Supervision team Main Supervisor: marie.devlin@newcastle.ac.uk
Co-supervisors: (1 & 2) steve.riddle@newcastle.ac.uk, (3) john.colqhoun@newcastle.ac.uk

Research projects

1. Using AI for Personalised Learning Pathways in UK School Curriculum

This project will help to tackle issues raised in national Curriculum and Assessment Review interim report from the UK Government [1] where the findings show that the curriculum is not working for everyone, particularly students with special educational needs and disabilities (SEND) and those from disadvantaged backgrounds. The proposed output from the project is an AI tool that allows teachers to compare individual pupil progress to national benchmark data and to create personalised learning pathways and interventions that ensure those who may be at a disadvantage can achieve their full potential.

[1] UK Government, Curriculum and Assessment Review: interim report, May 2025, available online: https://www.gov.uk/government/publications/curriculum-and-assessment-review-interim-report. Date of Access 24/09/25

2. Ensuring Integrity and Foundational Skill and Knowledge Development in Programming Education in the AI era.

The aim of this project is to create learning opportunities for students to develop and use AI systems when learning to program but also ensure that assessment integrity is maintained. The researcher should explore technical solutions for skill development and design active learning assessments and curriculum enhancements that minimise the risk of plagiarism and over-reliance on AI for complete solutions. Some strategies have been trialled, such as incorporating visual components, emphasizing dev-ops skills, and designing assignments with precise solution constraints [2] but these have not been tested widely nor examined for their impact on student skill development in the longer term.

[2] Bradley McDanel and Ed Novak. 2025. Designing LLM-Resistant Programming Assignments: Insights and Strategies for CS Educators. In Proceedings of the 56th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSETS 2025). Association for Computing Machinery, New York, NY, USA, 756–762. https://doi.org/10.1145/3641554.3701872

3. How AI tools will change the way Software Engineering Teams Work – implications for Team Projects in Computer Science Education.

This project will explore how we should teach Software Engineering team projects given the rapid advance of AI tool capabilities for designing, coding, and testing programs and for AI code assistants to act like an additional member of a development team. There has been some previous work in this area [3] but AI tools have evolved in terms of their capability since then and real-world examples of best practice are needed to better inform curricula. This project will explore human-AI collaboration approaches used by industry that could be adapted and become best-practice for Software Engineering team projects in CS Education.

Marian Daun and Jennifer Brings, 2023, How ChatGPT Will Change Software Engineering Education. In Proceedings of the 2023 Conference on Innovation and Technology in Computer Science Education, Vol. 1 (ITiCSE 2023), Association for Computing Machinery, New York, NY, USA, 110-116, https://doi.org/10.1145/3587102.388815

Applicant skills/background

Project (1) The project would suit someone with experience of the UK education system (or a similar system), good communication skills, an interest in inclusivity and in working with local schools.
Projects (2) and (3) These projects are suited to applicants with an interest in how computing students learn, confident in software development with knowledge of, and active interest in, developments in LLM capabilities.