Two-Year Review
Vocational Training Programs

Name of Program: Computer Science Information Technology
Division Chair: F. Saddigh
Academic Year: 2013-14

Program Specific – Desired Student Outputs (Ed Code 78016(a)(1))—Meets a documented labor market demand.

What do the data indicate about the desired student outputs at the program level?

a) Documents and labor market data from professional organizations, government agencies, and community groups related to needed skills and demand for future workers.

According to the LMI Profile, employment prospects have been strong for Computer Science Bachelor’s graduates as Computer Systems Analysts, Software Developers, Web Developers, Information Security Analysts and Computer Network Architects. Growth from 2010 to 2012 was 5.1% with a median pay of $43.27 per hour.

According to the Bureau of Labor Statistics, nationally, the employment picture is also strong in computer science related fields. For example, the job outlook for Computer Programmers 2012-2022 is 8%, average growth. The median pay for 2012 was 74,280 per year.

In the U.S. News & World Report “100 Best Jobs of 2014”, 9 of the top 100 jobs related to Computer Science, with the top 2 in tech. They consider factors such as employment opportunity, salary, work-life balance and job security. The rankings were as follows:

#1 Software Developer
#2 Computer Systems Analyst (24.5% projected growth by 2022)
#9 Web Developer (20% projected growth by 2022)
#11 Information Security Analyst
#12 Database Administrator
#24 IT Manager
#30 Computer Programmer
#52 Computer Systems Administrator
#78 Computer Support Specialist
(http://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs)

b) Data from advisory committee regarding appropriateness of current outcomes and needs for entry and upgrade level training.

The Computer Science Advisory committee met in May 2014. The members indicated that the local demand for skilled programmers was strong with a high rate of pay. The predominant language is C++, which is the basis of the new computer science sequence at Harbor. The advisors also agreed that a 4-
year degree in computer science is normally needed for employment, but in some fields like gaming it is not.

c) Data from employers

Six of the top 20 jobs requiring a BA or higher in the LA-Long Beach-Santa Ana MSA area are open to graduates in Computer Science (Economic Modeling Specialists, Jobs by Occupation Report 2nd Quarter, 2013). These include Software Developers (System Software), Software Developers (Applications), Computer Systems Analysts, Network and Computer Systems Administrators, Information Security Analysts, Web Developers, Computer and Information Systems Managers.

d) Data from students via focus groups, & surveys/questionnaires

A survey was administered in Spring 2014 in the COSCI340 C++ Programming class to determine the interest level in transferring to major in Computer Science. Out of 31 students surveyed, the intention to transfer for a Bachelor’s degree was as follows:

3 Computer Information Systems
10 Computer Science
12 Engineering
  3 Math
  1 Physics
  4 Undecided or Other

Only 2 students indicated an interest in an Associate’s degree in Computer Science.

e) Review and comments from a local South Bay Workforce Investment Board (N.B.—Required by LACCD Board regulation).

Not available

Evidence of Students’ Attainment of Intended Learning Outcomes (Ed Code 78016(a)(3)—Is of demonstrated effectiveness as measured by the employment and completion success of its students.

How and why is the program/discipline effective? Analyze student performance indicators and patterns of student success in the course and/or the program. Provide evidence regarding progress toward and achievement of desired student outputs. Where appropriate, please indicate “not applicable.”

Select those performance indicators applicable to the program.

a) Success and retention rates.

1) What is the overall trend in success and retention in your program (have they increased/decreased)? Cite evidence from assessment of student learning
The overall retention rate has been about 77% for 3 of the past 5 years, with a high of 84.5% in 2008. The most recent year that data is available is the lowest, with 76.6% retention. There are at least 2 underlying factors. The first is that the sole full-time Computer Science faculty member, Lora Lane, was reassigned as SLO Coordinator from 2008-2012 with a greatly reduced workload. With that and severe budget cuts, the offerings in Computer Science were reduced to two sections of the general education COSCI058 course and lab and one more advanced course per semester. The COSCI058 course has stronger enrollment and completion than the programming courses. In Fall of 2012, Lora Lane returned to a full time teaching assignment and the rotation of courses is now 2 COSCI058 sections and 2 computer programming courses.

Also, at least one of the two programming courses is offered in a fully online format each semester. Retention rates in the online classes are much lower.

The course SLO assessments show that students who remain in the class are really understanding the fundamentals of programming. For example, in a 2012 C++ course SLO assessment of the ability to code classes, the results were as follows:

1 online section
Assignment 6

13 90% or higher
07 80% or higher
03 70% or higher
01 60% or higher
02 did not attempt

The enrollment was maxed at 40 in the first weeks of the semester.

2) How do these rates compare to the college and/or comparable programs?

The retention rate and trend is comparable to the Math division as a whole, but lower than the overall college rate. It would be good to improve this number, but it could prove difficult with limited resources and only one faculty member (who will be on pre-retirement reduced workload in Fall 2014). Moshen Beheshti, the chair of Computer Science at CSU Dominguez Hills referred to the lower division programming courses as “gatekeeper courses.” They have improved their retention by developing a mentoring program with required tutoring sessions by more advanced students. Without a Computer Science AS-T degree, it is unlikely that anything like this could be adopted at Harbor College.
3) Analyze course specific trends in success and retention.
COSCI058 is stable.
COSCI091 and 344 have low success rates
COSCI092 and 340 have high success rates
Online versions of courses have lower success and retention rates.
See detail in #4 and 5. 2010-2012 data provided by the LAHC Office of Institutional Effectiveness.

The enrollment in the courses other than the General Education COSCI058 is predominately Male. For example, 11 out of 71 students in COSCI 340 were Female. The women did well however, 9 of the 11 passed with a C or better. The low enrollment of women in Computer Science is a highly acknowledged and studied problem throughout the country.

4) Are there any courses where the trend over the past two years deviates from the program trend? What explains any observed differences?

While most of the courses stayed stable or increased the success rate, the number of students passing COSCI344 with a C or greater decreased sharply in 2012. In 2010, the rate was 56%, in 2011, 72% and in 2012 it was only 42%. A possible explanation could be that a free textbook was being used prior to 2012. This textbook could no longer be used in 2012 due to articulation requirements. The textbook that was adopted instead had a cost of about $130 and included an interactive lab system. Some students tried to complete the class without purchasing the required textbook. This trend should improve as students are strongly reminded that the textbook is a requirement and the instructor becomes more familiar with the materials.

5) Do some courses tend to have higher or lower success and retention rates than other courses?

Surprisingly, the COSCI 340 Programming in C++ course has a high success rate with 72% receiving a C or better from 2010-2012. C++ has a reputation for being a challenging programming language to learn. It is normally recommended that students take COSCI 344 Java or COSCI 91 Visual Basic before attempting C++. Students may consider more carefully before enrolling in the course.

The success rates in the “beginner” courses for 2010-2012 are much lower, 55% (Java) and 42% (Visual Basic). COSCI 91 has only been offered in an online format which contributes to the lower success rate.

COSCI 92 HTML also has a high success rate of 78% (one section 2010). COSCI 92 is a course of lower complexity than the others.
b) Degrees and certificates

1) Describe the types of awards (degrees/certificates) available through your program.

At this time there are no degrees or certificates available. An A.S. in Computer Science and Engineering was approved by the state in 2010, but it is out of date and must be discontinued in favor of an AS-T following the state approved pattern for Computer Science.

All of the Computer Science courses needed for the AS-T degree were adopted and updated through the curriculum process at Harbor in Fall 2013. They are:

- COSCI 317 Beginning Micro Assembly Language (reactivated from archive)
- COSCI 340 Programming in C++
- COSCI 344 Programming in Java
- COSCI 360 Introduction to Data Structures (reactivated from archive)
- COSCI 942 Discrete Structure (district adoption)

All of the courses have been approved for C-ID except for COSCI344. It was conditionally approved and sent back for minor modifications to content. These will be approved through the curriculum process and resubmitted in Fall 2014.

The degree itself is stuck in limbo due to an overage in the number of units for the courses required. There is no solution on the horizon. The required courses for the degree are:

- COSCI 340 (3)
- COSCI 360 (3)
- COSCI 317 (3)
- COSCI 942 (3)
- MATH 265 (5)
- MATH 266 (5)
- PHYSICS 037 (5)
- PHYSICS 038 (5)

With GE requirements, the degree units total 62-64 and the limit is 60. The suggestion from the state was to lower the units for the Math or Physics courses, but the Harbor faculty will not agree to do this. Until the state changes their requirements, there will not be an AS-T in Computer Science.

That places the COSCI transfer courses in a position of being stand-alone and subject to archival. The alternatives are to develop a Certificate (< 18 units) that includes these courses and to include the applicable courses in an update to the Computer Technology degree. A visit to CSUDH revealed that their Computer Technology degree included many of these COSCI courses as requirements. The Computer
Technology degree at Harbor is currently being studied and updated. The necessary paperwork to adopt a Computer Science Certificate will be submitted in the 2014/15 year.

COSCI 058 is a General Education course.

COSCI 091 is part of the Industrial Engineering degree program.

COSCI 092 has been part of the Computer Information Systems vocational degree and can be articulated with CSUDH as one of the courses in their Computer Technology degree with some updates.

2) What is the general trend in program awards over the past 3 to 5 years and how does this compare to the college as a whole?

There have not been any awards because there has not been an applicable degree or certificate. The top code for Computer Science overlaps that of COINFO. Awards attributed in the Factbook actually belong to COINFO.

c) Certification exam results

1) Is there a governing board that provides certification exams for students in your program? No

2) What was the most recent pass rate and how does this compare to pass rates over the past 3 to 5 years? What factors affecting pass rates are relevant for program planning? Not Applicable

d) Job placement rates

1) Do you track job placement of students in your program or use external data (VTEA)?
   Harbor College does not track job placement of Computer Science students. Most employment in the field requires more training than what is currently offered at Harbor. A Bachelor’s is typically required and students are normally taking the courses to transfer to a university.

2) How do your rates compare to external criteria or standards? Not applicable

Duplication—(Ed Code 78016(a)(2) Does this program represent unnecessary duplication of other manpower training programs in the area? Please describe any relevant differences between your program and the college and/or other programs.

No