



Using Quantitative Ethnography to Explore Interdisciplinary Collaboration in a CTE Building and Construction Pathway



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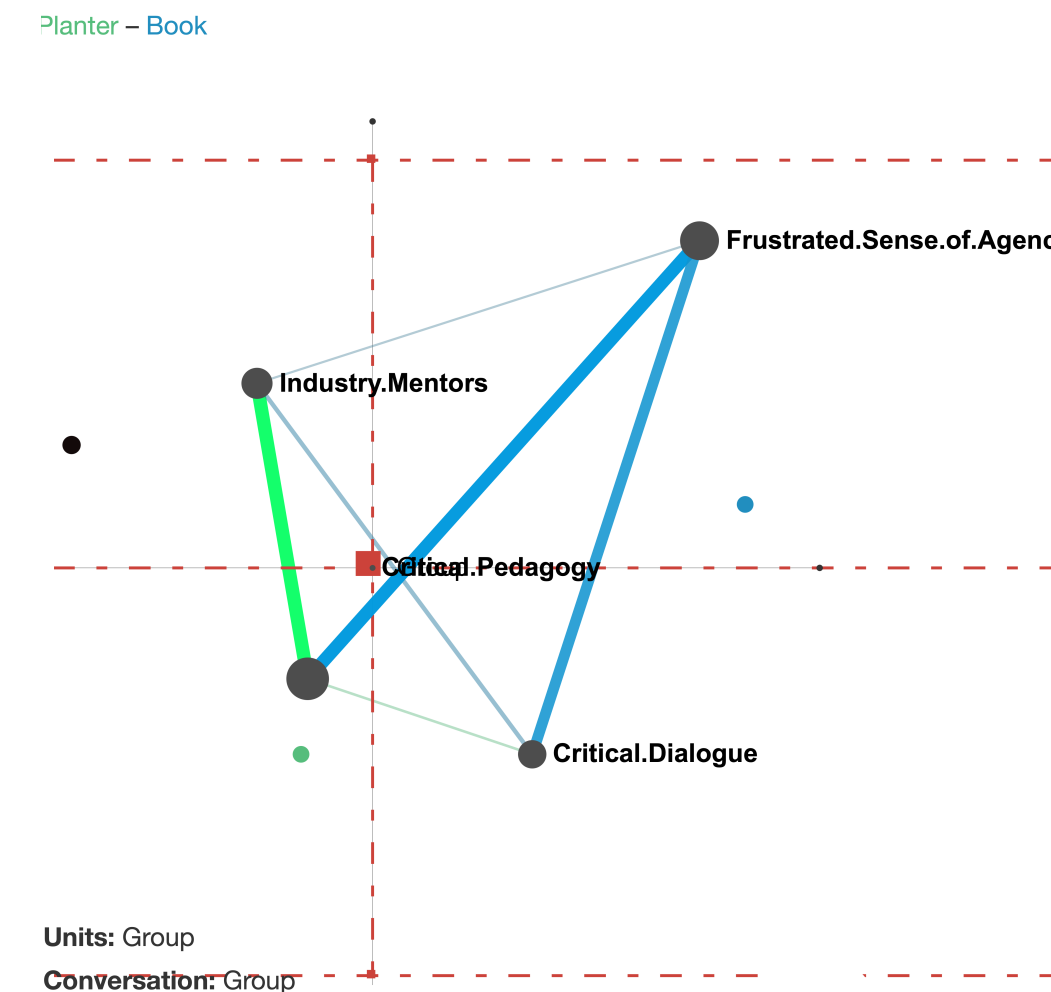
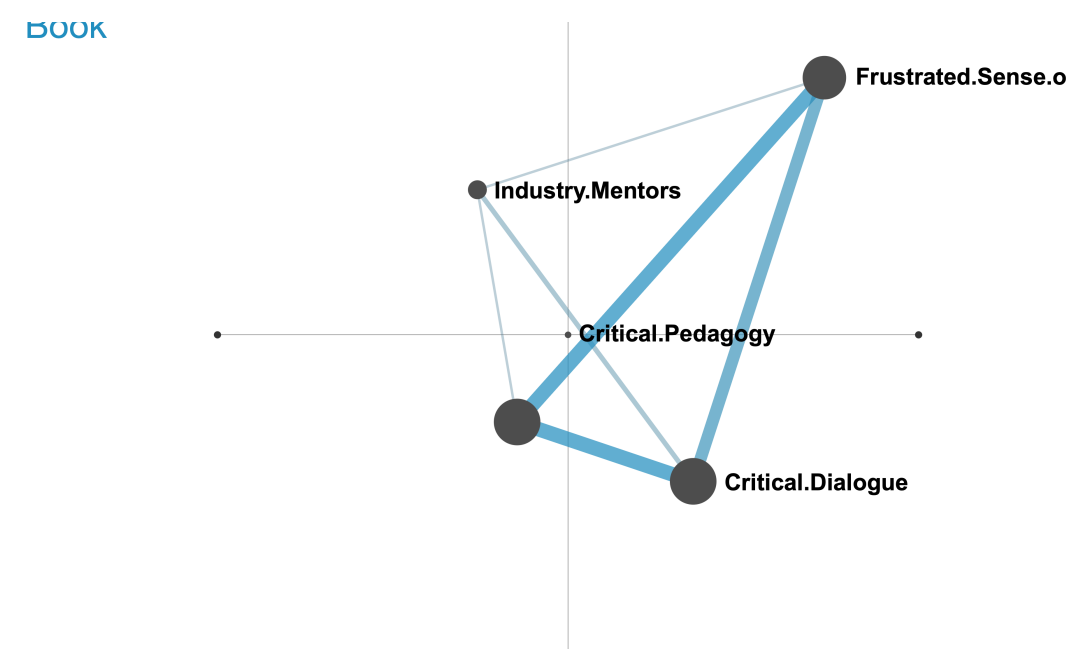
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Abstract

Despite robust research on secondary CTE building and construction pathways (Montoya et al., 2020; 2018), further study with novel methods is needed. Quantitative Ethnography (QE) and Epistemic Network Analysis (ENA) provide tools to examine the siloed structures and neoliberal rationality of CTE Pathways, which limit students' critical consciousness (Lundell et al., 2023; Brown, 2017). Using QE and ENA, researchers found constructivism, critical pedagogy, and interdisciplinary collaboration can improve students' and educators' experiences in CTE pathways.

Research Question

Can an Interdisciplinary collaboration positively impact secondary students' experience, participation, and critical consciousness in a CTE building and construction pathway?



Methods

This study uses Quantitative Ethnography (QE) and Epistemic Network Analysis (ENA) to analyze qualitative data originally coded in MAXQDA. The data comes from a secondary school practitioner researchers' autoethnography, focus group interviews, daily observation notes, student artifacts, one-on-one interviews, and student reflections. Data were extracted, cleaned, and transferred to an ENA software where data were analyzed and visual network models were generated.

Findings

Using QE and ENA, to enhance a qualitative research design, researchers found that constructivism, critical pedagogy, and interdisciplinary collaboration can positively impact the experience, participation, and critical consciousness of students and educators in a CTE building and construction pathway.



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Introduction

Despite robust qualitative research to explore the efficacy and equity of secondary CTE building and construction pathways (Montoya et al., 2020; 2018), there is still a need to further interrogate these studies with novel methods. Quantitative Ethnography (QE) has been established as a reliable means to interpret qualitative data (Arastoopur et al., 2023; Shaffer, 2017). Furthermore, Epistemic Network Analysis (ENA) has been used to create QE models to help interpret qualitative data (Bauer et al., 2019). In this study, we use QE and ENA as novel methods to interrogate the silo structure and neoliberal rationality of Career Technical Education (CTE) secondary pathways, which have been shown to limit students' critical consciousness (Lundell et al., 2023; Brown, 2017). Despite its history of racial tracking, CTE pathways still neglect critical thinking/dialogue around social/environmental justice issues, drastically hurting workers' ability to confront these inequities (Darder, 2017; Oakes & Saunders, 2011; Shor & Freire, 1987). Using quantitative ethnography and epistemic network analysis to enhance a qualitative research design, researchers found that constructivism, critical pedagogy, and interdisciplinary collaboration can positively impact the experience, participation, and critical consciousness of students and educators in a CTE building and construction pathway.

Theoretical Framework

In the absence of critical thinking, a banking model of education dominates pedagogies in secondary classrooms and CTE pathways. In *The Art of Critical Pedagogy*, the authors argue this banking model works to depoliticize marginalized groups, rendering them susceptible to policies and ideologies of oppression (Duncan-Andrade, Morrell, 2008; Freire et al., 2020). As an antidote to the banking model, Freire argues for a problem-posing pedagogy that is founded in praxis, the transformation of reality through continual action and reflection (Freire et al., 2020). Through this praxis, students develop a critical consciousness (political imagination), and they enlist in the struggle to transform reality (Freire et al., 2020).

The banking model perpetuates myths, a problem-posing model demythologizes; the banking model treats students as objects, a problem-posing model views them as subjects who create and recreate knowledge; the banking model subdues creativity, a problem-posing model stimulates creativity through reflection and action (praxis); the banking model is fatalistic, a problem-posing model is revolutionary (Freire et al., 2020).

Despite the history of racial tracking, CTE research still adopts the "learn to earn" model, decenters student voices, and neglects critical pedagogies (Megayanti et al., 2020). STEM-CTE has shown that pedagogy has a more substantial impact on perceived teacher quality than overall career interest (Chen et al., 2024). While often focused solely on career readiness, the field of CTE still does not fully understand how critical pedagogy can simultaneously increase critical consciousness and career-based technological skills.

Methods

Research Questions

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Research Methods

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Research Context

This study focuses on a construction technology course for secondary students (9-12th) in a building and construction pathway. This course has four unique elements: first, students are dual-enrolled in a Building Information and Modeling (BIM) 101 course at a community college; second, the curriculum earns students a professional certification in Virtual Design and Construction (VDC) from the Center for Integrated Facilities and Engineering (CIFE) at Stanford University; third, the class is co-taught by science and English teachers who both hold CTE credentials in the building and construction trades; fourth, the class is taught using principles of critical pedagogy, such as problem-based learning and critical dialogues centering around social and environmental justice issues in the built environment.

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