

CU LTA Conference 2026

Story Session



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Developing Tools Supporting Assessment and Feedback on
Assessments

Problem & Setting

- Novice programming students need formative feedback on their attempts to make progress.
- In large Computer Science cohorts in the Higher Education setting, it can be difficult for teaching staff to provide the required feedback.
- Automating assessment processes facilitating formative feedback *to* students can be effective.
- But, reliance on these automated processes can mean teaching staff miss feedback *from* students.

Research Questions

Primary Research Questions:

1. With an Automated Assessment Tool (AAT) as an analogue of traditional in-person assessment, what AAT features do students offer positive feedback about or indicate a liking/preference for?
2. When students learning programming are given options to return feedback about their experiences through an AAT, how do students make use of these options?

Approach & Timeline

Six-years part-time:

Years 1 & 2 (1-year full time) -

Literature review, pre-implementation data, requirements gathering and system design.

Years 3 & 4 (1-year full time) -

System implementation and testing (including iterative user testing).

Years 5 & 6 (1-year full time) -

Mixed-methods experiment gathering quantitative and qualitative data.

Requirements

A systematic review of literature:

Found a gap about feedback from students supplementing learning analytics from use of AATs facilitating formative assessments in a HE CS setting.

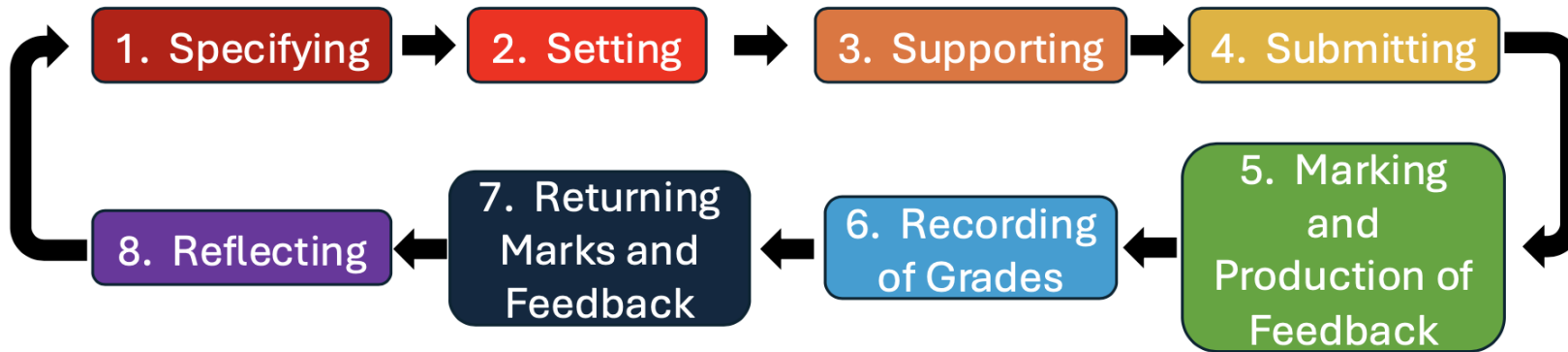
Resulted in an initial research deliverable, a list of AAT requirements for future systems to consider including under-reported:

- Integration of a StackOverflow like per-question forum.
- Feedback from students per-question and per-formative assessment.

Defining the Assessment & Feedback Lifecycle

A second research deliverable was the Adapted Assessment and Feedback Lifecycle.

Taking the “uncontroversial” assessment steps as the basis to describe a formative assessment workflow through the format of a workflow diagram.



Necessary to identify aspects of an assessment workflow to automate, used to highlight which aspects have been well reported, and promotes discussions between assessment stakeholders.

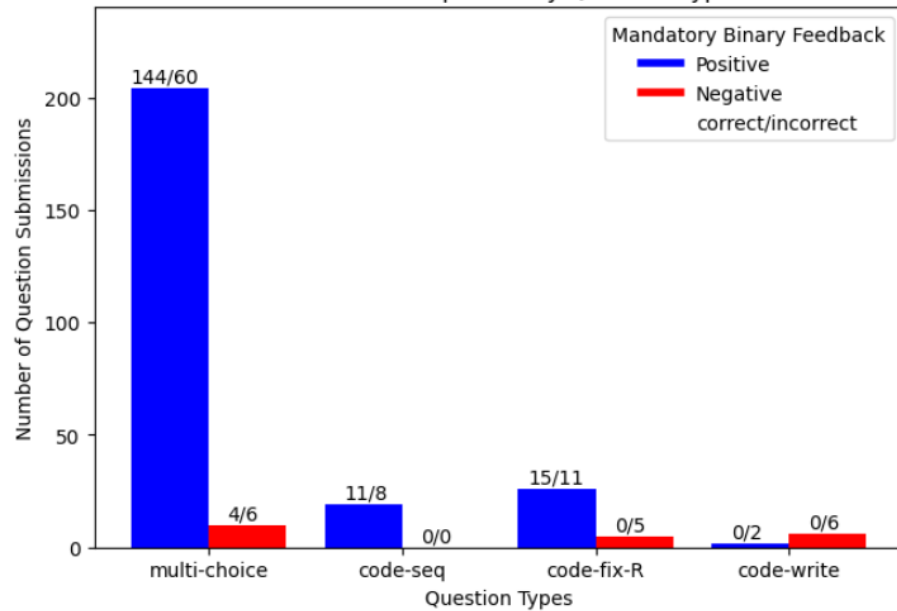
Implementation

Using the requirements identified from literature and the Adapted Assessment and Feedback Lifecycle workflow a novel AAT was created, including:

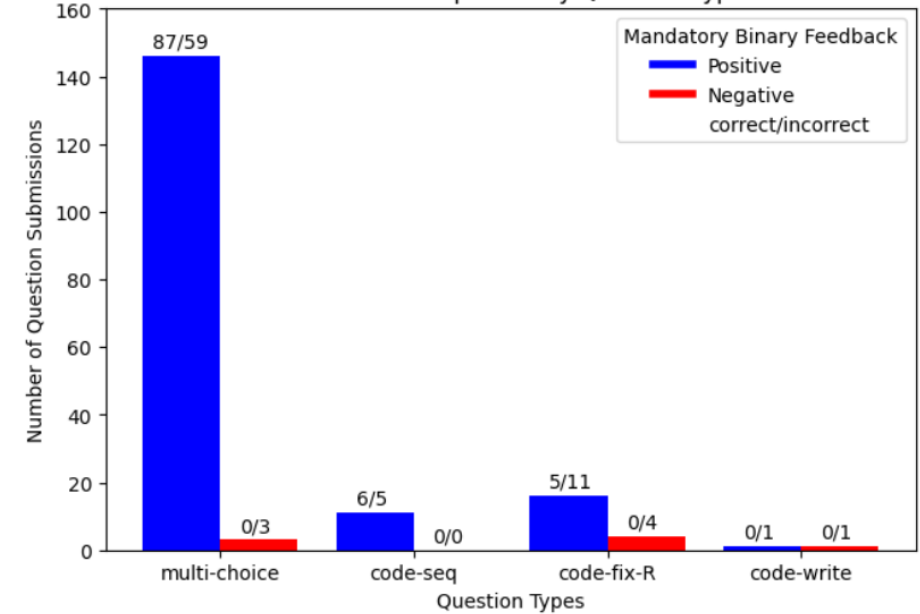
- MCQ, Parsons problem, Code-fixing and Code-writing question types.
- Formative assessments (randomised per teaching-week or topic alongside those defined by teaching staff.
- Features facilitating a range of feedback types *to* and *from* students, in the context of automatically assessed question and assessment responses.

Initial Experiments 1 & 2 (2023/24)

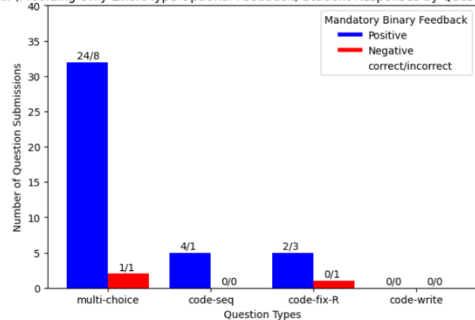
EXPERIMENT 1
All Student Responses by Question Type



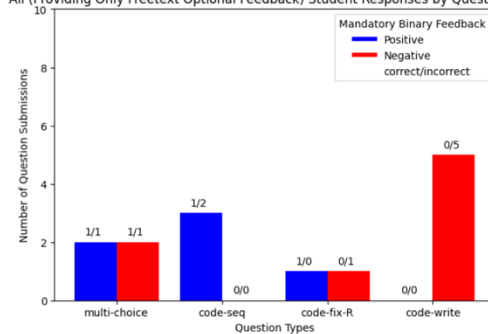
EXPERIMENT 2
All Student Responses by Question Type



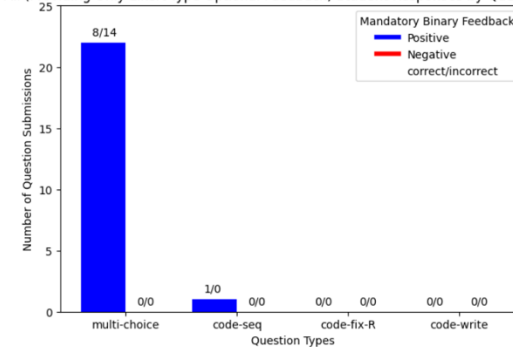
EXPERIMENT 1
All (Providing Only Likert-Type Optional Feedback) Student Responses by Question Type



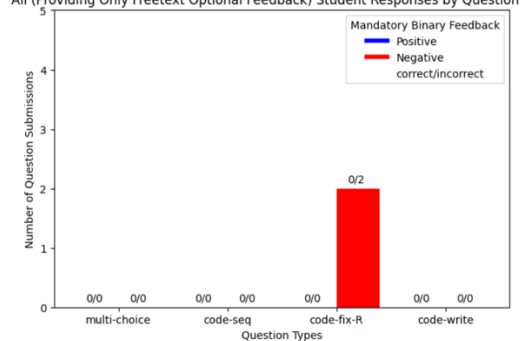
EXPERIMENT 1
All (Providing Only Freetext Optional Feedback) Student Responses by Question Type



EXPERIMENT 2
All (Providing Only Likert-Type Optional Feedback) Student Responses by Question Type

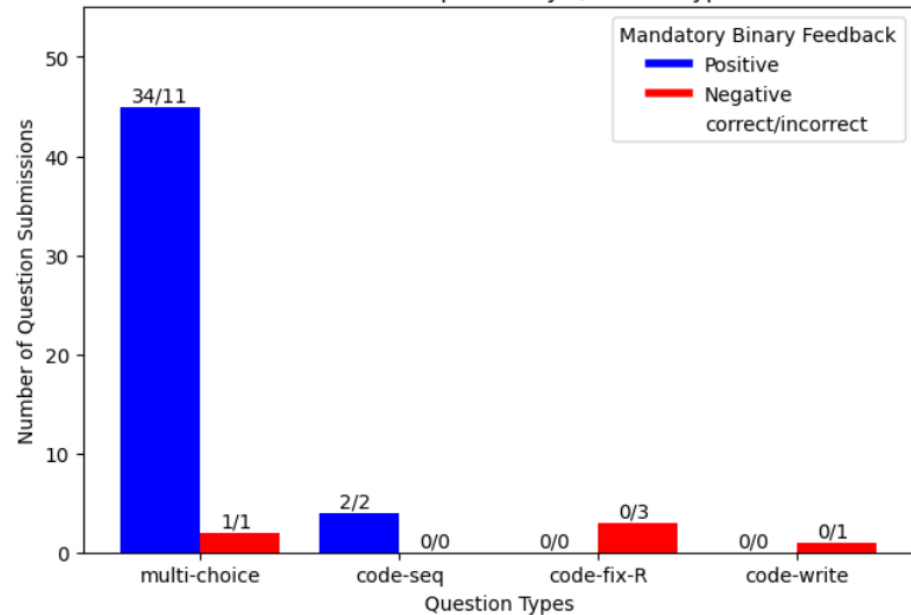


EXPERIMENT 2
All (Providing Only Freetext Optional Feedback) Student Responses by Question Type

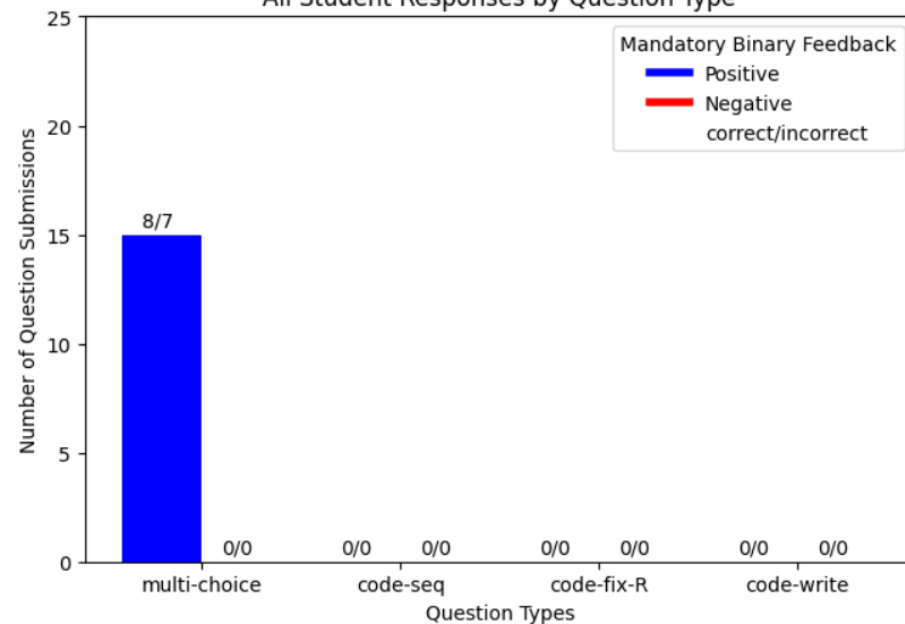


Repeat Experiments 3 & 4 (2024/25)

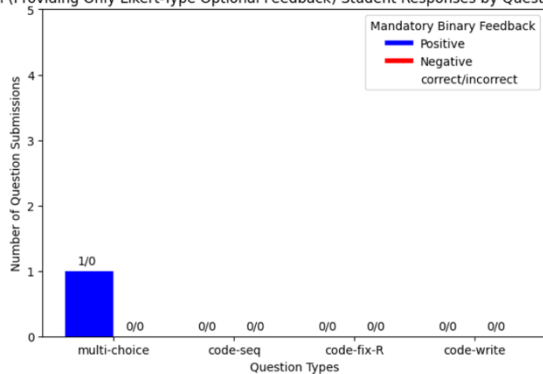
EXPERIMENT 3
All Student Responses by Question Type



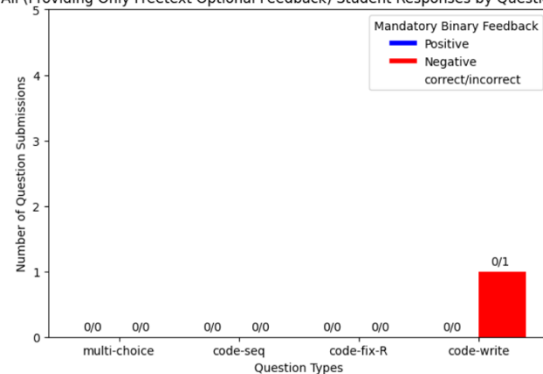
EXPERIMENT 4
All Student Responses by Question Type



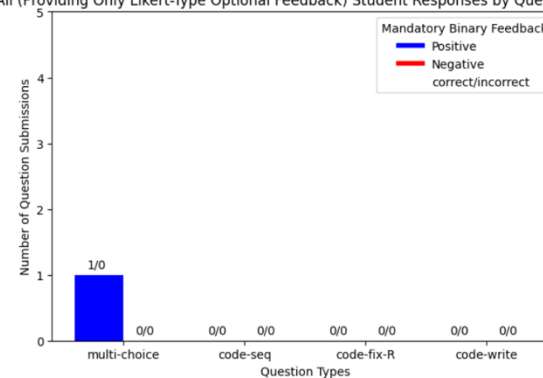
EXPERIMENT 3
All (Providing Only Likert-Type Optional Feedback) Student Responses by Question Type



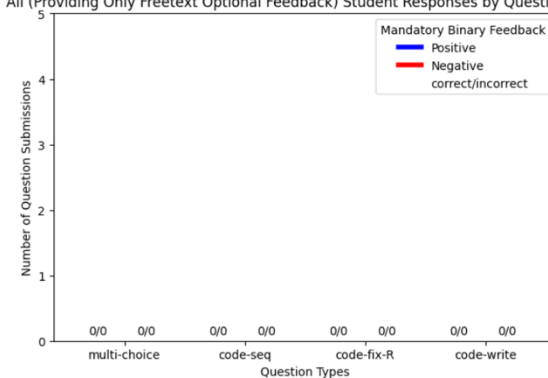
EXPERIMENT 3
All (Providing Only Freetext Optional Feedback) Student Responses by Question Type



EXPERIMENT 4
All (Providing Only Likert-Type Optional Feedback) Student Responses by Question Type



EXPERIMENT 4
All (Providing Only Freetext Optional Feedback) Student Responses by Question Type



Key Findings

- Students prefer to engage with question types which require less time-input/are aimed at a lower levels of Bloom's taxonomy.
- Students tend to select formative assessments randomized by teaching-week (rather than by topic or teaching staff defined).
- Student mandatory binary feedback strongly aligns with the optional feedback. Where free-text optional feedback is offered, student feedback tends to be negative. Where Likert-type optional feedback is offered, feedback tends to be positive.
- From feedback provided in a post-experiment questionnaire, students indicate a preference for providing optional in-AAT feedback, students prefer to do this after a formative assessment, but valuable insights can be garnered per-question, with students learning analytics.

Impact & Further Actions

There are implications for settings outside Higher Education and/or Computer Science, from the research deliverables and findings:

- Use of the adapted assessment and feedback lifecycle could aid decision making and discussions of assessment processes to automate in a range of settings.
- Insights about how students make use AAT features to provide feedback about their experiences could be important for other areas, where large student cohorts are the norm.

Questions?

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