University of the Witwatersrand,Johannesburg

School of Computer Science

Perceptions of Computer Science

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Introduction and outline

- motivation
  - related research
  - computer science at Wits
- research methodology
  - data collection
  - sample
- data analysis
  - data collected 1999, 2000, 2001, 2002 – trends
  - gender differences
- further research
- conclusion

Motivation

- perceptions of computer science often incorrect among school learners [Greening 1998, Durndell and Thomson 1997, Craig 1997]
  - use of application software, secretarial
  - only programming, limited career possibilities
  - no interaction with people, only with machines
  - 'nerdy', 'geeky'
  - limited understanding of breadth of computer science
- perceptions affects who studies computer science
  - low participation by women worldwide [Galpin 2002]
  - perceptions may cause this [Clarke and Teague 1996, Selby *et al.* 1998]
  - accurate perceptions may increase participation

Computer Science at Wits

- innovative first year curriculum [Sanders and Mueller 1994, Sanders and Mueller 2000]
  - build from fundamentals and present overview
  - emphasis is not programming
  - does not favour those with computing experience
  - Bloom's taxonomy and skills hierarchy [Bloom 1956]
  - evaluation necessary
- gender
  - from 1986 to 1998 BSc and BSc Hons, 27% female, no clear trends [Galpin and Sanders 1993, Herbert 2000]
  - research: attitudes to computer science [Sanders and Galpin 1994], role models [Herbert 2000], self-efficacy [Turner 2001]

Methodology

- survey on at registration or first day of the academic year
- analysed data from new students only
- sample

	1999	**2000**	**2001**	**2002**	**All**
Female	33	19	23	12	87
	33.3%	33.3%	25.6%	22.6%	29.1%
Male	66	38	67	41	212
	66.7%	66.7%	74.4%	77.4%	70.9%
Total	99	57	90	53	299

- statistical techniques – descriptive

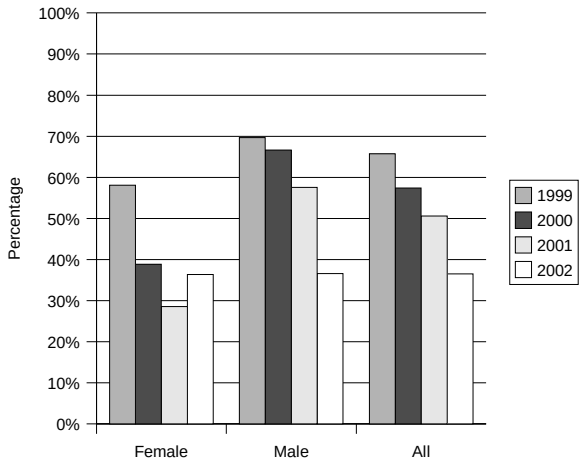
Understanding of Computer Science

- "Do you have a clear idea of what CS involves?"
  - Yes responses

	1999	**2000**	**2001**	**2002**
All	65.7%	57.4%	50.6%	36.5%
Female	58.1%	38.9%	28.6%	36.4%
Male	69.7%	66.7%	57.6%	36.6%

  - clear trends
  - clear gender differences

Clear idea of what CS involves



Content of Computer Science

- "Do you think CS and Maths are closely related?"
  - Yes: 95% of total sample
  - no gender differences
  - constant trend
- "CS is not interesting because it involves working with machines instead of people"
  - no gender differences
  - trend in disagreement with statement

	1999	**2000**	**2001**	**2002**
All	83.7%	84.2%	87.8%	92.7%

Content of Computer Science (Cont.)

- "CS involves mainly programming"
  - no clear trends
  - gender differences

	Agree	**Disagree**	**Other**
Female	25.3%	25.3%	49.4%
Male	19.0%	35.2%	45.7%

- "CS work involves mainly word processing"
  - no clear trends
  - gender differences

	Agree	**Disagree**	**Other**
Female	1.2%	48.8%	50.0%
Male	0.9%	74.4%	24.6%

Careers

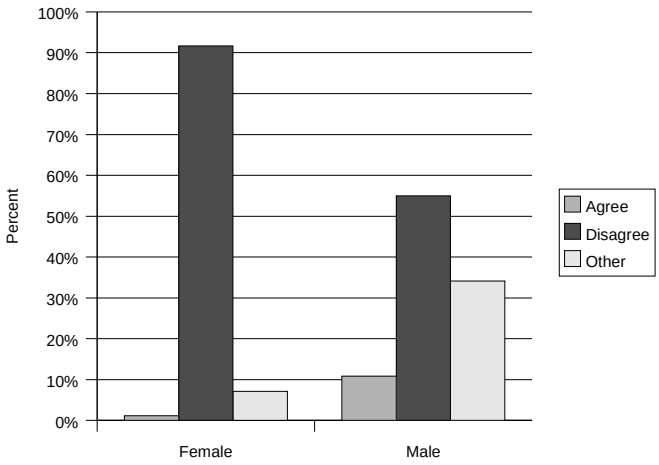
- "Do you think that there are good jobs available for people with Computer Science degrees?"
  - Yes: 97.7% of total sample
  - no gender differences
  - constant trend
- "It is difficult to find interesting jobs in computer science"
  - Disagree: 75.0% of total sample
  - no clear trends, no gender differences
- "There are many jobs for people who have studied computer science"
  - Agree: 73.2% of total sample
  - no clear trends, no gender differences

Stereotyping

- "CS, Engineering and Maths are more appropriate fields for men than for women"
  - variation over time, but no clear trends
  - definite gender differences

	Agree	**Disagree**	**Other**
Female	1.2%	91.7%	7.1%
Male	10.9%	55.0%	34.2%

CS, Eng and Maths are more appropriate for men



Further research

- perceptions before and after first year course
  - choice of students
  - trends – 2000 and 2002
- international study about computer professionals
  - UK, Australia, Hong Kong, USA, South Africa
  - intermediate results [Craig *et al.* 2002]
  - further data analysis and interpretation
- current Honours research reports
  - impact of incorrect perceptions on outcomes for disadvantaged students
  - survey of school children before subject choice

Conclusions

- main results
  - students perceive they are unclear about CS
  - CS is closely associated with Maths
  - female students less clear on content
  - perceptions of good, interesting jobs
  - male students are more negative about women in CS
- strategies
  - information about computer science before career decisions made
  - early introduction to breadth at universities

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