Collaborative Computing Observation Instrument

(The C-COI)
What can be analyzed using the C-COI?

<table>
<thead>
<tr>
<th>Questions we wanted to ask:</th>
<th>Constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does the student request help?</td>
<td>Adaptive vs. Negative Help Seeking</td>
</tr>
<tr>
<td>How does the student individually problem solve?</td>
<td>Persistence</td>
</tr>
<tr>
<td>What kind support(s) did the student receive?</td>
<td>Collaborative Problem-Solving, Modeling, Explicit Instruction</td>
</tr>
<tr>
<td>Did the computing experience result in skill/concept acquisition?</td>
<td>Understanding CS concepts/vocab.</td>
</tr>
</tbody>
</table>
Measurement:
The Collaborative Computing Observation Instrument (C-COI)

Uses record video screen capture of computing activities and audio of conversations

*Must observe a student AT LEAST three times to gain a full picture of students’ computing behaviors.

Israel, Shehab, Wherfel, Ramos, Metzger, & Reese (in press)
C-COI (cont.)

• Analyzes individual or collaborative CS behaviors

• Event=Sequence behaviors beginning when a student starts to work on a computing task (e.g. making a sprite dance) and ending when the sub-task is solved or abandoned.

• Each event can be composed of three types of paths
  – Problem solving
  – Socialization
  – Expressing curiosity, excitement, & accomplishment

• These codes are then visually displayed in directed graphs

Israel, et al. (in press)
Event Begins

Node 0

Node 1

Node 2

Node 5

Node 6

Node 7

Node 9

Node 15

How did the event begin?

Who initiated the interaction?

How did the interaction begin?

What was the problem?

How did the interaction occur?

What did the interaction look like?

Was the problem solved?

Does the event end or continue?
Interrater Reliability- Level 1

There is a process in coding to establish reliability that involves multiple coders
Level 1 (Node reliability)

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Coder 1</th>
<th>Coder 2</th>
<th>Coder 3</th>
<th>Total Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0:11</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>10:28</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>3</td>
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<td>3</td>
<td>28:03</td>
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<td>Yes</td>
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Agreement \( \frac{9}{9} \times 100 = 100\% \)
## Interrater Reliability - Level 2

### Level 2
(Subnode reliability)

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<th>Event</th>
<th>Coder 1</th>
<th>Coder 2</th>
<th>Coder 3</th>
<th>C1&amp; C2</th>
<th>C1&amp; C3</th>
<th>C2&amp; C3</th>
<th>Total Agreement</th>
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<tbody>
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<td>13</td>
<td>(40/48)*100 = 83%</td>
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</table>

Note: C1 = Coder 1, C2 = Coder 2, C3 = Coder 3; X = Subnode was not recorded
A conversation can be seen between Kevin, a 4th grader, his peers, and his teacher:

**Kevin:** Mr. Connor, check this out. Woah, its darkly shaded. It's a black hole.

[Mr. Connor did not respond. He was working with other students. Peer joins in.]

**Peer 1:** Try to make it bigger.

**Kevin:** Oh look at that. Doesn't that look like space in the middle?

**Peer 1:** Oh yeah it does. That is so cool!

**Kevin:** Doesn’t that look like you’re going into space?

**Peer 1:** Yeah. It’s so cool, man.

**Peer 2:** It’s like the end in Minecraft.

**Kevin:** Its looks like Star Trek. [Sings: de-de-da-deeeeee]
C-COI Directed Graphs
[A Node Graph, Separate]

- This graph helps the researcher identify the number of events that occurred. In this case there are 15 events. Four events were solved individually (0B to 15D). There is one event that involved multiple problem solving and socialization paths but no curiosity, excitement, accomplishment paths.
Kevin: Mr. Connor. Mark made Facebook. He made Facebook.

Mr. Connor: That’s why he is the richest man in America.

Kevin: Wait, he’s rich?

Peer 1: Yes.

Peer 2: Everyone who buys it, it like costs money to make it. There is probably over a million people that have it.

Kevin: Yeah, even in China. Da zing!
Collaborative Problem Solving

This is an instance of students using the Collaborative Framework

Kevin: Can you help?
Peer: What do you need help with?
Kevin: How do I make the girl say “...”
Peer: What have you tried
Kevin: I went into sounds block but, can’t see it
Peer: What about going into looks?
For More Information

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