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

GEM pathway:
- Faculty Nomination
- MaGE Training
- MaGE Practicum

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

Overview
- 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)

"The MaGE program has helped make my computer science experience more enjoyable and collaborative." ~ CS1 PEBL (Fall ’15)

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

"A significant benefit of the program is the increased sense of community and support among the students." ~ CS1 GEM (Fall ‘15)

"The 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 before. 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)

"The social identity training is useful for understanding how our students feel about being a CS student — they show to you." ~ CS 1 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)

"When I was a CS1, students really don’t know how to write code. They are not really able to think of their mentor as someone who knew where they started and how they were progressing. " ~ CS1 GEM (Fall ’15)

"I found nested if statements a little confusing until I came to the Science Behind Buzzfeed Quizzes." ~ CS1 PEBL (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)

"Analyzing the data, I can see that my students have increased their code quality since they have been mentored by a GEM." ~ CS1 GEM (Fall ’15)

"It is very helpful to have someone who can help you. It’s a great experience to have someone who can help you and guide you in the right direction." ~ CS1 GEM (Fall ’15)

"The social identity training is useful for understanding how our students feel about being a CS student — they show to you." ~ CS 1 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)

"The MaGE program has helped me computer science experience more enjoyable and collaborative." ~ CS1 PEBL (Fall ’15)

"I found nested if statements a little confusing until I came to the Science Behind Buzzfeed Quizzes." ~ CS1 PEBL (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)

"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)

"The 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 before. 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)

"The social identity training is useful for understanding how our students feel about being a CS student — they show to you." ~ CS 1 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)

"The MaGE program has helped me computer science experience more enjoyable and collaborative." ~ CS1 PEBL (Fall ’15)

"I found nested if statements a little confusing until I came to the Science Behind Buzzfeed Quizzes." ~ CS1 PEBL (Fall ’15)