CS-480—Senior Seminar
Study questions for *Attraction to Computing*
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Primary papers

Almstrum, Vicki L. "What is the Attraction to Computing?" *Communications of the ACM*, Vol. 46, No. 9, pp. 51–55, Sept. 2003.

Estrin, Thelma. "Women's Studies and Computer Science: Their Intersection." *Annals of the History of Computing*, Vol. 18, No. 3, pp. 43–46, 1996.

Johnson, Deborah G. and Miller, Keith W. "Is Diversity in Computing a Moral Matter?" *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 9–10, 2002.

Lazowska, Ed. "Pale and Male: 19th Century Design in a 21st Century World." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 11–12, 2002.

Klawe, Maria. "Girls, Boys, and Computers." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 16–17, 2002.

Additional papers

Goyal, Amita. "Women in Computing: Historical Roles, the Perpetual Glass Ceiling, and Current Opportunities." *Annals of the History of Computing*, Vol. 18, No. 3, pp. 36–42, 1996.

Borg, Anita. "Computing 2002: Democracy, Education, and the Future." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 13–14, 2002.

Lee, John A. N. (JAN). "Well Behaved Women Rarely Make History!" *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 14–15, 2002.

Prey, Jane and Treu, Kevin. "What Do You Say? Open Letters to Women Considering a Computer Science Major." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 18–20, 2002.

Pratt, Lorien and Misra, Manavendra. "Perspectives on Academic vs. Industry Environments for Women in Computer Science." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 20–22, 2002.

Taylor, Valerie E. "Women of Color in Computing." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 22–23, 2002.

Jones, Anita/ "The Curious Ways of Professional Cultures and the 'Two-body Opportunity'." *SIGCSE Bulletin*, Vol. 34, No. 2, pp. 24–25, 2002.

Almstrum

(I had suggested that we needed to review the survey methodology on Almstrum's web site, but the site is not currently available.)

1. What proportion of the respondents to the survey are women? Assuming, as Almstrum does, that the respondents finished their pre-college education at around age 18, what was the average year that the respondents entered college? What was the most recent (roughly)? The earliest (again, roughly)? What proportion of the sample are or have been educators?

2. What evidence does Almstrum find that respondents tend to believe that math anxiety can "affect a student's ability to succeed in computing, irrespective of gender." What proportion of the respondents felt that math anxiety was a barrier in computing for either gender?

3. What proportion of the respondents perceived themselves as enjoying or being good at math? What relationship did Almstrum find between this perception, the perception of the degree to which math anxiety is a barrier in CS and the perception of differences between males and females in the likelihood of math anxiety?

4. How, do you think, might the demographics of the sample (with respect to gender, age and status as an educator) be reflected in the degree of math anxiety apparently experienced by the sample, to the degree to which they believe math anxiety is a barrier in CS, and to the degree they perceive a

correlation between math anxiety and gender? How well do you think these reflect the CS community as a whole?

5. Almstrum uses 18 attraction factors, drawn from the literature on CS education. What other factors might be significant? Does the way she has grouped theses into dimensions seem natural to you? How well do her names for the dimensions fit your perception of the common aspects of the attraction factors in the dimensions?

6. What factors drew you to study CS initially? Have these changed as your education has progressed?

7. To what extent, do you think, does the ranking of the attraction factors by importance reflect the CS community as a whole? To what extent, do you think, do the results reflect the gender distribution of the respondents? To what extent do they reflect the age distribution?

8. What specific factors do you think might rank differently if the sample was more balanced with respect to gender or was skewed towards males? If the sample was younger? Older?

9. What do *Weight* and *Influence* in the table signify? Do they seem to be independent of each other or do they seem to be correlated? Would you expect them to be?

10. For those of you who know something about primary component analysis or factor analysis, how were the factors partitioned into dimensions? To what extent does the weight indicate the significance of the inclusion of a factor into a dimension?

11. How well do Almstrum's suggestions for tailoring a curriculum to each of the dimensions reflect your perception of the dimensions? Is there a parallel between the degree to which her suggestions seem attractive to you and the degree to which the corresponding dimension fits your personal motivations for studying CS? How might the CS program at Earlham be modified to exploit these findings?

Estrin

12. How does Estrin characterize knowledge and cognition? She subsequently contrasts a notion of understanding, which she attributes to "humanists", with a

traditional notion of understanding (which she attributes to "researchers"). What are these contrasting notions? How do each of them interact with knowledge, as she characterizes it? Do they represent alternative cognitive processes? Is it possible to approach reasoning about abstractions with a methodology that is concrete, pattern based, and/or goal directed? To what extent are these notions of understanding gender specific?

13. In discussing the idea of feminist epistemology Estrin lists a number of pairs of terms, claiming that the first term of the pair generally correlates with men and the second with women. How do these terms correlate with your understanding of your own self? With your understanding of the men and women you know well?

14. In what sense does Estrin (following Turkle and Papert) use the term *bricolage*? Earlier, she suggests that concrete thinking enables a new kind of theory, based on relationships rather than properties. Thinking abstractly for the moment, what is the distinction between a relationship and a property? How do these notions of theory formation interact with knowledge, as she characterizes it? In what ways do they represent alternative cognitive processes?

15. Estrin, again following Papert and others, suggests that there are aspects of computers and the way that people interact with them that support this concrete sort of understanding. What are they? How does the contrast between the "analytic" approach and the concrete approach of *bricoleurs* show up in variations in styles of programmers/computer scientists? Where would you locate yourself on this continuum?

16. How do Almstrum's attraction factors and dimensions relate to Estrin's ways of understanding? Do the gender distinctions you perceive (if any) in the attraction factors reflect the gender distinctions you perceive in the ways of understanding? Does one account for the other, or are there other factors involved? What might they be?

17. In what ways have the courses you have taken at Earlham and, in particular, in CS exercised these ways of understanding? Does the CS curriculum, as instantiated here, support *epistemological pluralism*? If not, how might the program be modified to better do so?

Johnson and Miller, Lazowska and Klawe

18. What argument do Johnson and Miller give (by way of contradiction) against taking diversity in computing to be a moral matter? Does the variation in ways of understanding explored by Estrin support or undermine this argument?

19. Johnson and Miller, Lazowska and Klawe each give a number of "repulsion" factors for computing which they hold to be inessential to the field. How do these relate to Almstrum's attraction factors? To what extent are they self-perpetuating? To what extent are the attraction factors self-perpetuating? Johnson and Miller suggest that these repelling characteristics are detrimental not only to Computer Science but to the society as a whole. To what extent do the attraction factors reflect positive or detrimental characteristics of Computer Science?

20. Klawe lists a number of specific recommendations for addressing the common mis-perception of computers as being "boy-things". How do her recommendations address the call for *epistemological pluralism* in Estrin? How might the CS curriculum at Earlham be modified to incorporate them?