

Social Robots as Assistants to Promote Sustainable Habits and Attitudes Among Future Educators: an Experience from Co-creation and Environmental Psychology

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We currently live in a technological society, and it appears this will continue into the future. In this context, we consider the use of digital technology (DT) in educational settings as an ally to promote sustainable habits and attitudes. An example of this is social robots. These robots are programmed to understand and respond to human signals. Research linking the use of these robots with promoting sustainability is scarce (Scheutz & Scheutz, 2021).

The aim of this work is to investigate the use of social robots in the classroom from the perspective of environmental psychology (Tam & Milfont, 2020), which focuses on understanding human behaviour towards the environment and how psychological techniques can be used to induce changes. In this case, the change is aimed at promoting sustainability through interaction with social robots, which are used as motivating and supportive elements in this process.

We conducted exploratory research with a mixed-methods approach based on a pilot experience with future teachers. Specifically, we conducted a pilot trial with students from the Primary Education Degree at the University of Alicante during the 2023-24 academic year. A total of 48 students participated, along with 3 computer engineers and a psychologist/teacher. The data collection tool was an ad hoc questionnaire based on the UTAUT model of technological acceptance (Dwivedi et al., 2020). The questionnaire included quantitative items on a Likert scale and qualitative items. The process included a co-creation session (Sanders & Stappers, 2008) to program the social robot Pepper to interact with teachers and children in projects and experiences about sustainability. The work proposal was for future teachers to propose specific principles and aspects to be integrated into Pepper's design. Pepper interacted during the session with demonstrations of its capabilities, and participants worked collaboratively based on ideas, opinions, and proposals. At the end of the session, the questionnaire was distributed to the students.

The results showed high levels of acceptance and perceived utility in the use of social robots to promote sustainability in educational contexts. There was a strong influence of factors such as performance expectancy and effort expectancy, suggesting that future teachers see social robots not only as advanced technological tools but also as effective allies in teaching sustainable practices. The vast majority consider that social robots can be designed not only for practical and operational functions but also to foster interaction that reinforces

environmental awareness and actions among people.

We conclude by suggesting how these robot-human interactions can facilitate pro-environmental behaviour changes. However, it is essential that the use of technology, in this case, Pepper, is approached from a pedagogical and not merely technological perspective. This is why we proposed this interdisciplinary co-creation experience, which adds richness and meaning to how sustainability can be worked on in the educational context with digital technology. Overall, further research on this theme is needed to define new technological paths from sustainable approaches.

References

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