Introducing research methods to computer science Honours students

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Outline and introduction

- history and motivation
- skills needed to do research
- teaching the necessary skills
- evaluation
  - experience
  - impact
  - pragmatic issues
  - survey
- conclusion

History and motivation

- previously replaced practical projects with research reports
- why research?
  - appreciation and understanding
  - important for academia and industry
- problems experienced with research process
  - lack of understanding of research
  - time-consuming trial and error
  - statement of system to be built
  - scope too large
  - lack of methodology
  - deadline slippage
  - frustration for both staff and students
- Introduction to Research Methods course

Skills need for research

- skills
  - critical thinking
  - literature searching, summarising
  - critical reading, evaluation of relevance and value
  - recognising similarities and differences
  - presenting logical and coherent argument
  - identification of research question and hypotheses
  - presentation skills—verbal and written
- knowledge
  - different types of literature
  - choice of experimental and statistical techniques
  - scientific method, different research methods
- tools – literature search, research-oriented document production software

Teaching the necessary skills

- cover at least each skill once, some twice
- exposure to range of research, involvement of other staff members
- feedback important, individual and group
- small guided exercises

LECT	lectures on research methods, small group work
TEST	survey paper and test
COMP	compare and contrast papers
PRES	presentation of paper from literature
ANNB	annotated bibliography from assigned list of papers
LITR	literature review and presentation
HYPO	formulation and testing of hypotheses
REFR	refereeing of research report
PROP	prototype research proposal

Evaluation

- teaching the course
  - challenging and enjoyable, choice of materials
  - lots of assessment and feedback
  - not seen as important as other courses
  - opportunity to encourage students to consider further research qualifications
- impact on research report
  - process smoother
  - better proposals, greater focus and understanding of research question
  - better use of literature
  - understanding of need for method to answer research question
  - more time with supervisors on research as opposed to process of research
  - better documents, better presentations
- pragmatic issues – workload, time for research report

Survey

- 1999 class, all 17 students
- questionnaire completed shortly before final research report hand-in
- questions about students' perceptions of usefulness of IRM
- question types – 5 point Likert scale, ranking, open-ended
- general usefulness of IRM

	Average	% agree
Generally, I found what I learnt in IRM useful for RR	4.59	100
I believe the RR would have been more difficult without IRM	4.41	100

Usefulness of aspects of IRM

	Likert scale			Ranking	
	Average	% agree	% disagree	% top 3	% bottom 3
PROP	4.59	100		90	
PRES	4.19	82		45	18
HYPO	4.06	94	6	45	
LITR	3.82	71	12	64	9
LECT	3.65	65	6	9	73
REFR	3.56	53	12	18	45
COMP	3.18	47	30	18	27
ANNB	3.18	41	30		55
TEST				9	72

Usefulness for career, comments and changes

	Average	% agree	% disagree
Generally, I believe what I learnt in IRM will be useful for my career	3.88	71	6

- useful aspects for career
  - report writing, presentations, proposal writing
- comments on course
  - report writing and document preparation, intensive, group work, enjoyable
- suggested changes
  - workload issues, number of documents and phases, more statistics

Conclusions

- potential changes for 2000
  - continue focus on reports and presentations, more than that
  - look at number of hand-ins, what can be combined
  - refereeing of research report
  - compare and contrast
  - continue with LaTeX and BibTeX templates
- success
- advantages
  - insight into research
  - better research reports
  - not by trial-and-error
  - broader background into computer science research