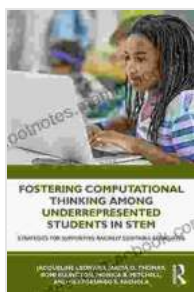


# Fostering Computational Thinking Among Underrepresented Students in STEM Fields

Computational thinking is a problem-solving approach that involves using computational concepts and techniques to solve problems and create solutions. It is an essential skill for success in the 21st century workforce, and it is particularly important for students who want to pursue careers in STEM fields.



## Fostering Computational Thinking Among Underrepresented Students in STEM: Strategies for Supporting Racially Equitable Computing

by Jacqueline Leonard

★★★★★ 5 out of 5

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However, research shows that underrepresented students are less likely to have access to opportunities to learn about and develop computational thinking skills. This is due to a number of factors, including systemic racism, sexism, and classism. As a result, underrepresented students are less likely to pursue STEM careers, and they are less likely to be successful in those careers if they do.

It is essential to foster computational thinking among underrepresented students in order to create a more equitable and inclusive STEM education system. This article will discuss the importance of computational thinking and provide strategies for educators and policymakers to promote computational thinking and create a more inclusive STEM education system.

## **The Importance of Computational Thinking**

Computational thinking is a way of thinking about problems and finding solutions that is based on the principles of computer science. It involves using computational concepts and techniques to solve problems and create solutions. Computational thinking skills include:

- **Decomposition:** Breaking down a problem into smaller, more manageable parts
- **Pattern recognition:** Identifying patterns in data and using them to make predictions
- **Abstraction:** Creating models and representations that capture the essential features of a problem
- **Algorithm design:** Developing step-by-step instructions for solving a problem
- **Evaluation:** Assessing the effectiveness of a solution

Computational thinking skills are essential for success in the 21st century workforce. They are used in a wide range of fields, including:

- **Science:** Using data analysis and modeling to solve scientific problems
- **Technology:** Designing and developing new technologies
- **Engineering:** Solving engineering problems using computational methods
- **Mathematics:** Using computational tools to solve mathematical problems
- **Business:** Using data analysis to make business decisions

In addition to being essential for success in the workforce, computational thinking skills also have a number of other benefits, including:

- **Cognitive benefits:** Computational thinking skills help to develop critical thinking, problem-solving, and creativity skills
- **Educational benefits:** Computational thinking skills help students to learn other subjects more effectively, such as math, science, and engineering
- **Social benefits:** Computational thinking skills help students to collaborate with others and to communicate their ideas more effectively

## **Barriers to Computational Thinking for Underrepresented Students**

Research shows that underrepresented students are less likely to have access to opportunities to learn about and develop computational thinking skills. This is due to a number of factors, including:

- **Systemic racism:** Underrepresented students are more likely to attend schools that are underfunded and have less access to technology and other resources
- **Sexism:** Underrepresented students, particularly girls and women, are often discouraged from pursuing STEM fields and are less likely to have access to opportunities to learn about computational thinking
- **Classism:** Underrepresented students from low-income families are less likely to have access to computers and other technology resources

These barriers can make it difficult for underrepresented students to develop the computational thinking skills they need to succeed in STEM fields. As a result, underrepresented students are less likely to pursue STEM careers, and they are less likely to be successful in those careers if they do.

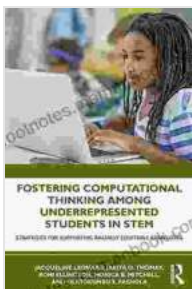
## **Strategies for Fostering Computational Thinking Among Underrepresented Students**

There are a number of strategies that educators and policymakers can use to foster computational thinking among underrepresented students. These strategies include:

- **Provide access to technology and resources:** Make sure that underrepresented students have access to computers, tablets, and other technology resources. This can be done through school programs, after-school programs, and community centers

- **Offer computational thinking courses and activities:** Offer computational thinking courses and activities in schools and after-school programs. These courses and activities should be designed to be engaging and accessible to all students, regardless of their prior experience with computational thinking
- **Train teachers to teach computational thinking:** Train teachers to teach computational thinking effectively. This includes providing teachers with professional development opportunities and resources
- **Support underrepresented students:** Provide underrepresented students with academic and social support. This can include things like tutoring, mentoring, and counseling
- **Create a more inclusive STEM culture:** Create a more inclusive STEM culture in schools and after-school programs. This means valuing diversity and ensuring that all students feel welcome and respected

By implementing these strategies



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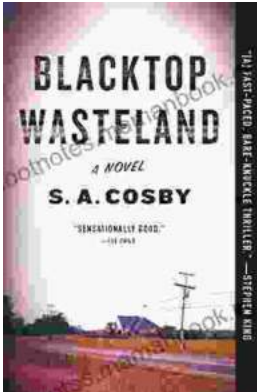
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