Assessing Computational Thinking

Educator uses assessment feedback to support student growth in computational thinking.

**Key Method**

The educator designs an assessment of a computational thinking activity or project, which is clearly linked to learning goals and supports student growth.

**Method Components**

**Assessing situated learning**

The core content of computational thinking is not facts, but instead consists of ways that students think about and approach questions. If we want a clear picture of our students’ learning in computational thinking, we need to keep in mind that their learning is situated:

- Computational thinking happens in context; if students do not understand the context, they will probably not be able to show what they can do.
- Computational thinking describes ways of working; evidence of strong computational thinking may be more visible in the process than in the final product.
- Computational thinking is often social and collaborative; students may demonstrate capacities when working in groups which are not visible when working alone.
- Computational thinking often depends on using computational tools; if students have trouble using the tools, they will be unable to demonstrate what they can do.

Therefore, we cannot give an absolute statement about a student’s learning in computational thinking; we can only give an assessment of a student’s situated learning, which describes what a student can do in certain contexts, in collaboration with other people, and using certain tools. Common methods of assessing computational thinking include project portfolios, artifact-based interviews, and design scenarios.

**Supporting future learning**

When we understand what students are able to do in different situations, we can identify precisely how best to support their continued learning. For example, while two students might each have struggled with a computational thinking task, the reasons for their struggles could be very different. It might be that one student had a clear idea of what they were trying to do but struggled with the tools, while the other student had always played the role of programmer in prior groups and got stuck trying to understand the task on their own.

It is not necessary to put classroom learning on pause in order to conduct assessments of student learning; students can learn through the process of assessment. This is particularly true when students participate in assessing their own learning, so that the assessment becomes an opportunity to become aware of their thinking processes. When assessments involve completing tasks that are already important to students, with access to all the resources that can help them do their best work, we are likely to get the most complete picture of what they can do.

**Suggested Implementation**

1. Consider pursuing this micro-credential alongside colleagues, such as other teachers in the same grade or the same department. Planning is often much more successful when several people work together.
2. Start by deciding which assessment you will focus on for this micro-credential. The micro-credentials in the “Key Elements of Computational Thinking” stack address the core ideas of computational thinking, and each contains a suggested implementation of lessons using computational thinking which you could use in your curriculum unit; any of them would be suitable for use with this micro-credential. Once you decide which lesson you will use, complete the questions in Part 1.

3. Before you start teaching the unit, be sure to read the submission requirements so that you can make sure you collect the evidence you need. Make sure you keep copies of student work from enough students that you can still compile the micro-credential even if one student needs to miss class unexpectedly.

Supporting Research

Assessing situated learning


  [umdberg.pbworks.com/w/file/fetch/94889045/Collins%26Ferguson.pdf](umdberg.pbworks.com/w/file/fetch/94889045/Collins%26Ferguson.pdf)


Supporting future learning

  [http://eprints.glos.ac.uk/3607/1/LATHE%201.%20Assessment%20for%20Learning%20Brown.pdf](http://eprints.glos.ac.uk/3607/1/LATHE%201.%20Assessment%20for%20Learning%20Brown.pdf)


Resources

- Access resources for this micro-credential on Digital Promise’s website dedicated to resources for teaching computational thinking:
  [https://sites.google.com/digitalpromise.org/computationalthinking](https://sites.google.com/digitalpromise.org/computationalthinking)

Submission Guidelines & Evaluation Criteria

*To earn the micro-credential, you must earn a ‘passing’ evaluation for Parts 1 and 3, and a ‘Yes’ for each component of Part 2. In the assessment of this micro-credential, an educator will submit three students’ examples from an assessment of computational thinking, as well as evidence of how the assessment was used to support future learning. The educator will analyze how the assessment shows students’ situated learning, and how this information was used to support future learning.*

Part 1. Overview Questions
Please answer the following questions:

- What was the learning goal you were assessing in this lesson? Explain why it is an example of computational thinking.
- Describe the assessment you conducted of this learning goal. Describe your rationale for using this assessment.
- Briefly describe each of the three students whose work you are submitting.
  - **Passing:** Responses sufficiently describe the learning goal, the assessment, and the students whose work is being submitted. The learning goal is justified as an example of computational thinking, and the rationale for the assessment explains why it is an effective means of assessing the learning goal.

**Part 2. Work Examples / Artifacts**

To earn this micro-credential, please submit the following:

1) **Assessment of student work**

Submit assessments of the [three students’ work from the same computational thinking activity](#). These may include portfolios, project journals, artifact-based interviews, design scenarios, or another kind of assessment.

2) **Demonstration of growth**

Additionally, submit artifacts showing evidence of how you supported each of the three student’s future learning through the assessment. These might include revised drafts of a project, student reflections, examples of student work focused on growth areas, etc.

3) **Analysis**

(500-word limit total)

As you answer the following questions, refer to specific evidence from the artifact(s) submitted.

- **Assessing situated learning**
  - For each of the three students, explain what the assessment reveals about their learning in computational thinking. What are each student’s strengths and areas for growth?
  - Contrast the situated learning of each of the three students. How did this assessment reveal differences in how each student interacts with context, peers, and tools in using computational thinking?

- **Supporting future learning**
  - For each of the three students, use evidence from the artifacts to explain how you supported his/her future learning.

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<th>“Yes”</th>
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<tr>
<td>Assessment of student</td>
<td>Submission includes assessments of the work of three different students. The assessments focus on the same computational thinking activity.</td>
<td>Submission includes assessments, but may not focus on the same activity or include the work of three different students.</td>
<td>Assessments may not be included in the submission or may be impossible to interpret.</td>
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<td>work</td>
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<td>Demonstration of</td>
<td>Submission includes artifacts that demonstrate evidence of the educator supporting each of the</td>
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### Part 3. Educator Reflection

(300-word limit)

Reflecting on this process, what would help you better understand the situated learning of one or more students and help you better support their future learning? (See Method Components for information on understanding “situated learning.”)

- **Passing:** The educator proposes specific changes to the assessment or how it will be used, and refers to specific student examples in explaining the rationale for how these changes might offer a clearer understanding of students’ situated learning and how the assessment could support future learning.

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