ALTA Learning & Teaching grant report

Investigating the nature and design of computer programming examinations

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Motivation

- Formal examination - a common technique for summative assessment of computer programming students.
- Designing an exam paper is an important task.
- … and yet there are very few studies of exam instruments. *How are introductory programming exams constructed? What type of questions are used? What is the pedagogical basis of the design?*
- If we do not understand the instrument we are using, how can interpret the results with any confidence?
Project aims and outcomes

To investigate the *nature* and *composition* of formal examination instruments for introductory programming and the *pedagogical intentions* of the educators who construct these instruments.

Potential outcomes:

- find exam questions that are commonly used and could be shared.
- gain ideas for novel exam questions.
- gain an understanding of current practice in exam design.
- a searchable, shareable repository of questions
What we have done …

Prior to ALTA grant:
- Exam question classification scheme developed - characteristics of introductory programming exams
- Workshop at ACE 2011
- 20 exam papers analysed by 12 academics – individual then paired classifications – inter-rater reliability checks.

For the ALTA grant:
- Extension and refinement of classification scheme - complexity of questions
- Workshop at ACE 2012
- Exploring the pedagogical basis of exams: 12 academics interviewed. (analysis in progress, publication planned for the CSE journal)

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Classification scheme for exam questions

- Percentage mark allocated
- Topics covered by question
- Skill required to answer question
- Style of question
- Open or Closed question
- Measures of complexity:
  - External domain references
  - Explicitness
  - Linguistic complexity
  - Conceptual complexity
  - Intellectual complexity
  - Code length
- Degree of difficulty
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Question style

![Bar chart showing the percentage of exam marks for different question styles across various exam papers. The chart includes styles such as code, Parsons problem, short answer, multiple choice, and graphical representation.](image)
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Degree of difficulty
Intellectual complexity
References


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