Institutional Effectiveness Report

Name of the Program/Department: BS in Computer Science

Year: 2016/2017

Name of the Preparer: M. Padmaja Rao

Mission

The Computer Science Department aims to instill in our students a sound knowledge of all key domains of the computing sciences while encouraging critical thinking, teamwork, innovation, and a lifelong love for learning. We have a vision of graduating engineers, who are ethical, creative in problem solving, effective communicators, respectful of their peers, and have a desire to serve their community. Our internship program and placement efforts actively assist students in finding computing jobs.

Program Learning Outcomes

1. Computer Science students at FMU will DEVELOP AND DEMONSTRATE critical thinking skills along with creativity to ANALYZE and solve software engineering and computational problems.

2. Computer Science students at FMU will DEVELOP AND DEMONSTRATE the ability to effectively communicate technical knowledge through presentations and writings.

3. Computer Science students at FMU will DEMONSTRATE an understanding of ethical challenges that may arise in the field of software engineering and be guided by high ethical standards.

4. Computer Science students at FMU will DEMONSTRATE that they know the core concepts within each computer science discipline: programming, computer architecture, software engineering, algorithms, operating systems, compiler theory, theory of computation, and database management.

Executive Summary

During the 2016-2017 academic year, the Computer Science program assessed five Student Learning Outcomes (SLOs). The SLOs covered areas such as ethics, written and oral communication skills, critical thinking ability, and creative problem solving.
The CS program employed department-developed rubrics and holistic evaluations in assessing the five SLOs. We measured two of the five SLOs by presenting ten juniors in CS 340 with an ethics module that consisted of a series of readings, case studies, and discussion questions that engaged the student in ethical reflection. All the ten students were evaluated by two faculty members using ethics and written communication rubrics. The other three SLOs were measured in CS 480 through the Capstone projects of graduating seniors who presented their projects at the annual Computer Science Symposium. All six graduating seniors were evaluated by two faculty members using critical thinking, creative problem solving, and oral communication rubrics. We aimed to have 80% of student meet or exceed expectations for each SLO; therefore, we achieved our target for each of the five SLOs as 100% of student met or exceeded expectations in their demonstration of ethical reasoning, written and oral communication, critical thinking ability, and creative problem solving skills.

Based on these findings, the Computer Science program will continue to implement current strategies to maintain student involvement and interdisciplinary thinking.

Student Learning Outcomes

SLO 1.0 – ETHICS: Eighty percent (80%) of students in CS 340 (2015-2016 benchmark:100%) will meet or exceed the expectations when identifying elements and dilemma, relationships among direct and indirect stakeholders, positive and negative issue consequences and DEMONSTRATE the ability to recommend a response that balances the positive and negative consequences for the stakeholders in ethics case study modules.

SLO 2.0 – WRITTEN COMMUNICATION: Eighty percent (80%) of students in CS 340 (2015-2016 benchmark = 93.75%) will meet or exceed the expectations when DEMONSTRATING the proper use of vocabulary, organized presentation of information, thoughtful presentation of well-reasoned arguments, and written reports which are free of grammatical and spelling errors in their response to ethics case study modules.

SLO 3.0 – ORAL COMMUNICATION: Eighty percent (80%) of students in CS 480 (2015-2016 benchmark: 100%) will meet or exceed the expectations when demonstrating the proper use of vocabulary, organized presentation of information, appropriate amount of eye contact with audience, effective use of body language, minimal use of written notes, and understandable projection of voice in their presentation of their final Capstone project.

SLO 4.0 – CRITICAL THINKING: Eighty percent (80%) of students in CS 480 (2015-2016 benchmark: 100%) will meet or exceed expectations when identifying and understanding the information systems problem at their heart of their project, gathering and managing functional and non-functional requirements, implementing risk management, implementing project timeline and team management, and implementing a viable solution that meets functional and non-functional requirements for their self-assigned projects.

SLO 5.0 – CREATIVITY: Eighty percent (80%) of students in CS 480 (2015-2016 benchmark: 100%) will meet or exceed expectations in their approach to solving business problems by demonstrating creative ability, elaborate on the problem in ways to show insights beyond the stated situation, identifying components of the situation that are beyond the given information, identifying unanswered questions that are of consequence to the solution, and developing a solution that transforms the assumptions of the situation and can be feasibly implemented in the context of their self-assigned projects.

Assessment Methods

SLO 1.0 - ETHICS Eighty percent (80%) of students in CS 340 (2015-2016 benchmark:100%) will meet or exceed the expectations when identifying elements and dilemma, relationships among direct and indirect stakeholders, positive and negative issue consequences and DEMONSTRATE the ability to recommend a response that balances the positive and negative consequences for the stakeholders in ethics case study modules. This will be evaluated by two faculty members using a departmentally-developed rubric assessing student responses to a standardized ethics module.

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Assessment Results

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The assessment results are from Spring 2017

	Benchmark	CS 340	CS 480
Ethics	80%	100%	
Written Communication	80%	100%	
Oral Communication	80%		100%
Critical Thinking	80%		100%
Creativity	80%		100%

Table 4: Assessment results from Spring 2017

SLO 1.0: Ethical reasoning Computer Science students will be aware of ethical issues that they might encounter in the context of practicing software engineering.

- 100% of juniors in CS 340 met or exceeded expectations in ethics.
- **We conclude that the target has been achieved** since over 80% of the student met or exceeded expectations in the Spring of 2017.

SLO 2.0: Computer Science students will be able to demonstrate superior written communication skills

- Written communication skills have been assessed at the junior level. 100% of the students met or exceeded expectations in the Spring 2017.
- **We conclude that the target has been achieved.** Over 80% of the student met or exceeded expectations in Spring 2017.

SLO 3.0: Computer Science students will be able to demonstrate superior oral communications skills

- Graduating seniors were tested in CS 480 for oral communication skills. 100% of the seniors met or exceeded expectations in oral communication in their capstone projects in Spring 2017.
- **We conclude that the target has been achieved**. Over 80% of the student met or exceeded expectations in Spring 2017.

SLO 4.0: Computer Science graduates will analyze information system problems critically and logically.

- 100% of graduating seniors tested met or exceeded expectations using critical thinking in their capstone projects in Spring   2017.
- **We conclude that the target has been achieved**. Over 80% of the student met or exceeded expectations in Spring 2017.

SLO 5.0: Computer Science graduates will demonstrate creativity in their approach to solving information systems problems.

- 100% of the graduating seniors met or exceeded expectations giving creative solutions in their capstone projects in Spring 2017.
- **We conclude that the target has been achieved**. Over 80% of the student met or exceeded expectations in Spring 2017.

Action Items

The Computer Science faculty would like to aim to have all our students exceed expectations especially in the areas OF oral and written communications and ethics.

1. Oral Communication
   In their junior year, Computer Science students do a presentation in CS 340, Software Engineering. Although the course instructor (Rao) does review the presentation with the respective student, the CS faculty concluded that students would benefit more from a review of video-taped presentation and have begun implementing this method with the Class of 2018. We expect this experience and analysis to have a positive impact on their senior capstone presentations at the Computer Science Symposium in Spring 2018.
2. Written Communications
   English 318, Technical Writing, is a requirement for Computer Science majors. The CS faculty would like to continue to work closely with the English Department instructor so that the course includes an emphasis of content organization and depth of discussion.
3. Ethics
   In their junior year, the CS 340 instructor (Rao) introduced ethics discussions using the ACM/IEEE Software Engineering Code of Ethics. This was followed by giving the students a software engineering module which consists of a series of readings, case studies and discussion questions that engage the student in ethical reflection. Students were given six weeks to complete the assignment. The CS faculty believes that the students should be given one or more examples on how to approach the discussions in the module before beginning the assignment which resulted in broader and deeper discussions. This item was implemented with the Class of 2018 and will be assessed next year.