Rutgers Emerging Scholars in CS (RESCS) 2006-2007

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Outline

• Program organization
• Recruiting
• Institutional buy-in
• Examples of group-learning sessions
• Other activities
• Things to improve/change
RESCS Organization

- **Students enroll in CS111 + CS293**
  - 111: 3 hours lecture + 1 hour computer lab (3 credits - graded)
  - 293: 2 hours/week group learning session in groups of 5-9 students plus a peer leader (1 credit - pass/fail)
- **Ran program both semesters in 2006-2007**
- **Staff meets weekly to formulate exercises, discuss progress, plan extra events**
- **Course development in Spring 2007 for specialized CS1 for math majors**
RESCS Statistics

• Fall 2006 (4 peer leaders)
  • 14 participants finished class (3 dropped)
    - 14: 5 female, 11 male
    - 14: 6 White, 4 African American, 3 Asian, 1 Hispanic
  • 171 (131 male; 40 female) in CS111
  • 24% female in CS111 vs 17% female CS majors vs 50% female total undergraduate population
RESCS Statistics

- Spring 2007 (3 peer leaders)
  - 19 participants finished class (6 dropped)
    - 19: 5 female, 14 male
    - Larger groups this term
  - 141 (~20% female) in CS111
  - Ethnicity info provided by dean’s office at end of term for reporting purposes
Recruiting

- Lists of incoming freshmen obtained from 3 ug college's deans
  - First year: restricted to incoming students strong in science and math; Second year: opened to all
  - Summer 2006: ~500 postcard invitations sent including website address (website included extensive info on program); Email follow-ups
  - Winter 2007: used preregistration for CS111 to invite students
  - Deans encouraged participation as part of course schedule creation with new students

- PI attended on-campus orientation days for freshman

- Peer leaders took flyers to freshmen activities day at beginning of academic year
RESCS Sessions

• Groups comprised of students from 2–3 distinct lectures of CS111
• Refreshments provided weekly by participants
• Curriculum of ~4 exercises/week, topics coordinated with CS111
  • Emphasis on CS problem-solving techniques, not programming
  • Exercises embedded in familiar real-life activities, including logic games and fun stuff
  • Do each exercise to completion, discuss what CS ideas are being explored.
Institutional Buy-in

• Academic deans, honors program director, and minority student counselors assist in recruiting
• Undergraduate education dean’s office
  – Aids data gathering on participants
  – Promise of support when NSF $ are gone
• Undergrad student groups support co-curricular events
Sample Exercises

• Algorithms and data structures to support planning a party
  - Select participants who will get along well by specifying likes and dislikes (practice with arrays)
  - Answer queries (e.g., match partygoer’s profiles with those of famous persons)
  - Flowchart ‘matching’ algorithm

• Uses of Lists for organizing ToDo’s
  - Design functions needed
  - Handle extensions which may be needed in the future
  - Allow merging of ToDo lists for different family members
Sample Exercises

- **Logic puzzles**
  - Inferences, use of truth tables
- **Substring matching problems**
  - Algorithm design and looping
  - Practice coding in Java
- **Playing a simple game - NIM3**
  - Play game in pairs
  - Devise objects to simulate game
  - Recursive look-ahead to determine next move; development of winning strategy
  - Develop Java code for game
Other Activities

• Hold **Career Night** each semester
  • Recent Rutgers CS grads tell of job experiences
  • Audio tapes (MP3) on our website provide benefit to non-attendees
  • About 35 student attendees each term - successful
  • Open to all CS majors and co-sponsored with our undergrad CS organizations

• **Beginning-of-term dinner for participants**

• **End-of-term pizza lunch off-campus provides informal feedback**

• Informed participants of interesting visiting speakers and programs in DCS
Things to change/improve

• Recruiting, recruiting, recruiting
  • Problem is getting students, especially women, to take CS

• Need more activities for networking
  • Plans for on-campus speakers, possible visit to a company for a day?

• Need to consider follow-up activities for graduates of RESCS
  • Need for continued networking in later years of the CS major