

A Bridge to the Future: Recruitment and Retention of Female Information Systems Majors in the Pennsylvania State System of Higher Education

Patricia A. Joseph
patricia.joseph@sru.edu
Computer Science Department, Slippery Rock University
Slippery Rock, PA 16057 USA

ABSTRACT

Almost all undergraduate programs of information systems have experienced dwindling enrollments in the past few years, but the dearth of female students majoring in information systems related fields at U.S. colleges and universities is striking. The literature explains how some universities recruit and retain women in the information sciences; however, until now there has been no published literature that discusses recruitment and retention practices of information systems related departments in the Pennsylvania State System of Higher Education, which is comprised of 14 state-owned, mostly undergraduate institutions. A study was conducted in academic year 2006-2007 to determine these recruitment and retention practices as they relate to gender. This paper documents the results of this study and is a starting point for discerning enrollment trends among undergraduate women majoring in information systems at Pennsylvania-owned universities. The paper provides an opportunity to share ideas that can increase the number of women enrolling in information systems related programs. The study demonstrates how much work needs to be done to attain equality in the recruitment and retention of students based on gender. The results are significant because, although PA-SSHE faculty bemoan dwindling enrollments by women, very little is being done to change the status quo. The paper highlights the schools that are being pro-active in the hope that they can offer suggestions for sister institutions to emulate. The scientific results that may be expected from new information gained by this protocol are those which benefit gender-free education in the Commonwealth of Pennsylvania.

Keywords: enrollment trends, ethics, gender issues, recruitment, retention

1. INTRODUCTION

Almost all undergraduate programs of computer and information systems have experienced dwindling enrollments in the past few years, but the dearth of female students majoring in information systems related fields at U.S. colleges and universities is striking (Vegso, 2005; Zweben, 2005). The literature explains how some universities recruit (Alstrum, 2003; Alstrum and Last, 2005; Camp, 1997; Jepson and Perl, 2002; Moorman and Johnson, 2003; Rodger and Walker, 1996) and retain (Bernstein, 1997; Burge and Suarez, 2005; Howell; Randall, Price, and Reichgelt, 2003;

Roberts, Kassianidou; and Irani, 2002; Scragg and Smith, 1998; Teague, 2002; Treu and Skinner, 2002) women in the information sciences. In particular, Carnegie Mellon University has done an outstanding job in recent years of recruiting and retaining more women in its computer science undergraduate program (Blum, 2001; Fisher and Margolis, 2002; Fisher, Margolis, and Miller, 1997), but not many public universities (especially in Pennsylvania) have the luxury of CMU's selectivity in choosing students and available finances to support such endeavors. Until now there has been no published literature that discusses the recruitment and retention practices of computer and information systems related

departments in the Pennsylvania State System of Higher Education, which is comprised of fourteen state-owned, mostly undergraduate institutions. A study was conducted during academic year 2006-2007 to determine these recruitment and retention practices as they relate to gender. This paper documents the results of this study and is a starting point for discerning enrollment trends among undergraduate women majoring in information systems at Pennsylvania-owned universities. The paper provides an opportunity to share ideas that can increase the number of women enrolling in information systems related programs.

The study demonstrates how much work needs to be done to attain equality in the recruitment and retention of students based on gender. The results are significant because, although PA-SSHE faculty members routinely bemoan dwindling enrollments by women, very little is being done to change the status quo. The paper highlights the universities that are being pro-active in the hope that they can serve as 'best practices' for sister institutions to emulate. Suggested solutions that have worked at these universities to recruit and retain female information systems majors are cited. The scientific results that may be expected from new information gained by this protocol are those which benefit gender-free education in the Commonwealth of Pennsylvania. The paper concludes with hope for the future.

2. THE PROBLEM

This paper addresses the recruitment and retention of women who major in the computing sciences. The current situation in undergraduate programs of computer and information systems is that most have experienced dwindling enrollments in the past few years, but the dearth of female students majoring in these fields at colleges and universities in the United States is striking. Recent statistics from the Taulbee Report indicate the extensiveness of the problem (Vegso, 2005; Zweben, 2005). The historical perspective is that not since the 1970's has the number of women majoring in the computing and information sciences been so low.

Over twenty-five years ago, academe was referred to as "The Classroom Climate: A

Chilly One for Women?" (Hall and Sandler, 1982). However, that was last century, before technology was supposed to level the playing field for women. Unfortunately, this problem is getting worse, in spite of the great strides women have made in other fields of study.

3. LITERATURE REVIEW

A brief review of the literature illuminates the problem and demonstrates its pervasiveness (Gurer and Camp, 2002). Most of the more recently published literature focuses on two major issues: (1) recruitment and (2) retention. The recruitment and retention of women (often called "R & R" in the literature) in what is sometimes referred to as "the pipeline" (Camp, 1997; Jepson and Perl, 2002; Randall, Price, and Reichgelt, 2003) of the computer information systems discipline, is a major source of angst. The so-called pipeline is supposedly shrinking and thus needs to be primed in order to get more women to study in the discipline. Various articles discuss the reasons for this shrinkage (Howell, 1993; Moorman and Johnson, 2003; Patterson, 2005; Rodger and Walker, 1996; Scragg and Smith, 1998) and offer solutions to the problem (AAUW, 2000; Bernstein, 1997; Burge and Suarez, 2005; Cohoon, 2002; Teague, 2002). One article (written by a male) even explains "Why Women Avoid Computer Science" (DePalma, 2001).

Many articles do not offer proven ways to improve the situation; rather, they try to explain why it happened. The articles about Carnegie Mellon University are specific to its type of privately-funded, world-renown, larger institution and therefore have limited direct application to state-funded, regionally-known, smaller institutions. The major reason that CMU has been able to increase its female enrollment in the computer information systems related field is that it has been able to set aside slots for women to ensure some sort of equity in its classes of students (Blum, 2001; Fisher and Margolis, 2002; Fisher, Margolis, and Miller, 1997). However, CMU's ideas are useful for adapting to one's own institution, if that is a possibility.

The most extensive suggestions for recruitment and retention of women in the discipline appear in the article "Recruiting

and Retaining Women in Undergraduate Computing Majors" (Cohoon, 2002). Interestingly enough, Cohoon is not a computer or information scientist; rather, she is a teaching and research professor of education who has conducted extensive research on the gender gap in computer and related disciplines.

Cohoon makes nineteen (19) recommendations for the recruitment and retention of women. Her carefully researched recommendations are paraphrased below:

- 1 Communicate with high school teachers.
- 2 Contact high school guidance counselors.
- 3 Recruit high school students via recent graduates.
- 4 Recruit community college students.
- 5 Involve the local community.
- 6 Recruit undeclared majors in your own university.
- 7 Select students based on performance in challenging courses other than computing.
- 8 Structure introductory courses that appeal to women.
- 9 Monitor public relations documents for representation of women.
- 10 Provide a stable faculty environment.
- 11 Employ female professors.
- 12 Hire faculty members who like to teach undergraduate students.
- 13 Foster an environment that encourages peer support and professional activities.
- 14 Provide mentoring to female students.
- 15 Praise female students for their performance.
- 16 Involve female students in research.
- 17 Provide strong institutional support so that adequate resources are available.
- 18 Offer internships with local employers.
- 19 Give students a chance to use skills in service-learning capacities. (Cohoon, 2002)

4. THE SURVEY

After approval by the Slippery Rock University Institutional Review Board (see Appendix A), the author of this paper conducted a survey of computer-related academic departments at PA-SSHE universities (see Appendix B) to gather data

about their recruitment and retention of female undergraduate majors.

The departments surveyed were those at these institutions:

- Bloomsburg Department of Mathematics, Computer Science and Statistics
- California Department of Mathematics and Computer Science
- Cheyney
<http://www.cheyney.edu/pages/index.asp?p=746>
- Clarion Computer Information Science Department
- East Stroudsburg Department of Computer Science
- Edinboro Math and Computer Science Department
- Indiana Computer Science Department
- Kutztown Mathematics and Computer Information Science
- Lock Haven Department of Business Administration, Computer Science and Information Technology
- Mansfield Department of Computer Information Science
- Millersville Computer Science Department
- Shippensburg Department of Computer Science
- Slippery Rock Computer Science Department
- West Chester
<http://www.cs.wcupa.edu/root/>

5. SURVEY RESULTS

Survey results were obtained from nine of the fourteen PA-SSHE universities. Despite three separate requests (see Appendix C) to obtain data from all fourteen PA-SSHE universities via email, postal mail, and fax, the following five institutions declined to

submit student data: Cheyney, East Stroudsburg, Edinboro, Kutztown, and Lock Haven.

Note that the faculty data for all institutions that are recorded in this paper was gathered via the universities' own websites so that faculty results could be calculated as well. It is important to report that, of these five departments that declined to submit student data, only one (East Stroudsburg) has a 'true' computer and information systems department. Cheyney offers degrees only in mathematics, and the departments at Edinboro and Kutztown are heavily weighted toward mathematics. Furthermore, Lock Haven's department of twelve (12) faculty members includes just two (2) computer/information systems professors.

6. DATA ANALYSIS

The survey data obtained are interesting. All of the responding departments from the PA-SSHE institutions reported a variety of ways in which they recruit undergraduates to major in computer and information science, even when the departments reported that their admissions office coordinated the recruitment efforts. Three of the nine reporting universities have formal mentoring programs for their majors: California, Indiana, and West Chester. Six of the nine responding universities conduct exit surveys to assess their support for graduating seniors: Bloomsburg, Clarion, Mansfield, Millersville, Shippensburg, and Slippery Rock. None of the respondents conduct surveys to assess their support for female majors. Just one university--Millersville--makes a special effort to recruit women. Only one university--Indiana --offers special mentoring for female majors.

The study found that a mere 8% of the computing & information sciences majors in these universities is female, or 121 students out of a total of 1,333 majors. This is much less than the percentage of female faculty, which is 25%; 38 out of the 161 total tenure-track faculty are female. There is nothing in the data that explains why the percentage of female students is so much lower than the percentage of female tenure-track faculty. In fact, one might expect the number of female students to increase where

the number of female faculty is higher; however, that is not the case.

A case in point is Mansfield University, where there are no women on the faculty. It is interesting to note that, of all the universities surveyed, Mansfield has the largest percentage of female majors: 18%. Mansfield reported that it does make a special effort to recruit women, but it did not say exactly what it does to do so. It should be noted that, at Mansfield, there are no women employed in the ranks of tenured faculty.

It was surprising to find that, while Indiana has two tenured women and a special mentoring program for women, it has the smallest percentage of female majors in the discipline, just 6%. Is the IUP mentoring program merely a way of retaining majors without recruiting more women into the pipeline? Is it possible that the IUP mentoring program is counter productive with regard to recruitment? This analysis of data leads one to a series of provocative questions that need to be investigated in a follow-up study.

7. RETENTION SOLUTIONS

Suggested solutions that have been implemented at two Pennsylvania State System of Higher Education universities to retain the number of undergraduate female majors in computer and information systems are those at Indiana University of PA and Shippensburg University of PA. These are institutions that have instituted ideas that their sister institutions of higher education may want to implement. Other ideas that can work to retain more women major in information systems related undergraduate programs are beginning to be implemented at Slippery Rock University of PA.

Indiana University of Pennsylvania

Indiana Computer Science Department has two female faculty members with tenure; however, one of them works at two off-campus sites and has a heavy teaching load that precludes research and mentoring of female students. It is left to Dr. Rose K. Shumba to mentor her female students via her successful track record of obtaining grants so that they can conduct research and

make presentations of papers, which have subsequently been published. For the past three years, Dr. Shumba has worked with female students. Her department chair and her administration have funded travel for her students to present their papers at professional conferences. Her students' work is the best advertisement for recruiting other women in their field to major in computing & information systems at IUP.

For details, see

http://www.cosc.iup.edu/www/studentResearch/womenofcs_files/index.html

Shippensburg University of Pennsylvania

Shippensburg Department of Computer Science is an example of how just one female faculty member in a department of nine (9) can make a difference in the lives of her female students. Dr. Carol A. Wellington has single-handedly mentored female majors in a group called Women in Computer Science. They conduct research, obtain grants, create special websites, and produce podcasts.

For more information, see

http://clipper.ship.edu/~wics/about_us.php

and

<http://clipper.ship.edu/~wics/podcasts.php>

Slippery Rock University of Pennsylvania

Slippery Rock University Computer Science Department. Inspired by the work of Drs. Shumba (Indiana) and Wellington (Shippensburg), Prof. Patricia A. Joseph and Dr. Deborah Whitfield have continued to hold "Brown Bag" lunches for their female students and prepare to present research with their computer & information systems students at the 2007 Grace Hopper Celebration of Computing. Last fall, they hosted Dr. Shumba and her students for a preview of their presentation made at the 2006 Grace Hopper Celebration of Computing. That event was the catalyst for SRU students to believe that they, too, could make valuable contributions to information systems research. To jump-start their efforts to retain students, Joseph and Whitfield obtained one-time funding from their department chair and dean for these retention activities. Joseph and Whitfield

hope that these initiatives will lead to larger and more exciting possibilities to increase diversity in their department.

8. CONCLUSION

The main title of this paper is "A Bridge to the Future," and that is what this study offers. Despite the past practices of the Pennsylvania State System of Higher Education universities, it is still possible to recruit and retain more undergraduate women who want to study computer and information systems. As with the three universities described above, it is necessary to have the will to change and the funding to implement these changes. Can we expect any less of our Commonwealth for the future of information systems education?

9. REFERENCES

- AAUW Educational Foundation on Technology, Gender, and Teacher Education. (2000) *Tech-Savvy: Educating Girls in the New Computer Age*. Washington, DC: American Association of University Women Educational Foundation.
- http://www.aauw.org/member_center/publications/TechSavvy/TechSavvy.pdf
- Alstrum, V. L. (2003) "What is the Attraction to Computing?" *Communications of the ACM*, 46 (9), 51-55.
- Alstrum, V. L., Last, M. Z. (2005) "What Attracts Women to CS?" *Proceedings of the 10th Annual SIGCSE Conference on Innovation and Technology in Computer Science Education, July 27-29, 2005, ACM ITiCSE '05*, p. 378.
- Bernstein, D. R. (1997) "Computing, Diversity, and Community: Fostering the Computer Culture." *Proceedings of the Annual SIGCSE Conference on Computer Science Education, ACM '97*, pp. 101105.
- Blum, L. (2001) "Women in Computer Science: The Carnegie-Mellon Experience." http://www.cs.cmu.edu/~lblum/PAPERS/women_in_computer_science.pdf.
- Burge, J. D., Suarez, T. L. (2005) "Preliminary Analysis of Factors Affecting Women and African-Americans in the

- Computing Sciences." TPIA '05, October 19-22, 2005, pp. 55-56.
- Camp, T. (1997) "The Incredible Shrinking Pipeline." *Communications of the ACM*, 40 (10), 103-110. Retrieved from the compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing*. (2005) The Association for Computing Machinery, Inc.
- Cohoon, J. M. (2002) "Recruiting and Retaining Women in Undergraduate Computing Majors." *SIGCSE Bulletin*, 34 (2), 48-52. Retrieved from the compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing*. (2005) The Association for Computing Machinery, Inc.
- DePalma, P. (2001) "Why Women Avoid Computer Science." *Communications of the ACM*, 44 (6), 27-29. In *Computers in Society 05/06*, 12th edition. ed. DePalma, P. Annual Editions Series. Guilford, CT: McGraw-Hill/Dushkin, 2005.
- Fisher, A., Margolis, J. (2002) "Unlocking the Clubhouse: The Carnegie-Mellon Experience." *SIGCSE Bulletin*, 34 (2), 79-83. Retrieved from compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing*. (2005) The Association for Computing Machinery, Inc.
- Fisher, A., Margolis, J., Miller, F. (1997) "Undergraduate Women in Computer Science: Experience, Motivation, and Culture." *Proceedings of the Annual SIGCSE Conference on Computer Science Education*, ACM '97, pp. 106-110.
- Gurer, D., Camp, T. (2002) "An ACM-W Literature Review on Women in Computing." *SIGCSE Bulletin*, 34 (2), 121-127. Retrieved from the compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing*. (2005) The Association for Computing Machinery, Inc.
- Hall, R.M., Sandler, B.R. (1982) *The Classroom Climate: A Chilly One for Women?* Washington, DC: Project on the Status and Education of Women, Association of American Colleges.
- Howell, K. (1993) "The Experience of Women in Undergraduate Computer Science: What Does the Research Say?" *SIGCSE Bulletin*, 25 (2), 1-8.
- Jepson, A., Perl, T. (2002) "Priming the Pipeline." *SIGCSE Bulletin*, 34 (2), 36-39. Retrieved from the compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing*. (2005) The Association for Computing Machinery, Inc.
- Moorman, P., Johnson, E. (2003) "Still a Stranger Here: Attitudes Among Secondary School Students Towards Computer Science." *Proceedings of ITICSE '03*, pp. 193-197.
- Patterson, D. A. (2005) "Restoring the Popularity of Computer Science." *Communications of the ACM*, 48 (9), 25-26, 28.
- Randall, C., Price, B., Reichgelt, H. (2003) "Women in Computing Programs: Does the Incredible Shrinking Pipeline Apply to All Computing Programs?" *Inroads -- The SIGCSE Bulletin*, 35 (4), 55- 59.
- Roberts, E. S., Kassianidou, M., Irani, L. (2002) "Encouraging Women in Computer Science." *SIGCSE Bulletin*, 34 (2), 84-88. Retrieved from the compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing*. (2005) The Association for Computing Machinery, Inc.
- Rodger, S. H., Walker, E. L. (1996) "Activities to Attract High School Girls to Computer Science." *Proceedings of the Annual SIGCSE Conference on Computer Science Education*, ACM '96, pp. 373-377.
- Scragg, G., Smith, J. (1998) "A Study of Barriers to Women in Undergraduate Computer Science." *Proceedings of the Annual SIGCSE Conference on Computer Science Education*, ACM '98, pp. 82-86.
- Teague, J. (2002) "Women in Computing: What brings them to it, what keeps them in it?" *SIGCSE Bulletin*, 34 (2), 147-158. Retrieved from the compact disc *Pathways: Women and Computing. Excerpts from*

- Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing.* (2005) The Association for Computing Machinery, Inc.
- Treu, K., Skinner, A. (2002) "Ten Suggestions for a Gender-Equitable CS Classroom." *SIGCSE Bulletin*, 34 (2), 165-167. Retrieved from compact disc *Pathways: Women and Computing. Excerpts from Inroads--SIGCSE Bulletin, Communications of the ACM, IEEE Annals of the History of Computing.* (2005) The Association for Computing Machinery, Inc.
- Vegso, J. (2005) "Drop in CS Bachelor's Degree Production." *Computing Research News*, 18 (2). <http://www.cra.org/CRN/articles/march06/vegso.html>.
- Vegso, J. (2005) "Interest in CS as a Major Drops Among Incoming Freshman." *Computing Research News*, 17 (3). <http://www.cra.org/CRN/articles/may05/vegso>.
- Zweben, S. (2005) "2003-2004 Taulbee Survey. Record Ph.D. Production on the Horizon; Undergraduate Enrollments Continue in Decline." *Computing Research News*, 17 (3). <http://www.cra.org/CRN/articles/may05/taulbee.html#9>

APPENDIX A-- Institutional Review Board Protocol

Recruiting Women to Major in Computing

Summary

Almost all undergraduate programs of computer science have experienced dwindling enrollments in the past few years, but the dearth of female students majoring in computer science related fields at U.S. colleges and universities is striking. There is literature (see "References") that explains how other universities recruit and retain women in the computing sciences. However, there is no published literature that mentions any recruitment practices of Computer Science Departments in the Pennsylvania State System of Higher Education. This project provides an opportunity for SSHE departments to share ideas to increase the number of women enrolling in their computer science related programs.

Specific Aims of the Study

The study (see "Survey" attached) will help to form a picture of what the state-owned universities are doing to recruit female undergraduates in our field in the Commonwealth of Pennsylvania, at the SSHE institutions. This survey seeks to gather existing data to generate a baseline, i.e., a reference with which to compare future observations or results. The aim of the study is the generation of the most complete results to allow SSHE institutions to share practices which will benefit the common good.

Methods

The sequence and methods of the study that will be performed for the purpose of the research activity includes mailing and emailing the survey, conducting follow-up telephone reminders, and tabulation of survey results. Please note the following:

- The entire study population will be surveyed, e.g., all SSHE institutions.*
- The location for carrying out all study procedures is the Commonwealth of Pennsylvania. The survey will be conducted via U.S. mail and email. (See "Letter" attached).
- The proposed statistical treatment of data will be conducted using standard accounting procedures.

Significance

The scientific results that may be expected from new information gained by this protocol are those which benefit gender-free education in the Commonwealth.

*

Bloomsburg
California
Cheney
Clarion
East Stroudsburg
Edinboro
Indiana
Kutztown
Lock Haven
Mansfield
Millersville
Shippensburg
Slippery Rock
West Chester

APPENDIX A-- INSTITUTIONAL REVIEW BOARD PROTOCOL CONTINUED**Exempt From Review Protocol Application Form**

Protocol Number: [To be assigned by the IRB]	
Study Title: <u>Recruiting Women to Major in Computing & Information Sciences</u>	
Principal Investigator: Patricia A. Joseph	Department Address: 254 ATS Hall
E-mail Address: patricia.joseph@sru.edu	Phone: (724) 738-2138 Fax: 738-4513
Location(s) where research is to be conducted: <input checked="" type="checkbox"/> Other (specify): <u>all SSHE universities.</u>	
Expected Number of Human Research Participants: At XXXX University: <u>0</u> Study-wide: <u>0</u>	Anticipated Project Period: (mm/dd/yyyy) From: <u>4/20/2006</u> To: <u>4/20/2007</u>
Proposed participant accrual procedure: <input type="checkbox"/> Referrals <input type="checkbox"/> Advertisement (Attach a copy of the final ad) <input checked="" type="checkbox"/> Other (Specify): <u>survey known departments of Computer/Info Science at all SSHE universities.</u>	
Indicate the funding source for the research study (check all that apply): <input checked="" type="checkbox"/> None <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Industry <input type="checkbox"/> Private Funding <input type="checkbox"/> Other (specify): _____	
Remuneration and amount for each indicted: <input type="checkbox"/> Normal Volunteer <u>\$0.00</u> <input type="checkbox"/> Other Participants <u>\$0.00</u>	
Participant Type (check all that apply): <input checked="" type="checkbox"/> Adult volunteer <input type="checkbox"/> Minor volunteer <input type="checkbox"/> Pregnant women* <input checked="" type="checkbox"/> Women** <input type="checkbox"/> Severe physical illness <input type="checkbox"/> Prisoners* <input checked="" type="checkbox"/> Minorities** <input type="checkbox"/> Mentally disabled* <input type="checkbox"/> Elderly <input type="checkbox"/> Economically/Educationally disadvantaged *Participants of this type do not qualify for exempt review ** Justification must be included in protocol if not checked	
Conflict of Interest: <u>none.</u>	
Do you have any relationship to the sponsor of the study or the company of the product you are investigating that would be considered a conflict of interest as defined in the Conflict of Interest Policy? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Level of Risk to Participants: <input checked="" type="checkbox"/> No Risk <input type="checkbox"/> Minimal Risk <input type="checkbox"/> More than Minimal Risk	

Research activities are exempt from the Federal policy for the Protection of Human Subjects when the ONLY involvement of human subjects falls within one or more of the categories below. Check the appropriate category(ies) that apply to your research project:

- d. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or indirectly through identifiers linked to subjects.
(NOTE: According to the Office of Human Rights Protection (OHRP), "to qualify for this exemption, the data, documents, records, or specimens must be in existence **before** the project begins. The principle behind this policy is that the rights of the individuals should be respected; subjects must consent to participation in research.")

APPENDIX B -- SURVEY**Pennsylvania State System of Higher Education Universities****Academic Year 2006-2007****Slippery Rock University - Institutional Review Board-approved study, conducted via****Pennsylvania Computer & Information Science Educators****PACISE Survey on Recruiting Women to Major in the Computing & Information Sciences****SSHE University:** _____

1. How do you recruit undergraduates to major in computer & information science?
2. Do you make a special effort to recruit women? YES NO If YES, how?
3. Do you have a formal mentoring program for your majors? YES NO
4. Do you offer special mentoring for female majors?
5. How many majors do you currently have?
6. How many of these majors are female?
7. How many tenure-track faculty do you have?
8. How many of these faculty are women?
9. Do you conduct exit surveys to assess your support for graduating majors?
10. Do you conduct surveys to assess your support for female majors?

APPENDIX C -- LETTER

Computer Science Department
254 Advanced Technology & Science Hall
Slippery Rock University
Slippery Rock, PA 16057

<date>

<Computer & Information Systems Department Chairperson>
<SSHE institution> of Pennsylvania
<Local Address>
<City>, PA <zip code>

Dear <Computer & Information Systems Department Chairperson>:

I may have met you at the recent annual PACISE (Pennsylvania Association of Computer and Information Science Educators) Conference held at Indiana University of PA. If so, you know that I chaired the 'Birds of a Feather' session on "Recruitment and Retention of Female Students" at the conference. If not, allow me to introduce myself. I am a Professor of Information Systems at Slippery Rock University. This semester, I have been conducting research on the recruitment and retention of undergraduate women who major in the computing sciences. As part of this research, I have already conducted a literature review and have learned how other universities recruit and retain women in the computing sciences. However, there is no literature which mentions any recruitment practices of Computer Science & Information Systems Departments in the State System of Higher Education.

The enclosed brief survey will help to form a picture of what the state-owned universities are doing to recruit female undergraduates in our field in the Commonwealth of Pennsylvania, at the SSHE institutions. This survey seeks to gather existing data to generate a baseline, i.e., a reference with which to compare future observations or results. Your input will enable me to generate the most complete results and will allow us to share practices which work for us all. As soon as I have obtained surveys from all SSHE institutions' Departments of Computer & Information Systems, I will send you a summary of the results, with my observations.

Please use the enclosed, self-addressed envelope to return your completed survey to me at your earliest convenience, or you may fax the survey to me at (724) 738-4513. Note also that I will be sending the identical survey to you via email, so that you can complete it in whatever format you prefer. Feel free to contact me with questions or comments by telephone at (724) 738-2138 or by emailing me at patricia.joseph@sru.edu

Thank you in advance for your time and your invaluable input to this effort.

Sincerely yours,

Patricia A. Joseph

Enc.: 1
Copy: PACISE Representative for <SSHE institution> of Pennsylvania

APPENDIX D -- SURVEY DATA

PACISE Survey on Recruiting Women to Major in the Computing & Information Sciences																							
PA State System of Higher Education	B l o o m s b u r g	C a l i f o r n i a	C h e r o n e	C l a s s i f i c a t i o n	E a s t S t r o n g	E d u c a t i o n	I n d i a	K u c k H o u s e	L o c k H o u s e	M a n s f i e l d	M i l l e r s v i l l e	S h i p p e n s b u r g	S l i p p e r y R o c k	W e s t C h e s t e r	T O T A L S	P E R C E N T A G E							
1. How do you recruit undergraduates to major in computer & information science?	Open houses, print & multimedia ads, school visits, scholarship & programming contests																						
2. Do you make a special effort to recruit women? If YES, how?	N	N		N			N			N	Y	N	N	N									
3. Do you have a formal mentoring program for your majors?	N	Y		N			Y			N	N	N	N	Y									
4. Do you offer special mentoring for female majors?	N	N		N			Y			N	N	N	N	N									
5. How many majors do you currently have?	100	161		150			250			73	184	162	128	125	1,333								
6. How many of these majors are female?	5	18		17			15			13	17	13	13	10	121	8%				Female Majors			
7. What is the number of your tenure-track faculty?	20	18	3	9	12	23	10	11	12	4	7	9	11	12	161								
8. How many of the tenure-track faculty are women?	3	7	0	2	2	8	2	2	5	0	1	1	2	3	38	25%				Female Faculty			
9. Do you conduct exit surveys to assess your support for graduating majors?	Y	N		Y			N			Y	Y	Y	Y	N									
10. Do you conduct surveys to assess your support for female majors?	N	N		N			N			N	N	N	N	N									