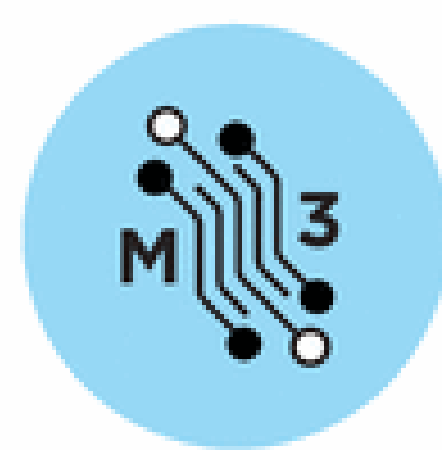


Broadening Participation in Computing: The Multi-tiered Approach



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Introduction

A majority of teens fail to be engaged in technology careers, largely because they “do not know anyone who works in these fields or understand what people in these fields do.” [1] This is particularly true for students from populations that are underrepresented in computer science careers.

A multi-tiered mentoring model (M3) has been created to foster excellence in grades 5-20 computer science education in the Birmingham area. The goal of the M3 program is to provide sequential tiers of mentoring, by which the learner in one tier becomes the mentor teacher to the next tier down.

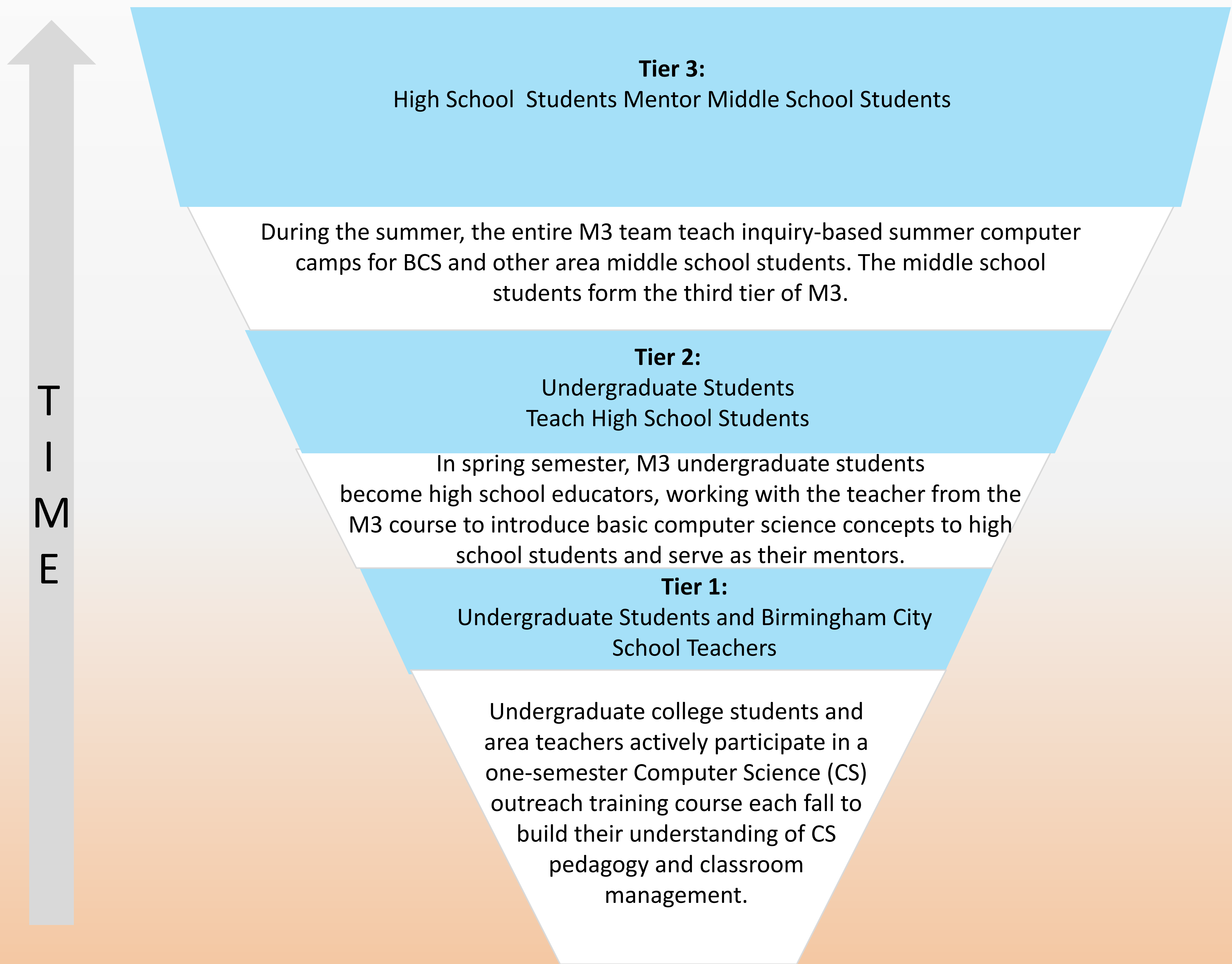
This model focuses on providing a more effective pathway for students from underrepresented backgrounds to pursue careers in computing. In this poster, we describe in detail how the multi-tiered model is being implemented and summarize some of the benefits and challenges related to the M3 model.

Implementation

Our initial implementation of the M3 model occurred during the 2010-2011 school year and we are now in the second year of the project. Our teacher participant was from the high school that we eventually worked with during the spring 2011 semester. All of the UAB students previously completed an introductory programming course at UAB using Alice.

During the spring 2011 semester, the high school tier consisted of twenty freshman students, which were mostly young women. The class met twice a week during the school day throughout the semester, and introduced CS Unplugged [3] activities as well as programming concepts through Alice. Finally, the middle school tier participating in the summer camps consisted of students from several BCS middle schools. These camps were offered over four weeks at two BCS schools. Five students from the high school site served as mentors for the summer camps, and the collegiate mentors continued to serve as facilitators. Over 50 students participated in the four weeklong camps. During our second year of the project, we added a second public high school as well as a private school.

M3 Model



Context

The Birmingham City Schools’ (BCS) population includes 98% African American students and over 30% of the students live below the national poverty threshold. Thus, BCS provides an excellent venue in which to test a program that is geared toward increasing the pipeline for underrepresented students to enter computer careers. Likewise, UAB, which is one of the nation’s most diverse campuses, provides an excellent home institution for M3. The Princeton Review ranked UAB as “The Third Most Diverse Campus in the United States.” More importantly, in the same publication, the campus was ranked No. 3 in the “Lots of Race/Class Interaction Category” [2].

Challenges

There are several lessons that we learned during the first 18 months of the project:

- Classroom setup sometimes was not conducive for switching between CS Unplugged activities and the interactive format.
- Students surfing the web during lecture required a mechanism to disable internet access periodically.
- Teacher Engagement was often challenging. Teachers often view the time when we teach their students as additional preparation time.
- Mentor-mentee relationship was a challenge for some of the participating high school students and middle school students.

Conclusion

With UAB’s diverse population and close vicinity to the candidate schools, the program is realizing opportunities to move toward the goal of impacting underrepresented students. The challenges that have been mentioned are not insurmountable and are being remedied in the upcoming years. We believe the M3 model presents a viable way to encourage the next generation of women and minorities to enter the computing pipeline.

- Both formal and informal teaching can engage the students
- There is a considerable difference in the CS learning curve for students from different populations
- All students learn much, but they do not all learn the same thing based on baseline differences.

References

- [1] Massachusetts Institute of Technology (2009). Survey: Majority of U.S. Teens Feel Prepared for Careers in Science, Technology, Engineering and Mathematics, yet Many Lack Mentors [Press release]. Retrieved from <http://mit.edu/invent/n-pressreleases/n-press-09index.html>
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- [3] CS Unplugged, <http://www.csunplugged.com/>

