INSPIRE: Fourth Industrial Revolution Teaching in the Classroom

Conference or Workshop Item

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ABSTRACT

The INSPIRE pilot project provides core evidence on key interventions and CPD needs to enable a 4IR (Fourth Industrial Revolution) curriculum within secondary education. Across the UK, there is currently no systematic pedagogical design or evaluation to support interdisciplinary teaching and learning to include 4IR skills and knowledge. There is also no clear national strategy for schools and FE colleges to follow in how to embed 4IR, including Artificial Intelligence, Robotics and Internet of Things tools, skills and understanding into their teaching. Such a lack of an evidence-based research study impacts our young students in particular and education system in general, and further discriminates against disadvantaged and digitally excluded groups. We applied a design-based research methodology framework and worked with two London based schools to co-design and deliver a series of workshops to 13–14-year-old students introducing them to 4IR skills through engaging practical activities. Within the pilot study we engaged with both co-designers and students to capture opinion, understanding, learning and enjoyment before, during and after the workshops. The significance of this paper is twofold; to identify lessons learnt in developing 4IR skills and knowledge within the curriculum and to share the insights of the adults and young learners throughout the project.

CCS CONCEPTS

• **Social and professional topics** → K-12 education.

KEYWORDS: 4th Industrial Revolution, Artificial Intelligence, Internet of Things, Robotics, Pedagogy, Education, K-12

1 INTRODUCTION / PROBLEM

The fourth industrial revolution (4IR) has been signaled by a swathe of ground-breaking emerging technologies. It is predicted that by 2025, 15% of the workforce is at risk of related disruption, 6% of workers being fully displaced [1]. Job creation is beginning to lag behind job destruction, exacerbated by the COVID-19 pandemic and increasing moves to online and alternative working, those already disadvantaged by gender, race, social movement etc are going to be further challenged by 4IR technologies and advancements. It is the place of the educators to ensure the current and emerging generations are ready for the workplace that they will find themselves in.

2 BACKGROUND / RELATED WORK

Despite significant reform in 2015-17 the UK educational system still holds nothing but a passing reference to 4IR technologies; there is no teaching of skills. While higher education institutions may be slightly more prepared [2] the opportunities afforded to younger students, where there is still an opportunity to engage, excite and shape futures, is virtually non-existent.

3 OVERVIEW / METHODS / RESULTS

This pilot study introduced 4IR technologies in three strands to UK students in two schools. The project was co-designed with a number of teachers and industrial partners. Each strand had a club (one hour) and a full drop-down day. Surveys gathered student opinion throughout the study. Partners and contributors were also surveyed before and after the study. The students enjoyed the strands overall, with the applicability of the Mars rover, the opportunities to explore machine learning image recognition, debate ethics and build physical microcontroller-based devices all proving popular. There were many lessons learnt primarily in terms of resource development, ‘chunking’ of learning and the need for clearer targets for the learners. Overall, however, students of this age proved they were able and willing to engage with and learn about 4IR technologies.

4 CONTRIBUTIONS AND FUTURE WORK

The literature proves there is a need for 4IR-ready learners moving into the workplace, and the pilot study has proven that students are capable of engaging with 4IR learning. The INSPIRE project wants to move policy at a national and international level to include 4IR technologies into the curriculum. There is a need for further exploration with more schools and a wider demographic.

REFERENCES

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