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Students as Researchers and Participants: A Model of Iterative Member-Checking for Inclusive, Equity-Centered Assessment Research

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Abstract: Previous research on student learning outcomes has begun to advocate for the inclusion of student researchers. To fully grasp undergraduate student perspectives of learning objectives, this study was co-created and conducted by undergraduate student researchers, allowing for an inclusive, equity-centered research model to guide our findings. We argue that the intentional choice to involve students as participant-researchers and enact an iterative member checking process throughout the research allowed us to discover more nuanced findings on the topic of student learning outcomes. Specifically, not only are clear and transparent student learning outcomes necessary for academic success, as previous literature suggests, but we also found that confusion around learning outcomes causes emotional responses that negatively impact student perceptions of themselves and college, a finding which was elucidated through our methodological approach.

Keywords: *student learning outcomes, student voice, equity, student researchers*

Introduction

In 2021, the University of California system admitted the most “diverse undergraduate cohort in the university system’s history,” ushering in more racially inclusive, first-generation, and community college transfer students than ever before (UC Office of the President, 2021). This cohort comes at a time when, across universities, incoming undergraduate students are increasingly becoming more diverse by way of ethnicity, race, gender identity, socioeconomic status, ability, and so on (Montenegro & Jankowski, 2017). Thus, institutions must reimagine the ways they see and engage with students who have often been marginalized in academic spaces, a stance reflected in culturally responsive and sustaining pedagogical practices (Paris,

2012; Ladson-Billings, 1995; Ladson-Billings, 2014). Moreover, explicit and meaningful involvement of students in the research on student learning outcomes (SLOs) may have a great impact on the persistence of students from first-generation or low-income backgrounds (Fisher et al., 2016). While some research attempts to capture the student perspective on SLOs in higher education (Brooks et al., 2014), we are unaware of research in which undergraduate students drive inquiry around SLOs and mediate the project as participant-researchers.

While research on student learning outcomes (SLOs) in the post-secondary context has become increasingly important in becoming holistically culturally

responsive, especially regarding defining and understanding the impact of SLOs (Schoepp, 2019; Hussey & Smith, 2003), more nuanced research on how students understand and experience SLOs is needed, especially to address the various needs of the increasingly inclusive student cohorts (Montenegro & Jankowski, 2017). Taking in calls to distribute culturally responsive practices across institutions, assessment scholars have moved toward equity-minded assessment arguing that: “Assessment, if not done with equity in mind, privileges and validates certain types of learning and evidence of learning over others, can hinder the validation of multiple means of demonstration, and can reinforce within students the false notion that they do not belong in higher education” (Montenegro & Jankowski, 2017, p. 4).

This study employs a rare approach to learning outcomes assessment by relying on an iterative member-checking process that positions undergraduate students as both participants and researchers. This paper then focuses on answering:

- What does a student-inclusive research model, where students are participants and researchers, reveal about student expectations of undergraduate classroom experiences and SLOs?

Using a grounded theory approach to analyze student-collected data, the research team found that student confusion around SLOs and what they were expected to know in class corresponded with negative emotions about school. We argue that iterative member-checking of student-participants helped reveal the underlying impact of this confusion: without tangible, explicit artifacts that state SLOs and connect them to course curriculum,

participants described feeling alone in figuring out the SLOs in their courses leading to what they described as a “treadmill” effect of school. Through these findings, we reiterate previous research that indicates a lack of transparency in SLO delivery is problematic (Winkelmes et al., 2016), as it reinforces already established equity issues regarding who is most prepared for the work of understanding school (Montenegro & Jankowski, 2017). Primarily, our work seeks to expand on the impact of these findings and suggest an iterative member-checking framework for research that helps prioritize student perspectives and address topics that students directly identify as relevant.

Literature Review

New Students = New Practices; Same Onus

Efforts to increase diversity in higher education have invited different students into higher education than in years past. The National Center for Educational Statistics reports that while the total undergraduate enrollment in higher education decreased by 5% from 2009 to 2019, enrollment of Hispanic-identified students increased by 48% over this time and that the number of students from non-white identities has increased across the board (National Center for Education Statistics, U.S. Department of Education, 2020). While the presence of these student populations is by no means new to higher education, the heightened representation of culturally and racially diverse student populations requires institutions to adopt new practices. Additionally, while there have been great efforts to provide financial support, college preparatory programs, and ease in transferring, research indicates that in-class experiences in college are a

significant barrier to success for students from low-income, first-generation families (Engle & Tinto, 2008). Furthermore, efforts to retain diverse student populations should be more focused on classroom and assessment practices as “conducting assessment in a manner that takes into consideration the various needs of different student populations is a responsibility of higher education” (Montenegro & Jankowski, p. 4, 2017).

Particularly, McKenna (2013) builds on the work of Street (2006) to remind scholars that the burden of adaptation is on the institution lest we see students in the light of autonomous learning discourses, in which a student is constructed as an “individual devoid of history and socio-cultural norms who succeeds or fails in higher education by virtue of characteristics inherent within her” (p. 2). McKenna’s (2013) critique of the assumption of student-centered learning models, also asks us to re-evaluate how heightened inclusion of students from historically marginalized economic, racial, and cultural backgrounds necessitate changes to teaching and assessment, as well as to research practices around institutions.

Equity-Minded Assessment Practices

Research further indicates that understanding aspects of student identity is integral in understanding student persistence and achievement (Ramburuth & McCormick, 2001; Boughey, 2012; McKenna, 2013). To remove barriers for students from historically disenfranchised backgrounds, Montenegro and Jankowski (2020) call for equity-minded assessment practices “in order to be responsive to both issues of equity and the needs of diverse learners” (p. 4), emphasizing the

importance of cultural responsiveness and student voices in the evaluation of assessment processes. This echoes other research that suggests that integrating student perspectives informs increasing efforts to redefine successful student trajectories and outcomes contingent on its population for more inclusive teaching and assessment practices (Haas & Hadjar, 2019). Specifically, when it comes to understanding student experience, we believe that students must become co-creators of knowledge in the research process to truly capture the students’ voices and represent the needs of students accurately.

Assessment scholars, in efforts to move toward more equitable practices, have made calls for integrating student voices in all parts of assessment (Levy & Heiser, 2018). Particularly, McArthur (2017) asks “if our higher education colleges include an increasingly diverse and global student population, then why have our approaches to assessment not reflected these changes?” (n.p.) and argues for deeper integration of student perspectives to help better understand and address diverse perspectives and experiences in assessment. Recently, Montenegro and Jankowski (2020) specifically argue that meaningful student involvement in assessment is a key to equitable assessment practices.

SLOs: The Need for Clarity & Transparency

While SLOs are seen as fundamental to establishing transparent practices in higher education (Adam, 2004) research suggests that students may have a “limited interpretative framework, which severely restricts the potential for learning outcomes to fulfill their assumed

communicative functions” (Erikson & Erikson, 2019, p. 2301). This furthers the notion that SLOs need to be clearly communicated, explicitly connected to curriculum, and accessible to students. Research on student learning reinforces the importance of the instructor in providing clarity in instruction (Goldman et al., 2017) and highlights the connection between clear teaching behaviors and student learning outcomes (Titsworth et al., 2015). Aziz, Yatim, and Yusof (2012) also found that clear learning outcomes can lead to positive emotional responses such as students being more likely to enjoy their work and an increased interest in being involved in the course. Other research has linked emotional turmoil with difficulty in learning and cognition (Immordino-Yang & Damasio, 2007), suggesting the importance of emotional well-being in the learning environment.

In general, research has found that increased transparency leads to higher academic confidence, mastery of the skills that employers value most when hiring, and sense of belonging; importantly, these benefits were the greatest for low-income, first-generation, and underrepresented students (Winkelmes, 2016). Transparency and clarity of in-class assignments and expectations are crucial for equitable student success, and research practices ought to be transparent and inclusive, as well (Montenegro & Jankowski, 2017).

Methodological Framework

Research is working to capture what Seale (2009) calls the “student voice.” Brooks et al. (2014) researched learning outcomes from university student perspectives. The students were asked if, how, and when they use learning outcomes and about the

usefulness of learning outcomes in courses. However, while they collected student perspectives in this research, Brooks et al. (2014) did not integrate the perspectives of students throughout the research process. Salisbury (2014) noted the success of training students to host focus groups in eliciting more nuanced responses about assessment from students. In this project, Salisbury (2014) and fellow stakeholders saw the benefit of student-to-student interaction in dismantling issues of power between students and faculty researchers.

Students Assessment Researchers (StARs) & Iterative Member-Checking

The Student Assessment Researchers (StARs) at our research site are paid undergraduate researchers who work with an advanced graduate student and the university’s assessment team to research assessment practices on campus. Throughout the project, four undergraduate StARs from various disciplines and backgrounds worked to conduct this research under the mentorship of the Director of Assessment and the team’s graduate student. The development of this methodology relied on close mentorship of the undergraduate students with the assessment team and graduate student, as they were trained as researchers while acting as participants.

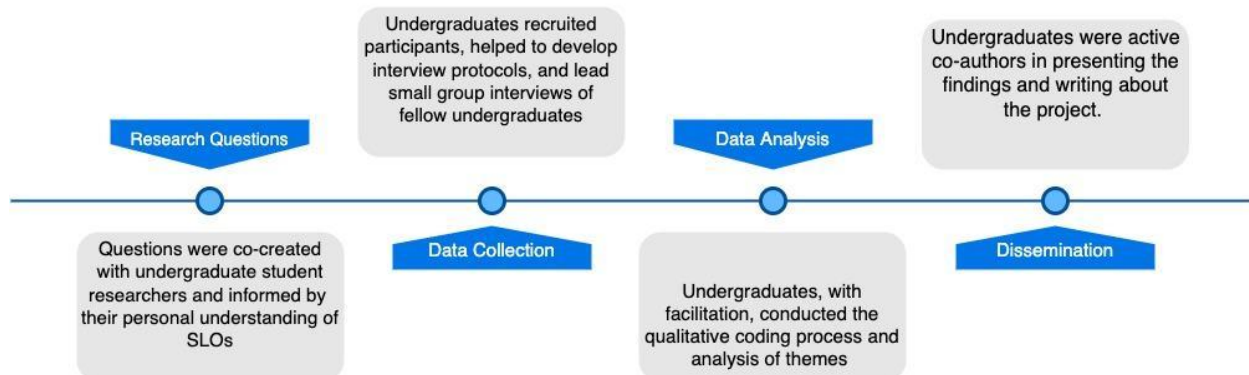
As a way of theorizing our undergraduate students as co-creators of knowledge, we implemented what we are calling an iterative process of member checking, which builds off of qualitative research traditions of reimagining how member perspectives are integrated in qualitative work (Birt et al., 2016). Member checking, also referred to as participant validation, seeks to improve and assess qualitative

research findings by addressing implicit researcher biases (Doyle, 2007; Miles & Huberman, 1994) and ensure that the dominant voice in the research is not solely that of the external researcher (Mason, 2002). Presenting research participants with transcripts, notes, findings, or other pieces of data and checking in on their understanding throughout the research project is often seen as a way of addressing ethical concerns of representation (Fossey et al., 2002), creating trustworthiness, and establishing rigor in qualitative methods (Creswell & Miller, 2000; Lincoln & Guba, 1986). There are various models of member checking in qualitative research: in some, a participant is given drafts of findings and encouraged to provide alternate viewpoints (Stake, 1995); in others, multiple participants are asked to verify the accuracy of the findings (Creswell (2005); and in some, entire manuscript drafts are read by participants to corroborate and invite new findings (Yin, 2014). To address the calls of Levy and Heiser (2018), McArthur (2017), and Montenegro and Jankowski (2020) regarding meaningful student involvement, we suggest a more integrative and iterative

framework to include students in research, employing member checking in each cycle of the research.

As detailed in Figure 1, the StARs were given a voice in each aspect of the research cycle, acting as integrated checkers of data throughout the process. First, students were consulted in the formation of research questions after they engaged in seminal readings in the field of assessment. Then, they were trained to recruit participants, co-create research protocols, and lead focus groups, in some cases occupying both the role of student participant and student researcher in these moments. In data analysis, students were guided by the graduate student through a grounded theory coding of the transcripts they collected. In this, they coded their own words as leaders of the focus groups and that of other students, working to shape the codebook and understanding of the transcripts. Finally, undergraduate students helped to shape the dissemination of findings, ensuring that the presentation of findings aligned with their experience and their understanding of the research.

Figure 1
StARs Integrated Member-Checking Model



Note. The image above described the ways undergraduate researchers were trained and included in stages of the research process.

Seale (2009) characterizes most research claiming to involve the student voice as not inclusive enough; most research includes excerpts from students or consults with students in a project as a means of capturing the student voice. These strategies do not necessarily consider the multiple ways that students can inform and improve research agendas. Our iterative member-checking model attempted to include students in every aspect as creators and checkers of knowledge and experience. Seale also (2009) describes including student voices in research to push against traditional power dynamics in higher education. In the practice we describe, students are theorized as partners and co-creators of knowledge that works to humanize and disrupt traditional research paradigms that might prioritize certain perspectives over others (Paris & Winn, 2013), important considerations in research that attempts to speak to diverse perspectives.

Overall, we found that our iterative member-checking methodology benefitted all the parties involved in the research. It allowed for the perceptions of the more experienced research team who are not undergraduate students to be checked by those who occupy and live the experience we were attempting to capture. It allowed the student researchers to see their perspectives and experiences authentically reflected in research, develop research identities and skills, and deeply reflect on their own time in higher education. As we will discuss, we believe it also allowed participants to reveal more than traditional hierarchical relationships might, revealing interesting insights about student experience with SLOs.

Methods

Context

We conducted the study at a large, public, land-grant, research-intensive university in California. In May of 2019, at an annual campus assessment event, a student panel was held to include undergraduate voices into the conversation of assessment at the university where the study was conducted. The questions students answered at this panel included: “How do you know what you’re expected to learn?” This made an impression on the audience of faculty, staff, and administrators and catalyzed the development of a brief preliminary survey, which served as a pilot project. This pilot project collected both qualitative and quantitative data from more than 30 student interviews and 20 preliminary survey responses. The preliminary results of this pilot project, as well as the themes found, informed the questions our study asks in the survey and interviews.

Data Collection

The data examined in this paper were gathered as part of a larger study which, in addition to semi-structured interviews, included a mixed-design survey. The survey was administered over 14 days in February and March of 2020. The survey included 27 scaled-response items (Appendix A) designed to elicit a depiction of the following: 1) how confident students felt about the academic quarter (Winter 2020), 2) tools and resources that were most beneficial for students to understand learning outcomes, 3) the timing that SLOs were made apparent to them, and 4) which tools and resources were utilized when SLOs were made unclear. The survey responses were then used to develop interview questions. This paper focuses on the results from the in-person interviews

where participants were recruited through a question at the end of the survey.

Participant Recruitment

To promote participation in the survey and subsequent interviews, undergraduate research fellows relied on non-probability sampling, or snowball sampling, to reach potential respondents. The undergraduate researchers used three primary methods to encourage participation. These methods included promoting the survey on social media through personal and academic accounts, distributing postcards (which had a link to the survey) at popular locations on campus, and emailing faculty, staff, and mailing lists with the request that they promote the survey among their students, advisees, etc. Approximately 7 faculty

invited the Student Assessment Researchers (StARs) to make announcements in large-enrollment courses and a few even utilized extra credit points to incentivize student participation. Students were surveyed until our data encountered a saturation of responses and interviews became essential in elaborating findings.

Participants

From the 648 total survey responses, 90 undergraduate students agreed to complete a follow-up interview. Survey takers hailed from over 70 majors of the 102 the institution offers. The demographic characteristics of student respondents can be found in Table 1.

Table 1

Ethnicity, Gender, and First-Generation Identities of Undergraduates vs. Survey Participants

	% of Total Enrolled Undergraduates (n = 31657)	% of Total Students Surveyed (n = 1002)
African-American/Black	4%	10%
American Indian/Alaskan Native	1%	1%
Asian/Pacific Islander	36%	35%
Hispanic/Latinx/Chicanx	24%	18%
International	14%	11%
White/Caucasian	21%	25%
Other/Unknown	1%	>1%
First Generation	38%	36%
Women	60%	72%
Men	49%	27%
Non-Binary/Different Identity	1%	>1%

Table 1 demonstrates that our survey sample was representative of the school's undergraduate demographics. Thirty of the ninety undergraduate students who indicated interest ultimately participated in 17 separate interviews. The interviews were held for 10 days in February and March of 2020. Interview participants were recruited from over 70 different majors across the sciences and humanities and included male and female-identifying students from a variety of socioeconomic, ethnic, and language backgrounds. Further, our team, who in some cases acted as participants, is largely composed of first-generation, female-identifying students from a variety of ethnic and racial backgrounds that reflect the composition of our campus.

Interviews

Semi-structured interviews (Merriam & Tisdell, 2015) used inductively and deductively constructed questions to better understand student experiences and perceptions of SLOs (See Appendix B). Undergraduate student researchers conducted each interview, allowing for participants to have conversations with peers and presumably eliciting more candid responses. To collect this qualitative data, undergraduate student researchers asked undergraduate participants eight questions within interviews that lasted between 15 and 45 minutes. Over 10 days in March 2020, undergraduate research fellows were able to interview a total of 30 students in 17 separate interviews. Throughout our interviews, we asked eight questions; the first two asked their consent to participate and minimal demographic information (class year, major); other demographic information was reported from the Office of Undergraduate Admissions. The last six

questions (See Appendix B) focused on faculty expectations of undergraduate student learning, or in other words, student learning outcomes and goals.

The interviews were audio-recorded to maintain the integrity of participant responses (Merriam & Tisdell, 2015) and later transcribed and anonymized. The interview recordings were transcribed by an online audio-to-text transcription service called Temi and cleaned by student researchers who listened to the audio recording to correct the transcription as necessary and ensure that the speaker changes were accurate. Following, the transcripts were downloaded and organized by the graduate student researcher for analysis.

Analysis

Analysis of the transcripts followed a grounded theory approach (Charmaz, 2014; Strauss & Corbin, 1997). First, after transcripts were cleaned and anonymized, the research team read through each transcript and memoed during each reading to process initial thoughts (Merriam & Tisdell, 2015). From memoing, an initial set of descriptive codes (Miles & Huberman, 1994) were created to address specific mentions of resources for SLOs. Initial rounds of coding yielded 27 codes (See Appendix C) that could be described as a combination of descriptive codes where the code “summarizes in a word or short phrase – most often as a noun – the basic topic of a passage of qualitative data” (Saldaña, 2015, p. 87) and in vivo codes to “keep the data rooted in the participant’s own language” (Saldaña, 2015, p. 6). Examples of in vivo codes include “Treadmill of School” and “Clear Path.” This process also included simultaneous coding where codes

overlapped to identify a single piece of datum, as certain descriptive codes seemed to connect to others in a recurring pattern (Saldaña, 2009).

Through several rounds of axial coding (Charmaz, 2014) a codebook was finalized and broken into seven parent codes, including “Resources for Recognizing SLOs,” “Experiences with SLOs,” “Perceptions of School,” etc. Coders were then normed with the codebook through several group rectification sessions. With a finalized codebook, each of the 17 transcripts was coded by two separate readers and who later met for code rectification using a spreadsheet to document code agreement. Once each transcript had been rectified, the collection of codes was analyzed for larger themes, consulting frequency of codes and a corpus of excerpts for a more holistic understanding of student responses.

Member Checking/Bias

As mentioned, member checking is an important component of qualitative research (Tracy, 2010). This was done by proxy in this framework. Specifically, one of the principal investigators and co-authors is both a participant and researcher. As a result, their interview portions were coded along with other interview participants. Code rectification and analysis checks were conducted throughout the study to ensure findings were representative and reflexive; however, this methodological paradigm is unconcerned with bias controls, as we prescribe to an anti-foundational epistemology that does not “adopt any permanent, unvarying (or ‘foundational’) standards by which truth can be universally known” (Lincoln & Guba, 2011, pp. 119-120), but rather values understanding and representing an experience.

Findings

The transcripts analyzed for this project provided key insights into how students experienced SLOs and the tools they used to better understand them (See Appendix C for the full list of codes). There were several codes where students described their experience with SLOs in terms of the resources they use to understand them. However, we found that our methodology was especially helpful in getting at the emotional effect students experienced when confused, found in “Treadmill of School” and other codes related to emotional response.

Particularly, confusion around SLOs was a relevant category in 88% of the interviews, while an emotional response has been coded in ~71% of transcripts. The excerpts in Table 2 provide examples of how students experienced confusion. Our “Confusion around SLOs” code is defined as follows: when the student expresses uncertainty about the purpose of the class, learning outcomes, confuse them with content, etc. We constructed this code to capture both explicit and implicit statements of when learning outcomes are unclear and what ways course content can be presented that might be confusing to the students. Additionally, this code has captured statements on how SLOs themselves can be confusing, outside of the context of a course.

In our analysis, we had seven separate codes that captured the resources that students identified as both helpful and unhelpful in understanding SLOs (See Appendix C). Of those seven codes, three were the most frequently documented in the transcripts. Specifically, “Professor as a

Resource or Lack Thereof” was noted in 82% of transcripts, while “Syllabus as Source/Non-Source of SLO” and “Classroom/Pedagogical Practices as Source/Non-Source of SLO” were noted in 100% of transcripts. The code “Syllabus as Source/Non-Source of SLO” confirmed that clearly stated SLOs on syllabi are important to students as a tangible resource of resolving confusion, while “Professor as a Resource or Lack Thereof” was specifically designed to capture how students named the instructor of the course as facilitating or not facilitating their understanding of SLOs and course materials. Largely, this code included mentions of how students would confront or not confront their professors as

a resource and the importance of instructor disposition and perceived accessibility to students.

Finally, “Classroom/Pedagogical Practices as Source/Non-Source of SLOs” was a code used to capture the instances in which student interviewees expressed or highlighted a pedagogical or classroom practice that informed them of their SLOs. The code captures circumstances of students inferring what they will be assessed on based on the topics that are highlighted within an assignment, essay, project, or study guide for an exam, and the frequency in which these practices were done.

Table 2

Most Prevalent Codes and Relevant Excerpts from Student Interviews

CODE	EXCERPT
“Confusion around SLOs”	“I would say it definitely gives me a challenge just to be able to figure out what I’m expected to know and it definitely makes my studying a lot more difficult just because I don’t know what I should be studying.” “Like, am I getting all that I need out of the classes so I can do my major right? It’s kind of difficult cause I feel like I know what’s expected of me, but I don’t know what to learn”
“Emotional Response”	“I feel more comfortable knowing that, okay, the professor knows what the topics are, outlines them properly and that makes me feel secure. So I feel like I don’t, have as many doubts or like insecurity about how I approach or how I do my work and how I go into class” “Um, so I think in terms of like how much I will be excited or not excited about the class and [clarity on expectations] affects that. Um, and I also would judge a class based on how organized the professor is. Cause you know, if they’re not organized, that’s more stressful and then you don’t like the class as much.”
“Syllabus as Source/Non-Source of	“I would say, for me the syllabus... there’s a little paragraph that’s like when in this class, what you will do, like you’ll be learning this and stuff. That’s helpful.”

SLO"	"I guess just briefly, if I'm ever confused about something, just look at the syllabus. That's my first instinct. Okay, well what's going on?"
"Classroom/ Pedagogical Practices as Source/Non- Source of SLO"	"Every exercise we did she would remind us of the course expectations and how these problems we're doing are very relevant to real life situations. For example, I feel like first of all that made me really interested in the class. And second of all I think I was just very clear of what I was supposed to do." "I'm actually extremely confident that I understand the expectations at the beginning of all my lectures, they always have an outline of what we're going to go over. That's beautiful. And they always do an overview"
"Professor as Resource or Lack Thereof"	"I would try to talk to the professor, but I feel kind of shy about that sometimes. Maybe 40% of the time I wouldn't do anything. I would just try to go with it for a week one or two and then I literally just don't get it anymore. I'd be like: I had to do something about this. But it's kind of a mixed bag of just what I can understand when I can." "A lot of the professors don't say, oh yeah this and this and this will be on the final exam and expect you to know it. So, you have to guess what's going to be on it and it makes it a lot more difficult to learn everything."
"Treadmill of School"	"I also think a lot of times we don't take that time to reflect back on things, what am I going to be able to do or what are my end goals? So, then we're just stuck in kind of like the treadmill of school and maybe you learn that at the beginning. Maybe I've read that, but now I'm in the middle of it. You're right in the thick of it and I think it's definitely easy to lose sight of what my end goal is." "And a lot of the time I think that it's easy to lose sight of that there are expected learning outcomes and there's a reason that you're in that class and it's supposed to be building knowledge and I think it's really easy to get caught up in: I just need to get through this class and get a good grade in it so I can get my degree." "Sometimes, it may happen that a student just takes courses and then perhaps in the third or fourth year they're still: well, what am I going to do career wise? Should I continue going to school after undergraduate? I guess what I'm trying to say is that it's easy to just take classes and not necessarily think about the next step. Especially if you're first-generation, so you don't know."

The final code displayed in Table 2 is an in-vivo code that captures how students get caught up in putting one foot in front of the other, akin to running on a treadmill, in their educational experiences. It connects to the mentality many students have when they enter a university setting, as time constraints and social expectations to have their academic careers figured out lead students to approach their educational choices in a way that is often unintentional and focused on checking off the expected requirements. Our analysis found “Treadmill of School” in 6 out of 17 artifacts (35%). Despite its less frequent occurrence, this code reflects themes that are described in other, more frequently occurring codes: “emotional responses” (71%), “Clarity of Major Trajectories” (65%) which referred to lack of clarity, and “Usefulness/Benefit of Learning” (65%), which referred to confusion over what is the benefit of their learning. This group of codes, all labeled under parent codes as perceptions of students, were instrumental in understanding the benefit of our methodological approach.

Conclusion

This study originally sought to understand how students understand or grew to understand SLOs. While the interview transcripts were diverse in reflecting how students interpret SLOs and provided insight that reinforces previous research about syllabi as sources of SLOs (Willingham-McLain, 2011), our findings, made possible by a unique student-researcher methodological framework, suggest a more emotional aspect of student experiences regarding SLOs.

Confusion & Unclear SLOs

Throughout the interview process, students expressed a spectrum of emotions related to the learning experience. Previous research (Titsworth et al., 2015) confirms our findings that the clarity of SLOs can produce positive learning experiences and benefit students. However, the feelings associated with frustration and confusion when SLOs are unclear appear to bear more weight on the student than when they are accessible. With these types of responses in mind, we can infer that students expect their learning outcomes to be easily accessible and digestible, and when they are not, students notice.

Stork and Hartley (2009) found that students’ emotional responses to learning are also dependent upon their perception of their instructors’ pedagogical practices. The way professors teach and present SLOs incites emotional responses such as security, confidence, understanding, and increased interest in the course. Our research also reflects this and finds that students expect professors to have the answers about the usefulness of their learning and how it will relate to future classes or jobs. When professors fail to deliver these answers, or these answers are unclear, students develop a lack of motivation and feel lost about the purpose of their learning.

Our findings are confirmed by Aziz et. al (2012) in that students experience less confusion when learning objectives are explicitly stated by the professor.

Additionally, our findings suggest that the emotional response students had to SLOs was resolved in the presence of clear, tangible presentations of the artifacts. Namely, during the coding process, we

developed the “Resources of SLOs” parent category to encompass multiple methods and approaches that students use to find their student learning outcomes. The three most frequently documented codes found within our transcripts were “Professor as a Resource or Lack Thereof,” “Syllabus as Source/Non-source of SLOs,” and “Classroom/Pedagogical Practices Source/Non-Source of SLOs.” As mentioned by Titsworth et al. (2015), “higher levels of clarity [around SLOs] are associated with higher levels of student learning” (p. 394). The frequency of these categories suggests that they are necessary for providing clarity for the students, and an interplay of all of them can increase student learning confidence by providing them with multiple resources to refer to. The students’ responses reflect the importance of professors fostering transparent communication about what students should be learning to guide the students through the overwhelming nature of college.

Transparency & True Inclusion

Our methodology was effective at revealing student emotion regarding SLOs and the potential long-term impacts of these emotions. Specifically, the “Treadmill of School” reflects how students, when lacking clarity and in a rush to keep up with assignments and exams, lose sight of the intention behind their work. This absence of clarity leads students to grow feelings of frustration and stagnancy as they push through to complete the articulated expectations, which are typically viewed through assessment. The literature reflects how sentiments of frustration within academic settings can result in lower self-efficacy (Bandura et. al, 2001).

While our research was focused on a

specific student population from a large public research university in Northern California, the findings from this analysis point to general issues with access and equity in higher education. Specifically, the “Treadmill of School” code we identified through our iterative member-checking process highlights the importance of tangible artifacts that clearly and transparently communicate SLOs in terms of the long-term impact of transparency. Research has confirmed the importance of transparency (Winkelmes et al., 2016), how transparent learning environments can impact a student’s sense of belonging at an institution (Hausmann et al., 2009), and that pedagogical approaches oriented toward transparency of goals and expectations have “significant benefits for first-generation, low-income, and underrepresented students” (Winkelmes et al., 2016, p. 35). Moreover, research emphasizing equity in school systems has determined that transparency is a necessary practice of more equitable educational environments (Sturgis & Casey, 2018).

Students who expressed “Treadmill of School” sentiments felt a lack of purpose in their schoolwork and a sense of loneliness to figure it out. As a result, our findings suggest that this lack of transparency is problematic and prevents students from reaching academic success, reifying previous research. However, we believe that identifying this code and the deeper impacts of unclear SLOs on students was made possible by the iterative member-checking process we engaged in, suggesting a need for more work that uses this type of methodological approach.

StARS: Students as Researchers

The findings above elucidate our understanding of the larger impact of the confusion that students feel. These emotional, underlying responses were brought to light through using student researchers who led questions and conversations about the realities of assessment. Because of our student researchers and participants, we met the call to reflect the cultural diversity of the campus in our research (McArthur, 2017) to ensure that our data was provided and confirmed by credible sources of student perspectives. Particularly, our team was largely composed of first-generation, female-identifying students from a variety of ethnic and racial backgrounds that reflect the composition of our campus. Additionally, while the research team was guided by professional assessment scholars and a doctoral student, the research process was dialogic with student experience and perspective, including and prioritizing the student voice at every step of the process.

Proponents of student voice research suggest that this type of collaborative, agenda-setting research is transformative for the students who participate and the students who benefit from such work (Bain, 2010). Certainly, by framing our research as a conversation between students with an iterative member-checking process, our participants were inclined and comfortable with sharing their experiences, revealing the underlying equity issues present in their experiences with SLOs. This was confirmed by a student researcher who was also a participant in the project. We believe that students would not have been as willing and open to share personal opinions and

anecdotes in an interview that was conducted by staff members, as previous research on the topic has done.

Limitations

Our research cohort recognizes that the data from our 464 survey participants, including 30 focus group interviewees, cannot be generalized to all undergraduate student experiences. This research, however, contextualizes our participants' student experiences with their coursework and captures unique perceptions about this experience. We also recognize that including students as both participants and researchers can be seen as introducing bias, but we argue that this intentional student-inclusive approach was valid and valuable. Formalizing and systematizing student perceptions into empirical research provided new ways to view assessment, demonstrating the value in shifting research paradigms broadly.

Recommendations

We hope that our research encourages more inclusive, equity-centered assessment research that centers on the student voice. Our findings suggest that our iterative member-checking process is an effective research framework to understand the emotional aspects of students' educational experiences. We support investment in additional research—conducted at other diverse campuses from the perspective of the students via student researchers—to better understand how students truly see SLOs. In conclusion, we believe that inquiries need to center student ideas and experiences to meet the demands of the universities' student populations and produce equitable research across our institutions.

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STUDENTS AS RESEARCHERS AND PARTICIPANTS: A MODEL OF ITERATIVE MEMBER-CHECKING FOR INCLUSIVE, EQUITY-CENTERED ASSESSMENT RESEARCH.

Appendix A Survey Questions

In how many of your courses **THIS QUARTER** are the following statements **TRUE**?

	0 courses	1 course	2 courses	3 courses	4 courses	5 or more courses
I read the syllabus, which described what I was expected to learn.	☐	☐	☐	☐	☐	☐
I found the expectations for my learning on CANVAS.	☐	☐	☐	☐	☐	☐
My instructor(s) explained what I was expected to learn in the class.	☐	☐	☐	☐	☐	☐
TA(s) explained what I was expected to learn in the class.	☐	☐	☐	☐	☐	☐
Questions on the exam(s) clarified what I was expected to learn.	☐	☐	☐	☐	☐	☐
Questions in the homework clarified what I was expected to learn.	☐	☐	☐	☐	☐	☐
Study guides clarified what the learning objectives were.	☐	☐	☐	☐	☐	☐
Practice tests clarified what I was expected to learn.	☐	☐	☐	☐	☐	☐
The instructor's slides stated what we were expected to learn.	☐	☐	☐	☐	☐	☐
I found out the learning expectations during office hours.	☐	☐	☐	☐	☐	☐
Other students in the class told me what we were expected to learn.	☐	☐	☐	☐	☐	☐
Other (please describe) 	☐	☐	☐	☐	☐	☐

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In how many of your courses **THIS QUARTER** are the following statements **TRUE**?

	0 courses	1 course	2 courses	3 courses	4 courses	5 or more courses
I found out what I was expected to learn in Weeks 1-2.	☐	☐	☐	☐	☐	☐
I found out what I was expected to learn in Weeks 3-8.	☐	☐	☐	☐	☐	☐
I have not yet found out expectations for learning.	☐	☐	☐	☐	☐	☐

In general, when you **DO NOT KNOW** what you are expected to learn in a course, how **frequently** do you do the following?

	Never	Rarely	Often	Always
I do nothing	☐	☐	☐	☐
I ask the professor(s).	☐	☐	☐	☐
I ask the TA(s).	☐	☐	☐	☐
I ask other students.	☐	☐	☐	☐
I look into resources on CANVAS.	☐	☐	☐	☐
I read the syllabus.	☐	☐	☐	☐
I participate in study groups.	☐	☐	☐	☐
I figure out what the learning expectations are by attending the lectures.	☐	☐	☐	☐
I find out what the learning expectations are once I take the first test/exam.	☐	☐	☐	☐
Other (please describe) 	☐	☐	☐	☐

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FOR INCLUSIVE, EQUITY-CENTERED ASSESSMENT RESEARCH.

In how many of your courses **THIS QUARTER** are the following statements **TRUE**?

	0 courses	1 course	2 courses	3 courses	4 courses	5 or more courses
I am NOT confident that I know what I am expected to learn in...	☐	☐	☐	☐	☐	☐
I am SOMEWHAT confident that I know what I am expected to learn in...	☐	☐	☐	☐	☐	☐
I am VERY confident that I know what I am expected to learn in...	☐	☐	☐	☐	☐	☐

Appendix B

Interview Protocol

The following questions were asked in each interview:

- How confident are you that you know:
 - what you are expected to learn by the time you graduate from your major?
 - what you are expected to be able to do by the time you graduate from your major? [Optional follow-up: Please say more about that.]
- In the courses you are taking right now, how confident are you that you know what instructors expect you to learn by the end of the quarter? [Optional follow-up: Please say more about that.]
- In your own words, please tell me how you find out what you are expected to learn in a course.
- What do you do when you are not clear about a course's learning goals?
- How does knowing or not knowing the learning objectives of a course influence you? [If further clarification is needed, "For example, how you approach learning in the class or what you think about course."]
- What else would you like the research team to know?

Appendix C

Final Codebook

Parent Code	Child Code	Definition
Experiences with SLOs		
	Intuiting Expectations	When students believe they must use context clues to figure out expectations/learning outcomes
	SLOs Over Time	When students mention SLO use/development/understanding throughout the course
	Confusion around SLOs	When the student expresses uncertainty about the purpose of the class, learning outcomes, confuse them with content, etc.
	Labor to Understand SLO	Any mention of work, labor, efforts regarding a class, assignment, etc.; work to figure out what is expected
Resources for Recognizing SLOs		
	Professor as a Resource or Lack Thereof	How/When the student uses the professor as a resource or when the student perceives the professor as not useful to them as a resource to understand the SLOs
	TA as a Resource or Lack Thereof	How/When the student uses the TA as a resource or does not use them as a resource to understand the SLOs
	Peers as a Resource or Lack Thereof	How/When the student uses their classmates/peers as a resource or does not use them as a resource to understand the SLOs; Interacting with peers absent the instructor or TA--when students are together creating knowledge and making things clear.
	Assignments as Source/Non-Source of SLO	When students use the assignment and what is prioritized or not prioritized in the assignment to try to understand SLOs; this is focused on out of class work (homework, reading, etc.)
	Exams as Source/Non-Source of SLO	When students use an exam and what is prioritized or not prioritized in the exam to try to understand SLOs
	Syllabus as Source/Non-Source	When students use the syllabus and what is prioritized or not prioritized in the syllabus to try to understand

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	of SLO	SLOs
	Classroom/Pedagogical Practices as Source/Non-Source of SLO	When the student discussed in-class work that helps or hinders their understanding of a SLO
Perceptions of Professor/Instructor		
	Pedagogical Expectations	When the students have certain assumptions/desires for how the instructor should teach; This is the student's perceptions of what is best/most helpful in the classroom and how instructors should teach.
	Educational Gatekeeping	The student's perspectives on how teachers may guard/gatekeep knowledge
	Instructor Disposition/Approachability	How approachable/accessible students perceive the instructor to be; the student's understanding the personal relationship they have with the instructor/professor
Perceptions of Disciplines/Major		
	Disciplinary Mentions	When students discuss how different majors/fields approach, explain, demonstrate SLOs/ Different understandings of a major; how disciplines may differ, etc.
	Clarity of Major Trajectories	Uncertainty about the purpose of the major or classes in the major
	Hierarchy of Knowledge	When the student(s) have a prescribed understanding what is "lower order" vs. "higher order" knowledge in a class; when they think about the order of learning in a discipline; From Bloom's taxonomy, higher order learning refers to the top three levels of the taxonomy (analyzing, evaluating, and creating), as opposed to the bottom three: remembering, understanding and applying.
Perceptions of Future Work		

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	Unclear about Transferability/"Clear Path"	Lack of clarity on applicability of course content to future/work; When there is unclear insight into the purpose of an assignment, or it's applicability to one's academic or professional goals
	Theory vs. Practice	Students' desire for theoretical content to be made practical and job related
	Career Applicability	Student choices based on how well the course learning goals and content are going to prepare them for their career.
Perceptions of School		
	Usefulness/Benefit of Learning	Questioning the value / "use" of learning content / transactions; When students discuss what they "get out of school"; capitalistic language included
	"Treadmill of School"	This was an in vivo code (pg. 6 of Artifact #14) referring to how students do not often look back or far forward in their educational career and just get caught up in putting one foot in front of the other. Perhaps this is a product of not knowing the purpose of what they should be learning.
	Agency	Anytime the student discusses who should be doing the work to understand school; When students exercise their agency or choose not to in a school situation
Self-Identified Qualities of Student		
	Student Self-Efficacy	The level of self-efficacy/confidence students have when entering, during, and after a course.
	Self-Reported Personal Information	When the student reveals personal information in relation to the discussion about learning that is unsolicited or seemingly unrelated to the topic
	Emotional Responses	Anytime students mention or seem to indicate an emotional response