Design and Validation of a Novel Instrument for Measuring Student Cultural Competence

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***Abstract*— As undergraduate computing departments develop interventions to create more equitable and inclusive environments for students from diverse identities, there exists a need for instruments to measure the impact of these efforts on improving student cultural competence with respect to creating more equitable and inclusive environments. This work presents an instrument to measure the cultural competence of computing students. Initial results indicate that the instrument demonstrates both construct validity and internal consistency. While the instrument is not an intervention, it can supplement them to understand the impact of activities on improving student cultural competence.**

Keywords*— *diversity, equity, inclusion, students, cultural competence

I. Introduction

Disciplines such as social work, education, counseling, and healthcare provide training to develop and instruments to measure student cultural competence, primarily because graduates are expected to effectively render services to clients/patients from all identities, especially vulnerable populations [1]–[11]. An inability to effectively provide these services can result in uncomfortable to life-threatening situations for clients/patients.

While there are a range of instruments to measure individual cultural competence [12], several limitations render the them impractical for adoption in computing [12] (e.g., too narrow a focus, centering respondent's knowledge about "others" as the primary indicator of competencies, and the lack of item generalization for application to computing (or any discipline other than the one it was originally developed for).

This work focuses on developing an instrument to measure student cultural competence. The instrument would codify the impact of these interventions on student knowledge, beliefs, practices, and consciousness [13]–[16]. The goal of this study was to design and validate an instrument to measure student cultural competence in university computing programs. Project description

The target population for the study was students completing university computing (e.g., computer science, computer engineering, and information systems) courses at U.S. colleges and universities. The study was not restricted to students majoring in computing, as the interdisciplinary nature of the field results in non-computing majors often completing at least one computing course to meet graduation requirements.

The instrument was developed and tested across multiple semesters. First, a review of the literature on existing instruments was completed, which focused on widely used instruments in disciplines such as healthcare, education, and counseling psychology. Next, the instrument was developed and mapped to five constructs that were inspired by [17]:

- *Valuing diversity*- understanding, appreciating, and respecting its worth.
- *Cultural self-assessment*- accurately and exhaustively assessing current beliefs against current practices.
- *Consciousness of the dynamics of difference*- recognizing that interactions with people of different identities may not be received as intended, due to historical situations.
- *Institutionalized cultural knowledge*- consistently seeking avenues for continued learning, engagement, and practice to develop proficiency.
- *Adaptations to diversity*- adapting approaches to better meet the needs of people from all backgrounds.

Close- and open-ended responses were then collected in multiple phases. Within each phase, results of the data analysis were used to identify the final constructs and items for revision or removal.

II. Results and Future Work

The results indicate an instrument for measuring the cultural competence of computing students can successfully be developed that incorporates the range of ways identity is defined. This instrument was analyzed for internal consistency and construct validity. While the original instrument was inspired by the five constructs originally defined in [17], the results provided strong evidence supporting a four-factor model.

It is important to note that this instrument is not an intervention. However, it can be useful for measuring the impact of interventions in university computing departments (especially longitudinal studies to understand the impact of courses, modules, teaching assistant training, and other activities). Future work includes continued review of the instrument for revisions and extensions to computing faculty and staff, K-12 educators, industry professionals, and other STEM disciplines.

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