Social Robotics in Education: A Multidisciplinary Approach to Teaching Affective Movement Planning

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Abstract—This paper presents the planning, execution and results of Australia's first undergraduate social robotics course at UNSW titled: *Social Robotics: Movement Design for Human-Robot Interaction (HRI)*. The course was taught from within the Faculty of Art and Design and open to students from all disciplines. The present research examines the unusual, affective and nuanced resulting morphologies and movements generated by students in the course with non-anthropomorphic low degrees of freedom (DoFs) robots, and the art-based approach that fostered these outcomes. The students approached their designs equipped with a unique combination of knowledge and skills; they were first taught the core concepts of human-robot interaction and social robotics theory, which they then put in to practice designing expressive movements through animation puppeteering techniques, and then brought their robot prototypes to fruition with introductory electronics. To counteract the propensity for students to design humanoid or 'mecha' morphologies, the morphology of the robot was limited to a recycled milk bottle. In response to this, students focused on embodied expression without relying on the articulation of facial features or complex gestures. The resulting movements were nothing short of compelling. In a reversal of traditional robotics design sequences, the movements generated by the students quickly suggested a potential morphology, 'personality', and even a practical application for their social robot. The author presents the course as a prototypical example, and posits recommendations for best practice in social robotics education which encourages a multidisciplinary approach in a field that is by its very nature, multidisciplinary.

Keywords— social robotics, morphology, animation, education, affective