Great Public Schools for Every Student

Technology Integration: Facilitator

Educator uses technology to facilitate learning.

Key Method

The educator uses digital tools to facilitate a learning culture that challenges students to take ownership of learning and use higher-level thinking, including computational thinking.

Method Components

Higher-Level Thinking Skills

Students are more engaged and have deeper learning when they are given the opportunity to engage in higher-level thinking. Bloom's Taxonomy is a good model to refer to, to help you create and deliver lessons that incorporate these skills. The levels of the New Bloom's Taxonomy are (listed from highest to lowest):

- Create
- Evaluate
- Analyze
- Apply
- Understand
- Remember

Computational thinking is a problem-solving process that requires higher levels of thinking. According to ISTE, the components of computational thinking are:

- Formulating problems in a way that enables us to use a computer and other tools to help solve them
- Logically organizing and analyzing data
- Representing data through abstractions such as models and simulations
- Automating solutions through algorithmic thinking (a series of ordered steps)
- Identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources
- Generalizing and transferring this problem-solving process to a wide variety of problems

Student Ownership of Learning

Students are more engaged in their learning when they have buy-in and ownership. Some of the ways you can facilitate this are:

- Use personalized learning strategies
- Create and deliver inquiry-based lessons
- Make time for project-based learning
- Have students set their own goals
- Create and deliver lessons that incorporate elements of design thinking
- Include students in the planning and assessment of learning activities and outcomes
- Allow students choice and options for tools, process, and/or final products
- Use digital platforms/tools ubiquitously

Supporting Research

Basawapatna, A. R., Repenning, A., Koh, K. H., Nickerson, H. The Zones of Proximal Flow: Guiding Students Through a Space of Computational Thinking Skills and Challenges. In Proceedings of the Ninth Annual International ACM Conference on International Computing Education Research, 67–74, (ICER 2013, August 12–14, San Diego, California, USA). ACM Press: New York. https://wiki.computationalthinkingfoundation.org/wiki/images/4/4c/ICER-2013_zones_of_proximal_flow.pdf

Double, K.S., McGrane, J.A. & Hopfenbeck, T.N. The Impact of Peer Assessment on Academic Performance: A Meta-analysis of Control Group Studies. Educ Psychol Rev 32, 481–509 (2020).

https://doi.org/10.1007/s10648-019-09510-3

Giraldo-García, Regina & Roy, Mamta & Alotebi, Hatem. (2015). The Interplay of Technology and Critical Thinking Skills in the 21st Century Blended Classroom. International Journal of Advanced Research in Education Technology (IJARET). 2. 32–35.

https://www.researchgate.net/publication/321934531_The_Interplay_of_Technology_and_Critical_Thinking_Skills_in_the_

Hasso Plattner Institute of Design at Stanford University, "A Virtual Crash Course in Design Thinking." Stanford d.school, 2017, dschool.stanford.edu/resources/a-virtual-crash-course-in-design-thinking.

Ndoye, A. Peer/Self Assessment and Student Learning. International Journal of Teaching and Learning in Higher Education. 2017 Volume 29, Number 2, 255-269

https://files.eric.ed.gov/fulltext/EJ1146193.pdf

Partnership, Great Schools. "Backward Design Definition." The Glossary of Education Reform, 13 Dec. 2013, www.edglossary.org/backward-design/.

Repenning, A., Webb, D. C., Brand, C., Gluck, F., Grover, R., Miller, S., et al., "Beyond Minecraft: Facilitating Computational Thinking through Modeling and Programming in 3D," IEEE Computer Graphics and Applications, vol. 34, pp. 68–71, May–June 2014.
https://www.academia.edu/20387763/Beyond_Minecraft_Facilitating_Computational_Thinking_through_Modeling_and_Pr

U.S. Department of Education Office of Education Technology Learning. "Technology Effectiveness" , June 30, 2014. Retrieved from https://tech.ed.gov/wp-content/uploads/2014/11/Learning-Technology-Effectiveness-Brief.pdf

Resources

Standards

ISTE Standards for Educators
https://www.iste.org/standards/for-educators

ISTE Standards for Students

https://www.iste.org/standards/for-students

Articles, How-To, and Tools

Center for Teaching Innovation - Peer Assessment
https://teaching.cornell.edu/teaching-resources/assessment-evaluation/peer-assessment

Lui, Angela, and Heidi Andrade. "Student Peer Assessment." SpringerLink, Springer, Dordrecht, 19 Mar. 2014, link.springer.com/referenceworkentry/10.1007/978-94-007-6165-0_461-3.

Barrett, Lindsay. "You Can Do It! Helpful Resources for Setting Goals with Students." WeAreTeachers, 18 Jan. 2018, www.weareteachers.com/goal-setting-for-students/.

Using Technology to Develop Students' Critical Thinking Skills
https://dl.sps.northwestern.edu/blog/2015/09/using-technology-to-develop-students-critical-thinking-skills/

What is Successful Technology Integration?
https://www.edutopia.org/technology-integration-guide-description

Technology Integration and Blended Learning
https://www.digitaljlearning.org/technology-integration-and-blended-learning

Computational Thinking

https://sgd.cs.colorado.edu/wiki/Scalable_Game_Design_wiki

https://www.agentcubesonline.com/

https://studio.code.org/projects/public

https://apcentral.collegeboard.org/courses/ap-computer-science-principles/course

Videos(Media)

Reimagining Classrooms: Teachers as Learners and Students as Leaders | Kayla Delzer
https://www.youtube.com/watchtime_continue=1&v=w6vVXmwYvgs

Parsadanov, Tina. "Technology Integration in Education." YouTube, 7 May 2017, youtu.be/lo9agDXhd3I.

Teaching Resources

Kathy Schrock's Guide to Everything
http://www.schrockguide.net/

Google for Education Teaching Center
https://edu.google.com/teacher-center/

FreeTech4Teachers
https://www.freetech4teachers.com/

Control Alt Achieve
http://www.controlaltachieve.com

Submission Guidelines & Evaluation Criteria

To earn the micro-credential, you must receive a passing score in Parts 1 and 3 and receive a proficient for all

components in Part 2.

Part 1. Overview Questions

400 - 500 words

Please answer the following contextual questions to help our assessor understand your current situation. Please do not include any information that will make you identifiable to your reviewers.

1. Describe what technology is available to you and assess your comfort level integrating technology in your classroom.

2. Why did you choose to focus on this micro-credential?

3. Describe your demographics and your educational setting.

4. Describe your current level of student ownership and engagement. What specific strategies/techniques/tools/platforms have you used already in your classroom?

5. What are your goals related to facilitating student learning (computational thinking, innovation, engagement, creativity, etc.)?

- **Passing:** All questions were answered completely using specific details to support responses. Answers reflect an understanding of what engagement is, how to build engagement, and why it is important to develop student ownership of learning.

Part 2. Work Examples / Artifacts

To earn this micro-credential, please submit the following **three artifacts** combined **into one document** as evidence of your learning. Please do not include any information that will make you or your students identifiable to your reviewers.

In order to combine all artifacts into one document to submit, you could: scan the student work, copy and paste the student work into one document, put links to student work on a document and add the feedback, use your phone to take pictures of the annotated work and then insert the photos into the document.

Artifact 1: Two Lesson Plans

Write 2 lesson plans. Each lesson plan should include:

- ISTE Student Standard(s) addressed
- Learning outcomes
- Description of the lesson
- How Bloom's Higher-Order Thinking (Create, Evaluate, Analyze) and/or Computational Thinking skills are included
- How you will encourage student ownership of learning
- Description of how technology will be integrated
- How the learning will be evaluated

Artifact 2: Four Annotated Student Work Samples

Four student work samples, two from each lesson, annotated with the following:

- Feedback given by peers and/or the teacher based on learning outcomes
- Student self-evaluation
- Next steps for student

Artifact 3: Analysis of Technology Integration

(300–600 words)

- What technology did you use for delivery of the lesson? Why did you choose this/these tool(s) as your delivery method? How did it go?
- What technology did students use to complete the assignment? Why did you choose this/these tool(s) for your students to use? How did it go?
- How did the technology integration support/facilitate student ownership of learning?
- How did the technology integration provide students with opportunities for computational thinking and/or Bloom's higher-level thinking?
- How did your students react to the use of technology? Were there challenges?

	Proficient	Basic	Developing
Artifact 1: Lesson Plans	2 lesson plans were submitted Each lesson plan included all of the following: ISTE Student Standard(s) addressed Learning outcomes Description of the lesson How Bloom's Higher-Order Thinking (Create, Evaluate, Analyze) and/or Computational Thinking skills are included How students were encouraged to take ownership of learning Description of how technology will be integrated and how the learning will be evaluated	2 lesson plans were submitted Each lesson plan included at least 5 of the following: ISTE Student Standard(s) addressed Learning outcomes Description of the lesson How Bloom's Higher-Order Thinking (Create, Evaluate, Analyze) and/or Computational Thinking skills are included How students were encouraged to take ownership of learning Description of how technology will be integrated and how the learning will be evaluated	Only one lesson plan was submitted and/or lesson plan included less than 5 of the following: ISTE Student Standard(s) addressed Learning outcomes Description of the lesson How Bloom's Higher Order Thinking (Create, Evaluate, Analyze) and/or Computational Thinking skills are included How students were encouraged to take ownership of learning Description of how technology will be integrated and how the learning will be evaluated
Artifact 2: Annotated Student Work Samples	4 student work samples were submitted All student work samples were annotated with feedback, student self-evaluation, and next steps	2–3 student work samples were submitted Student work samples were annotated with some feedback, student self-evaluation, and next steps	1 or 2 student work samples were submitted Student work samples may or may not be annotated with some feedback, student self-evaluation, and/or next steps

	All the evidence is easy to read and understand (i.e. organized, no blurry pictures)	All the evidence is on one document and is easy to read and understand (i.e. organized, no blurry pictures)	All the evidence is on one document but may not be easy to read and/or understand (i.e. not organized, blurry pictures)
Artifact 3: Analysis of technology Integration	All questions were answered completely. Specific examples from the lessons were cited Responses give a clear picture of how technology was integrated into the lesson, what the challenges were, and how technology affected student engagement	Questions may not have been answered completely. Specific examples from the lessons may not be cited Responses give only a small part of the whole picture of how technology was integrated into the lesson (i.e. may not include what the challenges were and how technology affected student engagement)	Not all questions were answered Questions may not have been answered completely Response did not give a picture of how technology was integrated into this lesson.

Reflection

500-word limit

Please answer the following reflective questions. Please do not include any information that will make you identifiable to your reviewers.

1. What specific strategies/techniques/tools/platforms did you choose to use to facilitate learning and the use of technology? What worked and what didn't?

2. How will you continue to facilitate student ownership and engagement, and did it change your classroom?

3. How will you continue to facilitate students engaging in computational thinking or Bloom's higher-thinking skills?

4. Based on the learning in this micro-credential, how will technology integration change in your classroom?

- **Passing:** Reflections answer all questions and cite specific examples from the planning and teaching of these lessons and it is obvious that the work has had a positive impact on both their practice and students, and includes specific actionable next steps for future classroom implementation.