Project Title: Actionable Personalised Learning (PL) Strategies to Improve a Growth-mindset in an Educational Setting using Artificial Intelligence (AI)

Supervisors: Dr Nigel McKelvey, Dr James Connolly, Dr Pamela Cowan

Keywords: Computer Science Education, AI, Growth Mind-set, Personalised Learning, Games Based Learning, AR/VR, Neural Networks

Project Summary:
This study will evaluate a growth mind-set intervention with Computer Science students, in Ireland, where gamification and AR/VR are used to incentivise growth mind-set behaviour. The study measures mind-set with before and after surveys (conducted nationally) and by recording growth mind-set behaviour whilst playing a digital game. This research builds on the work of O'Rourke et al. (2014) applying their findings using gamification to incentivise growth mind-set behaviour to a computer programming contexts in Ireland. The study uses AI, a national survey, a review of gender impacts, socio-economic variables as well as the utilisation of additional technologies to evolve and analyse personalised learning experiences. Within this study, Vygotsky's Social Learning Theory is used as a framework to guide the research identifying key areas such as playful learning, self-regulation, Zone of Proximal Development and the role of the More Knowledgeable Other (MKO).

The data is analysed through the lens of Activity Theory which may unveil that some game elements were effective at incentivising growth mind-set behaviour while others were less effective. The analysis should also serve to highlight the effectiveness of an AI-driven personalised learning experience. The data will position AI within the Irish educational landscape, with specific focus on the teaching of Computer Science. These findings will benefit Coding and Computer Science teachers by providing a clear pedagogy for the effective delivery of personalised learning strategies for Computer Science education that prevents students from developing a fixed mind-set while helping students to exhibit persistence of effort, use of strategy and a mastery response to challenge.

Candidate Qualifications/Requirements: Level 9 Masters Degree in a Computer Science or Computer Science Education related discipline.