

Grounding Student Retention and Recruitment in Computer Science Programs in Sound Research Methodology and Data: a CSU System-wide Workshop

Organizers:

Tyson Henry, Ph.D., Assistant Professor
Department of Computer Science, CSU, Chico
530-898-5709 (office), 530-898-5995 (fax), tyson@ecst.csuchico.edu

Hilary Holz, Ph.D., Assistant Professor
Department of Mathematics and Computer Science, CSU Hayward
510-885-3458 (office), 510-885-4169 (fax), hholz@csuhayward.edu

Clarke Steinback, Ph.D., Assistant Professor
Department of Computer Science, CSU, Chico
530-898-5418 (office), 530-898-5995 (fax), ranger@ecst.csuchico.edu

Project Summary:

On April 3, 2004, twelve Computer Science and one Teacher Education faculty from eight CSU campuses attended a workshop on the retention and recruitment of Computer Science students on the Hayward campus. The primary goal was to build a collaborative of many universities to collect recruitment and retention data, develop new approaches, and to build research partnerships.

The workshop contained four sessions:

1. Designing Research on Recruitment and Retention in Computer Science
2. How to Research Retention in our own Departments
3. Recruitment and Retention of Women and Minorities
4. Technologies to Improve Recruitment and Retention

After each session, workshop participants broke into small groups, discussed the previous session, and answered questions relating to the session. The results from all the groups were collated and distributed to all participants.

Attendees:

Terence Ahern, Monterey Bay
Mohsen Behshti, Dominques Hills
Robert Chun, San Jose
Woogon Chung, Bakersfield
Roger Doering, Hayward
Tyson Henry, Chico
Hilary Holz, Hayward
Donna Meyers, Bakersfield
Catherine Reed, Hayward

Clarke Steinback, Chico
Clark Turner, San Luis Obispo
Sharon Tuttle, Humboldt
Arif Wani, Bakersfield
Ken Yasuhara, University of Washington

Outcomes:

The ITL workshop provided valuable insights into programs, common and disparate issues, and the variety of attempts already made to address perceived issues. Issues of recruitment and retention in CS programs across the CSU system are worrisome. Absolute numbers of new CS majors are falling in some programs. Diversity is not growing. Students are leaving programs after beginning the major. The most common response from the workshop participants was the desire to continue a dialog and to attend follow-up workshops.

The format for the workshop provided a balance between presentations and breakout sessions. The organizers understood that the opportunity for participants to develop understandings of programs other than their own and to explore issues of common concern would transcend any single formal topic. For this reason, each of the four presentations was followed by a breakout session. During the breakout, participants were engaged in exploring a topic that either extended the presentation or was suggested by the presentation topic.

A consideration of the first session provides an understanding of the structure of the workshop. All participants heard a presentation about general education research design. Participants reviewed the major methods employed for educational research. The presentation focused on aspects of qualitative and quantitative data gathering. In groups of no more than five, participants discussed how they might research their own campus-specific issues, built collaborative connections with the other breakout session participants, and returned to the workshop ready to move into the next, structured presentation.

The workshop organizers asked all participants to complete a workshop assessment composed of nine Likert scale statements, six yes/no statements, and two free response questions to both model qualitative and quantitative research methods and to gather some summative information about the workshop. With the number of participants well below the N required for standard statistical evaluation ($N = 30$), descriptive statistics best describe the understandings provided by the respondents. The results clearly indicated that the participants gained information about issues surrounding recruitment and retention in CS programs and about collaboration possibilities. In addition, the participants indicated a solid interest in attending subsequent workshops on “follow-up themes” with the intention to encourage attendance by other faculty from their campuses.

From the Likert portion of the assessment survey, statement 2, “I know where to look (or who to ask) to access current research on R&R in CS” yielded a mean of 2.3 out of 5. Whether the presentations made any difference to the participants is not captured in this item. A different interpretation could be that the participants found colleagues to whom they could turn for answers to research questions.

The five yes-no statements provided the richest source of agreement that the workshop partially met initial expectations. The response to “I have some new ideas to use to retain students within my program” was uniformly “yes.” No participant disagreed or left this statement unanswered.

On the other hand, the participants did not find sufficient or new information and ideas about how to recruit students from under represented groups. The response to “I have some new ideas to use to recruit students from under represented groups to my program” was predominantly, though not uniformly, “no.” Subsequent workshops will need to address this issue with greater clarity.

Given the nature of this workshop – the first to be held system-wide to address issues of recruitment and retention – the outcomes are encouraging. Follow-on workshops can provide a forum where colleagues can share issues and answers. Collaboration initiated during the workshop can be strengthened and widened. Joint explorations and the sharing of data will allow for the development of clearer understandings of issues common to recruitment and retention in CS system-wide.

A description of the workshop will appear in the *Proceedings of the IEEE Frontiers in Education Conference*, October 2004.

Next Steps:

We would like hold a follow-up workshop during 2004-2005. We will be seeking funding from both internal and external sources to fund the workshop.

We are developing a web-based tool that can be used by CS Departments across the CSU to collect data on why leave Computer Science. The basic idea is that the instructor will require students to register on our web-site at the beginning of the semester. Since all students anticipate finishing the course at the beginning of the semester, the instructor has some leverage and can require them to register and answer several questions about themselves and about their expectations. At the end of the semester the instructor will require all students remaining in the course to go back to our web-site and fill out an exit survey. Our web-site will send e-mail to those students who dropped the course asking (or maybe begging) them to fill out a survey about why they gave up. Part of our challenge will be to find ways to encourage students to fill out the exit survey.

Two of the organizers have also submitted a proposal to the NSF to study how informal education in CS improves retention. Specifically, they plan to determine what skills students who stay in the major learned informally that those who leave the major did not learn. Their goal is to develop a course that will bridge the knowledge gap for students who are likely to leave.

Expenditures:

Travel	\$3076
Catering	\$397
Student Labor	\$350
<u>Web-Based Retention Tracker (student labor)</u>	<u>\$1677</u>
Total	\$5500