Institutional Effectiveness Report
2019-20

Program:Computer Science BS
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College and Department:College of Engineering-gCo

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as a supplement to the direct and indirect assessments we conduct for Student Outcome 1: Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.

8. External Advisory Board Review: We conduct a review of Program Educational Objectives on a two year cycle. These reviews allow us to determine whether the results are consistent with the expectations of these industrial stakeholders.

Assessment Tools, Frequency of Measurement, Applicability, and Attainment

Assessment Tool	Frequency	Applicability	Attainment

Results:

Student Outcome 1Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.

Outcome 1 is directly assessed along two specific traits (e.g., performance criteria):

- x

attainment fell below our 70% threshold for both Trait1 and Trait2. Our discussions on these skills have led to identifying a need to focus on both the mindset and mechanics of requirements definitions through user stories so that the focus is not just on the rote practices, but also their usage in practice. The teaching team recommends creation of transferable knowledge from the Fall 2018 instructor and the Fall 2019 instructors, and development of more in-depth learning materials on the use of user stories. In particular, the instructors state that we need to provide more examples and exercises for writing good user stories. We know from past experiences that the students get better at this in the following semester (as they continue to work on their project), but we need to think about getting them more experiences earlier."

The Major Field Test sub

Semeste	Course	Trait	E	P	A	N

The senior exit surveys, conducted when students complete the program, ask three identical questions to the pre-post surveys. The results of the surveys are below with the percentage of students responding either “Excellent” or “Good”.

Senior Exit Surveys

Outcome 1		
F16– S18	F16– S19	F18– S20
94%	94%	94%

Students indicate that they have gained the ability to design, implement, and evaluate a computing-based solution.

Student Outcome 3: Communicate effectively in a variety of professional contexts.

Outcome 3 is directly assessed

In Course Direct Assessment Details

We use the general rule of thumb of attainment of 70% of students falling in the Excelling and Practicing level of achievement as a marker for identifying potential action items for strategic and tactical changes to the curriculum.

Semeste	Course	Trait	E	P	A	N	E/P	E/P/A	Action
[redacted]			57	39	4	0	96	100	None
		1	71	[redacted]	0	[redacted]	[redacted]	[redacted]	None
			96	4	0	0	100	100	None
Sp 2020	3040								

[redacted]

1. How well can you communicate technical information in writing to a technical audience?
2. How well can you communicate technical information in writing to a non-technical audience?
3. How well can you communicate technical information orally to a technical audience?
4. How well can you communicate technical information orally to a non-technical audience?

The statistical results for these surveys using a one-tailed Student's T-Test, with the Fall 2019 surveys indicated a statistical significance change of the means.

The data shown indicates a statistically significant change in the means as measured using the Student's T-Test at the 97.3 (s)-4

Pre-Post Surveys for CSC 4460 Fall 2019-Spring 2020

The senior exit surveys, conducted when students complete the program, asks four questions. The results of these surveys are below with the percentages representing student responses of either “Excellent” or “Good”. In general, this points to students’ perception that they have gained the ability indicated by the outcome.

Senior Exit Surveys

Outcome 3

- Students can apply ethical concepts to assess computing
- Students can apply legal concepts to assess computing

It should be noted that, while the specific traits are similar, they were split (starting in Fall 2019) to provide a cleaner, and the department's realization that there were multiple skills specified in what had been previous treated as a single trait.

In Course Direct Assessment Details

term and the final. In response to this discrepancy, the instructor (along with the instructor for CSC 3040 in Fall 2018) recommends that future offerings should consider putting all ethics material in the first half of the semester, with the second half spent solely on writing.

Indirect Assessments

We conducted two different levels of indirect assessments: pre-post surveys for selected courses, and senior exit surveys. The pre-post surveys measure student perceptions of learning based on two different questions posed to the students at the beginning and end of the semester:

1. How well can you make informed judgements in computing practices based on legal principles?
2. How well can you make informed judgements in computing practices based on ethical principles?

The statistical results for these surveys using a one-tailed Student's T-Test, with the Fall 2019 surveys indicated a statistical significance change of the means.

Pre-Post Surveys for F19

The senior exit surveys, conducted when students complete the program, asks four questions. The

Student Outcome: 5 Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

Outcome 5 is directly assessed along three specific traits:

- Students can create, track, and manage a plan (assessed by group).
- Students can effectively participate as members of a team.
- Students can produce working deliverables (i.e., a minimum viable product).

In Course Direct Assessment Details

We use the general rule of thumb of attainment of 70% of students falling in the Excelling and Practicing levels of achievement as a marker for identifying potential action items for strategic and tactical changes to the curriculum.

Semeste	Course	Trait	E	P	A	N	E/P	E/P/A	Action
Sp 2020	3040	1	29	14	14	7	64	85	Flag
			14	64	18	4	78	96	None
Fa2019 Sp2020	4610 4620	1	60	7	26	7	67	93	Observe

1. How well can you function on as a member or leader of a team to establish goals and plan tasks?
2. How well can you function on as a member or leader of a team to meet deadlines and produce deliverables?
3. How well can you function on as a member or leader of a team to manage risk?

The statistical results for these surveys using a one-tailed Student's T-test, indicated no statistical significance change of the means. However, students' perceptions of functions as a team to manage risk has improved. Students may also realize that their initial estimates of their abilities (as scored on the pre-

Student Outcome 6: Apply computer science theory and software development fundamentals to produce computing-based solutions.

Outcome 6 is directly asses along two specific traits:

- Students can apply computer science theory and software development fundamentals to design computing-based solutions.
- Students can apply computer science theory and software development fundamentals to implement computing-based solutions.

In Course Direct Assessment Details

We use the general rule of thumb of attainment of 70% of students falling in the Excelling and Practicing levels of achievement as a marker for identifying potential action items for strategic and tactical changes to the curriculum.

Semeste	Course	Trait	E	P	A	N	E/P	E/P/A	Action

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Sp 2020

In the latest window of the major field test, a “buy” issue arose that severely affected our use of this assessment tool. In Fall 2019, we observed a significant change in the administration of the test. A requirement mandating that the test be made a requirement for graduation was previously not enforced by the department. The enforcement of this requirement was met with significant backlash from students. Furthermore, in Spring 2020, the administration of the test by ETS was severely degraded due to the use of online testing requiring third-party administration. For example, many students were unable to take the test due to ETS-provided proctors not attending scheduled appointments.

Major Field Test

Cohorts		
Category	F14- S16	

following semester (as they continue to work on their project), but we need to think about getting them more experiences earlier."

Student Outcome 4: In the 2019–2020 academic year, we flagged a number of potential issues related to Student Outcome 4: Professionalism. As this outcome is addressed primarily in a single course, we made the following changes for the next academic year, including:

- Faculty assignments: Faculty assigned to teach this course have been rather variable over the past few years, making it difficult for anyone to achieve flow or create a stable curriculum. In AY 2020–2021, this course will be assigned to a single faculty member.
- Teaching assistants: The CSC 3040 course (Professionalism, Communication, and Research in Computing) has employed computer science graduate students as teaching assistants. We began a partnership with the Department of Communication and Journalism to hire students in the technical communication field to support this course.

Appendices

Appendix 1: Curriculum Map

Computer Science - Student Learning Outcomes and Curriculum Map

1. Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.