1 Lesson Overview

1.1 Topic Description

Students and professionals alike in computer science point to climate as a major factor that influences their persistence or departure. Climate refers to the reputation and the norms of a particular organization (organizational climate) or department (departmental climate). Within the research literature and popular literature alike, numerous examples have been provided where the climate in many STEM-related disciplines is considered “chilly” or “hostile” for women, people of color, and other underrepresented groups (see, for example, Johnson, 2012).

Learning more about Inclusive pedagogy is considered a way to promote a positive climate, at least within academic realms. Teaching inclusively means you teach in a way that is open, inviting, and encourages participation from a wide range of people (see for example, UNC Chapter). Intentionality needs to be provided to inviting students who may look different from the teacher/peer mentor or from a “prototypical” successful student, and may approach problem-solving or view the world differently from the normative profile (i.e., currently a White male prototype; for more about the prototypes in computer science see Cheryan et al., 2013). Indeed, teaching inclusively does not have to exist separately from teaching with rigor, as indicated by the movement toward “inclusive excellence” (see https://www.aacu.org/making-excellence-inclusive).

Because peer mentors are on the front lines of feedback and may be viewed as ambassadors of the department, their preparation needs to include a focus on inclusive pedagogy as well as an awareness of how climate affects learning.

1.2 Motivations and Objectives

The objectives for the students:

- To continue to gain competence and confidence in practical code review skills
- To reflect on their own assumptions and biases
- To reflect and understand the complexities of diversity, inclusion, and climate in a technical setting and to be able to apply this when interacting with students and providing feedback
1.3 Pre-requisite Knowledge

1.3.1 Readings

To use this module, the following readings, activities, and reflections should be completed:

- The Mentor’s Dilemma: Providing Critical Feedback Across the Racial Divide (Cohen, Steele, and Ross, 1999)

- Diversity Reading (student chooses at least 1 of 5 topical articles to read)
  - “Gender Bias in Hiring: Interviewing as a Trans Woman in Tech” (2/1/16)
  - “The Stories of ‘Women in Tech’ That We May Never Hear” (11/4/15)
  - “Dear White Women in Tech: Here’s a Thought - Follow Your Own Advice” (2/3/16)
  - “The Stats on Women in Tech are Actually Getting Worse” (3/27/15)
  - “The Core Belief Keeping Marginalized Groups Out of Tech” (2/4/16)

1.3.2 Preliminary Activities

Activities to be completed prior to this session:

- Practice Code Review [Sample Code on Website]

- Reflection: Emotional Intelligence and Mentoring Roles [Sample Prompts on Website]

1.3.3 Reflections

Due to its particular to the focus on inclusion and climate, this session is an excellent time for the instructor(s) to take time to reflect on the climate they create in the classroom. In order to create an inclusive and welcoming atmosphere for a discussion of diversity, it is important to consider how much space you as the instructor take up in the room.

- What is my definition of “diversity”?

- What cultural groups do I identify with?

- How do my experiences working, living, or studying within different cultures affect my practices in the learning context?
2 Lesson Plan

2.1 Summary
The agenda for this session:

- **Activity:** Compare code reviews in pairs (15 min)
- **Discussion:** Code review experience (20 min)
- **Activity:** Assumptions scenarios (15 min)
- Break (5 min)
- **Discussion:** Diversity in Computer Science (1 hr 30 min)
- **Discussion:** Inclusion and climate in educational settings and mentor relationships (25 min)
- Review assignments for next session (5 min)
- Exit Feedback

2.2 Activity: Compare code reviews in pairs (15 min)

2.2.1 Description
In pairs, students use this time to discuss their code reviews. They should be instructed to discuss both the technical portion of code review, as well as the process of reviewing code in general. Some prompt questions for them to consider: Did they find something that their partner missed, or vice versa? Did they find the same error, but respond to it in different ways?

2.2.2 Objective and Motivation
In doing written code reviews before class and discussing the code review process, students are working on the core technical competencies required to be an effective peer mentor.

2.2.3 Materials
[Sample Code to Review on Website]

2.3 Discussion: Code review experience (20 min)

2.3.1 Description
As a whole class, allow groups to share what they discussed in pairs. Technical questions are likely to arise, so have the code ready to refer to on a projector. Draw the students attention to the ways in which they gave feedback. How might they have given feedback differently if they were meeting this student in person? What types of considerations would they need to make?
2.3.2 Objective
As reviewed in previous lessons, learners are more apt to identify their own strengths and weaknesses and internalize feedback that helps them to boost their confidence and engage in strategic action when they are able to visualize and articulate the learning process and where they are within it. In a similar way, peer mentors need to have practice where they construct feedback and receive feedback, whether using scenarios or in simulation with a peer. In addition, being able to observe and critique feedback as provided by peers can also be an effective strategy.

Rather than telling peer mentors a list of do’s and don’ts, a key strategy for the peer mentors’ learning is to also have them engage actively in seeing others and seeing themselves engage in the activity with constructive feedback. We use a think-pair-share format. They first think about and reflect in writing. Then they share within pairs and in the whole group to generate a range of strategies, as well as ask each other questions about their approaches. [for more about think-pair-share, see: http://serc.carleton.edu/introgeo/interactive/tpshare.html]

2.3.3 Materials
[Sample Code to Review on Website]

2.4 Activity: Assumptions scenarios (15 min)

2.4.1 Description
Before beginning this activity, a brief explanation of assumptions is useful. The purpose of this exercise is not to shame people for making assumptions - that’s natural - but rather to examine critically the assumptions that we make and prevent them from affecting our behavior towards others.

Display a small number of assumption scenarios to the class. Each student should read them, and select one scenario. Students will the create a written reflection of the assumptions they would make in this scenario. When complete, students should reflect on this process of understanding and acknowledging their own assumptions.

2.4.2 Objective and Motivation
As discussed in the previous activity, there are a variety of ways to engage the peer mentor’s. In this case, we discuss sample scenarios of typical students they may encounter (for more about case study approaches, see https://www.cmu.edu/teaching/design/teach/design/instructionalstrategies/casestudies.html).

2.4.3 Materials
Assumption scenarios can be adjusted to suit the needs of a particular course.

Example Activity: Read the introduction to each of the following hypothetical students. Pick one and write the assumptions you find yourself making about that student as a person, as a
student in general, and how that student will perform in an introductory level Computer Science class. (We recommend picking the hypothetical student who is inspiring the most or the strongest assumptions in your mind.)

Note: These are private and will not be collected or shown to the class. Write them in whatever way flows most easily: handwritten or typed, list or complete sentences. This is just for you so express your thoughts however you want.

Student A: When you first meet with them, they express anxieties about taking Computer Science and are clearly concerned that they will be in over their heads. They mention that they are an Art History major and have no experience with programming.

Student B: When you first meet her, she starts telling you about some of her favorite programming projects in high school. She makes a point of dropping a few technical terms and expressing enthusiasm about studying Computer Science.

Student C: When you first meet her, she is effusive and scattered. She tells you that she is a Frances Perkins Scholar [non-traditional age student] and that she hasn’t taken a Math class in over 30 years. She says her kids have convinced her that she needs to get more familiar with computers. She doesn’t seem at all anxious about the class.

2.5 Discussion: Diversity in Computer Science (1 hr 30 min)

2.5.1 Description

Prior to the session, students have been instructed to select and read and reflect upon at least one of the five readings on diversity.

Have students break themselves into groups based on the reading they selected. They should discuss their reflections, in particular:

• What were the most important points for them?
• Did they disagree or feel skeptical?
• How will this be useful or relevant to the MaGE program?

Once students have had ample opportunity to discuss in small groups (approximately 15-20 minutes), bring the entire class together for discussion. In turn, each group will tell the class what was discussed in their group. Groups should keep in mind that not everyone in the class read their reading so a brief summary may be necessary! Students from other groups are encouraged to ask questions. Allow the students to guide the discussion, but if discussion stalls possible prompts are:

• What experience do you have with the issues raised in the reading in the context of your academic life?
• How will these issues affect your work as a peer mentor?
2.5.2 Objective and Motivation

Peer mentors need to be prepared for their role by talking about the process of learning for students from diverse backgrounds.

Established within decades of learning research, we know that learners rely on feedback to change their strategies, improve their confidence, and grow in their learning (for example, Schunk, 1991). Although critical feedback on poor performance can be especially necessary for improvement, this can be the type of feedback that is most challenging to provide effectively. For one, critical feedback can sting, and students can leave feeling discouraged, deflated, or without direction; this negative impact from critical feedback is most apt to happen when the feedback is focused only on the problematic outcomes. In contrast, when the feedback combines specific, candid assessments of what is missing or problematic, with the reassurance that the student can meet a higher standard and strategies to move in that direction, students are more apt to be motivated to take on the challenge (see Cohen et al., 1999).

What is especially important about this buffered approach to providing feedback (also referred to as “wise mentoring”) is that reassurance matters that the feedback provider is invested in the learner’s success is especially necessary when the feedback provider is of a different race or gender than the student, or in other circumstances where social relations may, at the surface, involve mistrust or uncertainty. Mistrust or uncertainty can arise, even when the instructor has good intentions, because we live in a racist, gendered, and classist society. In particularly negative situations, students have voiced their experience of microaggressions or discouragement from harsh feedback, stemming from being uncertain whether the instructor had their best interests and were invested in their potential, rather than stereotyping them negatively based on their social identity (see for example, Constantine & Sue, 2007).

Rather than give critical feedback, instructors may strive instead to “gloss over” the major problems rather than be candid because they do not want to appear gender-biased or racist (see Crosby & Monin, 2007; Rattan, Good, & Dweck, 2012). When instructors are overly positive, particularly about simple accomplishments, a learner’s confidence can be undermined and the instructor can be viewed as patronizing. When problems are not raised, there is a delay in the negative outcome for the learner. A key indicator of success will be whether introductory students find the peer mentors to be 1) knowledgeable (speaks to credibility of the mentor), 2), approachable (gives a sense of inclusiveness), 3) flexible in their approach (which indicates they saw the learners as individuals and were therefore more open or inclusive). We also look to see if the learners credit the peer mentors with 1) improving their confidence and 2) contributing to their learning.

2.5.3 Materials

Diversity readings can be adjusted to be topical and relevant to a particular course.

Sample Diversity Reading Assignment:

This selection of readings is intended to encourage reflection and discussion rather than to advocate any particular viewpoint expressed. Please read at least one of the articles linked below and come to the first class prepared to discuss:

1. Why did you choose that particular reading?
2. What, in your mind, were the most important takeaway points?

3. Do you disagree or feel skeptical about any information or opinions in the reading?

4. How does it relate to the MaGE Program?

2.6 Discussion: Inclusion and climate in educational settings and mentor relationships (25 min)

2.6.1 Description

Preface the discussion with references to the reading on the Mentor’s Dilemma.

2.6.2 Objective

One strategy that aligns with inclusive pedagogy is for instructors to think intentionally about how they provide feedback on learning. Feedback, to be effective, needs to be provided to students in ways that inspires students to undertake challenges and continue to engage in their learning. Helpful feedback is specific, informative, formative (rather than purely summative, and focused on the performance (rather than just the outcome) and timely, as well as informative and focused on the process and is future-oriented (formative and performance rather than summative) where possible (see Tanes et al., 2011). Feedback is more helpful when it is encouraging without sugarcoating the problems. Helpful feedback leaves the learner hopeful and with a direction for further action. Because one major component of the GEM peer mentor role is to provide weekly feedback in written and spoken form, the provision of effective feedback, with an awareness of teacher and student social identity/climate, is a major lesson in their preparation course.

3 Tips/Advice

3.1 Common Issues

When doing pair exercises such as Comparing Code Reviews, you may wish to create the pairs ahead of time for a variety of reasons. Particularly when technical competence is a factor, we found it beneficial to pair students further into the CS curriculum with the less senior students.

The discussions in the session are open ended and may run longer than expected.

3.2 Tips

This section is a placeholder for feedback and tips from current MaGE students to future students (what they wish they had known going in), as well as from current MaGE students to future instructors.
4 Assessment, Debrief, and Looking Ahead

4.1 Assessment

For each session, two types of feedback are collected. First, anonymous feedback collected immediately at the end of the session. While this may be done in any form, we chose to use simple index cards passed out at the end of the class deposited anonymously at the classroom exit as the students left. The benefit of this form of feedback is it’s immediacy - thoughts and feelings relating to the session are fresh in the students’ minds. Students were instructed to write anything they felt like - or nothing at all.

The second type of feedback was an Exit Feedback Google Form which the students were asked to complete before Midnight on the day of the session. [Sample Exit Feedback Form on website]

4.2 Debrief

Drawing on the skills and discussion of this session, students should prepare for the next session with the following activities:

- Reflection: Diversity, Inclusion, Candid Feedback, and Climate [Sample Prompts on Website]
- Practice Code Review
- Record Mock 1-on-1 Videos

4.3 Looking Ahead

In preparation for the next session on Active Learning students should read:

- Guide to Teaching Computer Science (ch. 2), “Active Learning and Active-Learning-Based Teaching Model” (Hazzan et al., 2004)
- Techniques for Active Learning in CS Courses (Briggs, 2005)

5 Supplemental Readings

• Cohen, G. L., Steele, C. M., & Ross, L. D. (1999). The mentor’s dilemma: Providing critical feedback across the racial divide. Personality and Social Psychology Bulletin, 25, 1302-1318. Explains that giving critical feedback across the racial divide can be challenging because of mistrust of the instructor’s motive. Students may wonder: is this feedback because of my work or because of my race? The researchers document the benefits of combining specific candid feedback about the work’s limitations with a reassurance of reaching a higher standard (and strategies to get there). This buffered approach to giving feedback, also called wise mentoring, may be especially important for underrepresented students.


• Johnson, D. R. (2012). Campus racial climate perceptions and overall sense of belonging among racially diverse women in STEM majors. Journal of College Student Development, 53(2), 336-346. Discusses how the campus attitudes toward racial diversity can contribute to belongingness and persistence of diverse women in STEM.

• Packard, B. W., Marciano, V., Payne, J. M., Bledzki, L. A., & Woodard, C. T. (2014). Negotiating peer mentoring roles in undergraduate research lab settings. Mentoring & Tutoring: Partnerships in Learning, 22(5), 433-445. Studied the importance of the faculty member in establishing the peer mentor’s credibility and authority for their role in the lab, and how this in turn influenced the experience for the peer mentor.

• Rattan, A., Good, C., & Dweck, C. S. (2012). It’s ok ? not everyone can be good at math?: Instructors with an entity theory comfort (and demotivate) students. Journal of Experimental Social Psychology, 48(3), 731-737. Documents an approach to giving feedback where instructors try to gloss over problems by reassuring students. However, by comforting students?, they reinforce the idea that skills are inherent, fixed, and cannot be grown, thereby demotivating students. This is an approach to feedback that may be more common for instructors working with female students in math or science fields.


• Tobias, S. (1994). They’re not dumb, they’re different: Stalking the second tier. Arizona: Research Corporation. This short inexpensive book documents case studies of learners who were asked to seriously
audit STEM classes and explain what their experiences were. The case studies clearly illustrate why the climate of the classroom can be off-putting to students with talent to contribute when they find the environment does not motivate them or leverage their strengths. Choosing one case study (Vicky) can be helpful for peer mentors who might not identify with or empathize with students who leave STEM and may assume they leave because they cannot handle the rigor.

  A very useful chapter that defines inclusive teaching and explains how to support underrepresented students without singling out or stereotyping.