

A Robot-Facilitated Educational Escape Room: Design and Results from a Pilot Study in Higher Education

Abstract

This paper presents a pilot study on the design and preliminary results of an Educational Escape Room (EER) facilitated by the robot NAO and focused on enhancing citation skills in academic writing among first-semester students. The pilot aimed to explore the feasibility of integrating a robotic facilitator into a 45-minute EER session and its potential to foster students' motivation to engage in citing and referencing, which are critical components of academic writing. A total of 52 undergraduate students participated in this technology-enhanced educational experience, which combined human collaboration in teams and robotic facilitation. Working in groups of 5-6, students tackled collaborative problem-solving tasks related to citation and referencing styles, guided by the NAO robot, which provided structure and narrative flow for 10 parallel teams. The study explored how integrating a robotic facilitator into a 45-minute EER session could foster students' motivation and learning outcomes. The pilot study revealed both positive assessments of the robotic facilitator and significant correlations between students' perceptions of the robot's sociability, agency, and animacy and the reported levels of interest/enjoyment and perceived competence. The findings highlight the importance of perceived social attributes of educational robots in driving students' intrinsic motivation. Participants with prior exposure to robots reported significantly higher levels of motivation compared to those without such experience, pointing to a familiarity effect. The study also identified some challenges related to perceived competence, with participants reporting lower self-assessment of their citation skills despite high levels of interest and enjoyment. The paper concludes by addressing these challenges and proposing future directions, including integrating more explicit reinforcement strategies in EER settings. Our pilot study contributes to the evolving field of hybrid human-robot systems, showcasing the potential of using robots in education to enhance motivational and learning outcomes.