

# Promoting Diversity-Inclusive Computer Science Pedagogies: A Multidimensional Perspective

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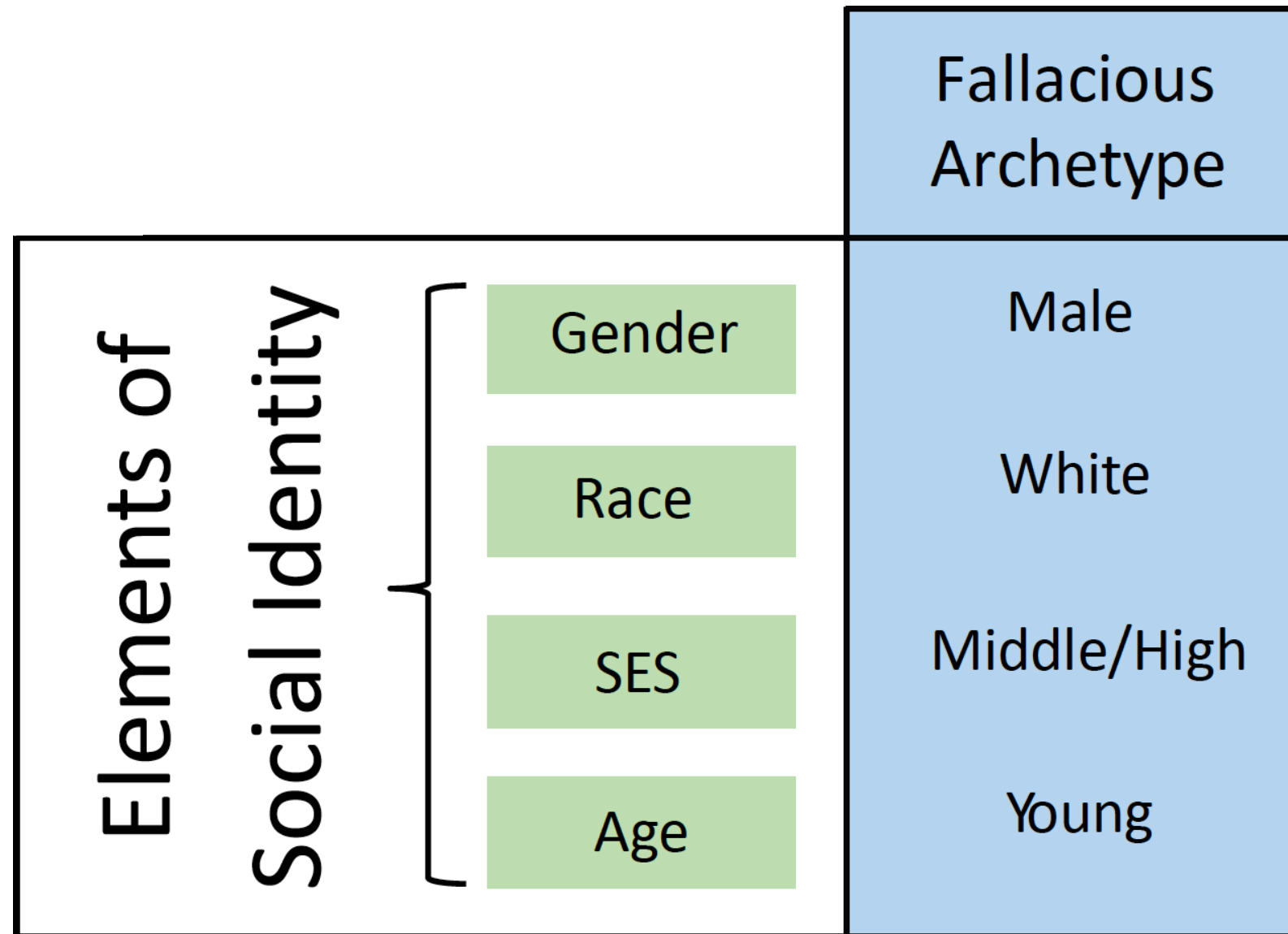
# Motivation

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- The field of Computer Science has long been criticized for its lack of minority representation.
- CS Education research on increasing minority representation has been mostly limited to two factors: (1) Enhancing female participation, and (2) promoting racial diversity.
- While these single-faceted examinations of two elements have proven to be valuable, they are not complete. We believe that the existing approaches are limited in capturing the interrelationship that may exist between social identity elements.
- We address and examine the need to adopt a multidimensional intersectional approach in the context of CS, beyond examining merely two elements.

# Elements of Intersectional Identity

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# Gender

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## Binary Gender Inequality

- Manifestations of gender inequalities in CS have long been well-documented.
- Although women's performance indicators show figures competitive to men's, studies consistently show that their confidence levels are considerably lower than their male counterparts. This has been attributed to factors such as perceptions of a masculine environment, unequal treatment by faculty, and inequalities in course materials.

## Non-Binary Gender Inequality

- Gender is a social construction, not a biological certainty.
- Gender for some, is also a fluid, rather than static quality of their identity.
- As a result of increased gender awareness, the amount of people identifying with non-binary genders has doubled in the last five years, in an American study. Most of these people are of traditional college age.

***The Fallacious Archetype: Male.***

# Race

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## Preparation Inequality

- Despite parallel or heightened interest and confidence levels in the desire and ability to learn CS, REM students encounter 'structural barriers' that may prevent them from accessing CS learning opportunities.
- e.g., classes dedicated to teaching CS at school, use a computer daily at home.

## Accessibility Inequality

- Exposure to CS is well documented as an important factor for involving more minorities in the field.
- Generally, Blacks and Hispanics are less likely to have exposure to CS than their White counterparts.

## Achievement Inequality

***The Fallacious Archetype: White.***

# Socioeconomic Status (SES)

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## Opportunity Inequality

- Prior exposure to CS is a well documented factor in predicting student achievement in college, we emphasize the importance of considering student's SES to promote diversity in the field.
- Low SES is linked to less access to experienced teachers and school resources in k-12.

## Expectation Inequality

***Fallacious Archetype: Upper/Middle.***

# Age

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## Industry Inequality

- Agism is the most accepted form of prejudice and is often overlooked.
- CS industry is well documented as being on the most ageist fields, and have been referred to as a “young-oriented industry.”

## Education Inequality

- There is an influx of older people returning to school to compete in today’s highly competitive workforce. CS is particularly attractive to people returning to school for a second degree/career change due its large and growing employment opportunities. However, older adults may be at increased risk of failing. Many adult learners face heightened challenges not present for their younger counterparts. This includes access to information such as program length, post-graduate employment opportunities, financial aid opportunities, and child-care options.

***The Fallacious Archetype: Young.***

# Intersectionality

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- Students naturally have varied experiences in a field based on a variety of factors. For instance, not all females have the same experiences as each other, and should therefore not be categorized into the same 'box.'
- This multidimensional perspective is widely used and accepted in the social sciences and referred to as intersectionality.
- Examining pedagogies through an intersectional perspective could lead to finding relationships and correlations between different dimensions.
- Failure to consider intersectional identities may lead to false unification of a cohort's variability of experiences.



# Summary & Discussions

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- We have shown the critical need to incorporate a multidimensional approach to researching pedagogical diversity initiatives.
- Through the four elements of social identity: gender, race, socioeconomic class, and age, we have identified the profile of the fallacious archetype of a successful Computer Science student.
- Our aim is, within the field of Computer Science Education, to increase awareness of the needs and benefits associated with applying an intersectional approach.
- Other aspects may be considered:
  - Able-bodieness
  - Cultural variations
  - Linguistic background
  - Geographic location