Chapter 7
Inclusive Pedagogy in Computer Science Education:
A Critical Pedagogical Framework for Computational Access

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ABSTRACT

Computer science (CS) inclusive teaching provides an opportunity for everyone to learn in a way that is fair and accessible. Through the traditional approaches, neurodiverse and disadvantaged learners are often cut off due to the strictness of the instruction and the surrounding limitations on support. UDL (Universal Design for Learning) and CRP (Culturally Responsive Pedagogy) are the two major strategies for inclusive teaching that facilitate flexible, engaging, and relevant learning. UDL allows you to choose different ways to learn and to express your understanding, and CRP connects the content with the students' cultural backgrounds. Gallaudet University and AccessCSforAll are some of the initiatives that have been proving that learners are more engaged when using assistive tools and through the application of adaptive methods. Supported by educating CS for all, U.N. SDG 4, inclusivity in computer sciences education not only narrows the digital gap but also opens up the door for every student to thrive in a diverse and tech-savvy world.

DOI: 10.4018/979-8-3373-6546-6.ch007

INTRODUCTION

The global industry's digitization has made computer science (CS) an essential literacy (Ryoo, 2019). On the other hand, the traditional teaching methods—stiffly structured lectures and standardized tests—gradually push out the learners with different cognitive styles or cultural backgrounds than the "norm" (Pournaghshband & Medel, 2020). Those students who belong to the neurodivergent category (e.g., with ASD, ADHD, or dyslexia) usually find it hard to learn in a still-and-unyielding classroom setting that does not use and thus oppresses their innate cognitive strengths (Bonnette et al., 2022). Marginalized populations suffer more from the inequities caused by the institutional inertia and structural barriers (Israel et al., 2022).

The Inclusive pedagogy, which is the merging of Universal Design for Learning (UDL) and Culturally Responsive Pedagogy (CRP), is the one that can break down the walls of systemic inequities (Madkins et al., 2020, Kooli & Chakraoui, 2025) Although UDL helps in the creation of a communication environment that meets the needs of all learners with the help of a range of media, CRP in its turn fosters through recognition and trust the learner's culture the identity and the motivation necessary for the learner to stay on (Goode et al., 2020). Even though there are global laws like UNESCO's Sustainable Development Goal 4 (SDG 4) which promote inclusion in education, the goal of equal opportunities in CS teaching is still often blocked by a big "Policy-Practice Gap," which is characterized by the discrepancy between the lack of institutional support and resources and the theoretical aspirations (Ferguson & Roofe, 2020)

MAIN FOCUS OF THE CHAPTER

This chapter contributes to the field by introducing the Critical Pedagogy of Computational Access (CPCA)—a conceptual framework that does not stop at the analysis of "access" but rather probes the power relations and the reasons for the failures of an inclusive CS implementation. The CPCA framework does not only map out a set of the best practices but also interprets how models such as UDL can turn into "compliance checklists" without any structural changes. The main goals of the framework are to: (a) critical analysis of CS access and retention placing emphasis on systemic and structural barriers; (b) failure of implementation and unintentional consequences of applying foundational theories in resource-poor or culturally diverse contexts being the target of scrutiny; and (c) development of an