



**Rigor
In
Computer Science
Education**

*Brought to you by the Kansas
Association for Education Service
Agencies (KAESA) in collaboration with
the Kansas State Department of
Education (KSDE)*

Welcome!



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Access Today's Slides
at this address:
<https://www.ksde.org/Agency/Division-of-Learning-Services/Career-Standards-and-Assessment-Services/Content-Area-A-E/Computer-Science>

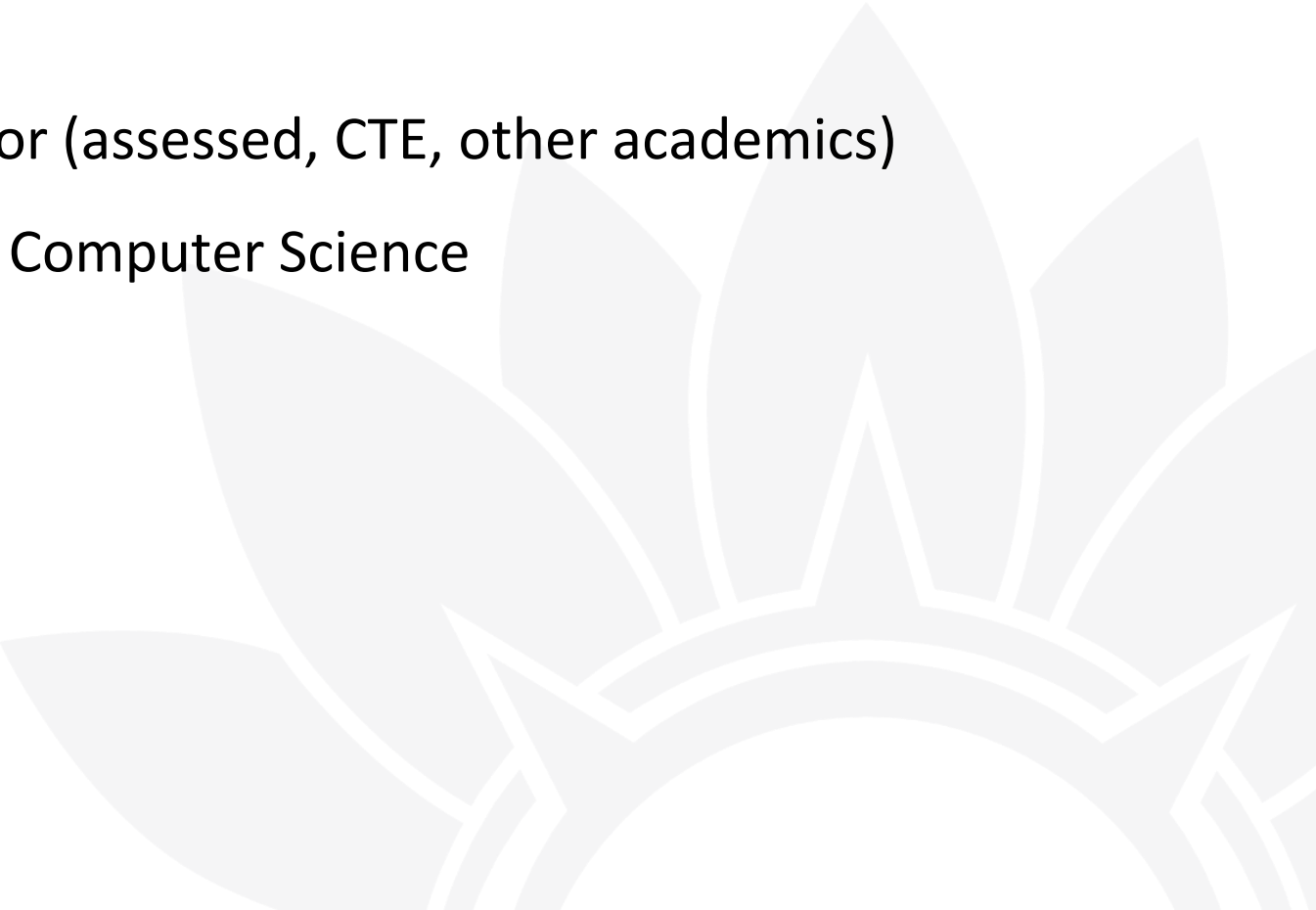


Norms for Today's Session

- Collaboration is encouraged:
 - Have fun and engage with us.
 - Keep camera on as appropriate.
 - Use the chat to ask questions, provide ideas, and connect with others.
 - Rename yourself to include your name and district name.

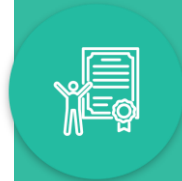


Today's Objectives

- Understand Rigor (assessed, CTE, other academics)
 - Discuss Rigor in Computer Science
 - Wrap up
- 

Objective 1:

What is “Rigor”?



KANSAS VISION FOR EDUCATION

Kansas leads the world in the success of each student.



Successful High School Graduate

A successful Kansas high school graduate has the

- Academic preparation,
- Cognitive preparation,
- Technical skills,
- Employability skills and
- Civic engagement

to be successful in postsecondary education, in the attainment of an industry recognized certification, or in the workforce, without the need for remediation.

Results

Social-Emotional
Factors Measured
Locally

Kindergarten
Readiness

Individual Plans
of Study Based on
Career Interest

High School
Graduation

Postsecondary
Success

Evidence-Based Practices

Relationships

Staff

Students

Families

Community

Relevance

Curriculum

Instruction

Student
Engagement

Technology

Responsive Culture

Leadership

Early
Childhood

District
Climate

Nutrition and
Wellness

Rigor

Career and
Technical
Education

Professional
Learning

Resources

Data

Rigor Definitions

- Dictionary: “the quality of being extremely thorough, exhaustive, or accurate.”
- Edutopia: “Rigor is not defined by the text -- it comes from what students do. It is not standard across a curriculum -- it is individual to each student's needs. It is not quantified by how much gets crammed into a school day -- it is measured in depth of understanding. Rigor is a result, not a cause.”

Rigor Definitions

- “Academic rigor and relevance are based on established expectations that ensure that all students develop the capacity to master content that is complex and challenging.”
- “In every subject, at every grade level, instruction and learning must include commitment to a knowledge core and application of that knowledge core to solve complex and real-world problems.”
- From “The Non-Negotiables of Academic Rigor,” retrieved from <https://files.eric.ed.gov/fulltext/EJ860952.pdf>

Rigor Definitions

- “What is rigor? My conception of rigor is not a greater amount of, more difficult or esoteric knowledge. I think of rigor as the kind of learning that prepares students to apply (transfer) their learning to increasingly novel, complex and authentic situations.”
- Jay McTighe on Twitter

Rigor Definitions – What It's NOT

- Making the learning activities harder
- Doing more worksheets
- Assigning more pages to read
- Grading more critically on summative assessments
- Talking louder and/or slower
- Using multiple color markers (though you should do this...except red...never use red)

Rigor Results

- Assessed subjects: success rate on state assessments
- CTE subjects: assigned certification
- Some programs: employment rate for graduates
- Model standard subjects: ???

Objective 2:

Rigor in Computer Science Education



Rigor in Computer Science

- CS is a model standard in Kansas
- No Kansas standardized assessment to gauge student success in the topics
- Some industry certifications exist (CompTIA, Microsoft, Cisco, etc.) but are often expensive, and none presently cover the entire subject area
- AP Exams – CSA, CSP

Rigor in Computer Science

- Rigor should exist at all levels
- Wiggins & McTighe's Understanding by Design process helps by starting lesson design by envisioning the “end result” – classroom activities and assessment
- PBL: “Project-Based Learning frames an approach to learning that actively engages students in deeper levels of comprehension and interpretation ... is a potentially powerful means to produce relevant and rigorous learning.”
(from Project Based Learning: Rigor and Relevance in High Schools by Harada, Kirio, and Yamamoto)

How To Add Rigor To Anything

TeachThought.com

1. Necessitate a transfer of understanding
2. Require students to synthesize multiple sources
3. Design tasks with multiple steps that build cognitively
4. Use divergent perspectives
5. Use divergent media forms
6. Break away from content-area convention
7. Require design thinking (often in PBL)
8. Require long-term observation or analysis
9. Study nuance
10. Require students to take and defend positions



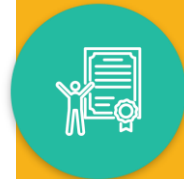
“In a bit of a twist, however, retention rates are also influenced by successful student performance. Some students frequently leave the computer science major due to unpleasant experiences and lack of satisfaction, despite earning good grades [1]. These competing retention factors create a paradox to provide a fun learning experience that makes students want to stay in the CS major while simultaneously emphasizing the rigor and discipline needed to advance in the CS major.”

- From “Addressing the Paradox of Fun and Rigor in Learning Programming” by Dorodchi and Dehbozorgi, accessed from <https://dl.acm.org/doi/10.1145/3059009.3073004>

Make
Sure
To
Have
Fun

Objective 3:

Wrap Up



Questions/Further Discussion

- Have great examples? Send them to the presenter for compilation
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- 785-296-1893

So What, Now What?

- **Consciously plan learning activities to involve rigor**
- **Start with the end in mind**
- **Consider implementing Project-Based Learning**



For Additional Information:

If you or your staff would like to learn more about this topic or others, please [contact your local education service center](#) for more in-depth training opportunities.

To receive a certificate of completion for this session, please complete the form below. A certificate will be emailed to the address listed within 24 hours. If you do not receive your certificate, please email Emma Herrman (emma.herrman@greenbush.org).

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Presenter Contact
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