

March 2009

Partners in Computing Executive Summary

Even before the recent, drastic decline in students majoring in computing, the Bureau of Labor Statistics data showed that the U.S. was significantly under producing Information Technology (IT) graduates; that imbalance has only gotten worse. For the next decade, projections show that the overwhelming portion of new job growth will be in the IT sector. IT innovation is a major driver of our economy, and it is critical to our national security. If the U.S. is to remain globally competitive, we must increase the number of domestic students receiving undergraduate and graduate degrees in the computing disciplines. This increase must occur across all segments of our population, but it is particularly important among those groups that historically have participated only at very low rates: minorities, women, persons with disabilities and the economically challenged. The under participation of these groups causes a loss of opportunity for individuals, a loss of talent to the workforce, and a loss of diverse perspectives and creativity that are needed to shape the future of technology. The greater Sacramento Region has a shortage of approximately 500 graduates with a BS in Computer Science (CS) or Computer Engineering (CE) Degrees each year. At Sacramento City College (SCC), we typically lose 60% of our CS majors who start our program. At Sacramento State (CSUS), they typically lose 40% of their CS majors by the end of two years.

It is time to start doing something about this. We need to be actively recruiting CS students into our program and be helping them to complete their education to close the gap of needed CS and CE graduates in the Sacramento region. Specifically, the PIC plan is to recruit under-represented groups into the CS program at SCC. When they complete our program, they will then transfer to a 4-year university where they will finish their BS degree, taking an average of 4 to 5 years total – from beginning at SCC to graduating from the 4-year university. The NSF Grant for broadening participation in computing is the perfect grant to help us achieve this goal. It will give us \$500,000. over three years to make Partners in Computing (PIC) become a reality.

Following are some specifics of the plan and how the NSF grant will help:

- In fall 2009 or 2010, contact our feeder high school faculty partners (those schools that feed students into college at SCC) to help select students 30 to 50 students (initially) who are strong in math and science, who would like to earn a degree in CS and who fall into one or more of the under-represented groups mentioned above. The next year add 30-50 more students to the program.
- The summer after the end of high school will be a busy summer for these students. They will be welcomed, introduced to their own mentors, assigned a CS faculty who is their team leader. During the summer, the teams will work with the student and her family to determine the amount of financial aide needed to keep the student living at home and not having a job. They will learn together that we expect college to be their only job for the next 4 to 5 years. We will place all these students in our college success classes with each other. These students, teachers, mentors and tutors are going to become their second family over the next 2 years.
- Present the selected students with a special invitation to the program. Hold a special session to welcome the students and to help them enroll in the classes they need to be taking. Assign each one a faculty advisor who they can talk with anytime. The advisor should join them at the welcome session to help make them feel welcome to SCC and to the computer science program

in general. The goal of this is to make the CIS dept feel like a high school home room where students are always welcome and there is always someone who can help solve any problems.

- Require these students to go to college full-time and partially subsidize their living expenses by their parents providing a home; any FAFSA scholarships grants or loans; funds provided by the NSF grant; and funds provided by local businesses (see next bullet). They will be encouraged to live at home with their parents; commute to college on light rail and buses with our free student pass; bring their young children to the SCC child care center; and fully immerse themselves in college at SCC.
- Involve our business partners, the community leaders from the cities of Sacramento, West Sacramento, Rancho Cordova, and Elk Grove, Linking Education and Economic Development (LEED), American Association of University Women (AAUW) and the STEM Pipeline (Science, Technology, Engineering and Mathematics) to help find companies in the greater Sacramento region who are willing to provide financial aid, a mentor/tutor and a paid summer internship for 1 student in this program (about \$10,000. per year the first year if they have not qualified with FAFSA on time). Those companies that get involved stand to gain a wonderful new generation of local workers with the high technology background needed to keep their companies strong.
- Bring counselors into the PIC Team meetings, prior to the beginning of each semester. Require these students to seek counseling to be sure they get enrolled into their required Computer Science, Calculus, Physics, and Chemistry classes. Additionally, the counselors will make sure that the students take the English classes needed so that they can complete the English reading and writing requirements necessary transfer after 4 to 6 semesters at SCC. Lastly, the counselors should help the students choose general education classes that will be transferable. (Since we will be enrolling them, the CS classes will be filling, instead of running half full.)
- Enroll all them in a Friday morning (PIC Team Meeting) class that meets for the same 3 hours each Friday. Each student will be grouped with between 7 and 9 other students who all have the same faculty member as their PIC team leaders. Spend time with each student to find out what may be a barrier to their success of obtaining a degree (childcare issues, transportation issues, financial issues, lack of study skills, etc) and help *them solve that problem* (so they feel good about the solution and that they can do it.) Teach these students how to be successful in college; how to determine their own learning styles; how to study using their best learning methods; how to manage time and a budget; how to solve problems; how to be a leader; and how to be a "winner" in every aspect of their lives. **Teach them the skills** needed to do this throughout their lives.
- Once or twice a month (on that Friday morning) have an inspirational or motivational speaker on such topics as the importance of good study habits, balancing work, home and school, striving to be the best you can be, the field of computer science or computer engineering and why it is such a wonderful field, benefits of a degree in a technical field, how to work hard for 4 -5 years to earn a lifetime of potential employment... and other relevant topics. Take these students as well as students from our feeder high schools and the community to these events. The NSF grant will provide a stipend for these speakers as needed.

- Require attendance at PIC Team meetings each week with free tutoring for those who need it. Involve MESA, RISE, EOPS and other campus programs. Again, the NSF grant will pay for the necessary tutors. Once the students have passed the introductory CIS classes, let them serve as tutors for the newer students. Evaluate their success or need for assistance at week 4, 8 and 12. Provide any extra help as needed.
- Keep these students engaged and enjoying what they are learning. We want these students to connect with SCC and feel like part of our family. We intend to provide a "home room" where they can bond with other students and our CS faculty. We intend that they spend enough time at SCC each week to develop this connection. We know that the stronger their connection to college, the more likely they are to graduate. Our goal is to graduate over 80% of those students who are subsidized by the NSF grant.
- Work with CSUS and UC Davis to arrange scholarships, grants or funds that can be offered to these students to pay for the next 2 years at Sacramento State or UC Davis. Write guaranteed transfers to UC Davis and CSU Sacramento. Sacramento State University guarantees that they will accept 100% of our graduates from this program.
- Have a special awards program at graduation that honors the success of each of these students as they transfer to a 4 year university. Invite the entire family and all their friends to attend the party in their honor. Invite faculty, administration, mentors, tutors and faculty from CSUS and UCD to attend this celebration. Grant funds can help pay for this event.
- Each summer for 4 years, these students will have an internship position with a local company in their own field. They will already have experience working so they will graduate with up to 4 internships.
- After students obtain their BS degree, keep track of them and use the job placement services team at the school of Engineering and Computer Science at CSUS and job placement services at UCD to help them find a good job in their new fields. Do a long-term study about their success in the field using researchers from SCUSD and U.C. Davis. Dr Nina Amenta from UCD has already agreed to help us.
- Continue speaking with junior high and high school teachers, students and their parents to recruit young students early by telling them about a special opportunity that will be available. Be sure to stress that in order to participate in PIC, students must take all the math and science classes that they can take in junior high and high school. Help them to understand what wonderful doorways to the future are closed forever if students choose to opt out of math and science in junior high and high school.
- As students are finishing their junior year of high school, let them know that they are being considered for a special college program (PIC) offered through SCC, STEM and Sacramento State University. This program will help them get into college, have money to pay for college and obtain an Associate Degree and a Bachelor's Degree. Have them complete the first 2 courses of the CS degree at SCC while they are seniors in high school.

Team Members Include

A team has already been built consisting of

- members from Sacramento City College (SCC) including Johnson, Mai Gemu (MESA),
- CSUS Partners: Dr Anne-Louise Radimsky, Dr Du Zhang, dept chair of CS at CSUS
- members of UC Davis including Dr Nina Amenta, computer science department
- members of Sacramento City Unified School District including their grant writer, teachers and principals, administration including Rebecka Hagerty (grant writer)
- Washington USD (West Sacramento) faculty and administration
- partners from LEED David Butler Chair, Penny Cobarrubia
- CA State Government Agencies
- two local congressional assistants from Dan Lundgren and Doris Matsui's office,
- Sacramento and West Sacramento City Leaders,
- Business Representatives from Intel (Leroy Tripette), Aerojet and other local businesses.

Each member of the team knows that they are an active part of the plan and are in support of the plan. To do this takes funds, a team of committed people and a grant writer. NSF has the right grant that could work for our plan. LRCCD has a grant writer and we have a team. I understand that CTE funds are available for grants and need a team who would like to do this with me. From BITREC, STEM and LEED, I have contacts who can help. I consider this a beginning project that will allow STEM to move in the right direction.

PIC's Relationship to College Goals

The Partners in Computing plan aligns closely with several college goals:

Goal 1. Develop and implement processes to promote engagement and success of first-year students. PIC intends to have close to 100% success with first year students.

Goal 5. Develop new courses, programs and services based on assessment of emerging community needs. PIC will help close the 500 person gap referred to in the first paragraph. This is a huge community need that will help the economy in Sacramento by providing a technically strong local workforce that includes the under-represented groups.

Goal 8. Identify and respond to the needs of the college community that is growing increasingly diverse in terms of demographics and culture. PIC will be bringing a diverse population into industry through a degree in Computer Science or Computer Engineering.

Goal 9. Deliver programs and services that demonstrate a commitment to learner-centered education and institutional effectiveness through continuous process improvement. PIC focuses on learner centered education and will deliver a new standard of commitment to each student in the program.

PIC's Relationship to Department Goals

2008-9 Dept Unit plan states: "Improve student success in all courses by researching and implementing innovative teaching, learning and mentoring strategies, effective instructional philosophies and methods, and assessing and evaluating SLO's in all courses." PIC plans to deliver this.

After the PIC Grant has Ended

When this grant ends in 3 years, we hope to have demonstrated that we can include under-represented groups who can complete their Bachelors' degrees in STEM fields with increased support, motivation and encouragement. We hope to spread this demonstration to other STEM fields at SCC and the Los Rios District.

Conclusion

Sacramento City College seeks to create a learning community that celebrates diversity, nurtures personal growth, and inspires academic and economic leadership. **PIC is the right thing to do and this the right time to do it.** With our new President Obama calling people to action, we should be able to find even more support.

All that is needed to move forward is pursuing this grant is the blessings of the administration of Sacramento City College. The grant is due in May 2009
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