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EngageAI: Transforming student engagement through ethical AI-driven nudging in online higher education

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Student engagement in digital learning environments presents a critical challenge, with attrition rates in online delivery modes averaging six times higher than traditional face-to-face courses (Wang et al., 2023). To address this pressing issue, the EngageAI project introduces an innovative AI-driven persuasive technology tool that delivers personalised, real-time nudges to enhance student engagement in digitally rich learning environments.

EngageAI represents a significant advancement in Technology Enhanced Learning by applying behavioural economics principles within educational contexts. While existing tools rely on teacher-determined schedules and group-based messaging, EngageAI leverages individual student behavioural patterns derived from LMS analytics to deliver strategically timed, psychologically informed interventions. This innovation centres on the system's adaptive personalisation capabilities, which analyse individual engagement patterns to identify optimal intervention moments across three critical areas: motivation enhancement, time management improvement, and meaningful instructor interactions. For instance, when analytics indicate a student typically engages with course materials on Tuesday evenings but has missed their usual pattern, the system delivers a contextually appropriate nudge that respects their preferred learning schedule while encouraging re-engagement.

The project's theoretical foundation rests on Thaler and Sunstein's (2009) nudge framework from behavioural economics, ensuring interventions respect freedom of choice while encouraging positive behaviours. Building on Wang and Eccles' (2013) multifaceted engagement model, the system simultaneously targets behavioural, emotional, and cognitive dimensions. Most importantly, EngageAI incorporates Lades and Delaney's (2022) FORGOOD ethics framework, ensuring all interventions meet rigorous standards for Fairness, Openness, Respect, Goals, Opinions, Options, and Delegation. This comprehensive ethical foundation distinguishes EngageAI from purely technical solutions by consistently prioritising student autonomy, privacy, and dignity throughout the intervention process.

The research methodology employs a within-subjects design implemented in the undergraduate online course Critical Approach to Online Learning. The approach begins with an initial analysis of engagement patterns without AI-based nudging, establishing baseline data that informs the strategic deployment of interventions. The methodology then tests the intervention in one semester, comparing results to the non-intervention baseline, followed by refinement and retesting in subsequent semesters. This systematic approach unfolds across five carefully structured phases: framework development, tool creation, prototype testing, refinement and scaling, and final evaluation. Throughout each phase, continuous ethical review and stakeholder feedback ensure sustained alignment with educational goals and ethical standards.

EngageAI's design principles demonstrate inherent scalability across diverse tertiary contexts. The system's foundation in learning analytics enables seamless adaptation to different Learning Management Systems and course structures, while planned expansion to courses across Business, STEM, Health, and Creative disciplines confirms its broad applicability across academic disciplines.

References

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