged stress [19]. While originally studied in workplace settings, burnout is increasingly prevalent among university students due to academic overload, financial stress, and social isolation [6]. Unlike workplace burnout, student burnout often manifests as detachment from studies and doubts about academic ability, with long-term impacts on mental and physical health [26]. While preventive strategies like self-compassion and boundary-setting exist, their adoption is hindered by stigma, low accessibility, and the passive nature of traditional interventions (e.g., text-heavy guides or symptom check-lists).

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Gamification, the application of game-like elements (e.g., rewards, interactivity) to non-game contexts to enhance engagement [4], offers a promising alternative. Prior research demonstrates that serious games improve motivation and skill-retention in mental health tools, especially for younger users, by offering more interactive and accessible skill-building than text-heavy methods [8, 10, 13]. However, applications specifically addressing academic burnout and preventive skills through interactive formats remain limited.

This project addresses that gap by proposing and evaluating a gamified mobile prototype that uses unlockable minigames to teach preventive strategies such as boundary-setting and reframing. The goal is to offer early, accessible support that helps students manage stress proactively before it escalates into clinical burnout.

This paper first outlines the problem statement and research questions, reviews relevant literature, describes the methodology, and then presents the results, discussion, and finally the conclusion.

2 PROBLEM STATEMENT

A range of digital mental health tools is available to students, including mindfulness apps and gamified interventions. Mindfulness platforms such as *Headspace* [25] and *Calm* [11] offer guided exercises that have been shown to reduce stress in student populations, but their content is not designed to address the specific cognitive and behavioural patterns that contribute to academic burnout, such as perfectionism, people-pleasing, decision fatigue, and difficulty setting boundaries [30, 32, 33]. Serious games like *MindLight* [29] and *SPARX* [8] demonstrate that interactive formats can support emotional regulation and engagement, yet their focus remains on anxiety and depression rather than burnout. While anxiety is a relevant component, these tools often overlook academic-context factors like perfectionism and boundary erosion that uniquely shape student burnout. A critical gap exists in the lack of engaging, burnout-specific tools that teach proactive strategies for early recognition and response through interactive, metaphor-driven minigames.

2.1 Research Question

Based on the identified gap in the problem statement, the research question guiding this project is:

RQ: How can a gamified mobile prototype support university students in learning and applying strategies to prevent burnout?

The following subquestions will address the main **RQ**:

SQ1: Does interaction with the prototype increase students’ perceived confidence in applying strategies to prevent burnout?

SQ2: How do specific gamification elements (eg. metaphor, narrative, feedback systems) influence users’ engagement and reflection on preventive strategies for burnout?

3 LITERATURE REVIEW

The literature review was conducted using Google Scholar, with search terms including “student burnout,” “university mental health,” “burnout prevention,” and “gamification,” “serious games well-being”.

3.1 Burnout in Students and Young Adults

3.1.1 Factors Contributing to Burnout

There are various factors that contribute to an individual being at risk of burnout. Among the most mentioned are the following:

Table 1. Factors Contributing to Burnout

Factor	Description
People-pleasing	Leads individuals to prioritise others’ needs over their own, resulting in excessive emotional labour, boundary-setting issues, and exhaustion [30].
Comparison to others	Undermines self-worth and creates perceived failure, increasing stress and dissatisfaction [5].
Isolation	Reduces access to social support, which increases burnout risk [12].
Impostor syndrome	Triggers persistent self-doubt and fear of failure, often resulting in overwork and reduced efficacy [14].
Decision fatigue	Impairs decision-making and increases vulnerability to stress due to excessive cognitive load [33].
Academic perfectionism	Involves unrealistic standards and harsh self-talk, which fuel chronic stress and emotional exhaustion [32].
Overwhelm	Reduces perceived control and increases emotional exhaustion, contributing to burnout onset [34].

3.1.2 Measuring Burnout

Burnout among students is a well-documented phenomenon, often assessed using standardised tools such as the Maslach Burnout Inventory–Student Survey (MBI-SS), which measures emotional exhaustion, cynicism, and reduced academic efficacy [28]. With this tool, participants scoring high in Exhaustion and Cynicism, and low in Academic Efficacy are typically considered to exhibit stronger signs of burnout [28]. Other validated frameworks include the Copenhagen Burnout Inventory (CBI) [15], the Oldenburg

Burnout Inventory (OLBI) [7], and the Burnout Assessment Tool (BAT) [27]. Some tools are not scientifically validated, such as the BMA Risk of Burnout Questionnaire [3], and are designed for public awareness and self-check purposes.

3.1.3 Addressing Burnout

Research suggests that the following strategies can support burnout prevention:

- **Self-compassion:** Neff’s model emphasises self-kindness over self-criticism, particularly useful for perfectionism in academic contexts [22].
- **Cognitive Behavioural Techniques (CBT):** Widely used and evidence-based, CBT includes strategies such as reframing negative thoughts and recognising cognitive distortions [1], as well as setting healthy boundaries [24]. However, engagement with these techniques outside of clinical settings, particularly in self-guided or academic contexts, can be limited.
- **Behavioural Activation:** Breaking tasks into manageable steps (e.g., “chunking”) reduces overwhelm [16]. This approach helps students gain a sense of control and momentum by encouraging small, achievable actions in the face of academic stress.

3.2 Gamified UX for Mental Health

Gamification has emerged as a powerful approach to increase engagement in mental health interventions by applying game mechanics to skill-building tasks [13]. Successful examples like *MindLight* [29] and *SPARX* [8] demonstrate that serious games can improve mood symptoms and emotional regulation through interactive design. However, most of these tools address general conditions like anxiety or depression, and are not tailored to the specific stressors of academic burnout. Therefore, while they may inspire aspects of feature design or evaluation, their focus limits their direct generalisability to this project.

Key insights from gamification and UX literature highlight three principles especially relevant to this project. These principles were selected based on recurring challenges highlighted in gamified mental health literature, including the difficulty of making psychological concepts relatable to users [29], sustaining engagement without introducing pressure or stress [13], and ensuring that tasks match users’ abilities and mental capacity in moments of vulnerability [9].

- **Metaphor-driven design** enhances relatability and engagement by grounding abstract psychological concepts in familiar imagery or interactions. Teachers and designers often describe gamification as a “journey” or “puzzle,” framing tasks as meaningful challenges [2].
- **Feedback systems and progress visibility**, such as rewards, completion indicators, or real-time responses, reinforce motivation and support habit formation over time [13]. However, completion indicators such as progress bars or day streaks could actually increase stress for users who feel they aren’t making meaningful progress.

- **Simplicity and personalisation**, drawn from UX frameworks like the Fogg Behaviour Model [9], increase user adherence by ensuring that motivational elements align with the user’s ability and context. Prior studies underscore the value of intuitive interfaces and low-threshold access in improving long-term engagement [13, 29].

4 METHODOLOGY

This section first outlines the prototype design, followed by a description of the participants, study procedure, and data analysis.

4.1 Prototype Design

A prototype for the mobile web-app was developed using HTML, CSS, and JavaScript. The desktop version can be found at <https://burnout-quest.onrender.com>. The source code can be found on GitLab at <https://gitlab.com/elenamalafronte/prototype>.

The game begins with a welcome box, instructing the user how the app works - each minigame level unlocks only after the previous one has been completed. This design choice was made to address issues related to decision fatigue and the cognitive burden of excessive choice. However, removing choice altogether may result in users feeling a lack of control, which could cause them to feel even worse. Ultimately, it was decided to have a predefined but guided route through the minigames.

Each minigame draws on psychological coping strategies linked to the literature review on burnout reduction and gamification elements. The minigames include:

- **Boundary Defender** *Burnout Aspect*: People-pleasing. *Strategy*: Boundary-setting. *Gamification*: Feedback system (energy hearts). Players accept or deny demands to conserve limited energy, as shown in Figure 1. They then reflect on which request was hardest to deny. *Theory*: CBT [1], which supports assertiveness and energy protection.
- **Visualising Goals** *Burnout Aspect*: Task overwhelm. *Strategy*: Task breakdown. *Gamification*: Feedback system (progress visibility). Players come up with sub-tasks to address a given goal. To prevent stress to the players if they can’t come up with a sub-task, players use unlimited hints. As each task is ticked off the taskbox, the path clears. *Theory*: CBT (Behavioral Activation) [16], promoting progress through manageable steps.
- **One Tree at a Time** *Burnout Aspect*: Social comparison, isolation. *Strategy*: Self-compassion. *Gamification*: Metaphor, visual feedback. Players nurture a struggling tree in a healthy forest, reinforcing that it’s normal to need care when everyone else around them is fine. *Theory*: Self-Compassion Theory [22], which promotes kindness toward oneself and normalises difficulty.
- **Reflection River** *Burnout Aspect*: Impostor syndrome. *Strategy*: Cognitive reframing. *Gamification*: Narrative metaphors. Players “fish” negative thought bubbles and learn to reframe, comfort, and release them. Then they come up with a thought

and apply what they have learnt. *Theory*: CBT [1], supporting the restructuring of negative self-talk.

- **Tip of the Iceberg** *Burnout Aspect*: Overwhelm, impostor syndrome, decision fatigue. *Strategy*: Emotional awareness. *Gamification*: Concept-matching with feedback. Players link emotional states to corresponding needs (e.g., “overwhelmed” → “rest”). If the incorrect solution is selected, players learn why it is incorrect. *Theory*: CBT [1], emphasising awareness of emotional signals and needs.
- **Once Upon a Feeling** *Burnout Aspect*: Academic perfectionism, impostor syndrome, people-pleasing, and isolation. *Strategy*: Social reflection and empathy. *Gamification*: Narrative flip-card. Players explore characters’ diary entries (see example in Figure 2), and are invited to respond with a message to the character. *Theory*: Self-Compassion Theory [22], aiming to normalise struggle and encourage accessible, reflective engagement. This minigame also leverages how people express compassion more easily for others than [22].

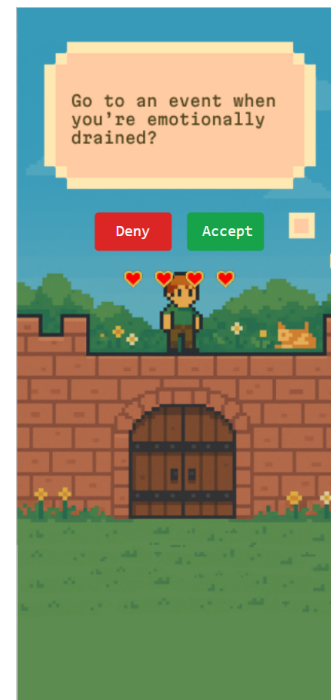


Fig. 1. Screenshot from the minigame *Boundary Defender*

4.2 Participants

The study recruited 15 university students aged 18–26, some of whom reported feeling at risk of burnout, though no formal diagnosis or self-identification was required for participation.

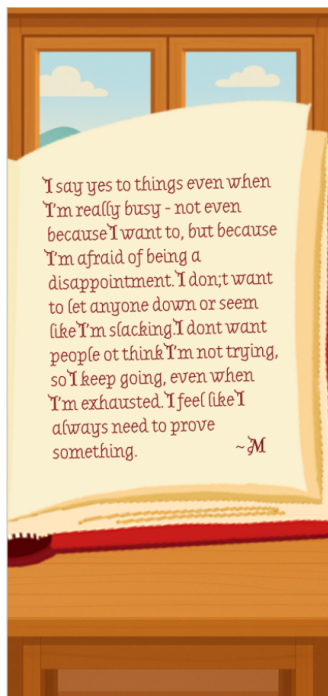


Fig. 2. Screenshot from the minigame *Once Upon a Feeling*

4.3 Measures

Three types of self-report measures were used to assess participants' well-being and confidence before and after interacting with the prototype:

- **Maslach Burnout Inventory–Student Survey (MBI-SS):** Selected items from the Emotional Exhaustion and Academic Efficacy subscales were included to assess baseline burnout levels [28]. The Cynicism subscale of the MBI-SS was not included, as the intervention focused on emotional and efficacy-related outcomes rather than disengagement from academic work. The questions asked can be found in Appendix A.1.
- **State Anxiety Inventory (STAI-S):** The 20-item State subscale from the State-Trait Anxiety Inventory was used to measure current levels of anxiety [20, 31], listed in Appendix A.2
- **Perceived Confidence Scale:** A custom 8-item Likert-scale questionnaire was developed to measure students' confidence in recognising and applying burnout prevention strategies, and is available in Appendix A.3.

4.4 Procedure

- (1) **Pre-test:** Participants first completed an online questionnaire containing the three measures described above: the MBI-SS subscales, the STAI-S, and the perceived confidence scale.
- (2) **Prototype session:** Participants then interacted with the prototype for approximately 20 minutes at their own pace, progressing through each minigame level in a fixed order.

- (3) **Post-test:** Participants repeated the STAI-S and confidence scale to assess any immediate changes in anxiety and perceived strategy confidence. The MBI-SS was not re-administered, as burnout levels were not expected to change after a single session. Following the post-test, a semi-structured interview was conducted to explore participant engagement, clarity of the metaphors used, and the perceived usefulness of the prototype. Interview prompts can be found in Appendix A.4, and sessions were audio-recorded for later analysis.

4.5 Data Analysis

Paired-sample t-tests were conducted in JASP¹ to evaluate pre-post changes in state anxiety and perceived confidence scores.

Because the MBI-SS was designed as a dimensional tool rather than a diagnostic instrument, it does not include validated cutoff scores. This reflects the fact that burnout is not a formally defined psychiatric disorder, and that threshold values can vary across populations and contexts [21, 23]. To enable relative comparison despite the small sample size, participants' EX and AE scores were divided into tertiles, following instruction from the original MBI manual [17, 18]. Participants' EX and AE scores were each sorted in ascending order and divided into three equal groups (tertiles), representing low, moderate, and high levels of the burnout sub-scales. Group-level differences in outcome variables were explored descriptively by comparing average changes in state anxiety and confidence across low, moderate, and high tertile groups.

Finally, thematic analysis was used for the qualitative results.

5 RESULTS

The following section details the results of the study.

5.1 Questionnaire

To examine the effects of the app on participants' state anxiety and self-confidence, paired-samples t-tests were conducted in JASP comparing pre- and post-test scores. Prior to the analyses, the normality of the difference scores was assessed using the Shapiro–Wilk test. For both outcome measures, the assumption of normality was met, with $p = .904$ (> 0.05) for state anxiety and $p = .509$ (> 0.05) for confidence, indicating that parametric tests could be appropriately applied. Descriptive statistics for the changes in state anxiety and confidence are shown in Table 2. The raw pre- and post-test scores for each participant are provided in Appendix B.

5.1.1 State Anxiety Scores

A paired-samples t-test was performed to evaluate whether there was a difference between participants' state anxiety scores before using the app and after using the app. The results indicated that the state anxiety scores after using the app ($M = 29.13$, $SD = 7.03$) were significantly lower than before using the app ($M = 39.13$, $SD = 9.99$), $t(14) = 5.48$, $p < .001$, $d = 1.41$, 95% CI [0.68, 2.13].

¹<https://jasp-stats.org/>

Table 2. Descriptive Statistics

	Δ state	Δ confidence
Valid	15	15
Mean	10.000	4.867
Std. Deviation	7.071	3.091
Shapiro-Wilk	0.973	0.949
P-value of Shapiro-Wilk	0.904	0.509
Minimum	-1.000	0.000
Maximum	24.000	11.000

5.1.2 Confidence Scores

A paired-samples t-test was performed to evaluate whether there was a difference between participants' confidence scores before using the app and after using the app. The results indicated that the confidence scores after using the app ($M = 33.07$, $SD = 3.43$) were significantly higher than before using the app ($M = 28.20$, $SD = 4.04$), $t(14) = -6.10$, $p < .001$, $d = 1.58$, 95% CI [0.80, 2.33].

5.1.3 MBI-SS Scores

Participants' Emotional Exhaustion (EX) scores ranged from 7 to 23, and Academic Efficacy (AE) scores from 5 to 31. To allow for exploratory group comparisons despite the small sample size ($N = 15$), participants were divided into tertiles based on their EX and AE scores. Individual scores, tertile groupings, and changes in outcome measures are presented in Table 3.

No inferential statistical tests were conducted on MBI-SS data. Instead, descriptive patterns were examined across tertile groups. Participants in the higher EX tertiles showed greater average reductions in state anxiety than those in the low EX group, while confidence gains were highest in the moderate EX tertile. For AE, the largest average reduction in anxiety occurred in the low efficacy tertile, whereas confidence gains were greatest in the high efficacy tertile. These trends are summarised in Table 4.

Table 3. Participant Tertile Grouping and Change Scores

ID	EX Tertile	AE Tertile	EE	AE	Δ State	Δ Confidence
1	moderate	moderate	15	27	17	6
2	low	low	10	21	3	4
3	high	low	19	13	20	2
4	moderate	high	14	31	16	3
5	low	high	9	29	2	5
6	moderate	high	15	31	11	7
7	moderate	moderate	12	26	9	11
8	high	low	19	19	11	6
9	moderate	low	16	22	13	6
10	low	moderate	7	26	8	0
11	high	low	23	22	24	2
12	high	moderate	21	25	8	6
13	high	high	17	29	3	6
14	low	high	10	30	6	9
15	low	moderate	12	25	-1	0

Table 4. Mean Change Scores by Exhaustion and Efficacy Tertiles

Tertile Group	Avg. Δ State Anxiety	Avg. Δ Confidence
<i>Exhaustion tertile (EX)</i>		
High	13.2	4.4
Moderate	13.2	6.6
Low	3.6	3.6
<i>Academic Efficacy tertile (AE)</i>		
High	7.6	6.0
Moderate	8.2	4.6
Low	14.2	4.0

5.2 Interview

In addition to evaluating perceived confidence in applying strategies (SQ1), the interviews were also analysed to explore how specific gamification elements contributed to user engagement and reflection (SQ2). The following themes were identified through thematic analysis of the interview transcripts.

5.2.1 Emotional engagement and design appeal

Participants consistently described the app as calming, gentle, and visually pleasant. The narrator's tone and ambient visuals were highlighted as particularly soothing:

"Very fun, I loved how sweet the narrator was."

"It was very chill. Kind of calming, kind of meditative."

These responses suggest that the app's visual and narrative choices contributed to a low-pressure atmosphere, which participants found approachable.

5.2.2 Support for self-reflection and awareness

Many participants described gaining validating, eye-opening insight into stress-related behaviours they had not previously recognised as signs of burnout:

"It made me realise I've done these things in the past without realising how much I didn't defend my boundaries."

This quote illustrates how the app encouraged reflection on daily behaviour patterns. Other participants reported moments of recognition when reading character stories:

"Reading these stories made me realise that there were many times where I myself have felt this way."

"I realised how big of a people-pleaser I am."

These observations suggest the reflective structure of the app allowed for relatable interpretation of emotional content.

5.2.3 Minigame-specific insights

Each minigame elicited different responses in terms of clarity, usefulness, and emotional relevance.

Boundary Defender made emotional labour and boundary-setting more tangible for some users:

"It made me think about how I handle these situations."

Another participant reflected on how the game format influenced their choices:

"I intentionally saw the character and thought that was not me... If it were actually me, I'd have more difficulty denying them."

This suggests that the perceived detachment from real-life consequences allowed participants to make ideal choices in-game, even if they might struggle with those same boundaries in real situations.

Visualising Goals was seen as reinforcing strategies already known to participants:

"Breaking down tasks always helps me... it was fun to practice."

Participants appreciated the "heartwarming" metaphor of a clearing path, as it made planning feel more concrete. While the task breakdown format was recognised as useful, the strategies were already part of most users' routines.

One Tree at a Time received mixed responses. For some, the act of nurturing a tree served as a clear metaphor for self-care, with one participant describing it as "so wholesome". However, others struggled to see themselves in the metaphor: "It felt quite random, I didn't feel a connection with the tree being me." This disconnect may stem from personal experiences, as one participant even noted they were "bad at taking care of plants," which is why they said it affected the metaphor's emotional resonance. This highlights how individual backgrounds can affect how metaphors are received.

Reflection River was often described as personally meaningful or thought-provoking:

"Omg I loved this... I'm gonna try this in my real life when it happens again."

However, a few participants found the distinctions between strategies unclear:

"I forgot which one was which. I just had to think of something."

This indicates some difficulty in understanding the difference between options like reframing and comforting.

Tip of the Iceberg was mostly understood but sometimes caused confusion:

"It felt wrong to still have to click the 'wrong' options like 'ignoring'..."

"I thought the iceberg would be picking the option you want to do... that was a bit confusing."

Once Upon a Feeling encouraged several users to reflect on emotions through another person's story:

"Reading these stories made me realise that others feel this way too — it was eye-opening."

Most participants noted the third-person framing made it easier to show compassion:

"I think framing it as a third party and trying to help a friend rather than yourself was a very useful technique because after finishing it, like I realised, oh I should be able to tell this to myself as well. But it was much easier to give advice to someone else rather than myself."

However, one participant mentioned a drop in engagement due to the length of the minigame:

"At the end, I was sort of clicking without reading because I felt it took too long."

5.2.4 Reinforcement of existing strategies

Many participants described the prototype as validating rather than instructive. It helped them recall and re-engage with coping techniques they already knew:

"Interesting game, I already practice this in real life."

"It didn't give me new info, but it was a good reminder."

Others found this limiting:

"It didn't feel useful to me because I already use all these techniques — there was nothing new."

5.2.5 Usefulness in preventing burnout

Participants generally saw the prototype as useful for early-stage reflection and awareness-building, rather than intensive intervention.

"I think it might help people who are not self-aware."

"It could actually make you realise you're about to burn out."

5.2.6 Suggestions for expansion

Suggestions focused on adding flexibility and variety. Some wanted more control over which levels they interacted with:

"Maybe a skip button if a level doesn't feel useful."

"It would be nice to choose which levels you want to do — sometimes I felt stuck doing ones I didn't need."

Other suggestions included additional support features:

"More reminders to be gentle with yourself." "Add more stories, maybe cute sounds or notifications."

In addition to these suggestions, some participants reported usability issues within certain levels. These included moments of confusion (*Tip of the Iceberg*) or reduced engagement (*Once Upon a Feeling*), as seen in the minigame-specific feedback.

Overall, these reflect a desire for clearer, more personalised and emotionally responsive experiences,

6 DISCUSSION

The following section discusses the results found during the study.

6.1 Addressing the Research Questions

This study explored the research question: *How can a gamified mobile prototype support university students in learning and applying strategies to prevent burnout?*. The findings suggest that the prototype was effective as a reflective tool for short term use. Qualitative results suggested the app supported both emotional engagement and strategy reinforcement, particularly through metaphor-based interaction and narrative framing.

SQ1 asked whether interaction with the prototype increases students' perceived confidence in applying burnout prevention strategies. Results showed a statistically significant increase in confidence

scores from pre- to post-test, with a large effect size. State anxiety also decreased significantly, indicating the prototype's potential to support both self-efficacy and short-term emotional relief.

This aligns with the app's design intent to make strategies like boundary-setting, task chunking, and self-compassion feel more accessible. Even participants already familiar with these techniques described the app as a useful reminder. Qualitative feedback further supports this: many users described the app as calming, emotionally validating, and visually approachable, which are factors likely contributing to both increased confidence and reduced anxiety.

The MBI-SS baseline scores offer additional context for understanding variation in participants' responses to the intervention. While no statistical tests were applied to the tertile groupings due to the small sample size, descriptive comparisons suggest that participants with moderate or high emotional exhaustion showed greater average reductions in state anxiety than those in the low exhaustion group. This may indicate that students experiencing more emotional strain were more emotionally responsive to the intervention. In contrast, confidence gains were highest in the high academic efficacy tertile. These findings suggest that, in this sample, confidence gains did not appear to map linearly onto baseline efficacy levels. One possible explanation is that students with higher efficacy may have been more receptive to the intervention's strategies, though other factors, such as emotional readiness or prior experience, could also have influenced responsiveness. While exploratory and not generalisable, these patterns point to the importance of considering how different burnout profiles may interact with gamified mental health tools.

SQ2 explored how gamification elements (metaphors, narrative framing, and visual feedback) influenced engagement and reflection.

Metaphor-based interactions helped participants relate emotionally to burnout-related behaviours. Levels like Reflection River and Tip of the Iceberg guided users through structured emotional tasks, such as reframing negative thoughts or connecting emotions to unmet needs. These tasks were often described as meaningful, suggesting that the metaphors successfully prompted reflection. However, some participants struggled to distinguish between similar response options (e.g., "reframing" vs. "comforting"), which highlights the importance of clear instruction and framing to maximise engagement.

The emotional impact of metaphors also depended on personal relevance. For example, One Tree at a Time resonated strongly with users who related to the imagery of growth and care, but had less impact for others who did not find the metaphor relatable. This variability underscores the need to offer flexible or customisable metaphors in emotionally driven interventions to ensure broader resonance.

Narrative framing also contributed to engagement, particularly through the use of third-person perspective. In Once Upon a Feeling, participants reflected on burnout-related themes via fictional characters. This narrative distance made it easier for some users to express compassion, which they then redirected toward themselves. For participants who struggle with direct self-reflection, this structure appeared to provide a safe emotional entry point into topics like stress, impostor syndrome, or perfectionism.

Structure and pacing were additional elements that shaped user experience. Most participants appreciated the app's linear progression, which reduced decision fatigue and ensured exposure to all levels. However, a few users expressed a desire to skip or reorder levels. This reintroduces a key tension identified during the design phase: while user autonomy is important, full control may lead users to avoid tasks they might benefit from, potentially undermining the intervention's purpose.

Overall, the app was experienced more as reinforcing than instructive. While this limited its novelty for some users, many appreciated it as a prompt to apply existing strategies in a more reflective, emotionally engaging format. The gamified delivery helped make these strategies feel accessible and relevant, aligning with the app's goal of encouraging preventative reflection in everyday life.

6.2 Limitations

While the results of this study are promising, several limitations should be noted.

The absence of a comparison group limits how confidently the results can be interpreted. The prototype was not evaluated against other interventions such as CBT-based tools or non-gamified mental health apps. Without a control group, it is unclear whether the observed changes in anxiety and confidence were due to the intervention or other factors, such as temporary mood changes or participants' expectations. As a result, it is difficult to determine the relative effectiveness of the intervention, and conclusions made about the tool should remain tentative.

The metaphors used in the minigames were not universally effective. While some participants found the metaphors particularly resonant, others reported difficulty connecting to the imagery. This highlights how fixed metaphors were not suited to all users equally, which could limit the emotional impact or clarity of certain minigames. As metaphors play a central role in the design, these varied emotional responses may have influenced the effectiveness of the intervention.

Certain design elements caused momentary confusion for users, affecting the usability of the app. While most users navigated the app without issue, a few users required clarification during the use of the app. This suggests that certain instructions or interactions may have been ambiguous, which could have affected the flow of the game (and thus user engagement and understanding). Even small moments of confusion may have influenced how users interacted with the tool.

Several limitations arise from grouping MBI-SS subscale scores into tertiles. Though regular in MBI-SS research, the use of tertiles introduces arbitrary groupings and risks oversimplifying continuous data, which can exaggerate group differences/similarities. With only five participants per tertile, these divisions are especially sensitive to outliers, and no statistical comparisons could be carried out between groups. Tertiles offer only relative indicators of burnout severity, and their interpretive value is limited without validated thresholds or a control group.

Another limitation of this study was that the sample was small and self-selected: only 15 participants took part, all of whom voluntarily signed up and may have had a pre-existing interest in mental health

or gamified tools. This limits the generalisability of the findings to a broader student population, particularly those less receptive to this kind of tool.

The intervention was tested in a single 20-minute session, meaning long-term effects remain unknown. While this short exposure led to measurable short-term changes, the study does not address habit formation, sustained engagement, or whether the strategies would be applied over time.

Finally, the study measured perceived confidence but did not track behavioural outcomes. Although participants reported increased confidence, it remains unclear whether they would apply the intervention's strategies in real-life contexts beyond the study setting.

6.3 Recommendations for Future Work

Several directions for future work emerge from this study. First, future versions of the prototype could incorporate greater personalisation and branching paths to better accommodate users with different levels of familiarity and emotional resonance. The options might include allowing users to select metaphors that feel relevant to them or choose the order in which they complete minigames. Iterative testing could then help identify which combinations of choices lead to the most effective and engaging experiences.

Second, the addition of optional educational content could be beneficial for more advanced users. This might take the form of real-life examples, coping scenarios, or links to external resources, allowing the app to remain lightweight while still offering added depth for those who seek it.

Third, the long-term effects of the prototype are currently unknown. Follow-up research should investigate whether the short-term increases in confidence and reductions in anxiety are sustained over time, and whether users begin to apply the strategies in their daily routines. Importantly, future studies should explore whether this app has a preventive effect on burnout in the long run.

Fourth, the app should be tested across a broader range of users, including students from more diverse educational, cultural, and psychological backgrounds. This includes individuals with prior experience of clinical burnout or therapy, whose needs may vary from those of the current study sample.

Finally, future studies should include control conditions to assess the prototype's relative effectiveness. Comparing the current prototype to non-gamified versions or other existing mental health tools would help determine whether observed benefits stem from specific design features such as gamification, metaphor, or interactivity.

7 CONCLUSION

This study explored a gamified mobile prototype designed to help university students prevent burnout through interactive, metaphor-based minigames. Results showed reduced anxiety and increased confidence in coping strategies after a short interaction with the app. The app elicited reflective engagement, though the effectiveness of specific metaphors varied across use cases. Overall, the prototype shows promise as an accessible early intervention for student well-being.

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A TOOLS

A.1 Selected MBI-SS Items

Read each statement and select the appropriate response to indicate how you feel from 0 to 6, with 0 being never and 6 always. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Table 5. Maslach Burnout Inventory - Student Survey (MBI-SS)

Item	Statement	0	1	2	3	4	5	6
EX1	I feel emotionally drained by my studies.							
EX2	I feel used up at the end of a day at university.							
EX3	I feel tired when I get up in the morning and I have to face another day at the university.							
EX4	Studying or attending a class is really a strain for me.							
EX5	I feel burned out from my studies.							
AE1	I can effectively solve the problems that arise in my studies.							
AE2	I believe that I make an effective contribution to the classes that I attend.							
AE3	In my opinion, I am a good student.							
AE4	I feel stimulated when I achieve my study goals.							
AE5	I have learned many interesting things during the course of my studies.							
AE6	During class I feel confident that I am effective in getting things done.							

A.2 State Anxiety Subscale

Read each statement and select the appropriate response to indicate how you feel right now, that is, at this very moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Table 6. State Trait Anxiety Inventory Items and Response Options

Item	Statement	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so
1	I feel calm.				
2	I feel secure.				
3	I feel tense.				
4	I feel strained.				
5	I feel at ease.				
6	I feel upset.				
7	I am presently worrying over possible misfortunes.				
8	I feel satisfied.				
9	I feel frightened.				
10	I feel uncomfortable.				
11	I feel self confident.				
12	I feel nervous.				
13	I feel jittery.				
14	I feel indecisive.				
15	I feel relaxed.				
16	I feel content.				
17	I am worried.				
18	I feel confused.				
19	I feel steady.				
20	I feel pleasant.				

A.3 Confidence Scale Items

Please rate how confident you feel right now in your ability to do the following.

Table 7. Confidence Scale Items and Response Options

Item	Statement	1	2	3	4	5
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	I feel confident I can recognise early signs of burnout in myself.					
2	I feel confident I can set boundaries between study time and personal time.					
3	I feel confident I can take intentional breaks to support my well-being.					
4	I feel confident I can use strategies to manage academic pressure.					
5	I feel confident I can use strategies to manage overwhelm.					
6	I feel confident I can practice self-compassion when I experience stress.					
7	I feel confident I can practice self-compassion when I am confronted with handling setbacks.					
8	I feel confident I can talk to others or seek support when I'm feeling burned out.					

A.4 Interview Questions

Table 8. Semi-Structured Interview Questions

Section	Question
Warm-Up	Can you tell me about your experience using the prototype overall?
Usability	Can you walk me through your thoughts at each level? (Boundary Defender, Visualising Goals, One Tree at a Time, Reflection River, Tip of the Iceberg, Once Upon a Feeling).
	Did the game flow feel natural?
	Were there moments that felt confusing?
	Were there any points where you felt stuck or unsure about what to do next?
Perceived Impact & Relevance	Do you currently use any tools or strategies to cope with stress? Could this game fit into your routine?
	Do you think this could help someone who is stressed or at risk of burnout?
Closing & Suggestions	If you could change or add one thing to the game, what would it be?
	Is there anything else you'd like to share about your experience?

B RAW RESULTS

Table 9. Raw Pre- and Post-Test Scores for State Anxiety and Perceived Confidence, with MBI-SS Subscale Scores

ID	State_pre	State_post	Conf._pre	Conf._post	EX	AE
1	46	29	25	31	15	27
2	23	20	33	37	10	21
3	47	27	33	35	19	13
4	50	34	24	27	14	31
5	31	29	30	35	9	29
6	31	20	32	39	15	31
7	29	20	25	36	12	26
8	35	24	31	37	19	19
9	52	39	27	33	16	22
10	33	25	31	31	7	26
11	55	31	30	32	23	22
12	44	36	24	30	21	25
13	47	44	22	28	17	29
14	35	29	23	32	10	30
15	29	30	33	33	12	25

C USE OF AI

AI tools were used to support the author's own work during the development of this thesis and prototype. ChatGPT was consulted for debugging HTML and JavaScript code, resolving LaTeX formatting issues, and improving phrasing of pre-written sentences. It was also used to enhance the visual style of some hand-drawn images. Grammarly was used to check grammar, but no text was generated with it. No AI tools were used to generate new text.