Impacts of a STEM Student Teacher Affinity Space

Undergraduate Researchers: [Redacted] and [Redacted]
Faculty Mentors: [Redacted] (math) and [Redacted] (education)
Graduate Student Mentor: [Redacted]

Purpose

This project pilots an affinity space, an approach in teacher preparation that has shown promise in contributing to the social justice stances of teachers, and may increase teacher resilience and early career persistence. We propose to design, implement, and explore the outcomes of an affinity space, a reflective community of support for STEM student teachers and science teachers in the CalTeach program at UC Irvine. CalTeach is a 4-year baccalaureate plus credential program that aims to prepare socially just change agents for high need schools.

Existing literature highlights the importance of self reflection (Howard, 2003) and creating sustained communities (Kohli, 2021) to support teachers once they begin teaching. This study extends on this literature, introducing these approaches to teacher preparation. The affinity space will consist of regular community building activities, followed by individual and group reflection on participants’ student teaching experiences. Findings from this project will add to the literature exploring how teacher preparation programs can support teachers once in the classroom to improve teacher retention. In addition, this work will inform the programmatic features of the UCI CalTeach program and will be disseminated to the larger California CalTeach community, and National UTeach Community, thereby potentially informing the preparation of thousands of teachers nationally.

Research Questions

1. What are the experiences of STEM student teachers that engaged in an affinity space focused on creating community building and critical self reflection?
2. How does an affinity space focused on creating community and critical self reflection inform the practices and stances of STEM student teachers?

Literature Review

Statement of the problem

Student enrollment for students of color in K-12 public schools is growing, yet the number of Latino and Asian/Pacific Islander American teachers remains low (Gay & Howard, 2000). The low percentage of Teachers of Color entering the workforce is important to consider because current educational practices are not responsive to students from culturally diverse and low-income backgrounds. Teachers of color employ teaching practices that are responsive to marginalized students’ backgrounds (Irizarry & Donaldson, 2012) and serve as mentors (Villegas & Irvine, 2010). In order to enact responsive practices, teachers need a safe space to critically analyze issues related to race, ethnicity, and culture because teaching practices are informed by personal histories and identities (Howard, 2003). However, the reality is that teacher candidates often do not have the time to engage in self reflection, and may enter the classroom with implicit biases and deficit perspectives of students. These biases can have negative impacts on the educational experiences of marginalized students, and continue to push students out of educational opportunities (DeCuir-Gunby & Bindra, 2022).
On top of preparing teachers to employ practices responsive to marginalized students, teacher shortages are an ongoing challenge in the K-12 education system in the United States, especially in STEM fields (Sutcher, et al., 2019). Teacher retention is especially critical during the first few years of teaching. Teacher preparation programs play a central role in setting the stage for potential early career success or failure for novice teachers. Thus, teacher educators and teacher preparation programs are faced with an important responsibility of both preparing teachers and supporting them once in the classroom. This endeavor becomes much more important when we consider teacher preparation programs that prepare teachers to serve in underserved communities.

**Promising practices**

A growing body of literature explores the promising outcomes of critical reflection on a preservice teacher’s skills, dispositions, and knowledge (Shandomo, 2010). Critical reflection is deeply beneficial as teachers work to understand the ways in which their teaching can challenge traditional teaching styles. Thus, it is imperative that teachers receive support and space to engage in critical self reflection and to form a community of like minded teachers so they can work collectively towards structural changes in education (Cochran-Smith, et. al., 2009).

**Proposal overview**

We propose creating an affinity space, a support system, as an intervention that can promote teacher candidates’ vision for justice in their STEM classrooms by providing space for self reflection and building a community of social justice oriented teachers. We expect that building community will also contribute to persistence in teaching. We are attentive to how the support space can be informed by existing literature on how to best support justice oriented teachers. Kohli et al., (2015) documents the promising outcomes of Critical Professional Development (CPD), which provides a space where teachers participate in cooperative dialectical processes. Teachers voice their goals, needs and unite over similar social justice goals. Importantly, CPD allows teachers to develop their critical consciousness, teach with critical pedagogy, and challenge inequity found in schools, districts, and policy (Kohli, et al., 2015). Teachers experience autonomy, collaborate, and reconnect. As a result, they use education as a tool to fight for equity and social justice. Within this research proposal, we aim to integrate facets of CPD in our support space in order to best support future STEM educators. This approach should not only contribute to their practice, but also their persistence in the teaching workforce.

Collaborative organizations of STEM teachers are also considered vital to implementing and sustaining social justice pedagogy in STEM fields. Kokka (2018) documents how STEM teacher activists inform new teachers and educators unfamiliar with social justice concepts. Through a sustained community of educators, teachers learned and supported each other. STEM teacher activism also promoted teacher retention by connecting teachers to a shared purpose of providing humanizing learning experiences for students. Further, the community improved teachers’ sense of competence and relatedness by working toward larger social justice goals (Kokka, 2018). Our space will provide teacher candidates with access to a community of like minded educators who can assist in the implementation of social justice pedagogy when they transition to in service teachers. We also draw upon Martinez and colleagues (2016) to provide preservice teachers with a space focused on reflection and community building, which can equip them with the skills needed to be agents of change at their future school sites.
In summation, our support space for STEM student teachers will provide space for teacher candidates to engage with self reflection on topics relating to equity and justice, as well as talk through their field work experiences. Importantly, the space will also facilitate candidates' engagement with creating tangible steps teachers can make in the classroom to promote equity.

**Timeline**

**Phase I: Fall 2022**
- Consult with with faculty sponsors from education and math department, and graduate student
- Conduct Literature Review
- Create and send survey that captures why participants are joining the space and what they hope to gain from the space
- Design critical reflection prompts
- Develop interview protocol
- IRB Self Exempt submission
- Facilitate support group sessions
- Produce analytic memos after each session

**Phase II: Winter 2023**
- Conduct interviews with participants to capture support group takeaways
- Continue designing critical reflection prompts
- Continue facilitating support group sessions
- Produce analytic memos after each session

**Phase III: Spring 2023**
- Continue designing critical reflection prompts
- Continue facilitating support group sessions
- Produce analytic memos after each session
- Conduct quarterly interviews with participants to capture support group takeaways
- Conduct Interview Data Analysis
- Present Major Findings At UROP and CalTeach program staff

**Method**

**Participants**

This study will focus on 10 CalTeach students in their senior undergraduate year, as they will have already undergone most of their teacher preparation course work and are engaging in classroom field work that amasses to 600 hours of classroom experience. By studying 10 STEM student teachers during their fieldwork experience, we will be positioned to learn about the barriers they are encountering and how the space can best be designed to support their needs. In turn, this space can inform their development as STEM student teachers and serve as a support network as they engage with student teaching and beyond.

**Student Researcher Responsibilities**
Undergraduate student researchers will be responsible for organizing and leading the programmatic aspects of the affinity space and work closely with advisor, [Redacted] (mathematics), [Redacted] (education) and graduate student, [Redacted] (education) to carry out project activities. The student researchers will meet on a weekly basis with their graduate student mentor and a bi-weekly basis with one [Redacted], with a quarterly whole team check-in to discuss the overall progress of the project. Undergraduate student researchers will be dedicating 8 hours per week on this project throughout the year.

Student Researchers will be responsible for organizing and leading the programmatic aspects of the affinity space and work closely with advisor, [Redacted] (mathematics), [Redacted] (education) and graduate student, [Redacted] (education) to carry out project activities. First, student researchers will be responsible for conducting a thorough literature review. In response to the scarce literature that explores what critical reflection looks like in practice in teacher preparation programs, students will focus on what is necessary to facilitate critical reflection and how teachers can engage in critical reflection (fall 2022). Student researchers will also engage with literature relating to the outcomes of creating focus groups, affinity spaces, and communities of support for STEM student teachers. Next, student researchers will design the sessions of the critical support group, including the community builders and critical reflection prompts that participants will engage in (fall 2022). Student Researchers will be responsible for facilitating the support group sessions (fall 2022-spring 2023). For instance, the first session will be focused on getting to know the community, the purpose of joining the space and what each participant hopes to get out of the support group. After each session, student researchers will also engage in analytic memoing, focusing on the themes that participants in the group share, including the tensions or salient learnings from their student teaching. These analytic memos will also focus on how the space can be iterated to best meet the needs of participants. At the end of each quarter, student researchers will create interview protocols and interviews with participants. After interviews, student researchers will also assist with data analysis, capturing the major themes arising from analytic memos and interviews. Student researchers will create a poster presentation to present findings at the UROP Symposium in May and to the CalTeach program staff.

Project Implementation
During Phase One, (fall 2022), student researchers will create a survey that aims to capture why participants are joining the space, what they hope to take away from participating in the space, and how they believe the space can support their development. Following, they will design critical reflection prompts that will facilitate self reflection on the topics participants voice being interested in engaging in with the community. Reflection questions will include but not limited to the following prompts:

- **First Session Reflective Questions:**
  - What brings you to the support space?
  - What do you hope to get out of the space?

- **Second Session Reflective Questions:**
  - Think of one teaching practice that your mentor teacher employs. What are the affordances and constraints of it?

- **Third Sessions Reflective Questions:**
Think of a moment in your student teaching that you have been grappling with. How does your personal experience or experience inform the way you navigated that moment?

Fourth Session Reflection Questions:
○ Think of one teaching practice that your mentor teacher employs. How do you see yourself iterating this practice in your future classroom?

During Phase Two (Winter 2022), student researchers will continue to design, facilitate and engage with critical reflection questions during support sessions. Student researchers will also be doing preliminary analysis based on the end of Fall 2022 interviews with participants that aims to capture the outcomes of this space. The interview protocol will include but is not limited to these main questions:

Background:
1. Can you tell me a little bit about yourself and your background? (what brought you to CalTeach)
2. What are some of the core values and beliefs that you bring with you that will inform the teacher you will become?
3. Can you share one or two particularly memorable experiences or moments you had in K-12 schools that have shaped who you are?

Teacher Identity Related
1. Why did you decide to become a teacher?
2. How do you define or describe good teaching (what does good teaching look like)?

Support Space Related:
1. Can you please tell why you are joining the SOS space?
2. What are you hoping to take away from the SOS space?
3. What do you bring to the SOS space?

During the third phase of this project (spring 2022), student researchers continue facilitating and designing support sessions based on the needs vocalized during interviews in Winter 2022. They will analyze interview data using Dedoose (a qualitative research analytical tool). To create codes, we will draw upon the relevant literature and codes emerging from the data, and collaboratively create a codebook. Secondary coding will yield a number of analytic memos on the affordances of constraints of student participation in extracurricular activities. The student researchers will create a poster presentation to present findings at the UROP Symposium in May and to the CalTeach program staff.

Budget

Funds for this project will be primarily utilized to compensate undergraduate students in the CalTeach Program for their participation. In order to ensure we recruit sufficient participants from CalTeach students, who are juggling part-time jobs, their math and biology course, and
personal commitments, we are compensating students for their participation in the space and after each interview throughout the year. Participants will be compensated $13 worth in Amazon gift card for attending each session in which they will be engaged in reflection memoing. Sessions will take place on a bi-weekly basis during Fall, Winter and Spring Quarter for a total of 15 sessions. Participants will also be compensated $25 Amazon gift card for a quarterly interview that will explore how the space is informing their practice as a teacher and the outcomes of the space.

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Research Team
Undergraduate Student Researchers:
  1. [Redacted] (Biology/Education)
  2. [Redacted] (Mathematics)

Faculty Mentors
  1. [Redacted], School of Physical Sciences, Department of Mathematics
  2. [Redacted], School of Education

Graduate Student Mentor
  1. [Redacted], School of Education
References


