

CELL First Year Research Summary

July 7, 2020



Background

- **CELL project:** to eliminate equity gaps in online STEM gateway courses through humanized instruction across California public higher education institutions
- **Pilot stage:**
 - Pre-and post-treatment study with three STEM online courses from 2 community colleges and 1 university
 - To achieve a deep understanding of how online classes are taught and student experiences in online class
 - To refine instruments for data collection: e.g. survey instruments and observation protocol
 - To inform data collection during the upcoming scale-up stage
- **Year-1 research activity:** **pre-treatment data collection** in the pilot stage during the Fall of 2019

Data Sources

1. Student survey

- Pre-course and post-course survey
- Students' background and general online course attitudes, **students' experiences of student-teacher and student-student interactions**

	Institution 1		Institution 2		Institution 3	
	Total	Response %	Total	Response %	Total	Response %
Pre-course	98	80.61%	23	56.52%	45	71.11%
Post-course	90	66.67%	20	25%	45	51.11%

2. Instructor survey

- collected at the end of the course
- instructors' online teaching background; online teaching perceptions; engagement with instructional **practices that are promising in promoting student-teacher and student-student interactions**

3. Course observation

- Canvas records of three online courses
- recorded by two evaluation frameworks: a rubric to evaluate the **overall online course quality** (Xu et al., 2020) & a framework to evaluate **particular humanization strategies targeted in this project**

Survey Results

Student Survey:

We had a decent response rate (69%) from the pre-survey but fairly low response rate (48%) from the post survey with noticeable variations among the three courses, indicating that we might need to use other strategies in the scale-up stage to increase the response rate.

Pre-Survey	Post-Survey	Pre and post-survey difference
<p><u>White/Asian students</u> and <u>Minority students</u> were significantly different in <u>sense of belonging</u>, <u>teaching presence</u>, <u>cognitive presence</u>, and <u>student to student interaction</u>.</p>	<p><u>White/Asian students</u> and <u>Minority students</u> are not significantly different in any construct in the post survey, which is likely to be driven by the small number of students who responded to the post survey.</p>	<p><u>White/Asian students</u> experienced a decline in <u>teaching presence</u>;</p> <p><u>Minority students</u> experienced an improvement in <u>sense of belonging</u> and <u>cognitive presence</u>.</p>

Instructor Survey:

*Even though the sample size is small, we still observe **noticeable differences** in their self-reported interaction status with students, their facilitation of student-student interaction, and their general perceptions of online courses.*

Observation Results

- We developed an online course design [rubric](#) to provide a systematic and descriptive benchmark for researchers and practitioners who are striving to develop a culture of high-quality college-level online courses.
- Targeted humanizing strategies such as “Icebreaker” are used in a different format by some instructors in their current instruction.

Online Course Quality Rubric Matrix

	Website Organization and Presentation	Learning Objectives	Instructional Materials	Learning Activities (including activities, assignments, & assessments)	Logistics and Course Management	Targeted Support for Online Learning
Scaffolding Self-Directed Learning Skills and Guiding the Learning Process	<u>1.1 Course material organization and presentation</u>	<u>2.1 Articulation of learning objectives</u>	<u>3.1 Guidance on how to work with instructional materials</u>	<u>4.1 Regular and various learning Activities</u>	<u>5.1 Articulation of course policies, expectations, and course details</u>	<u>6.1 Learner support and opportunities for scaffolding learning skills</u>
	<u>1.2 Guidance on course navigation</u>			<u>4.2 Clear instruction on learning Activities and articulation of expectations</u>	<u>5.2 Clear communication of course schedule, predictable routine</u>	
Student Agency			<u>3.2 Diversified content delivery media</u>	<u>4.3 Flexible performance tasks and student choices</u>		<u>6.2 Facilitation and incorporation of ongoing feedback from students</u>
			<u>3.3 Flexible content and student choice</u>			<u>6.3 Opportunities for self-reflection on learning goals, process, and performance</u>
Presence & Interactivity	<u>1.3 Instructor presence in the structure of the website</u>		<u>3.4 Instructor presence in content delivery</u>	<u>4.4 Instructor presence in learning Activities and quality feedback</u>	<u>5.3 Regular announcements and reminders</u>	<u>6.4 Approachable and responsive instructor</u>
				<u>4.5 Collaborative learning and interaction opportunities</u>		<u>6.5 Progress monitoring and proactive outreach</u>
						<u>6.6 Non-content-related social interaction opportunities</u>

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3.4 Instructor Presence in Content Delivery

1. Definition and Importance

Unlike traditional face-to-face courses where students meet and interact with the course instructor during lectures, online learning creates a physical separation between the instructor and students during the instructional process, which often leads to greater challenges for students to develop a personal connection with the instructor. To address these challenges, it is critical for online instructors to strengthen instructor presence in instructional materials and activities to engage with students actively and visibly. The use of multimedia such as audio, video, and other interactive technologies (e.g., synchronous meetings) allow students to develop a sense of personal connection with the instructor, which in turn would motivate students to reciprocate and dedicate effort to the course materials.

2. Features

Beginning	Developing	Proficient
The instructor primarily relies on texts (such as slides and text-based handouts) to deliver instruction, presenting students an overwhelming amount of information in a disengaging way with no direct support and explanation from the instructor.	The instructor uses texts as the main method to deliver course content, but sometimes uses other media-rich and personalized modes, such as audio, video, and synchronous meetings, to directly explain the course content in some of the learning units.	The instructor consistently infuses a variety of visual, media-rich, and personalized modes, such as graphics, audio, video, synchronous meetings, and narrated slides, throughout lectures to allow for a thorough explanation of concepts in an engaging manner and also to create a strong instructor presence. In addition, the instructor uses a friendly and conversational tone when explaining the course content. When applicable, the instructor provides sample problems and offers step-by-step demonstration of how to format solutions to problems.

3. Examples

Beginning	Developing	Proficient
<p>For each learning unit, the instructor assigns readings from the textbook and provides PowerPoint slides to highlight the key concepts covered in these readings.</p>	<p>In addition to readings from the textbook and PowerPoint slides, the instructor occasionally provides short videos to explain difficult concepts and show herself on camera, and a whiteboard app with a voice-over to go through concepts that are particularly challenging to most of the students in class. The instructor also offers two synchronous review sessions where she uses screen sharing to illustrate relevant content.</p> <p>In addition, the instructor sends out periodic “Q&A” emails summarizing questions students have raised and answering them in a friendly, personable way.</p>	<p>For each learning unit, the instructor explains key concepts covered in that unit and shows herself on camera in addition to assigning readings from the textbook and providing PowerPoint slides. The instructor uses conversational voice (an active voice and shorter sentences) and a warm and friendly tone in the lecture videos, such as using interjections “Yay!” and “Phew”.</p> <p>The course materials also include short examples of worked problems with voice-over by the instructor explaining the steps being taken and why.</p> <p>* Please see “Adding Some TEC-VARIETY 100+ Activities for Motivating and Retaining Learners Online” for more examples:</p> <ul style="list-style-type: none">• Activity 16 (Chapter 5): Screencasted Supports and Directions

Observation Results

- We observe more between-course variations in “scaffolding self-directed learning skills and guiding the learning process” and “presence and interactivity” than “student agency.”
- Targeted humanizing strategies such as “Icebreaker” are used in a different format by some instructors in their current instruction.
- The self-reported instructional practices are not always consistent with the objective
 - observation of their actual practice in the course, indicating that surveys alone may not be sufficient in capturing instructors’ instructional practices in an online class.

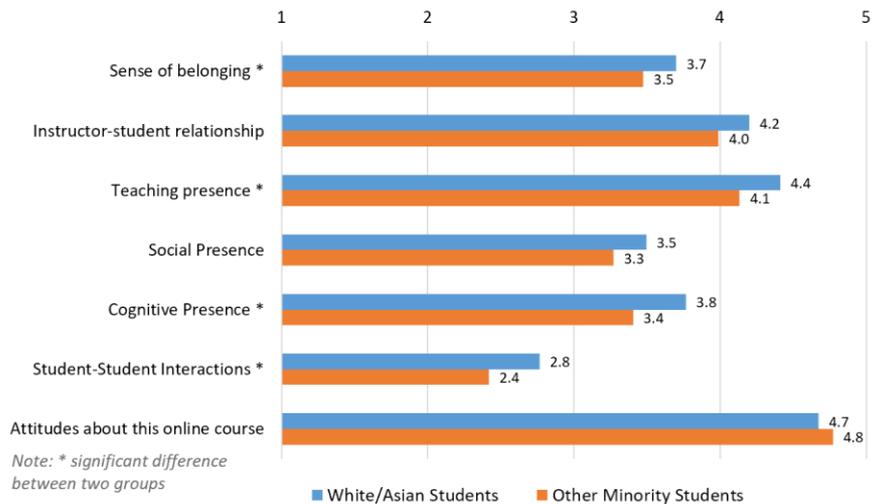
Conclusion

- **Survey:** there is significant **difference** in psychological constructs not only between Minority and White/Asian students, but also within students group before and after taking classes; there is also great variation in instructor's psychological constructs response
- **Observation:** there is **variation** on instructional practices among instructors; there is also some discrepancy between self-reported practices and observed practices
- **Implementation:** more efforts to boost the **response rates**; possible ways to further **refine** the surveys

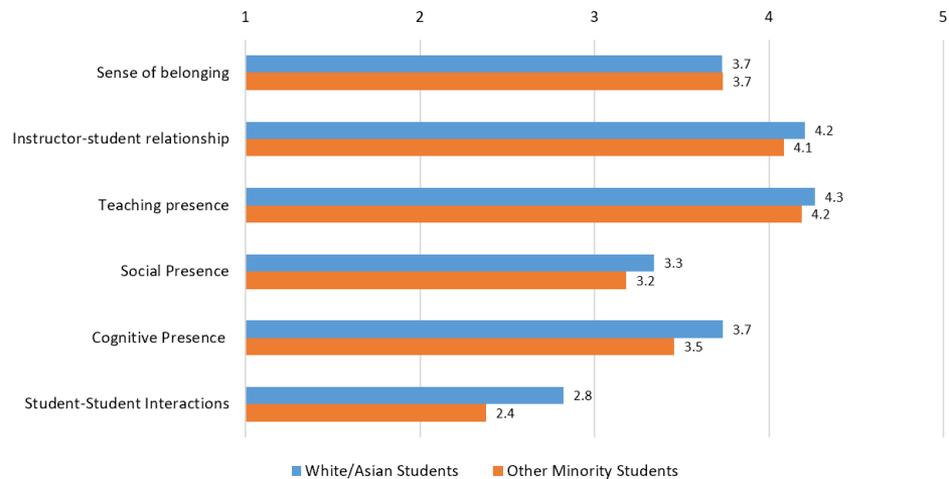
Bonus slides

Student survey

Composite Scores Comparison Between
White/Asian Students and Other Minority Students
(Pre-Survey, n=120)

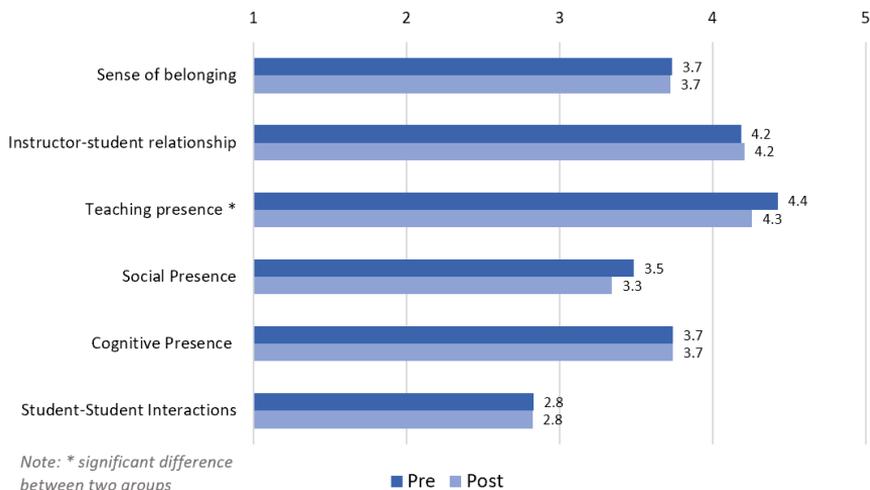


Composite Scores Comparison Between
White/Asian Students and Other Minority Students
(Post-Survey, n=77)



Student survey 2

Composite Scores Difference Between Pre and Post Surveys
(White/Asian Students , n=59)



Composite Scores Difference Between Pre and Post Surveys
(Other Minority Students , n=18)

