

Megas and Gigas Educate (MaGE): A Curricular Peer Mentoring Program*

Heather Pon-Barry
Computer Science
Mount Holyoke College

Audrey St. John
Computer Science
Mount Holyoke College

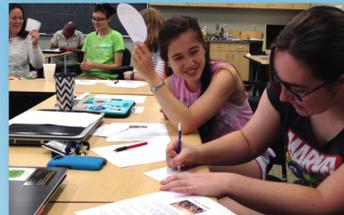


Becky Wai-Ling Packard
Psychology and Education
Mount Holyoke College

Barbara Rotundo
Computer Science
Mount Holyoke College

Overview

- Curricular peer mentoring program
- Required *training* course for mentors
 - Emphasis on fostering an *inclusive* environment for a diverse student population
- Assigns peer Giga Education Mentor (GEM) to CS1 and CS2 students in a 1:9 ratio



MaGE objectives

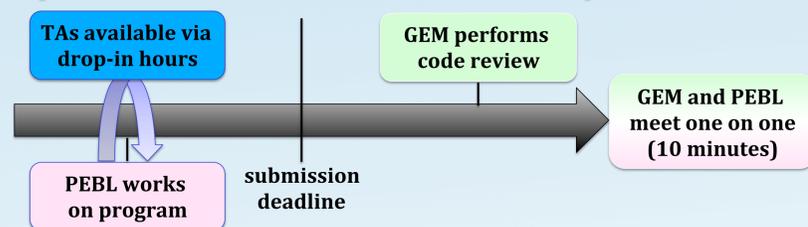
1. Grow enrollment over 3 years in introductory CS courses
2. Increase CS enrollment and retention for women and other underrepresented groups
3. Train CS students to educate, mentor, and support others in inclusive ways

Student experience

- GEM: Giga Education Mentor
 - Provide feedback and close 1-on-1 interaction
 - Lead active learning modules (ALMs)
 - Support weekly lab sessions
 - Reflect/share experiences via weekly practicum meeting



- PEBL: Peer Education Based Learner
 - part of a cohort of 9 PEBLs mentored by 1 GEM



Highlights

- Complements existing student-run CSSociety's Megas & Gigas co-curricular mentorship program
- Developed with education/mentoring research expertise
- Required *training* course provides preparation for inclusive and effective academic peer mentoring
- *Practicum* component allows GEMs to
 - Strengthen technical and communication skills
 - Gain experience with industry-level code review tools

Training Course

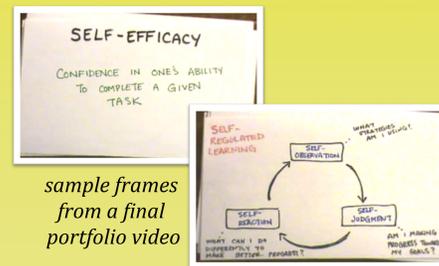
- Raises awareness of the role of social identity in learning
- Emphasizes active learning in CS
- Provides preparation for being technical peer mentors

Topics/sessions

1. Diversity in CS
2. Diversity, inclusion, and effective feedback
3. Learning and Motivation (self-regulated learning, self-efficacy, goal orientation, growth mindset, climate)
4. Peer mentor roles (e.g., mirror, coach)
5. Emotional intelligence
6. Code review (common types of programming errors; JetBrains code review tool)
7. 1-on-1 feedback session
8. Active learning in CS

Assignments/activities

1. Self-inventory surveys (x2)
2. Reflections: written (x4)
3. Discussion: case scenarios
4. Readings/discussion: scholarly articles
5. Practice/reflection: code review, videotaped 1-on-1 meeting
6. Pitching/developing/dry runs: active learning modules
7. Final portfolio



Practicum Course

- Provides structure and on-going support for GEMs via weekly meeting with instructors, coordinator and other GEMs
- Fosters connections between peer mentor experience and existing research/philosophies
- Develop effective practical strategies for teaching/communicating confidently and effectively

GEM responsibilities

- 1-on-1: code review and mentoring for PEBLs
 - Written code review
 - 10 minute 1-on-1 weekly meetings
- Reflect/discuss during weekly meeting with instructors, coordinator and other GEMs
- Plan and lead active learning modules
 - 1 hour active learning module before traditional 2 hour lab
 - *Fall '15 pilot: 4-5 modules delivered outside lab*
- Assist during labs
 - 2 GEMs per lab of 18 PEBLs
 - *Fall '15 pilot: 1 GEM per lab*

Progress and Assessment

- Summer '15
 - Training bootcamp (2 weeks, 10 GEMs trained)
- Fall '15
 - Training course (7 meetings, 8 GEMs trained)
 - Pilot in CS1 (71 PEBLs, 8 GEMs)
- Spring '16
 - Training course (7 meetings, 11 GEMs in training)
 - Full rollout in CS1 (51 PEBLs, 6 GEMs)
- Data collection
 - Enrollment/demographics
 - Feedback/reflection (through questionnaires/surveys)

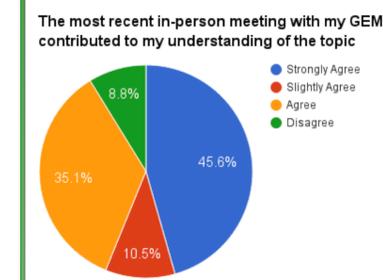
"MaGE training has given me a different perspective on my learning habits, and a new vocabulary to describe them." ~ CS1 GEM (Fall '15)

"My role as an inclusive peer mentor goes beyond making sure I do not have any prejudices about a certain group of people. I have to make sure that I have respect for the experiences that my PEBLs have been through because of their identities." ~ CS1 GEM (Fall '15)

"To be an inclusive mentor is to think of your mentee as more than a sum of the parts they show to you." ~ CS1 GEM (Fall '15)

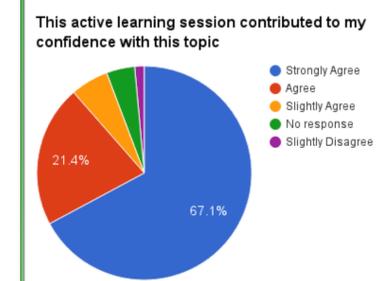
"I found nested if statements a little confusing until I came to [the Science Behind BuzzFeed Quizzes]." ~ CS 1 PEBL (Fall '15)

CS 1 PEBL feedback (Fall '15)



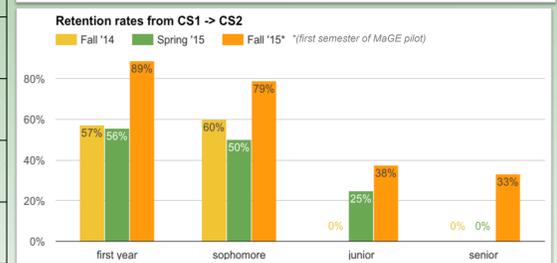
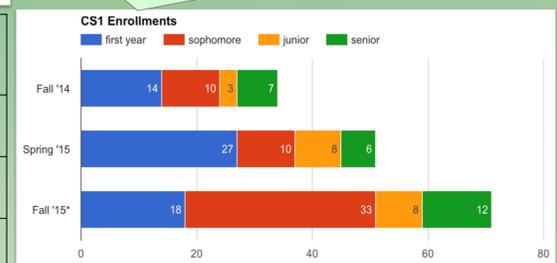
"There is always someone to explain the little details as they come up so that they don't turn into a snowball of misconceptions...it may seem that everything is clear in class, but these sessions reveal that there are always little things that need to be clarified." ~ CS 1 PEBL (Fall '15)

"The MaGE program has helped make my computer science more enjoyable and collaborative." ~ CS 1 PEBL (Fall '15)



"[T]he GEM experience contributes...experience with code review. I had never done a code review until I had been in an internship. My entire team was looking at my code. I had never been in that situation. Now my students are used to that. When someone tells me it is wrong, it is not bad — it is how you learn. They were being exposed to something you don't normally get exposed to until you are in industry. Every week, they had someone they could talk to — someone who knew where they started and how they were progressing." ~ CS1 GEM (Fall '15)

Race-citizenship	All MHC under-graduates	CS Majors	CS1	CS2
International	27%	51%	46%	54%
White	45%	17%	27%	14%
Native American	0%	0%	0%	0%
Asian/PI	10%	14%	14%	17%
Black	6%	5%	4%	3%
Hispanic	8%	3%	6%	6%
Multiracial	4%	8%	3%	6%



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