

INQUIRY AS AN ACCESS POINT TO EQUITY



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MOTIVATION

- ▶ Vana: I feel like all of us, you know there was some strong students in the class that kept coming up, but then I saw the quieter ones also get their voice during the semester (Latina)
- ▶ Ahn Pan: because of the nature of how the course was uh conducted, it encourages questions. It encourages um, questioning. It sounds very revolution type, you know question authority and don't take anything for granted and, you know fight back. (male, Asian/White)

MOTIVATION

- ▶ Peyton: because of the nature of this course, but when I did finally understand something, I did feel like I had a way stronger, I had much more confidence in it than I do generally and I retained the information a lot more. Like I barely even reviewed anything and I still remembered it by the end of the year. (white, female)

MY IBL

Cargo: “I think just having my classmates just go up and share their work and their thought process helped me like see things I, I didn’t notice. Like even when I was up presenting, there was always one guy that would always just keep asking like ‘How did you get that?’ And like, because he kept asking that, I kept like figuring out like ‘OK. I think I should probably put more details into my proofs so like they know like where I’m getting these things’.”

(Latino)

MY IBL

- ▶ Alice: “she would assign homework and then we’d always discuss them in class...being able to have those class discussions as well as like our individual group discussions that we had in class. (Latina)
- ▶ Vana: “the instructor was very, um, uh, I don’t know if limited is the right word in terms of her involvement in class...[she] kind of sat at the table and more was a listener and a mediator, like a facilitator of our discussions but she never really led the discussion. So it was a lot of you know bouncing ideas off of students and um kind of evaluating each other’s work in that sense. (Latina)

INQUIRY-BASED OR INQUIRY-ORIENTED LEARNING

- ▶ “deeply engage [students] in rich mathematical tasks, [give students] ample opportunities to collaborate with peers (where collaboration is defined broadly)” (Academy of Inquiry-Based Learning, n.d.),
- ▶ “enable students to learn new mathematics through engagement in genuine argumentation, ... empower learners to see themselves as capable of reinventing mathematics, and to see mathematics itself as a human activity” (Rasmussen and Kwon, 2007, p. 190).

SIX MAIN THEMES

COOK, MURPHY & FUKAWA-CONNELLY (2016)

Student Ownership -- students create knowledge

Knowledge Building -- incorporating prior knowledge

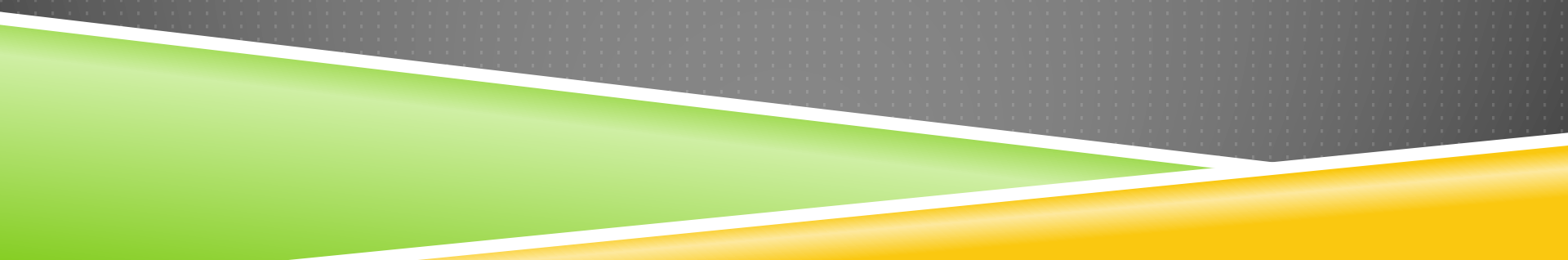
Doing Math -- becoming a participant in the mathematical community

Student-Instructor Relationship -- instructors elicit student thinking

Peer Involvement -- exposure to and attempting to understand other's ideas

Student Success – better alignment to how students learn

EQUITY GUTIÉRREZ

- ▶ Access
 - ▶ Achievement
 - ▶ Identity
 - ▶ Power
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ALIGNMENT OF EQUITY AND INQUIRY

▶ Access

- ▶ "equity to me is related to access by all students to opportunities to engage in rich mathematics" (Civil, 2007; p. 56)
- ▶ Inquiry invites and encourages all students' participation in doing, discussing, and presenting mathematics (*Peer Involvement*).
- ▶ When all students are given opportunities to be active participants in the classroom (*Doing Math*), students are given an additional access point to learn

ALIGNMENT OF EQUITY AND INQUIRY

▶ Achievement

▶ related to *Student Success*

- ▶ not only in the classroom, but in future math courses and career decisions

- ▶ participation in IBL courses does increase student performance as well as other measures related to this definition of achievement (Laursen, Hassi, Kogan & Weston, 2014)

ALIGNMENT OF EQUITY AND INQUIRY

▶ Identity

- ▶ When students are actively engaged with each other and each other's thinking (*Peer-Involvement*), it can lead to a shift in mathematical identity. Hassi's (2015)

ALIGNMENT OF EQUITY AND INQUIRY

▶ Power

- ▶ Opportunities to provide explanations and justifications of their thinking while others attempt to understand the ideas being discussed or presented (*Peer Involvement*), power shifts to the students because they decide on “what counts as acceptable knowledge” (Adiredja et al., 2015, p. 66)
- ▶ The instructor is the primary architect of the problems worked on (Laursen et al., 2011), and when the tasks assigned include problem-posing, students create and solve their own problems (Doing Math).

ACHIEVEMENT & STUDENT SUCCESS

- ▶ Vana ``I would say that [the class] impacted me or **influenced me to continue on to get a complete minor in math**...which was pretty important and kinda neat cause I don't know if I would've considered it before... And it made me wanna develop more of an understanding instead of just taking a class to get it over with for prereq to satisfy a prerequisite...I was able to develop a relationship with math if that makes any sense, ... and actually start enjoying it...[The class] built up **my confidence and that I felt like, "yeah I can get a minor in math, why not?"** and **"Let's do it"**

STUDENT OWNERSHIP & ACCESS

- ▶ “[W]ell I’m a really shy person so **I don’t really like talking in class and this class I was actually forced to like, get up. ... Like my group would know like, “do you understand something” ... and then I kinda wanna say no and like, “I’m actually kinda confused on this”. And they would, like, taught me like “oh, you would do this” and ... we’d go up on, on the white boards and they’d let me, like, okay like try this. And like, **I was able to understand it cause I was actually doing at the same time.**”**

POWER & PEER INVOLVEMENT

- ▶ “We were kinda like the professors themselves at the same time, like we were all professors in there cause we would help each other figure out whatever it was.” (Latina)

POWER & DOING MATH

- ▶ Stephanie: “Sometimes [the problems] came from questions the students asked or conjectures that the class made, and then we had to either prove or disprove the conjectures from our classmates.”
(white, female)

FUTURE

- ▶ Expand to other institutions
- ▶ Examine possible inequities or environments in which inequities do and do not reveal themselves (Esmonde, 2009)
- ▶ Expand on the Inquiry themes
 - ▶ “towards the end, like, um, I was able, like my friends would notice, like, I would like, raise my hand more, I even ask questions”
 - ▶ “I started out as a really shy person it really helped me, um, build more friendships, be more sociable, be able to talk in class now. Now I’m in another IBL cour-, or I guess it more, an IOL course and then um, so I’m really more talkative in that class as well. So as a person it’s helped me be more sociable and not afraid to talk in class.”