Is WALL-E Human? : Introducing STEM and ethical decision-making to younger audiences

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ABSTRACT

Educating children, particularly girls, in Science, Technology, Engineering, and Mathematics (STEM) and ethics is necessary for an inclusive, diverse data-driven society[8]. This poster illustrates the positive impact of engaging younger audiences, offering insights into encouraging ethical considerations in STEM.

CCS CONCEPTS

• **Social and professional topics → Computing education**; **K-12 education**;

KEYWORDS

women in computing, action research, education

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1 INTRODUCTION

Robogals[9] aims to decrease the STEM gender gap, where only 21% of the UK workforce are women[14], by encouraging primary school girls to cultivate their curiosity and self-confidence. This disparity is particularly evident in Computer Science, where women are negatively affected by biased algorithms[11], smart devices[2], and in software engineering[13]. Given that technology is not value neutral[6], ethical decision-making should be taught simultaneously in diversifying STEM.

2 DIVERSITY AND ETHICS IN EDUCATION

Increased awareness of the STEM gender gap has prompted investment in equality. Non-profits such as Code First: Girls[5], Robogals, and Stemettes[12] encourage, inspire, and educate females in STEM. Recent dilemmas in research ethics[4], data protection[10], and robotic personhood[7] has led to universities including ethics courses within scientific disciplines[3]. Whilst diversity and ethics are both goals within STEM, education is distinct in these areas. As controversies within these disciplines impact women as a whole, a diverse and ethical STEM education should happen simultaneously.

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3 ROBOGALS ST ANDREWS

Robogals St Andrews aims to encourage diversity and ethics in STEM. Volunteers teach students how to build robots and understand programming languages through ethical lenses. For example, by asking 'Is WALL-E human?', children can broaden their understanding of robots' capabilities and develop the ability to build ethical systems. Robogals teaches classes of all genders but special attention is placed on girls. Within 4 weeks, Robogals taught 11 STEM workshops to 252 primary school children, of which 58% identified as female[1]. From the feedback obtained, 82% girls showed interest in future STEM participation and 99% students enjoyed the workshops. Class teachers were surprised by the unpredictable interest demonstrated by girls, suggesting the importance of increased exposure and encouragement for STEM participation.

4 CONCLUSIONS

Primary school education in important for encouraging girls in STEM. Greater appreciation of ethics is essential to prepare future generations for the challenges to be faced in our data-driven society.

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