



**Project Based Learning
In
Computer Science
Education**

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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>



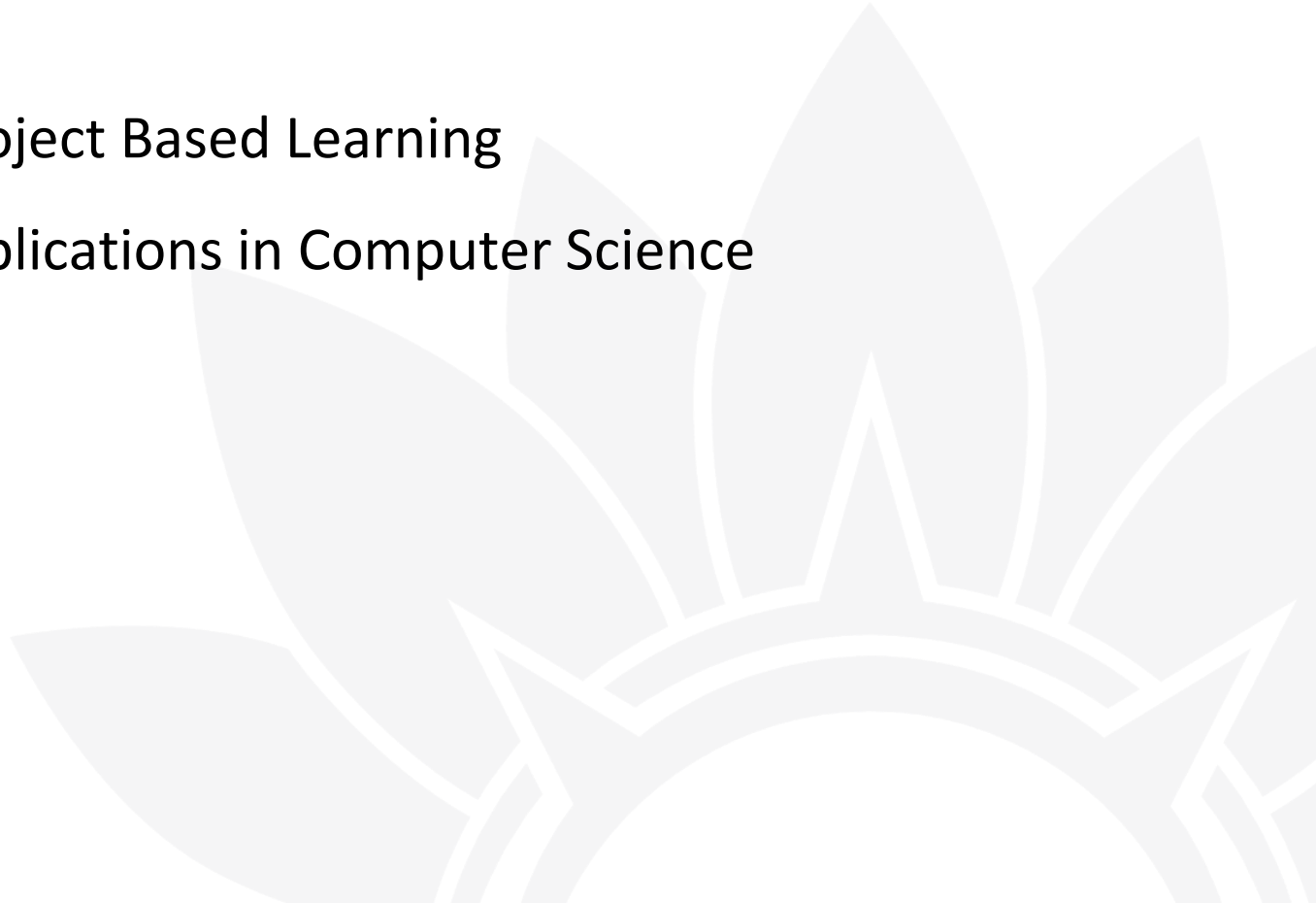
Norms for Today's Session

- 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.



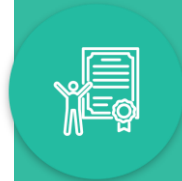
Today's Objectives

- Understand Project Based Learning
- Discuss PBL applications in Computer Science
- Wrap up



Objective 1:

What is “Project Based Learning”?



Project Based Learning: what is it?

- PBLWorks.org: “Project Based Learning (PBL) is a teaching method in which students learn by actively engaging in real-world and ***personally meaningful*** projects.” (<https://www.pblworks.org/what-is-pbl>)
- Edutopia: “PBL is the ongoing act of learning about different subjects simultaneously. This is achieved by guiding students to identify, through research, a real-world problem (local to global) developing its solution using evidence to support the claim, and presenting the solution through a multimedia approach based in a set of 21st-century tools.” (<https://www.edutopia.org/blog/what-heck-project-based-learning-heather-wolpert-gawron>)

More PBL quotes

- “Teaching with PBL is the difference between the atmosphere at Disneyland and the atmosphere at a Six Flags resort. No offense to Six Flags, I love a great roller coaster, but their décor needs some serious work. At Disneyland, you are submerged in the story of each ride from the time you enter the line. The walls, the ceiling, the ground on which you tread as you advance to the actual ride, all support the end result.”
- “PBL doesn't ask you to replace your content. It asks that you create a vehicle in which to communicate your content.”

What does PBL look like?

- Projects clearly tied to learning objectives
- Project teams clearly identified for both team members and visitors
- The Driving Question, tied to standards: How, not What
- Sending students on “quests” that are personally meaningful
- Meaningful review process for project progress and completion

PBL – What It's NOT

- Death by Lecture (though some information distribution is always required)
- Doing more worksheets
- “Waste of time” projects
- Projects with easy solutions
- “Organized chaos”

More info

- <https://www.edutopia.org/project-based-learning>
- <https://www.edutopia.org/video/how-pbl-taps-science-learning-and-development>
- https://free.openeclass.org/modules/document/file.php/ENG155/Projects%20online/PBL-Primer-www_techlearning_com.pdf
- <https://www.schoology.com/blog/project-based-learning-pbl-benefits-examples-and-resources>
- <https://www.cultofpedagogy.com/project-based-learning-lesson/>

Objective 2:

PBL in Computer Science Education



PBL in Computer Science

- Programming and web development are obvious fits
- Most students need shorter assessment cycles and frequent updates with peers/teacher
- Focus on real-world application and opportunities for collaboration (in and outside of class)
- Understand that existing administrators and evaluation systems may not “get it”
- Language/environment is less important than choice of problems...remember to ask how, not what
- A problem solved in Scratch might be just as important as one in Java
- Don't shortchange elementary students in PBL options

PBL in Computer Science - challenges

“After more than ten years of routinely use of PjPL in Computer Science the authors try to identify critical success factors for such projects. Four main reasons could be identified:

1. Students are no experienced project managers and frequently run into problems in early phases of the projects.
2. The motivation of students to actually finish the project varies between low and extremely high values.
3. Interactions of teachers with students, dependent on factors like specific experience of a given teacher with a specific project or students who are shy to ask seemingly stupid questions very early.
4. Origin of the project or project idea.”

From <https://www.sciencedirect.com/science/article/pii/S1877042811028655>

PBL in Computer Science - resources

<https://edu.stemjobs.com/project-based-learning-in-computer-science-classroom/>

(5 ideas for introducing PBL into your classroom)

https://www2.washjeff.edu/users/ahollandminkley/documents/PBL_CS_V4.pdf

(paper with some great examples and considerations)

<https://texascomputerscience.weebly.com/project-based-learning.html>

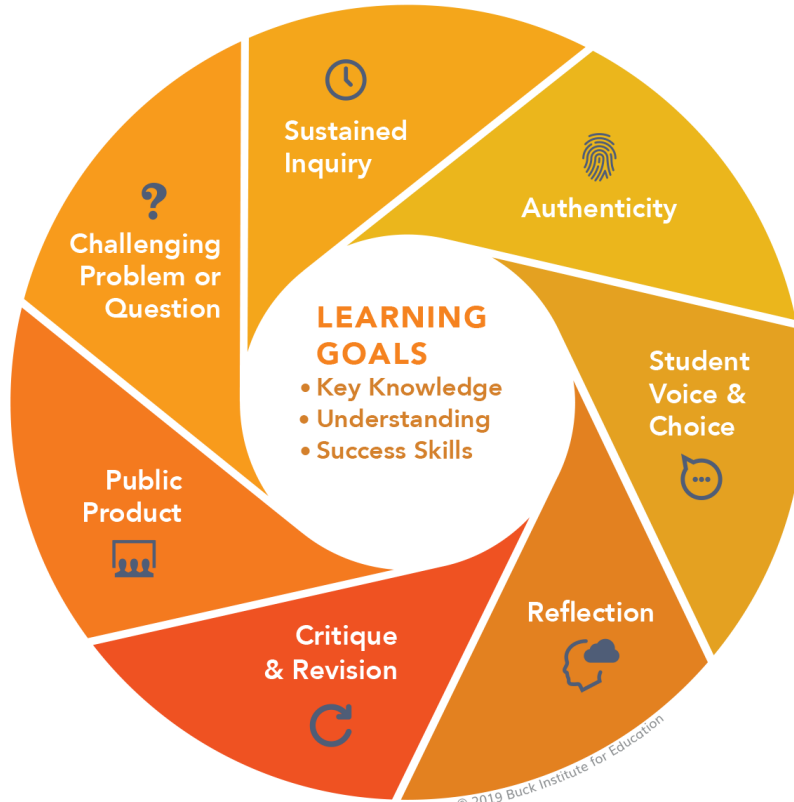
(a list of resources)

<https://www.pblworks.org/what-is-pbl/gold-standard-teaching-practices>

(7 project-based teaching practices)

Gold Standard PBL

Seven Essential Project Design Elements



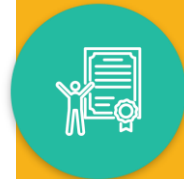
“Project Oxygen shocked everyone by concluding that, among the eight most important qualities of Google’s top employees, **STEM expertise comes in dead last**. The seven top characteristics of success at Google are all soft skills: being a good coach; communicating and listening well; possessing insights into others (including others different values and points of view); having empathy toward and being supportive of one’s colleagues; being a good critical thinker and problem solver; and being able to make connections across complex ideas.”

- From “10 Things That Happen When Students Engage in Project-Based Learning” accessed from <https://spencerauthor.com/10-things-happen-students-engage-project-based-learning/>

Make
Sure
To
Have
Fun

Objective 3:

Wrap Up



Questions/Further Discussion

- Have great examples? Send them to the presenter for compilation
- Stephen King: Computer Science Education Program Consultant, KSDE
- sking@ksde.org
- 785-296-1893

So What, Now What?

- Purposely plan learning activities to engage students in projects
- Start with the end in mind



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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