

## **Work in Progress: Enhancing Student Leadership Competencies through Reflection**

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## **Work in Progress: Enhancing Student Leadership Competencies Through Reflection**

This work-in-progress abstract is for a poster describing the use of reflection to enhance student leadership competencies in two different bioengineering courses at the University of Washington. The goal of this work is to offer pedagogical approaches using reflection to promote student development of leadership competencies.

Leadership is an essential professional skill for bioengineering students. However, leadership is not taught explicitly in many programs for a variety of reasons, including the challenge of defining leadership in concrete terms and the lack of buy-in by both instructors and students. As a result, students are left with a very narrow conception of what it means to be a leader. For example, some students expect that leadership skills are only relevant when they are formally charged with holding an office or managing a team. We hope that our reflection activities will help engineering students appreciate that leadership skills are wide-ranging and are valuable in any collaborative situation—from pairs to large, distributed teams and when leading or being led.

Our aim is to make teaching leadership to undergraduates more manageable by documenting our experience using leadership-focused activities in bioengineering courses. These activities leverage a teaching tool whose importance is becoming increasingly recognized in engineering education: reflection.<sup>1,2</sup>

Reflection is often used to promote cognitive development<sup>3</sup> – e.g., immediately after an exam, students articulate what they did that helped them do well on the exam and what they could do differently to improve their performance on a future exam. In this work, our teaching innovation is that we use reflection in promoting development of a professional skill – specifically, to help bioengineering undergraduates improve their understanding of and capacity for leadership. Reflection can help students learn more from projects, internships, extracurriculars, and other educational experiences. In revisiting these experiences with a focus on leadership, students can newly recognize that these experiences are helping them develop leadership skills.

To facilitate reflection on leadership, students in the two featured courses are introduced to the “leadership competencies” identified by Seemiller<sup>4</sup> including ethics, analysis, conflict negotiation, communication, providing/receiving feedback, problem solving, decision making, and personal contributions to effectiveness of group. Promoting familiarity with these leadership competencies is intended to provide students with a vocabulary to articulate their leadership abilities, and a lens with which to reflect on their past experiences.

It is essential for undergraduate bioengineering students to develop leadership skills and engage in leadership activities. Reflection is a valuable tool for the development of leadership competencies, as reflection helps students articulate and learn from their experiences. Here, we provide several examples of reflection activities to enhance student leadership competencies in a bioengineering context. We expect that providing these activities in a bioengineering context will promote student engagement and motivation. That said, the activities can easily be adapted to have value in other disciplinary contexts.

**Table 1.** Reflection activities to enhance leadership competencies in two bioengineering courses.

<b>Leadership Competency</b>	<b>Reflection Activity</b>
Receiving and providing feedback	<i>Reflecting on project feedback:</i> Students critique other teams' preliminary project proposal presentations. Teams are required to prioritize received feedback and document how they modified their proposals in response to feedback.
Conflict negotiation	<i>Reflecting on team conflict:</i> During team check-in meetings with instructor, students are asked to reflect on instances of team conflict and identify approaches that may be helpful in future conflict situations.
Self-understanding, Self-development	<i>Reflecting on challenge and development:</i> In the first class meeting, students write a private letter to their future self, responding to prompts about prior and anticipated challenges. The instructor keeps the sealed letters until the last class meeting, when students revisit the prompts before reading their letters and consider how their perspective has changed.
Collaboration, Productive relationships	<i>Reflecting on team membership:</i> After a team project, each student writes about their contribution to their team and the value of the team experience.
Personal contributions to effectiveness of group	<i>Reflecting on complementary strengths:</i> At the beginning of the team service project, each student writes about how their leadership abilities interact with their teammates' abilities to help ensure project success.
Competencies self-selected by students	<i>Reflecting on expert accounts of leadership:</i> After guest presentations about leadership in bioengineering careers, students will write about the leadership competencies that they deem most important and personally relevant.
Self-understanding, Self-development, Productive Relationships, Collaboration, Responsibility for personal behavior	<i>Reflecting on self-value and personal goals for development of leadership skills:</i> In the first class meeting, after a class discussion on defining leadership, students write a private letter to their future self, responding to prompts about goals for personal development during the team-based project. The instructor keeps the sealed letters for later use. <i>Reflecting on team work and project progress (check-in):</i> Midway through the team-based project, students read their letters and review the areas they wanted to develop. Students consider how the project is progressing, their team contributions, and how they are taking steps to develop desired competencies. <i>Reflecting on development:</i> At the last class meeting, students revisit the prompts before re-reading their letters and considering how their perspective has changed. Students also reflect on the development of leadership competencies and describe any self-assessed changes in preparation to act in a leadership capacity after the course.
Verbal and nonverbal communication	<i>Reflecting after team-based presentations:</i> Students will reflect on their experience of the visual and oral communication decisions made during their own talks, as well as those of their peers.

The featured reflection activities are being implemented this academic year in two bioengineering seminar courses with different learning objectives and student populations. The Bioengineering Honors Seminar is a leadership-focused, discussion-based seminar comprised of senior bioengineering majors in the departmental honors program at UW BIOE and culminates in a team service project. The collegium seminar, Bioengineering: Advancing Human Health, is for first-year students (bioengineering majors and non-majors) and provides exposure to different research areas in bioengineering through guest speakers and a team project in which students research and lead a class discussion on a biomedical innovation of their choosing.

Brief descriptions of reflection activities are shown in Table 1. The poster will include additional detail, including specific prompts used for each activity, allowing instructors to try these activities in their own courses.

**Example Reflection Activity: Letter to Future Self.** A reflection activity used in both courses, the “Letter to Future Self,” can be modified to be suitable for any bioengineering course. Students are given 15 minutes in the first class meeting to write a private letter to their future self in which they address specific prompts. The instructor keeps the sealed letters until the last class meeting, when students are shown the prompts again and asked to think about how they would answer if they were to write another letter. Then the students are given 15 minutes to read and reflect on their letter. This activity can be directed at a variety of leadership competencies, including self-understanding, self-development, and collaboration (Table 1).

Assessment in both courses will include student self-report data obtained by quantitative survey examining 1) how reflection (and the class as a whole) contributed to identification and development of their individual leadership competencies, and 2) the impact of reflection on the students’ ability to utilize and refine their individual leadership strengths in their team projects. We anticipate that the reflective activities themselves will yield qualitative data regarding self-reported student development of particular competencies.

In addition, students in both courses will evaluate how their perception of leadership was affected by the reflection activities and the course experience as a whole. Student feedback will be obtained through surveys immediately following reflection activities and end-of-course evaluations.

In conclusion, this work-in-progress poster describes reflection activities implemented in two bioengineering courses for the development of specific leadership competencies. The poster will include preliminary assessment data on the activities.

## **Bibliography**

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