Being Human in STEM

An Experiment in Partnering with Students to Address Issues of Equity in STEM

August 24, 2018
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The Being Human in STEM Initiative

- Create an inclusive learning environment that begins in the introductory courses
- Promote shared responsibility for a thriving STEM community for all among students, staff and faculty
- Foster students who see themselves and diverse others as capable of succeeding in STEM, while honoring their unique and shared identities
The Amherst College Context: recently diversified...

- **Racial and Ethnic Diversity:** Forty-four percent of our U.S. students identify as students of color (Hispanic/Latino, 13 percent; Asian-American, 14 percent; African-American, 12 percent; biracial or multiracial, 5 percent).

- **Socioeconomic Diversity:** At Amherst, 58 percent of students receive need-based financial aid, 23 percent receive Pell Grants and 17 percent are the first members of their families to attend college. The average annual financial aid package is more than $50,000.
Nov. 2015: The Amherst Uprising
“As both a woman and a student of color, I have (felt) loneliness and isolation in a field devoid of mentors who have gone through similar experiences and could support me in the challenge of taking on a STEM major. I felt compelled to write this letter because of my respect and love for the STEM field as well as the Amherst community.”
Step 2. Validating

“We support your efforts this week to highlight the ways in which the promise of Amherst’s commitment to diversity has not been fulfilled. Your individual voices have spoken powerfully about the continuing effects of racism in your lives. Both the College and its departments must do a better job of ensuring that students of every race and background have the support needed to thrive academically and to have full access to the opportunities here. Computer science is a field in which students of color are underrepresented, both here and nationally. This is a great loss, because our field needs all the talent that it can find. As a department, we will renew our efforts to provide an environment that welcomes and enables the success of all students. Thank you for telling your stories, for promoting justice, and for bringing together so much of campus in this cause.” Computer Science Department
Step 3. Reflecting
Step 4: Bridging the disconnect together - A Collaborative Academic Experiment investigating Being Human in STEM

- Learn from diverse humans on our own campus
- Research the academic literature on STEM inclusion & equity
- Share with the community to move the conversation
- Design locally-effective tools drawing from research

Spring 2016: HSTEM Pioneers
HSTEM 1.0: The Pilot Being Human in STEM Experiment

Interviews with our community

I love STEM just as much as you don't leave me behind or forget about me.

When you give up on me, I can tell. And now I've given up on me too.
HSTEM 1.0: The Pilot Being Human in STEM Experiment

**Interviews** with our community

**Literature review** on equity and inclusion in STEM

**GENERAL BACKGROUND READINGS**

Diversity Makes You Brighter

This article, published by the New York Times, is a succinct and cogent overview of a study published by the Proceedings of the National Academy of Sciences. The study examines the growing backlash against "diversity" recruitment efforts in higher education—an opinion infamously taken up by Chief Justice Roberts, who stated, "It never occurred to me that a minority student might bring to a physics class?" during a ruling on affirmative action. The study itself shows that diversity can make a material difference.

Participants placed in ethnically heterogeneous groups were far more accurate at pricing stocks than their peers placed in homogeneous groups. As the researchers' study groups in both Texas and Singapore, the "diversity" group improved by a factor of three, suggesting that the benefits of diversity are achieved through meaningful engagement.

**ADDITIONAL READING**

- Diversity in STEM: What It Is and Why It Matters
- Diversity Courses Are in High Demand. Can They Make a Difference?
- The Impact of an Undergraduate Diversity Course Requirement on Students’ Racial Views and Attitudes
- The costs of inequality: Education's the one key that rules them all
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Diversity Makes You Brighter

This article, published by the New York Times, is a succinct and cogent overview of a study published by the Proceedings of the National Academy of Sciences. The study examined the impact of diversity on academic performance. It found that diversity can make a material difference in the performance of students in STEM fields. Participants placed in ethnically heterogeneous groups were far more accurate at solving problems than their peers placed in homogeneous groups. Further, each “diverse” group improved the accuracy of its answer over time.

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Mapping STEM resources over time @ Amherst

Interviews about resources at other institutions
HSTEM 1.0: Sharing with the community: Salon in the Center for Humanistic Inquiry

Project stations

Case study

Panel Q & A
HSTEM 1.0: Connecting with Humans in STEM beyond Amherst
“You’ve not only helped to spark meaningful discussions but you’ve also helped us to enact real change in our STEM classes.”
Yale HSTEM 1.0 Being Human in STEM Workshop for Faculty
What your students want you to know...

Adapted from Prof. Andrew Miranker, Yale MBB
5 semesters of the Being Human in STEM experiment

- Learn from diverse humans on our own campus
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- Connect with humans in STEM beyond Amherst

Spring 2016  
0.5 credit taken by ~40 students across ~27 majors  
Spring 2018
Being Human in STEM student project products

- Themes from STEM stories of > 40 diverse Amherst humans
- Amherst STEM resources timeline
- Annotated bibliography on STEM inclusion & equity
- Summary of STEM pedagogy practices and programs
- Tip sheet for introductory STEM students
- Workshop for introductory STEM classes on Diversity in STEM
- Inclusive Elementary School DNA Activity
- 2-week summer HSTEM curriculum
- 25 minute documentary on HSTEM origin and pioneers
- Inclusive curricular practices handbook for faculty
Impact of Being Human in STEM at Amherst

HSTEM 4.0 student project interviewing “HSTEM 1.0 pioneers” and faculty implementing practices from HSTEM 2.0-3.0 “Inclusive curricular practices handbook”
Being Human in STEM empowered me to confront and understand my own privileges and accountability as a white, heterosexual, middle-class student in the classroom through readings and class discussion, while also providing the resources and framework to constructively and collaboratively find interventions and avenues through which we can promote inclusivity and a nourishing learning environment in the classroom.
HSTEM Course Handbook

HSTEM

Understand & reflect on various human identities in STEM classrooms, labs, & beyond

Introductions
- Names
- Various activities

First Lecture
- Share Professor's journey
- Establish professors' support for each student's success
- Reflection on studying tips

Group Work
- Switching lab partners & Reflection on group work
- Group activities

Ongoing
- One-minute papers:
  - Mid-semester assessment
  - Utility value writing
  - Exam wrappers
- Feedback & Interaction
- Reflect on own lives

Inclusive practices in STEM for lecture and the laboratory (that work for ALL disciplines!)
I’m teaching a laboratory and want to incorporate:

<table>
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<tr>
<th>Activity</th>
<th>Gain</th>
<th>Efforts Needed</th>
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| **Introduction Activity** | • Learn names of everyone in the section, promoting positive communal accountability through students’ sense of feeling “known”  
• Increases level of fun in the course to lower students’ affective filters and enhance students’ sense of belonging | • ~10-15 minutes on the first laboratory  
• Depending on the activity, may require paper |
I’m teaching a lecture and want to incorporate:

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<tr>
<th>Activity</th>
<th>Gain</th>
<th>Efforts Needed</th>
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<tbody>
<tr>
<td>1st class activities</td>
<td>• Models how to build a community and connect as a human in STEM</td>
<td>• ~25 minutes</td>
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<td>• Positive and memorable first impression of the multidimensional</td>
<td>• To share your own story, have to be vulnerable</td>
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<td></td>
<td>human side of professor</td>
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<td></td>
<td>• Helps students identify with professor and STEM by emphasizing</td>
<td>• Share some class leadership responsibilities with students</td>
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<td>human aspects</td>
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Lecture 1
WELCOME to TEAM CHEM

1. Introductions

2. Charting our gameplan for success

3. Chem151 as a community of diverse learners
Introductions: Team Chem Coaching Staff

Dr. Richmond Ampiah-Bonney
Prof. David Hansen
Jennifer Innes
Rowena Schenck
Prof. Joseph Kushick

Friendly faces in the CHEM Dept. office 5th floor Merrill
Ms. Martin & Ms. Stillerman

Minjee Kim
Brief History of a Human in STEM
We are all Humans in STEM! What is your story?
Consider advantages, obstacles, catalysts, failures, surprises, non-linearity...

- K-12 Education
- Role Models
- Friend, colleague, student experience
- Exposure to research
- Family support
- Identity

Take 5 minutes to jot down some thoughts about your HSTEM story on the index card provided. These will be collected and shared anonymously as we think about Being Human in STEM at DePauw.
Being Human in STEM annual summit

2017 @ Amherst College
~18 attendees from Yale & Amherst

2018 @ Yale University
~75 attendees from 10 institutions!
HSTEM Model: student-driven course as backbone to catalyze cycle between learning, designing locally-effective interventions, continuing the campus conversation, and connecting across campuses to effect national change.

Stay tuned for thought experiments on bringing HSTEM to DePauw tomorrow morning!
Acknowledgements

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http://www.beinghumaninSTEM.com/