UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Department of Computer Science

Gender and computer science research at Wits

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Introduction

- focus of research
  - gender
  - Computer Science at university level
  - three phases
    * monitoring
    * understanding
    * evaluating
- Vashti Galpin, Ian Sanders and Tamsin Herbert (MSc student)

Outline

- motivation

- is there a gender imbalance?

- why is there a gender imbalance?

- what can be done about the imbalance?

- monitoring at Wits

- research at Wits

- future research and projects

Motivation

- South African context
  - historical
  - current

- shortage of IT professionals

- lack of diversity

- importance for South Africa as a developing country

- untapped source of potential resources

Is there a gender imbalance?

- USA – incredible shrinking pipeline, increase from mid 70's (19%) to mid 80's (37%) then decrease in 90's (28%)

- Britain - decline from late 70's (24%) to late 80's (10%), increase in late 90's (19%)

- similar problems in Australia, New Zealand and Netherlands

- South Africa – anecdotal information from early 90's
  - undergraduate – 20% to 50%
  - differences between English-speaking and Afrikaans-speaking universities
  - differences between Computer Science and Information Systems
  - academic - only one female full professor

- Wits Computer Science
  - average over period 1986-98 27%
  - no general trends

Why is there a gender imbalance?

- social factors, socialisation

- stereotyping
  - computers
  - science and computer science

- differences in ability?

- differences in knowledge
  - maths background
  - prior experience with computers

- differences in self-confidence

- differences in preferred learning environment

- misconceptions about computer science
  - programming
  - computing culture
  - administrative/clerical work

- lack of role models and mentors

- survey of causes [Galpin 1992, Herbert 2000]

What can be done about the imbalance?

- understanding of causes and solutions

- understanding of local situation and causes

- social change

- schools

- university environment
    - mentors
    - role models
    - physical safety

- university teaching – various solutions have been suggested (discussed in [Galpin 1992, Herbert 2000])
    - subject matter
        * maths
        * applications
        * human-oriented
    - teaching approach
        * introductory courses
        * structured labs
    - change of perceptions
    - removal of gender bias

Monitoring at Wits

- surveys in 1992 [Galpin and Sanders 1993]
  and 1999 [Herbert 2000]

- classification of students

- Computer Science students, 1993 – 1998

	Black	Col	Ind	White	Total
female %	7.0	0.4	7.0	13.5	27.7
male %	18.5	1.1	12.5	40.0	72.3
total %	25.5	1.5	19.5	53.5	
population %	75.2	8.6	2.6	13.6	

- gender
  - BSc and BSc Hons, 1986 – 1998,
    between 24% and 31%, average 27%, no clear trends
  - MSc and PhD, 1986-1992, much lower percentages

- trends, 1993 – 1998
  - increase in Black female students,
    actual & percentage
  - increase in Black male students,
    actual & percentage
  - decrease in White male students, percentage
  - changes in class sizes

Research at Wits

- research into attitudes to computer science of first year Faculty of Science students [Sanders and Galpin 1994]
  - males registered for CS I, more informal and less formal exposure, more confidence
  - females registered for CS I, more formal exposure, less confidence
  - males not registered for CS I, less exposure, more negative perceptions
  - females not registered for CS I, more female role models, more games

- research into role models for first year Faculty of Science students [Herbert 2000, Herbert and Sanders 1999]
  - lack of positive role models
  - male dominated but women can learn
  - perception of good careers
  - confusion about what computer science is

- current research - evaluation of first year curriculum
  - first year curriculum [Mueller *et al.* 1993]
    [Sanders and Mueller 1994, Sanders and Mueller 2000]
    * build from fundamentals
    * give overview of computer science
    * emphasis is not programming
    * does not favour those with computing experience
  - how perceptions of computers and computer science
    change during the first year curriculum
  - focus on gender and race

Future research and projects

- national survey at university level

- ACM-W ambassador for South Africa
  - contact for ACM-W
  - programs and research in South Africa
  - website to provide information

Conclusion

- gender imbalance is an issue

- need to understand causes and solutions

- Department of Computer Science at Wits
  - doing research into causes
  - evaluating curriculum
  - monitoring

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