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Cognitive Interviews for Scale Development to Measure Intercultural Competency of Graduate Engineering Students in Faculty-led Laboratories

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Introduction

As globalization and international collaboration increasingly shape professional and academic environments, institutions must equip students with intercultural competencies to thrive in these settings [1]. Higher education institutions, particularly in English-speaking Western countries, often recruit international students and academics from diverse cultural and linguistic backgrounds [2]. In the United States, international students are especially concentrated in fields like mathematics, computer science, engineering, and business, which, alongside health sciences, accounted for 47% of all known graduate applications in 2022 [3]. According to the 2021 report by the National Foundation for American Policy [4], international students account for 82% of graduate students in petroleum engineering, 74% in electrical engineering, 71% in industrial and manufacturing engineering, 61% in civil engineering, 58% in mechanical engineering, 54% in chemical engineering, and 53% in metallurgical/materials engineering. These statistics position graduate school as a dynamic intercultural space where effective management of communication across cultures is essential.

In the context of engineering education, the concept of the "global engineer" reflects a shift toward preparing students with both technical skills and the intercultural competencies necessary for global collaboration [5], [6], [7]. Intentional integration of intercultural competence into curricula and experiential learning is essential for equipping graduates with skills that allow them to address challenges that transcend national and cultural boundaries [8]. Despite the recognized importance of intercultural competence, a significant gap remains in understanding how these skills can be effectively developed within graduate engineering programs. To date, scholars have emphasized the importance of intercultural competencies among graduate students, particularly in enhancing advising relationships [2], [9]. However, intercultural interactions extend beyond these relationships, encompassing peer-to-peer communication, faculty-to-student collaboration, and teamwork in academic and research settings [10], [11], [12]. Intercultural competencies, including cultural awareness, knowledge, motivation, and adaptive behavior, are essential for success in these diverse academic contexts [10]. Because of the growing cultural diversity within U.S. graduate programs, fostering intercultural competence is imperative for creating inclusive and productive academic environments.

Given the importance of intercultural competencies in graduate engineering education, it is imperative to understand how to foster the development of such skills among engineering graduate students. Study abroad programs have been a common approach to fostering intercultural competence, however, the significant expenses associated with such opportunities act as a barrier [13]. Consequently, there is an increasing emphasis on creating inclusive learning environments where all students, domestic and international, can develop these competencies through both formal instruction and informal interactions without traveling abroad [14], [15], [16]. Faculty-run laboratories offer a promising context for addressing this challenge, as they bring together individuals from diverse cultural and linguistic backgrounds to research.

To effectively study intercultural competency development among engineering graduate students in faculty-run laboratories, we investigate the suitability of an existing and previously-validated scale, the Expanded Cultural Intelligence Survey (ECQS) [17], for measuring intercultural competency in this context. This study presents the findings from cognitive interviews [18], [19], centered on the ECQS scale, with engineering graduate students. Cognitive interviews were used to determine the suitability of the scale for extension to a new audience. A full discussion of existing scales and justification for the scale selected for this study is included in the literature review. Specifically this paper investigates the following research question: To what extent are items in the ECQS relevant to the assessment of intercultural competencies in the context of graduate engineering research in faculty-run labs?

Literature Review

Several terms have been used across literature to describe intercultural competence, including intercultural communication competence, intercultural efficiency, cultural competence, cross-cultural competence, intercultural sensitivity, and global competence [10]. While definitions and nomenclature of intercultural competence vary across different disciplines, there is broad agreement on its core concept [20]. According to Spitzberg and Chagnon [21], intercultural competence can be defined as the appropriate and effective management of interactions between people who, to some degree or another, represent different or divergent affective, cognitive, and behavioral orientations to the world. Three intercultural competencies have been identified as crucial for individuals preparing for effective intercultural collaboration: intercultural communication, intercultural sensitivity, and intercultural responsibility [11]. Intercultural competencies encompass a diverse set of contextual knowledge and skills [11] and do not require fluency in another language [8]. While some scholars note that certain inherent traits may accelerate intercultural competencies, most agree that intercultural competencies are developed [10]. Intercultural competency involves cognitive, emotional, and behavioral skills that allow a person to engage effectively across cultures. As a product of context, it is co-constructed through interactions between people and influenced by the specific cultural and situational factors present [10]. Intercultural competency extends beyond intergroup attitudes; it involves understanding diverse worldviews and behavioral flexibility to engage with them [22].

In today's globalized workforce, engineers require a diverse skill set to remain competitive and efficient, with cross-cultural communication playing a pivotal role in achieving global competence [23], [24], [25], [26]. By developing intercultural competence, engineers can adapt to different cultural expectations and collaborate effectively across borders, ensuring success in their profession [23]. The need for intercultural competence is particularly pressing in engineering, as professionals often work on complex projects involving multicultural teams and international stakeholders [5], [23]. Global engineering initiatives, such as sustainable infrastructure projects, exemplify the demand for collaboration across geographical and cultural boundaries. As Valeeva et al. [27] emphasize, international teamwork is now indispensable in the engineering profession, underscoring the need for these skills.

Intercultural Competence in Graduate Education. Graduate-level engineering education literature has, to date, typically focused on either psychosocial experiences of graduate school (e.g., attrition and persistence [28], [29], [30], [31], [32], advisor matching [33], [34], academic

identity development [35], [36]; mentorship [37], [38]); mental health [39], [40], or professional competency development, mostly focusing on writing and other communication skills [41], [42], [43]. Research has also focused on understanding the experiences of engineering graduate students from marginalized racial, ethnic, and gender groups (e.g.,[31], [44], [45], [46]). While valuable, nearly all studies center (implicitly or explicitly) the experiences of U.S. domestic students studying in the United States or have participant pools dominated by U.S. perspectives. Recently, a few scholars have turned attention to issues and experiences felt especially by international students studying in the United States (e.g., [47], [48]); however, most of this literature is sociological (e.g., structural challenges for international students), psychosocial (e.g., feelings and experiences in navigating U.S. graduate study in engineering) [49], or focused on language competence and fluency as the primary focus of professional development literature (e.g., [50], [51]).

With the exception of a few works (e.g., Borrego et al. [52], [53] and Burt [31]), there has been little focus on how students engage in different types and structures of engineering research groups, though those papers were not intending to capturing intercultural competencies in group membership. Peripherally, other literature related to graduate identity and belongingness literature notes the importance of feeling like a scholar, especially in relationship to the conversations on "fit" (e.g., [54]) (double-edged wording that can hide bias or a hostile climate for "outsiders") has not well-considered international students specifically in terms of socialization. Simultaneously, work focused on graduate students broadly highlights that international students studying in the United States may not immediately feel welcomed or comfortable building connections with U.S. domestic students [55], [56].

While no doubt these studies are highly important, we identify that there is a missed opportunity at the intersection of intercultural competency development and graduate engineering students. To date, only one study by Main and Wang [57] addresses intercultural competency development in graduate school, but given the large percentage of international engineering students in engineering, it is timely to pursue how U.S. and international graduate students develop intercultural competencies within the setting of a research laboratory where they spend most of their time. As a first step in attempting to meet this gap, it is essential to ensure any employed metrics for assessing intercultural competency development are appropriately theorized for this situated context and population.

Assessing Intercultural Competence: Theoretical Framing for this Study. The literature widely agrees that intercultural competence can be assessed, but its complexity prevents any single tool from providing a comprehensive measurement [8]. Numerous instruments are available [58] with each differing in focus and scope. Some tools emphasize broad abilities, while others target specific subskills. Some prioritize language over culture or focus on international differences while overlooking intracultural variation. Others remain ambiguous, with unclear objectives [58], [59]. A summary of some of these tools is provided in [58], including those designed for individuals, teams, leaders, and organizations [59].

In the process of identifying a suitable theoretical framing for this study, we reviewed several instruments, each offering unique perspectives on cultural awareness and interaction. The Miville-Guzman Universality-Diversity Scale - Short Form (MGUDS-S), for instance, measures

individuals' awareness and acceptance of similarities and differences across diverse populations through 15 self-report items [60], [61]. The Intercultural Development Inventory (IDI), grounded in the Developmental Model of Intercultural Sensitivity (DMIS), evaluates intercultural competence across individual, group, and organizational levels using 50 statements; however, it requires certified administration and paid training [62], [63]. The Cross-Cultural Adaptability Inventory (CCAI) assesses communication effectiveness and adaptability across cultures, making it useful in academic, business, and government settings [64]. The Intercultural Sensitivity Inventory (ICSI) focuses on behavioral flexibility and cultural value orientations by measuring individualism, collectivism, and adaptability [65]. The Cross-Cultural World-Mindedness Scale (CCWMS) examines attitudes toward global issues such as immigration, world governance, and justice, often used in study-abroad programs [66]. The Assessment of Intercultural Competence (AIC) tracks changes in intercultural competence over time, analyzing dimensions like knowledge, attitudes, skills, and awareness alongside language proficiency [67]. Finally, the, Cultural Intelligence Scale (CQS), measures an individual's capacity to adapt and function effectively across cultures, emphasizing cultural intelligence (CQ) as a crucial factor for success in diverse cultural environments [68], [69], [70].

While these instruments have been widely validated and applied across various contexts, we found that most had been used primarily in undergraduate-level study-abroad programs or intercultural communication courses, rather than in faculty-led graduate engineering research settings. Additionally, access to certain tools, like the IDI and CCAI, was restricted due to paywalls, limiting our ability to evaluate their suitability for our study context. After reviewing numerous scales, the Expanded Cultural Intelligence Survey (ECQS) [17] emerged as the most promising option due to its public availability and the relevance of its language to a graduate research context relative to other publicly-available scales. There are many studies that have claimed validity of this instrument, offering some credibility. This decision aligns with Deardorff's [8] recommendation to prioritize the fit between the instrument's measures and the intended learning outcomes.

The ECQS builds upon an earlier edition (the CQS) by providing a more detailed evaluation of cultural intelligence through 37 items, compared to the 20 items in the original CQS. It retains the core four dimensions of CQ, metacognitive, cognitive, motivational, and behavioral [68], while offering additional subdimensions for a nuanced analysis. Metacognitive CQ involves being consciously aware of cultural differences during interactions, with subdimensions of planning, awareness, and checking [71]. Cognitive CQ refers to knowledge about various cultural norms, practices, and conventions gained through education and experience, with culture-general and culture-specific knowledge as its subdimensions [71]. Motivational CQ is the drive to learn about and engage in culturally diverse settings broken down into intrinsic, extrinsic, and self-efficacy components [71]. Behavioral CQ is the ability to adapt one's verbal and nonverbal behavior to suit different cultural contexts, with subdimensions related to verbal, non-verbal, and speech acts [71]. The ECQS’s expanded structure and accessible format make it particularly suitable for this study's focus on graduate research contexts. Empirical evidence of validity of the ECQS, using data from 286 participants across 30 countries, demonstrated good model fit through confirmatory factor analysis (CFA). The analysis provided evidence of convergent validity and discriminant validity, with significant factor loadings and acceptable

composite reliabilities [17]. These results support the ECQS's suitability for assessing cultural intelligence in diverse contexts.

However, during our research process, we received feedback indicating that the ECQS instrument had the potential to cause significant harm to participants. In line with ethical research practices, we decided to revise our study design, shifting from directly deploying the survey to conducting cognitive interviews to evaluate how the survey items were perceived and whether they functioned as intended. Consequently, we deployed a small pilot study employing cognitive interview techniques to understand whether and how, if at all, international and U.S. domestic engineering graduate students interpreted these questions and considered the utility of these survey items. It is this study that we present in this paper, answering the above research question.

Methods

Participants and Site. The participants in this study were 16 graduate students (master's and PhD) in Mechanical Engineering departments from two large, research-intensive, land grant institutions in the United States. Ten of the participants identified as men and six identified as women. The participants were from a variety of racial and ethnic backgrounds, with five identifying as white or Caucasian; four as black, African American, or of African descent; three as South Asian; two as Hispanic; one as East Asian, and one as North African. Seven students reported U.S. citizenship, and 10 students reported non-U.S. citizenships; one student had dual citizenship in the U.S. and another country. Participants were working in a variety of different research labs within each of the two institutions. The inclusion criteria for the study required participants to be graduate students actively engaged in research, working in faculty-led physical laboratories with more than one graduate student. Participants were recruited through recruitment emails sent out by the departmental secretaries and flyers. However, due to a low response rate from the initial emails, the authors employed snowball sampling to reach additional graduate students within the department. Students who responded to the recruitment email or reached out through the snowballing approach were sent a link to a screening survey with a consent form, demographic questions, and questions about their laboratory group. Appropriate institution review board approval was obtained from both institutions prior to data collection.

Cognitive Interview Protocol Development. Cognitive interviews provide a distinct method for capturing how participants engage with instruments and interventions [19]. During these interviews, specific questions are asked to assess participant's understanding during activities, such as completing a survey [19]. The cognitive interview protocol was developed based on the ECQS scale. The researchers made very minor adjustments to some items in the scale to better reflect the context of graduate students in laboratory settings (all scale items provided in Appendix 1). The protocol included foundational questions designed to provide insights into participants' backgrounds and their experiences across cross-cultural contexts. The foundational questions in the protocol were followed by the ECQS items, which were grouped into four categories according to their CQs: Cognitive CQ, Metacognitive CQ, Motivational CQ, and Behavioral CQ. Each group of items was preceded by primers to help participants understand what was being asked at each stage. Cognitive prompts were designed into the protocol to help

explore participants' thoughts more deeply whenever they seemed hesitant during the interview process, employing targeted prompts (Table 1).

Table 1: Sample of Cognitive Interview Protocol for Cognitive CQ

Primer	Reflect on cultures that you are familiar with (outside your own) and select the response that best describes your capabilities for the culture you are most familiar with.
Selected Sample of E-CQS Questions	1. I know the legal and economic systems of other cultures 2. I know the rules (e.g., vocabulary, grammar) of other languages 3. I know the cultural values and religious beliefs of other cultures 4. I know the marriage systems of other cultures 5. I know the arts and crafts of other cultures 6. I know the rules for expressing nonverbal behaviors in other cultures 7. I can describe the different cultural value frameworks that explain behaviors around the world 8. I can describe the ways that leadership styles differ across cultural settings
Cognitive Prompts	I see that you're hesitating a little bit, can you tell me what you're thinking? When you see this question, what does it mean to you? How do these items speak to your experiences in your lab? Do any of these items bring up negative experiences? Do you have any resistance toward any of these questions? What about the question is rubbing you the wrong way? (Can you propose an alternate language for the question?)

Data Collection. Cognitive interviews with the participants followed a semi-structured format, allowing the researchers to ask follow-up questions as the interviews progressed. Each interview lasted approximately one hour and was conducted in person at the two study sites. Graduate student researchers led this phase to facilitate peer-to-peer interaction. With participants' permission, the interviews were audio-recorded, and the data were transcribed using transcription software. The researchers also took notes on how participants responded to the questions, noting the ease or difficulty of their answers, any questions requiring clarification, and instances where participants answered confidently but out of context. In most cases, the researchers asked clarifying questions or provided context to help participants when they struggled. Detailed notes of participants thought and response processes were taken by the researchers during and immediately after the interviews. The research team met weekly to discuss the progress of the study and identify areas for improvement.

Data Analysis. A content analysis employing manual sentiment analysis approaches was conducted based on insights from notes taken during the interviews and the content of the interview transcripts. In particular, the feature of interest was the sentiment expressed or evoked in response to each of the EQCS items. In the content analysis, researchers categorized how well participants were able to respond to the questions, what issues with the questions were raised, and how much they struggled to interpret the questions, representing a manual form of sentiment analysis. This transformation of data from interview data into sentiment was useful in understanding which items were perceived as problematic and why, and for how many participants, as a way to assess our research question on whether and how the EQCS items would perform for this new audience. A review of audio recordings and transcripts was used for cross-referencing (triangulation). During weekly meetings, the research team discussed various

emergent patterns from the results. These patterns were deliberated upon, ultimately reaching a consensus on the most effective approach and salient narrative. In the findings section, we present the summative findings showing the ways in which participants were affected by the scale items.

Limitations. This study, like any research endeavor, has its limitations, which we acknowledge. First, as discussed in previous sections, narrowing down to one instrument from the numerous available was a challenging process. Time and cost constraints, along with limited access to certain tools due to paywalls, restricted our ability to consider instruments with well-established evidence of validity. For instance, the IDI and CCAI were unavailable for evaluation without financial investment. Second, recruiting participants also presented challenges, as the use of snowball sampling may have introduced selection bias, despite our efforts to capture diverse perspectives. Third, the ECQS was adapted for use in faculty-led graduate engineering laboratories, even though it was initially designed for broader cultural intelligence contexts. While we slightly modified specific wording to better align with the study's context, applying the instrument beyond its original context may have affected the validity and reliability of the data. Fourth, cognitive interviews about intercultural competence may have been influenced by social desirability bias, as participants might have felt compelled to present themselves in a positive light, particularly when discussing culturally sensitive topics. This potential bias could have impacted the accuracy of responses regarding their perceptions and behaviors related to intercultural competence. Despite these limitations, the study provides valuable insights into how intercultural competence can be assessed within faculty-led graduate engineering laboratories.

Findings and Discussion

A heat map was used to represent and analyze participants' responses across different items on the scale. The heat map Figure 1 used five color palettes: grey signified items with which participants related without hesitation and whose responses aligned with the questions asked; light grey indicated items where participants were almost okay, but they either hesitated, were uncertain, or doubtful; light red represented items participants struggled with, tried to answer, but did not fully capture the intended constructs, items that could easy have passed as problematic items; dark red was used for items that were completely confusing to the participants or items that felt demeaning or degrading; and yellow was used for items that needed clarification or were perceived by participants as repetitive. As shown in Figure 1, there were no participants that indicated full approval of all the items (looking at each column), and no items that had full approval from all participants (looking across the rows.) This is highly problematic and indicates that this scale should not be deployed to engineering graduate students to assess cultural competence. We use our qualitative data to highlight the major challenges with these items.

Challenges with Behavioral CQ Questions. Behavioral CQ questions elicited the highest levels of discomfort among participants, as indicated by the heat map (Figure 1) showing the most dark red and pink colors. These colors signify items that students found challenging, ambiguous, or uncomfortable to answer. Participants expressed unease about the framing of certain questions, perceiving them as judgmental or difficult to answer authentically. Emerging themes included ambiguity in interpreting intent, concerns about respect and miscommunication, and discomfort with specific wording. First, participants expressed difficulty in understanding the intent behind

behavioral CQ questions. For example, in item BQ1, “I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it in my research group,” one participant wrestled with distinguishing between necessary adjustments for mutual understanding and unintentional condescension. This internal conflict reflected a desire to avoid stereotyping while addressing practical communication challenges. Second, participants expressed concern around offending others by using the behaviors described in the questions. For example, one participant reflected on their own bilingual and bicultural background and described a conscious effort to avoid offending others by maintaining a neutral tone of voice. They noted that altering one’s accent to accommodate others could sometimes be perceived as disrespectful, illustrating their sensitivity to cultural nuances and the potential impact of behavioral adjustments. They said:

> I'm thinking a lot, especially on like Spanish speaking countries. I guess, changing your accent, might sometimes, you might offend people if you do that. So, I try to keep a natural tone of voice to that to avoid any other being disrespectful things like that.

Lastly, participants noted that some of the behavioral CQ questions read like “got-you” questions, which made them second-guess their responses and feel judged. This sense of being tested evoked vulnerability and defensiveness, likely tied to cultural identity and expectations. These reactions suggest that behavioral CQ questions may require careful framing to reduce the perception of judgment and better align with participants’ lived experiences.

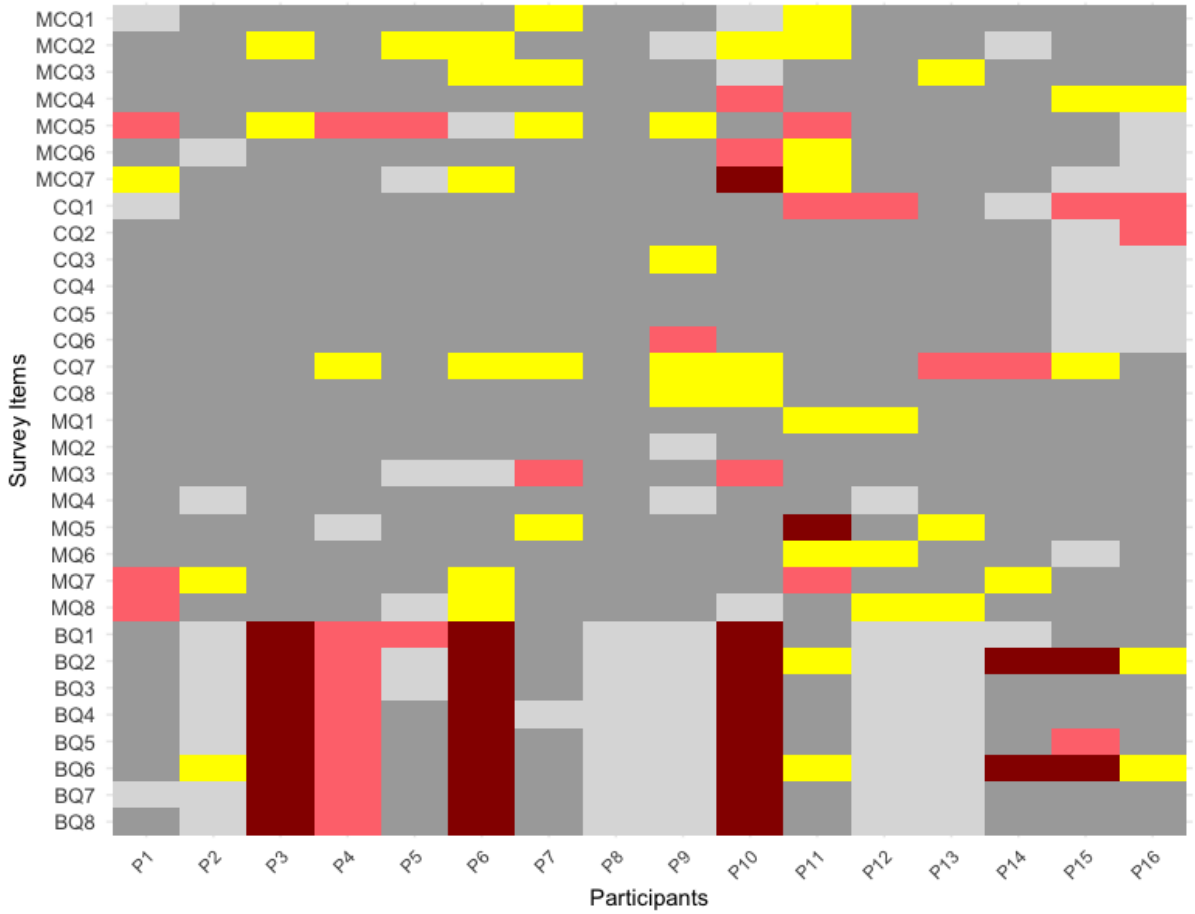

Figure 1: Heat map illustrating participants’ response patterns

Adjustments Needed for Laboratory Context. Participants commented on the broad and generalized nature of Cognitive CQ questions, which made it difficult for participants to relate their answers directly to their academic or lab settings. Instead, their responses often reflected broader cultural contexts or personal experiences outside of academic life. For example, P16 said, “I know a few [rules for expressing non-verbal behaviors], but not all. I think not everyone knows all the cultures. I would say the whole eight to 15 [cognitive CQs items] were broad.” The generality of these questions made it hard for participants to provide responses tied to specific contexts. For example, one question centers on understanding the legal and economic systems of other cultures. One participant believed they did know the legal and economic systems of other cultures, but then spoke mostly of social customs, like splitting the bill. This response, while culturally significant, diverged from the construct’s intended focus on legal and economic systems, illustrating a misalignment between question framing and participant interpretation.

This importance of context in cultural adaptability was underscored by other participants. For example, in response to item 7, P5 reflected on their role as a teaching assistant for an international trip to Ecuador focused on sustainability, saying:

> I interacted a lot with the faculty member for that trip who's from Ecuador. The more time I spent with him talking about his culture and experiences, I definitely adjusted my understanding of the culture. But that was in a context where we were talking about culture. So, I'm gonna put somewhat agree because I don't know that my understanding adjusts when we're just working on something unrelated.

This quote highlights a key challenge. In lab environments, where intercultural interactions are often incidental or unrelated to the work at hand, it is difficult to foster the same depth of cultural adaptability with generic questions. Several participants echoed this sentiment, suggesting that questions addressing topics like legal systems felt disconnected from their lived realities. For example, P12 remarked, “I don’t feel the need to know the legal system of other countries unless something prompts it." Others, like P15, proposed alternative approaches, suggesting that discussions about food or other everyday cultural practices might serve as more accessible entry points for exploring cultural differences in lab settings.

The data revealed a tension between the broad generalizations implied by CQ measures and participants nuanced, context-specific lived experiences. The broad framing of Cognitive CQ questions further limits the instrument’s utility in capturing actionable insights. These findings reveal the need for further consideration of the contexts in which students should draw on when answering the E-CQS items as well as consideration of the purpose of the research (i.e., to measure intercultural competency broadly or to measure intercultural competency in laboratory environments).

Challenges with Item Wording. Throughout the interviews, the language used in the items created confusion for participants. Non-native English speakers, for example, expressed difficulty with terms like "cross-cultural" and phrases that felt overly formal or abstract. For example, P13 asked, “What does cross-cultural mean?” Participants noted that some terminology required additional context or clarification, with some asking for simpler phrasing or examples to aid understanding. One participant remarked that certain questions such as item 14 sounded more like academic jargon than accessible prompts, further complicating their ability to engage

meaningfully. Item MCQ5, “I develop action plans before interacting with people from a different culture in my research group,” was the most contentious in the metacognitive CQ, often sparking confusion. P11 described item 5 as “too formal and ambiguous.” This situation highlights the overlooked issue of assuming that all participants would inherently understand these terms. Clear definitions or primers are essential to ensure comprehension, emphasizing the need to either introduce key terms upfront or incorporate explanatory elements within the survey. Another recurring issue was the specificity of questions. For instance, P15 initially struggled to interpret the question about preparing for intercultural interactions but gained clarity after rereading it. This kind of scenario suggests that while the intent of the question was clear to some, the phrasing might benefit from simplification to accommodate diverse linguistic and cultural backgrounds.

Positive Engagement with Metacognitive Questions. Despite these challenges, the survey prompted valuable self-reflection among some participants, particularly in the Metacognitive domain. For example, P12 shared how the prompts encouraged them to consider past interactions more critically, revealing insights they had previously overlooked. These reflective moments underscored the survey's potential to foster a deeper awareness of cultural adaptability if it is tailored to the right context. Participants generally found questions in the Motivational domain to be more intuitive and easier to respond to compared to those in the Cognitive domain, which often required additional clarity or contextual grounding. This discrepancy points to an opportunity to refine the instrument, ensuring a consistent level of engagement across domains.

Conclusion and Future Work

The findings from this study underscore the importance of considering context when deploying scales to measure intercultural competency development. Our data revealed that assumptions about participants' familiarity with certain terms or concepts, combined with the framing of questions, inadvertently confused or excluded respondents. The absence of uniformity in the heat map's color coding signals a clear need for a customized scale, particularly to ensure consistency across CQ domains. It is evident that simply adopting existing the intercultural competence instrument without consideration of context is insufficient. Instruments must be tailored to reflect the lived realities of participants and their unique academic and cultural environments, which may include simplifying complex phrasing, eliminating redundancy, and providing clear definitions or primers for technical terms. Incorporating participant feedback is also essential to refining survey items and enhancing their relevance to day-to-day scenarios. Moreover, the study highlights the limitations of broad generalizations in the intercultural competence survey measures. Future work will involve another qualitative interview phase that broadly explores intercultural competency development in faculty-run labs and is unanchored to a single existing instrument. This phase will inform the development and validation of a scale to measure intercultural competency development in this specific context.

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Appendix 1: Modified ECQS Survey Instrument Used in Cognitive Interviews

MCQ1	I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds in my research group
MCQ2	I adjust my cultural knowledge as I interact with people in my research group from a culture that is unfamiliar to me
MCQ3	I am conscious of the cultural knowledge I apply to cross-cultural interactions in my research group
MCQ4	I check the accuracy of my cultural knowledge as I interact with people in my research group from different cultures.
MCQ5	I develop action plans before interacting with people from a different culture in my research group
MCQ6	I am aware of how my culture influences my interactions with people in my research group from different cultures
MCQ7	I adjust my understanding of a culture while I interact with people in my research group from that culture
CQ1	I know the legal and economic systems of other cultures
CQ2	I know the rules (e.g., vocabulary, grammar) of other languages
CQ3	I know the cultural values and religious beliefs of other cultures
CQ4	I know the marriage systems of other cultures
CQ5	I know the arts and crafts of other cultures
CQ6	I know the rules for expressing nonverbal behaviors in other cultures
CQ7	I can describe the different cultural value frameworks that explain behaviors around the world
CQ8	I can describe the ways that leadership styles differ across cultural settings
MQ1	I enjoy interacting with people from different cultures
MQ2	I am confident that I can socialize with locals in a culture that is unfamiliar to me in my research group
MQ3	I am sure I can deal with the stresses of adjusting to a culture that is new to me
MQ4	I enjoy working in cultures that are unfamiliar to me
MQ5	I am confident that I can get accustomed to the shopping conditions in a different culture

MQ6	I truly enjoy interacting with people in my research group from different cultures
MQ7	I value the status I would gain from working in a research group with a different culture
MQ8	I am confident that I can persist in coping with working conditions in different cultures
BQ1	I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it in my research group
BQ2	I use pause and silence differently to suit different cross-cultural situations in my research group
BQ3	I vary the rate of my speaking when a cross-cultural situation requires it in my research group
BQ4	I change my nonverbal behavior when a cross-cultural situation requires it in my research group
BQ5	I alter my facial expressions when a cross-cultural interaction requires it in my research group
BQ6	I change my use of pause and silence to suit different cultural situations in my research group
BQ7	I modify how close or far apart I stand when interacting with people in my research group from different cultures
BQ8	I modify the way I disagree with others to fit the cultural setting in my research group

MCQ -Metacognitive domain
CQ - Cognitive domain
MQ -Motivational domain
BQ - Behavioral domain