



Culture in The Lab: A Model for Undergraduate STEM Research

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UC San Diego PRIME

- * Research abroad (9-week summer program)
- * Began in 2004
- * Serves 15-20 undergrad students per summer
- * Biology, engineering, visual arts majors
- * NSF funded initially, now relying on other sources
- * Leading Universities & Institutes in Pacific Rim
- * Faculty mentors at UCSD & locations abroad
- * Prime.ucsd.edu



Locations

- * **China** (Computer Network Information Center; Chinese Academy of Sciences, Beijing)
- * **Japan** (National Institute for Information and Communications, Tokyo; Osaka University; Nara Institute of Science and Technology)
- * **Malaysia** (Universiti Sains Malayisa, Penang)
- * **Taiwan** (National Taiwan University; National Center for Research on Earthquake Engineering, Taipei; and National Center for High-performance Computing, Hsinchu)
- * **Australia** (University of Queensland)



Rationale for Creating PRIME

- * **Calls for a Review of the 21st Century College Curriculum:**
 - American Association of Colleges & Universities – Liberal Education & America’s Promise report ([LEAP Report](#)) 2007
- * **Urgent Government, Foundation and Employer Reports Identifying Need for Better Global Workforce Development:**
 - Global Competencies & National Needs – Lincoln Report 2005
 - [Knowledge, Networks and Nations: Global scientific collaborations in the 21st century](#) – Royal Society 2011
 - Raising the Bar: [Employers’ Views on College Learning in the Wake of the Economic Downturn](#)” (AAC&U and Hart Research Assoc.) 2010
 - Institute of International Education - [Open Door Report 2011](#)
 - IBM Study - [Working Beyond Borders](#) 2011



PRIME Addresses Key Challenges

Professional development challenge :

Prepare STEM students to become effective and competent global workforce

STEM specific International Education challenge:

STEM students are underrepresented participants in educational abroad programs

Internationalization of the UCSD Campus challenge:

Global Concentration in an Undergraduate Major



PRIME'S Gestalt

- **Educational Goals:**
 - engage students in experiential learning in a global context
 - provide students with intensive research training
 - hone STEM students' research skills and cultural competency
 - Increase retention and graduation rate for STEM students through [LEAP high-impact learning experience](#)
- **Curricular Concept:**
 - Develop an immersive, international, summer, academic experience for STEM Students
- **Strategic Partnerships:**
 - **Research Context**
 - Engage a scientific research community, i.e., the Pacific Rim Community PRAGMA (Pacific Rim Application and Middleware Assembly), and recruit international PRAGMA scientists as mentors
 - **UCSD Context and Partners**
 - UCSD faculty - mentoring students
 - International Center – cultural competency training
 - Academic Internship Program – academic credit



PRIME Structure: Four Phases

1. Application, interview and placement: **Winter Quarter.**
2. Mentored skill building: **Spring Quarter.**
 - Develop research skills and new technical competencies – UCSD mentor
 - Develop cultural competencies – International Center educator
3. Summer internship at the host site: **Summer Months**
 - Integrate into host research team, conduct research, communicate research
 - Continue cultural competency development through written reflection and dialogue
4. Re-entry activities: **Fall Quarter.**
 - Participate in workshop to reflect about experience
 - Develop skills to communicate about experience
 - Continue research in UCSD mentor's lab
 - Disseminate research data (poster fair)



Indicator of Program Impact

Haley Hunter-Zinck, UCSD Alum, PRIME Alumna contributed \$100K to PRIME:

“... all students should study abroad. It pushes students out of their comfort zone, which is important for future scientists in our increasingly global society.”

Assessment of Learning Experience

- * **Assessment goals:**

- Quality of internship experience
- Understand the impact on students:
 - Research skills
 - Cultural competency skills
- Improve and refine overall program
- Career Development

- * **Assessment Tools:**

- Students, faculty mentors and hosts receive exit surveys
- Focus groups
- Interviews with interns upon their return
- Longitudinal tracking



Student Voice: PRIME Alumnus Jared Bell

“ I benefited immensely - professionally and personally - from PRIME. My PRIME research introduced me to a UCSD professor and my first professional internship. That internship and the experience gained through my PRIME research together helped me set myself apart from other UCSD graduates and get hired as a structural engineer at a competitive firm in a challenging industry. After PRIME I felt empowered and motivated, and approached my studies on my own terms. Instead of simply taking classes to fulfill the requirements of a chosen major, I realized I was acquiring the tools necessary to thrive in my chosen field. From a young student’s point-of-view, PRIME was an amazing experience that made the daunting professional and academic worlds feel like an accessible community instead of an impersonal metropolis.”



Intercultural Communication in the Science Lab

Program Development Timetable

- * 2004 – inception of Prime/Pragma program
- * Late 2004 – UCSD **internal** discussions on cultural issues related to working in international laboratories
- * May 2005 – Initial **external** consultation on Intercultural Competence in Study Abroad, and Demonstration Workshop on Components of ICC Training Design
- * Fall 2005 – First informal Cross-Cultural Training for outbound group



Timeline, contd...

Program development, cont.

- * Fall 2006 – First Reentry Workshop begun
- * April 2008 – Second external consultation and assessment review
- * 2008 - present – Revised Orientation and Reentry workshops routinely delivered on campus
- * 2008 - present – IDI used to measure impact of training, pre- and post-sojourn



Training Topics

- * Culture
- * Language Use
- * Nonverbal Communication
- * Communication Styles
- * Value Contrasts
- * Problem Solving Strategies
- * Intercultural Adaptation



Resources

- * Culture-general ICC Models and Categories
Significant use of *What's Up With Culture?*
website < <http://www2.pacific.edu/sis/culture/> >
both as source of on-line exercises and handouts
- * Culture-specific readings for each host country



Assessment Activities

- * Use of IDI for group assessment and longitudinal program tracking
- * Creation of a 'Critical Incident' Database from returning students on cultural *faux pas*, intercultural conflicts and misunderstandings...Shared with outbound students each year



Focus on Culture in Lab as a “Third Culture”

- * Emphasis in orientation is on promoting appropriate student behavior, attitudes, and procedures in the context of collaborative scientific research in multi-cultural settings
- * Need to raise awareness that ‘doing science,’ however guided by objective universal laws and procedures, takes place within subjective cultural contexts that are far more variable. Importance of realizing why one needs to pay attention to **both** to ensure success.

Pre-Departure Activities

- * Culture Workshop in the spring
- * 2.5 hours, followed by dinner with returnees
- * Icebreaker – Sharing previous travels
- * The Iceberg Conception of the Nature of Culture (Go Global! p. 1)
- * The Four Levels of Cultural Awareness (What's Up With Culture 1.7.2)
- * In the Mind of the Beholder (What's Up With Culture 1.3.2)

Pre-Departure, contd...

- * Insiders and Outsiders Activity
- * Skills that Make a Difference (Go Global! p. 3)
- * Concept of Self: Individualist or Collectivist (What's Up With Culture 1.3.4)
- * Context of Cultures: High and Low (What's Up With Culture 1.4.6)
- * Intercultural Development Inventory (IDI) discussion
- * Pre-departure Career Plan



Pre-Departure, Contd...

- * Reading Assignment
- * Critical Incidents small group discussion (PRIME Critical Incidents handout)
- * Evaluation
- * Logistics and final directions for dinner



Pilot program for Japan

- * Inspired by culturally guided development
- * Would these reduce culture shock and boost IDI results?
- * Assign book “With Respect to the Japanese”
- * Weekly Skype calls with students in Japan
- * Prepare a critical incident each week and discuss as a group
- * Moderated from UCSD with a faculty member originally from Japan and another with extensive experience there.



Post-Return Activities

- * Students each share the most meaningful critical incident
- * Intercultural Development Inventory (IDI) group results
- * Challenges and Intensity Factors in Coming Home (What's Up With Culture 2.3.1)
- * Preparation for PRIME poster presentations



Post-Return Activities, contd...

- * Highlighting the PRIME experience (elevator speech, resume, c.v.)
- * Making the most of your remaining time at UCSD
- * **Handouts:**
- * Intercultural Development Inventory: Pre and Post IDI
- * Challenges and Intensity Factors
- * Resume Worksheet, CV resource

Critical Incidents

- * Malaysia
 - * Shaking hands
 - * Cookies

- * Japan
 - * Hierarchy in the Lab
 - * Team bonding and work hours
 - * Feedback and special opportunities



IDI: Background

- Elite group of students
- Highly competitive admission process
- Wide range of backgrounds
- IDI helps us improve our cultural preparation, which is part of the larger assessment plan for this program



Experimental & Control Group

- * Experimental group: Japan
- * Control group: All other locations
- * Common preparation: pre and post workshops
- * Unique experiences for the Japan group
 - * Reading the book with Respect to the Japanese
 - * Weekly critical incidents
 - * Culturally guided Skype discussions each week

IDI: Important Highlights

- * Control group did not advance in IDI stages
- * Experimental group did advance
 - * In 2012 the number of students in Denial fell from 22% to 11% from pre to post (50% decline)
 - * In 2013 all students in Denial had advanced out of Denial from pre to post
 - * In the 2013 experimental cohort, students in the Cusp of Acceptance advanced to Acceptance

IDI: Preliminary Conclusions

- * Weekly intervention is valuable and effective
- * Most improvement in the Experimental group came at the low and high ends of the IDI scale (Moving out of Denial and others into Acceptance)
- * IDI is helping us to become more effective with our intercultural preparations
- * Future goal is to expand weekly guided development to all sites, pending resources



More To Do

- * Continue to improve cultural learning
- * Develop global concentrations in STEM majors, and integrate PRIME into them
- * Learn from your experiences and ideas

- * Contact Jim Galvin: jgalvin@ucsd.edu

Discussion Questions

- * Does anyone have a program that is similar to PRIME and if so what results have you gotten?
- * Does anyone have a program that has similar aims to PRIME, but a different approach? Please share.
- * What results do you have?
- * What are the main challenges you have encountered in delivering this kind of program, and how have you overcome them?