COMPSCI 747 — Computing Education Research Project — Part I

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Due: Midnight Friday, 8^{th} May 2015

1 Introduction

You are required to engage in a research project (worth 30% of the final marks). The research project is split into two parts — a literature review (15%) and the implementation of the project (15%). For the first part, you are expected to complete a (moderately) comprehensive literature review related to your research topic. Additionally, you are expected to present your literature review to the class in a seminar format. You must prepare material to talk for approximately 20-25 minutes.

2 Requirements

You are required to complete a survey of Computing Education literature, write a report on the literature and present your findings in class. You should start with keyword searches using the main library databases (such as the ACM digital library and IEEE explore) and quickly scan the title and abstract of the article to determine the relevance. Once you find some relevant articles, read the entire article (making notes as you read) and then use the references from the article to find other relevant literature. You are expected to find at least 10-20 articles that are most relevant to your topic area.

When you write up the survey of the literature, as well as summarising the content of the papers, you are expected to look at the papers critically for what has been done well, what could be improved, what the major contributions are, and especially the validity of the conclusions. Try to organise (synthesize) the results so they can be explained clearly.

Your report should be approximately 2000 words + references. Use the standard ACM SIGCSE template to write your report. The template can be located at:

`http://www.acm.org/sigs/publications/proceedings-templates`

3 Topics

You may choose your own research topic, but you must check your choice of topic with Andrew or Paul. Some potential topics:

- Investigate the degree to which Python language elements are related to each other, showing the language to potentially have a high intrinsic cognitive load or a low intrinsic cognitive load.
- Investigate the use of automated marking systems in first year classes. Obtain and analyse feedback from current first year classes.
- Investigate the use of code reviews in first year classes. What do students think about the code reviews — obtain and analyse feedback from current first year classes.
- What is the real evidence of learning gain from pair programming? Perform a meta-analysis of the available research papers.
- What approaches have been used to teach computer science concepts to the general public? Develop a resource to teach a computer science concept to a public audience in collaboration with MOTAT.
- Investigate Computing for the Social Good — what do current computer science students think about the discipline of Computer Science?
- What physical games have been used to teach computer programimng concepts? Develop a board or card game that uses CS concepts.
- What motivates students to study Computer Science? Are there any differences in the reasons that Women give for studying Computer Science compared with Men? Obtain and analyse feedback from current students.
- How do students go about debugging code? What techniques are commonly used? How might the debugging process be improved?
- Are students able to accurately assess the quality of programming solutions? Are the judgements more accurate when a detailed rubric is used compared to holistic judgement? Is a side-by-side comparison an effective method of reviewing? What is the relationship between peer review quality and ability to work at the relational level for similar code?

4 What to hand in

Submit your assignment via email directly to Andrew. Your assignment should include:

- A clear statement of the purpose of the literature review. What is it that you are reviewing and why?
- A descriptive account of the various research studies in the area and how they have contributed to the field.
- Some analysis of the strengths and weaknesses of individual papers
- Some synthesis of the different papers — how are they related? What gaps do they reveal?
- A conclusion that summarizes the main findings that have arised through the review process.
- A set of PowerPoint slides or other resource that will be used for the seminar.

4.1 Future use of your material

The resources you develop may be useful in future, either to use as teaching resources, or as examples for future students studying computer science education. We would like you to explicitly either give permission, or NOT give permission for the future use of the resource material/report you submit. Please include one of the following statements at the end of the assignment:

- I give permission for this assignment to be used in future for educational purposes.

  OR:

- I do NOT give permission for this assignment to be used in future for educational purposes.

Your grade for the assignment will not be affected regardless of whether or not permission is given.

5 Assessment

The assignment will be assessed using the following criteria:

- Introduction that provides the background and overview for the review (in other words, it sets the scene and provides the context). [2 marks]
- Critical analysis of the existing research. [2 marks]
- Some kind of synthesis - pulling together related work and organising the findings in some way that helps make the work clearer. [2 marks]
- Overall presentation style and coherence of the report. [3 marks]
- References [2 marks]
- Overall presentation style and coherence of the seminar. [2 marks]
- Participation in the seminars — asking questions and providing feedback. [2 marks]

The literature review will be worth 15% of your final grade.