THE PATH TO REPRESENTATION: FACTORS SHAPING BLACK WOMEN'S PARTICIPATION IN COMPUTER SCIENCE PROGRAMS

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INTRODUCTION / PROBLEM OF PRACTICE

The Equity Challenge

- Black women remain disproportionately underrepresented in computer science enrollment, retention, and degree attainment despite national diversity efforts.
- Although women earn the majority of college degrees overall, participation in computing remains low, with Black women representing an even smaller fraction.
- Disparities reflect systemic and structural inequities, not differences in academic ability.

Contributing Factors Across the Educational Pathway

- **K–12 Influences**
  - Declining STEM interest during the high school transition
  - Stereotypes of computing as male-dominated
  - Intersection of racialized and gendered narratives shaping identity

INTRO / PROBLEM OF PRACTICE – CONT.

- **Access and Exposure**
  - Unequal access to AP CS, enrichment, and experiential learning
  - Structured programs increase confidence and engagement
  - Persistent inequities limit pathways for URM students
- **Institutional Climate**
  - Mentorship, faculty engagement, and peer networks influence persistence
  - Inclusive environments strengthen belonging
  - Intersectional experiences often overlooked in diversity initiatives

Quantitative data show disparities; qualitative inquiry is needed to understand lived experiences. Increasing representation is both an equity imperative and essential for innovation and workforce advancement.

STATEMENT OF THE PROBLEM

The Core Issue and Contributing Factors

- Persistent underrepresentation of Black women in computer science in terms of participation, retention, and degree attainment, despite national diversity initiatives within STEM education.
- Societal stereotypes of computing as male-dominated, limited early STEM exposure, insufficient mentorship and representation, and a lack of culturally responsive institutional support prevent Black women's participation and persistence in computer science.

Gap in the Literature and Purpose of this Study

- Limited qualitative research examines the lived experiences, motivations, support systems, and persistence factors shaping Black women's participation in computer science, leaving critical intersectional dynamics underexplored.
- This qualitative study explores the experiences of Black female undergraduate students in computer science technology to identify factors influencing their pursuit and persistence and to inform more inclusive, equitable institutional practices.

PURPOSE STATEMENT

Study Purpose

- To explore and describe the lived experiences of Black women pursuing a bachelor's degree in computer science technology at Wetland State University (pseudonym).
- To examine how early educational exposure, mentorship, institutional climate, representation, and other environmental and personal factors influence recruitment, retention, persistence, and academic success.

Theoretical Framework

- Guided by Social Cognitive Theory to examine how experiences shape self-efficacy, sense of belonging, and resilience within computing spaces.

Intended Contributions

- Inform educational leadership practice and institutional policy by identifying actionable strategies that strengthen diversity, equity, and inclusion while supporting the development of sustainable pathways for Black women in computer science education.

SIGNIFICANCE OF THE STUDY

Addressing a Persistent Disparity

- This study confronts the significantly lower enrollment, retention, and graduation rates of Black women in computer science by examining the systemic, cultural, and institutional factors that contribute to their underrepresentation.

Amplifying Underrepresented Voices

- This study centers and elevates the lived experiences of Black women in computer science to highlight how mentorship, institutional support, and inclusive environments shape their sense of belonging, confidence, and persistence.

Impact on Policy and Practice

- This study provides insights to inform educational leadership and policy by guiding the development of equitable outreach, mentorship, and culturally responsive strategies that strengthen the STEM pipeline and promote inclusive excellence in computer science education.

BACKGROUND

Historical and Structural Context

- The underrepresentation of Black women in computer science is rooted in longstanding systemic inequities within U.S. STEM education that continue to shape access, preparation, belonging, and persistence despite national diversity initiatives.

Representation and Structural Inequities

- The underrepresentation of Black women in computer science reflects deeply embedded structural inequities, including unequal access to resources, advanced coursework, and supportive learning environments—rather than differences in ability or interest.

Early Educational Experiences, Preparation, and Exposure

- STEM interest often declines during the transition to high school due to male-dominated stereotypes and limited representation, while structured exposure, mentorship, institutional climate, and self-efficacy, as conceptualized in Social Cognitive Theory, play critical roles in shaping confidence, belonging, and persistence in computer science; however, access to these supports remains uneven.

THEORETICAL FRAMEWORK

Core Framework

- Guided by Social Cognitive Theory (Bandura, 1986), this study views academic decision-making as shaped by the reciprocal interaction of personal beliefs, environmental influences, and lived experiences within social and institutional contexts.

Central Construct: Self-Efficacy, Observational Learning, and Environment Reinforcement

- Beliefs about one's ability to succeed in computer science influence persistence and resilience and are shaped by mentorship, representation, institutional support, and experiences of inclusion.
- Through observing role models and receiving social and institutional support, students develop beliefs about belonging and capability, as inclusive environments and positive reinforcement strengthen self-efficacy and persistence in computer science.

This study examines how early exposure, mentorship, institutional culture, and representation interact with personal agency to shape self-efficacy, belonging, resilience, and persistence among Black women in computer science.

RESEARCH QUESTIONS

Purpose of the Study

- This qualitative study explores the factors that influence young Black women to pursue and persist in a bachelor's degree program in computer science technology, focusing on their lived experiences, motivations, challenges, and support systems.

Central Research Question

- What factors influence young Black women to pursue a bachelor's degree in computer science technology?

Supporting Sub-Questions

- How do early educational experiences influence interest in computer science?
- What challenges do Black women encounter in pursuing this field?
- What support systems and institutional resources enhance their persistence and success?
- How do mentorship, representation, and inclusivity shape their sense of belonging in computer science programs?

PROCEDURES / RESEARCH DESIGN

Methodological Approach

- This study employs a qualitative transcendental phenomenological design (Moustakas, 1994) to explore and describe the shared lived experiences of Black women pursuing degrees in computer science technology.

Alignment with Theoretical Framework

- Guided by Social Cognitive Theory, the design examines how personal beliefs, environmental influences, and lived experiences interact to shape self-efficacy and persistence in computer science.

Rationale for Design

- A phenomenological approach centers the lived experiences of Black women in computer science, allowing for in-depth exploration beyond quantitative measures of disparity.
- It captures both what participants experience and how they interpret those experiences, providing rich insights to inform inclusive institutional practices.

PROCEDURES / POPULATION

Participants

- Six Black women currently enrolled as undergraduate students in the Computer Science Technology program at WSU(pseudonym).
- Participants will represent multiple academic levels (first-year through senior) to capture varied experiences across the academic trajectory.

Sampling Strategy

- Purposeful sampling to select individuals with direct lived experience of the phenomenon.
- Selection ensures participants can provide rich, relevant insights aligned with the research questions and Social Cognitive Theory.

Recruitment and Ethical Considerations

- Participants will be recruited through email, classroom announcements, flyers, and STEM organizations, with voluntary participation, informed consent, the right to withdraw at any time, and strict confidentiality maintained throughout the study.

PROCEDURES / SETTING

Institutional Context

- The study will take place at Wetland State University (pseudonym), a Historically Black College or University (HBCU) in the Southeast region.
- HBCUs are historically recognized for providing culturally affirming environments that support the academic advancement of Black students.

Relevance to Theoretical Framework

- Guided by Social Cognitive Theory, the HBCU setting allows examination of how environmental influences and institutional climate interact with personal agency to shape self-efficacy, academic motivation, and persistence in computer science.

Significance of the Setting

- The HBCU context provides an opportunity to examine how mentorship, representation, faculty support, peer networks, and culturally responsive environments foster belonging, resilience, and persistence in computer science.

PROCEDURES / DATA COLLECTION

Primary Data Source

- Semi-structured, in-depth interviews lasting 45–60 minutes will be conducted to capture participants' lived experiences and meaning-making in computer science education, allowing flexible, participant-guided discussion while remaining aligned with the research questions

Procedures

- Interviews will be conducted in a secure virtual setting after participants complete informed consent and a brief demographic questionnaire; with permission, sessions will be audio-recorded, transcribed verbatim, and anonymized using pseudonyms to ensure confidentiality.

Ethical and Trustworthiness Measures

- Prior to data collection, IRB approval will be secured, participation will be voluntary with the right to withdraw at any time, and credibility will be ensured through reflective documentation, secure data storage, and responsible data management in accordance with IRB guidelines.

PROCEDURES / INSTRUMENT

Primary Instrument

- A researcher-developed semi-structured interview protocol will serve as the primary instrument, with the researcher acting as the central tool for data collection and interpretation, emphasizing reflexivity and alignment with the research questions and the theoretical framework.

Amplifying Underrepresented Voices

- The protocol includes open-ended, research-aligned questions exploring early STEM exposure, motivations, mentorship, institutional support, identity, barriers, and resilience, with probing questions used to encourage depth and authenticity.

Impact on Policy and Practice

- A brief demographic questionnaire will provide contextual background (e.g., academic level and program duration), complementing the interview protocol to support an in-depth exploration of participants' lived experiences in computer science.

PROCEDURES / DATA ANALYSIS

Analytical Approach

- Data will be analyzed using a phenomenological framework (Moustakas, 1994; Creswell & Poth, 2018) to describe and interpret the essence of participants' lived experiences and how they construct meaning around persistence, identity, and belonging in computer science.

Coding and Theme Development

- Transcripts will be analyzed through iterative coding to identify significant statements, organize them into meaningful categories, and synthesize overarching themes that capture shared experiences, supported by qualitative software to maintain organization and an audit trail.

Impact on Policy and Practice

- Credibility will be ensured through member checking, peer debriefing, reflexive journaling, textural ("what") and structural ("how") analysis, and triangulation of transcripts, field notes, and memos to produce transparent and authentic findings

THREE MINUTE THESIS LINK

- https://youtube.com/shorts/b7HYRtINmh4?feature=share

QUESTIONS, COMMENTS, AND INQUIRIES?

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EdD Checklist

Click here for the EDLD EdD Checklist

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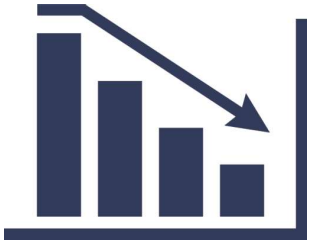
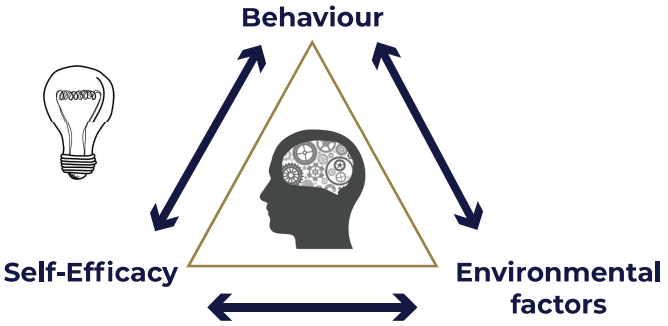
Problem of Practice

Underrepresentation of Black women in computer science programs



Theoretical Framwork

Social Cognitive Theory (STC)



Purpose

To explore factors influencing Black women's participation in computer science programs

Research Questions

What factors influence young Black women to pursue a bachelor's degree in computer science technology?

1. How do early educational experiences influence interest in computer science?
2. What challenges do Black women encounter in pursuing this field?
3. What support systems and institutional resources enhance their persistence and success?
4. How do mentorship, representation, and inclusivity shape their sense of belonging in computer science programs?

Participants

Six Black women undergraduate students at an HBCU

Methodology

Qualitative trasendental Phenomenology

Data Collection

Semi-structured interviews, 45-60 minutes.

Data Analysis

Phenomelogical coding and theme development

Implications

Mentorship
Representation
Inclusive Pedagogical Practices
Strengthening Self-efficacy
Belonging