Computer Science Project Courses: Learning, Assessment and Workload Issues

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1 Overview

- why are projects important?
- project courses: watch out for 2008!
- lessons from the PhB advanced study courses
- existing models for individual projects
- group projects for SE
- assessment and other issues
- questions to be addressed

2 Why are project Courses Important?

- ‘capstone’ for many degrees (BIT (?), BSEng, BCS, BIT Hons, MCOMP (?), MCOMP Hons, MSE (??))
  - integrate specific knowledge and skills into a large piece of work
  - learn generic, ‘lifelong’, skills (communication, project management)
  - valuable in the long-term, even if technical specifics become irrelevant
- provide differentiation between programs (e.g. MITS and MCOMP)
- support research-based education
  - give students a richer, closer learning experience
  - provide pathways / recruitment to HDRs
  - may even result in useful artefacts, papers!
- seem to be an easy thing to add in to degree programs . . .

3 CS Project Courses in 2008 at a Glance

- (mostly) individual courses; in (rough) order from implementation to research orientation:
  - COMP3750/70: Project Work in Computer/Information Systems (6u)
  - COMP874/5/6/7/8/90: Project Work in AI/. . . /SE (12u)
  - COMP4720/30, COMP8720/30: Project Work in SE I/II (3u/6u)
  - COMP4540: Software Engineering Research Project (12u)
  - COMP3006/3130: CS Research / Group Project (6u/6u)
  - COMP4005/ COMP8800: Honours projects (12+12u)
- SE group courses: implementation-oriented with a well-defined methodology
  - COMP3100/ 3500 SE Group Project (6+6u, 7/19)
  - COMP4500 SE Practice (6+6u, 16)
- consider not only the number of courses but that of the students!

4 Lessons from the PhB Program's Advanced Study Courses

- PhB (Science) program a "research-focused" Honours program
  - requires six advanced study courses (ASCs) over the first three years
  - usually in form of small research projects with an academic instructor
  - each student is also supplied a 'mentor' throughout
- assessment by Wilson, Wilson & Howitt (2006, GCHE project)
  - students: perceived benefit of ASCs mainly learning generic research skills & the resulting personal development
    - drawbacks: high workload, need more enthusiastic instructors, outcomes unclear, often felt unfairly assessed
  - instructors: a self-selected minority of eligible staff
    - few mentors had ever been instructors
    - many did not envisage any kind of educational outcome
    - lack of focus on generic skills
    - lack of consistency with assessment (still no guidelines!)

5 Some Established Models for Individual Projects

- Honour's projects: cs.anu.edu.au/honours/projects.html
  - milestones well defined; description of what is expected; thesis template; some past examples available
  - assessment guidelines: qualitative requirements for IIB, IIA, I grades; suggested marking scheme; outline of nature of a suitable project
  - 'at will' offering of topics and supervision
  - shared assessment: 2 examiners, with input from supervisor
- eScience Projects: escience.anu.edu.au/project
  - 'at will' offering of topics and supervision
  - well-established guidelines (assessment scheme, report format, organization); many example reports and presentations
  - project management (including milestone timetabling) expected
  - assessed by co-ordinators, with input from supervisor

6 The SE Model for Group Projects

- use of tools to assist with management
  - per-group FAIS forums (accessible also to clients & tutor)
  - SVN used for tracking, assessment
  - Wiki also used for communication, collaboration, presentation
  - GPME used to manage project proposals, record Work Breakdown Structure (WBS), track progress / contributions
- assessment:
  - WBS proposes key deliverables & time-line for delivery
  - for COMP4500:
    - 15% for scope identification & planning (WBS)
    - 20% for requirements and architecture
    - 15% for prototyping and implementation
    - 15% for delivery and presentation
    - 5% for reflective report; 30% for oral exam

7 Assessment and Other Issues

- project topics: who provides them, when, are they appropriate for the course?
- student issues: learning outcomes (+ generic skills), expectations on supervisor(s)
- to what extent should supervisor be involved in the assessment
  - may be +bely / -vely biased; potential conflict of interest
  - may color relationship with student
  - may be the only person who can feasibly judge the quality of artefacts
- project outcomes / supervisor rewards: improve with
  - the quality / maturity of the student(s)
  - the size and duration of the project
  - the number of the students working on it?

8 Questions to Address

- how should we ensure quality outcomes for project students?
  - clear expectations, learning outcomes (+ generic skills?), fairness, feedback, satisfying experience
- to what extent should project courses be standardized? (same for group /indiv?)
  - topic definition, co-ordinator/supervisor/student guidelines, assessment schemes
  - to what extent should co-ordination be centralized?
  - to what extent is organization around research groups appropriate?
- to what extent should supervision / assessment workload be shared?
  - should student choice of topic be constrained?
  - or, what incentives should be provided to supervisors?
- how to reduce overall workload and enhance outcomes for supervisors?
  - should (pseudo-) group projects be used more?
  - what guidelines and standards are appropriate?