Saint Louis University
College of Arts & Sciences
Student Learning Outcomes Assessment Report
Annual Report: June 1, 2010 to May 31, 2011
Dept.: Mathematics and Computer Science
Program: Computer Science

We begin by noting that our formal assessment plan is a work in progress. We have a goal of seeking professional accreditation by the Accreditation Board for Engineering and Technology (ABET) in either 2012 or 2013. As such, we are primarily focusing on the merits of the Computer Science degree, as that is the program that is formally accredited.

This academic year, we have proposed the following draft of Program Objectives and Learning Outcomes for Computer Science majors. We expect to finalize this draft with a vote during the coming year. We have also taken preliminary steps to assess these outcomes and to evaluate the assessment data that is gathered. We expect to develop a more comprehensive assessment plan by the end of next year. In this report, we outline our current progress to this end.

1 Program Objectives

Students who graduate with a Major in Computer Science will become:

(1) valued professionals in industry, government or academia, applying their knowledge of computer science either in traditional computing fields, or as part of organizations that apply knowledge of computing to other domains (e.g., scientific computing, finance, high-tech law, healthcare, graphic design)

(2) life-long learners who are able to embrace new technologies, either through continued professional development or graduate studies

(3) leaders in society who consider the broader impact of computing on humankind
2 Student Learning Outcomes

By the time of graduation, students will have attained:

(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(d) An ability to function effectively on teams to accomplish a common goal
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities
(f) An ability to communicate effectively with a range of audiences
(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
(h) Recognition of the need for and an ability to engage in continuing professional development
(i) An ability to use current techniques, skills, and tools necessary for computing practice
(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.
(k) An ability to apply design and development principles in the construction of software systems of varying complexity.

3 Outcomes assessed this year

All of these outcomes were assessed, but in limited form.

4 Assessment Methods

The only primary assessment that was performed for the program learning outcomes was a self-assessment by graduating students as part of an “exit interview” questionnaire, and a follow-up meeting with the Program Director.

As secondary assessment of the outcomes, we have begun to define course-specific learning outcomes for all of the Computer Science courses, and to have instructors gather data on those outcomes. This will allow us to produce a more objective evaluation of student achievements to go alongside the self-assessments by the students. However, at this point in time, we have not defined the mapping of which course-specific outcomes support which learning outcomes of the degree as a whole. So we are unable to provide such assessment of the program learning outcomes at this time.
5 Summary of assessment results

The only primary data we have at this time, is the following self-assessments received from this year’s graduating students. We received five responses out of eight students.

<table>
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<tr>
<th>Outcome</th>
<th>Rating</th>
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<tbody>
<tr>
<td>a) An ability to apply knowledge of computing and mathematics appropriate to the discipline</td>
<td>4 1</td>
</tr>
<tr>
<td>b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution</td>
<td>4 1</td>
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<tr>
<td>c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs</td>
<td>1 4</td>
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<tr>
<td>d) An ability to function effectively on teams to accomplish a common goal</td>
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<td>e) An understanding of professional, ethical, legal, security and social issues and responsibilities</td>
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<tr>
<td>g) An ability to analyze the local and global impact of computing on individuals, organizations, and society</td>
<td>3 2</td>
</tr>
<tr>
<td>h) Recognition of the need for and an ability to engage in continuing professional development</td>
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<tr>
<td>i) An ability to use current techniques, skills, and tools necessary for computing practice.</td>
<td>2 2 1</td>
</tr>
<tr>
<td>j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.</td>
<td>2 3</td>
</tr>
<tr>
<td>k) An ability to apply design and development principles in the construction of software systems of varying complexity.</td>
<td>4 1</td>
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Another data point collected as part of the exit interview process was this year’s graduating students plans for the future. This relates directly to Program Objective 1. Of the five responses we received:

- One student has a full-time job doing Software Development
- One student will be beginning a three-month internship doing software development for a biotech company, after which he will seek full-time employment or apply to graduate schools.
- One student will begin a graduate program in Statistics this Fall at UCSB
- One student will begin law school this Fall at University of Santa Clara
- One student remains unsure of plans after graduating
6 Departmental action plan

In the coming year, we will continue to develop a formal assessment plan for the Computer Science program. The overall Program Objectives and Learning Outcomes for the major are well-written. We also have initial drafts of course-level outcomes for all CSCI courses. What remains is to refine those course-level outcomes, and to define a clear mapping of how achievement of the course-level outcomes supports demonstrated achievement of the program’s stated learning outcomes.

As for the limited assessment data outlined in Section 5, the most striking concerns are the lack of students’ confidence toward outcomes (c) and (i). This data was collected in May 2011, and the Faculty has not yet had the opportunity to meet and reflect on it, but we will do so when returning in the Fall.

We have also made curricular changes to our Computer Science degree, as approved by Faculty Council this year, effective Fall 2011. All three of the changes will directly impact the learning outcomes we have defined. In particular:

- We have created a new course titled Computer Ethics, which will be jointly taught and listed as PHIL 341 and CSCI 281. It will be required of all Computer Science majors. The existence of this course directly supports Program Objective (3) via Learning Outcomes (e) and (g).

- We are replacing our single semester Capstone course (currently CSCI 491), with a two-semester Capstone sequence (CSCI 496/497). By affording a longer timeline for these student projects, we hope to increase students’ achievements of several Learning Outcomes, most notably (c) and (k).

- For the B.S. version of our degree, we have defined a more flexible structure for choosing among upper-level mathematics electives, following a recent change of guidelines by ABET. This change in structure provides students more leeway in choosing mathematics courses that they find most relevant to their Computer Science program. This change impacts Learning Outcomes (a) and (j).