PROGRESS through PREDICAMENT

How collaborating on tough problems cultivates a successful, supportive community

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What is Compass?

The Compass Project is a student-founded and student-run organization in the physical sciences at UC Berkeley. Its goal is to support students (especially those traditionally underrepresented) through the challenges of their academic careers by creating a unique environment that blends teaching, learning, mentoring, leading, and community building.
Core Values

Compass’s success lies in the shared vision and values of its membership.

- Strong Community
- Challenging Problems
- Student Ownership
Two Goals for This Talk

Inform you about some of the programmatic and organizational aspects of Compass.

Discuss how well we are meeting our program goals in the context of our values.
Today

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Community
(Summer Program)
Summer Program

- 16-20 incoming freshmen
- 2 weeks preceding fall semester
- All expenses paid
- Residential, on Berkeley’s campus
In the Classroom

- Overarching question (“How do wind turbines work?”)
- 3 classes (theoretical, experimental, reflective)
- Minimal lecturing
- Co-teaching, by grad students
- Curriculum updated daily to track student learning
Outside of the Classroom

- Homework
- Lab tours
- Weekend field trips
- Social events
Quotes on Community

“Having Compass and its community as a first year student at a large university helped me find my way and transition to Cal.”

“Compass has become a family for me and a support system I can count on for guidance and help.”
Undergrad to Undergrad

- Lasting relationships beyond the summer program
- "Compass apartments"
- Makes transitioning into college life easier
- Peer-to-peer counseling between different years
Grad to Grad

- “Making friends in grad school is really hard, but Compass makes it really easy.”
- Bonding through working together on summer program
- Develop relationships outside of Compass
Undergrad to Grad

- Undergrads treated as peers
- Grads mentor undergrads
- These relationships are otherwise rare on campus
Overview of The Compass Project
Why Compass?

For undergrads:

- Retention (for the right reasons)
- Develop problem solving skills
- Self-advocacy

For grad students:

- Improved pedagogy
- Professional development
- Mutual support
Basic Facts about Compass

Who?  
~65 undergrads, ~35 grad students, 2 postdocs, ~10 alums

When?  
Founded in 2006, first summer program in August 2007

What?  
Originally, the summer program. Rapid growth since ("Project")
Demographics

2008-2011 Compass Summer Program students (N=62) (vs. Berkeley physics department average):

- **47%** are female (vs. 16%)
- **21%** are Chicano/Latino (vs. 6.9%)
- **5%** are African American (vs. 0.5%)
- **3%** are Native American (vs. 0.5%)
- **26%** are first-generation college students
Academic Courses

- **FRESHMAN**
  - **May-July**: Application process
  - **August**: Students
  - **Fall and Spring**: Students

- **GRAD**
  - **Curriculum design**
  - **Teachers and RAs**
  - **Teachers and research advisors**

**Semester courses**
Services & Leadership

- Mentees
- Interviewers & attendees
- Organizers, creators, designers, teachers...

- Mentoring
- Lecture Series
- Leadership
- Attendees & occasional presenters
- Organizers, creators, designers, teachers...

+ office hours + high school outreach + social events + ...
Organizational Structure

Courses
- Summer program
- Semester courses
- Teacher training
- Pedagogy

Academic Services
- Mentoring
- Lecture series
- Office hours
- High school outreach

Support
- Technology & social media
- Publicity & design
- Social events

External
- Budgeting & fundraising
- Program evaluation
- Alumni association

Student-run, with departmental support (administrative, financial, office space, faculty advisor)

Consensus-based decision making

Continuous influx of new leadership

Still a challenge: financial stability
Challenging Problems (Semester Courses)
Semester courses

- 2 hours/week for credit
- Co-taught by grads and senior undergrads
- Concurrent with other math and science classes
- Fall: “Introduction to Modeling”
  Spring: “Introduction to Measurement”
What is a “challenging problem?”

+ = ?
What is a “challenging problem?”

- Presented in its own context
- No clear method for solution
- Open-ended
- An instigator for further inquiry
- A gift that keeps on giving
Talking about models

1. Understanding and applying models (Using the ray model of light to understand images through apertures)

2. Extending models (Including lenses)

3. Creating our own models! (Students design and answer their own research question)
The classroom

- Small group vs. large group
- Coming to consensus on results and future questions for study
- Graduates students act as advisors for research groups
Talking about models

“A model is] a useful representation of a physical phenomena in a particular context that aids in understanding.”

(Discussion included falsifiability, self-consistency, applicability, “accurate vs. inaccurate”)
Other Challenging Problems

For undergrads, adjusting to college:

- Working in study groups
- Approaching TAs and professors
- Reflecting on grades

For grads, learning to teach:

- Co-teaching
- Teacher training and guidance in curriculum development
- Education journal club
Group work

8/11 of fall compass students taking physics worked more than half the time in groups (mostly on homework).

10/11 worked in groups at some point.

8/8 of spring compass students taking physics worked more than half the time in groups (mostly on homework).
Navigating the university

13/13 met at least a few times with a math or physics professor or TA.

9/13 met regularly (at least monthly).
Student Ownership (Leadership)
Undergrads in Leadership

Compass is not a program done to or for students, it is a program of and by students.

Undergraduates shape Compass by taking on leadership roles.

Leadership allows undergraduates to have a sense of ownership.
In Compass, if you want to see something done, you can go out and do it.

When Compass needed someone to coordinate the Lecture Series, I did it!
Undergraduates do more than fill leadership roles: they advocate for and create changes in the program.

Three undergraduates created a scavenger hunt day to help students learn how to work together and transition from the summer into the Summer Program.
Undergrads in Leadership

It worked because:
- Graduate students provided mentorship and support
- We were treated as peers in the organization

It helped us to:
- Learn to coordinate and be organized
- Learn how to advocate for ourselves
- Dream big ideas!
15% of Compass Undergraduates in leadership roles (event organizing, chairing a cluster, coordinating summer program).

30% of Compass Undergraduates have participated in structural decisions.

65% of Compass Undergraduates have volunteered time.

50% of people giving this talk are undergraduates.
Recap: Core Values

Strong Community

Challenging Problems

Student Ownership
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A question for you
(while we answer your questions)

Consider the values (strong community, challenging problems, and student ownership) we have just presented. How do you or would you apply them at your home institutions?