

Collaborative Computing Observation Instrument

(The C-COI)

What can be analyzed using the C-COI?

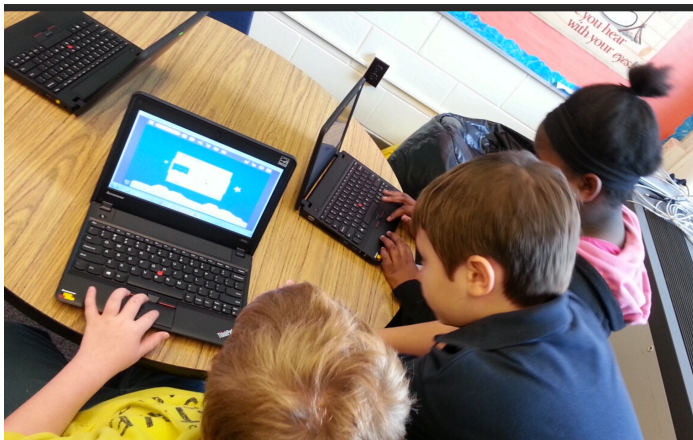
Questions we wanted to ask:	Constructs
How does the student request help?	Adaptive vs. Negative Help Seeking
How does the student individually problem solve?	Persistence
What kind support(s) did the student receive?	Collaborative Problem-Solving, Modeling, Explicit Instruction
Did the computing experience result in skill/concept acquisition?	Understanding CS concepts/vocab.

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.**



How did the peer begin the interaction?

Timestamp: minutes : seconds
9 : 26

PROCEED

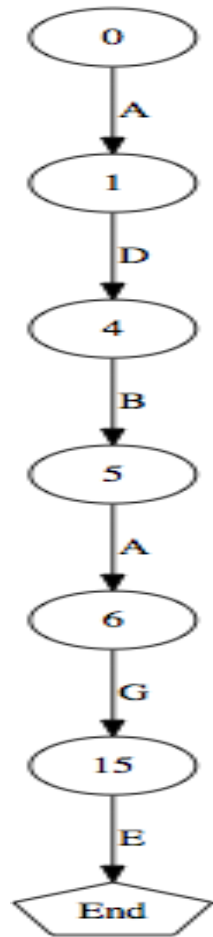
- ☐ (A) Peer offers help in response to student's self-talk on a difficulty or problem or topic (student did not specifically ask for help while self-talking)
- ☒ (B) Peer offers support to student who was working independently on a problem/topic without self-talk
- ☐ (C) Peer expresses curiosity, excitement or accomplishment (heard on student's computer)
- ☐ (D) Peer socializes (heard on student's computer)
- ☐ (E) Peer asks student for help
- ☐ (F) Peer said something that is unclear or inaudible
- ☐ (G) Peer verbally addresses the student without expressing the need/offer for help, curiosity, excitement, accomplishment or socialization (e.g. "Hey you..." or "Can you stop that!")
- ☐ Other (use notes)

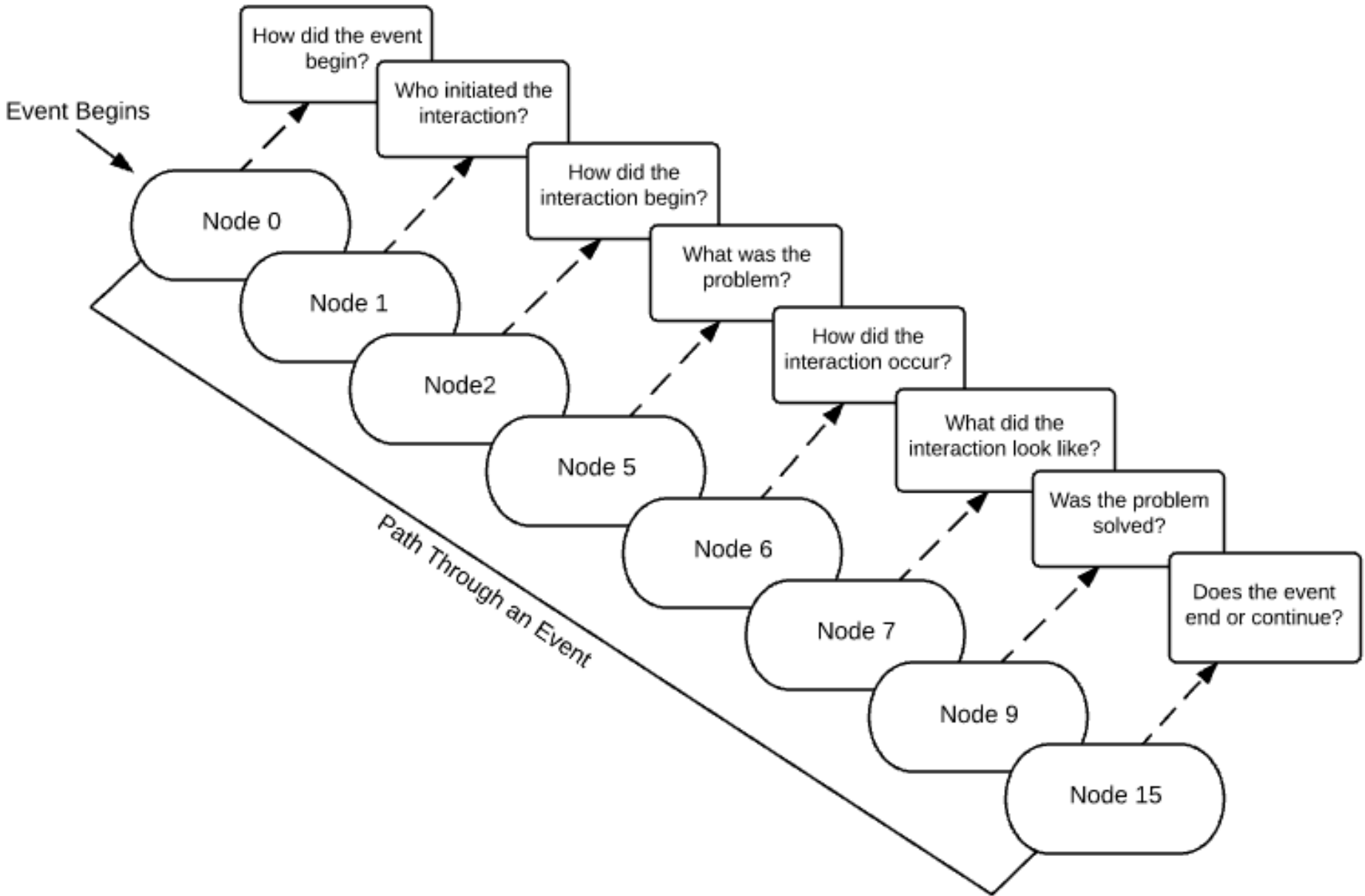
Notes:

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





Interrater Reliability- Level 1

There is a process in coding to establish reliability that involves multiple coders

Level 1 (Node reliability)

Level 1 Percent Agreement

Event	Time	Coder 1	Coder 2	Coder 3	Total Agreement
1	0:11	Yes	Yes	Yes	3
2	10:28	Yes	Yes	Yes	3
3	28:03	Yes	Yes	Yes	3
Total		3	3	3	9
Agreement					$(9/9)*100=100\%$

Interrater Reliability- Level 2

Level 2 (Subnode reliability)

Level 2 Percent Agreement							
Event	Coder 1	Coder 2	Coder 3	C1& C2	C1& C3	C2& C3	Total Agreement
1	0A	0A	0A	1	1	1	3
	1C	1C	1C	1	1	1	3
	3B	3B	3B	1	1	1	3
	5A	5A	5A	1	1	1	3
	6A	6A	6A	1	1	1	3
	7C	7A	7A	0	0	1	1
	9A	9A	9A	1	1	1	3
	15C	15C	15C	1	1	1	3
2	0B	0B	0B	1	1	1	3
	15D	15D	15D	1	1	1	3
3	0A	0A	0A	1	1	1	3
	1C	1C	1D	1	1	1	3
	3D	3D	X	1	0	0	1
	X	X	4D	1	0	0	1
	10D	10D	X	1	0	0	1
	15F	15F	15F	1	1	1	3
Total				16	16	16	40
Agreement				15	12	13	(40/48)*100=83%

Note: C1= Coder 1, C2= Coder 2, C3= Coder 3 ; X= Subnode was not recorded

Curiosity, Excitement, Accomplishment

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?

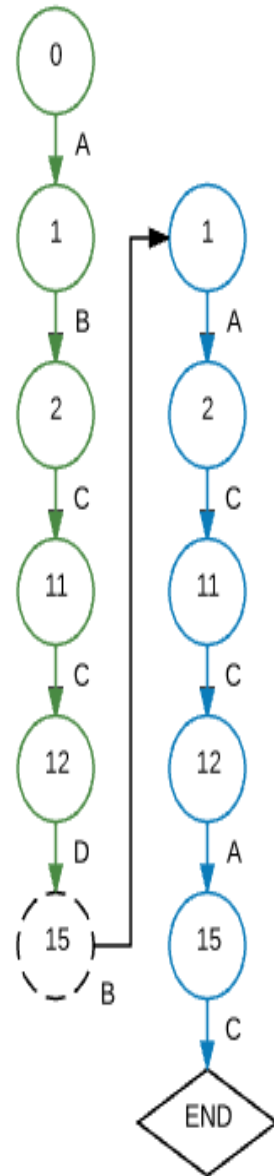
Peer 1: Oh yeah it does. That is so cool!

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

Peer 1: Yeah. It's so cool, man.

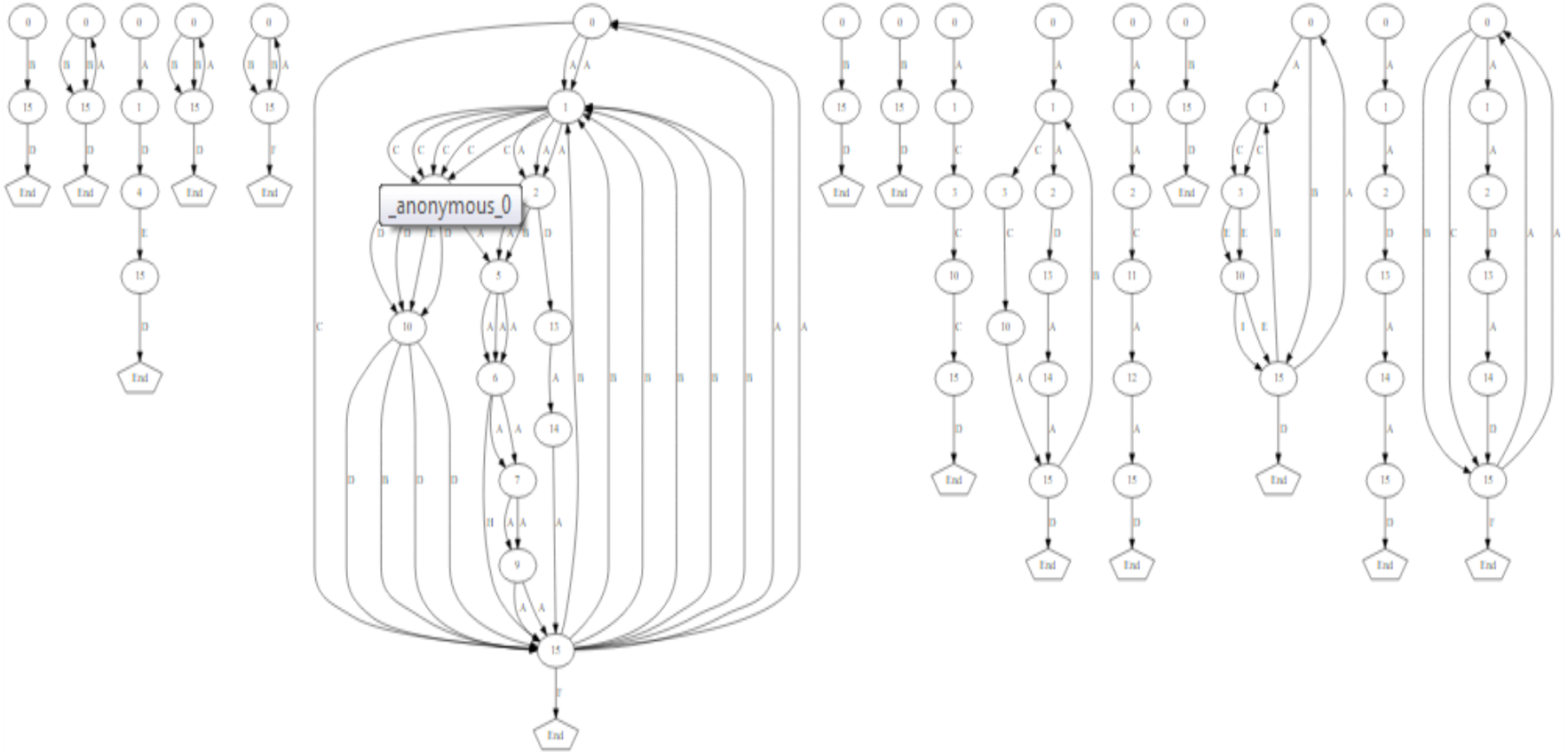
Peer 2: It's like the end in Minecraft.

Kevin: Its looks like Star Trek. [Sings: de-de-da-deeeeeeee]



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.

Socialization

Kevin: Mr. Connor. Mark made Facebook. He made Facebook.

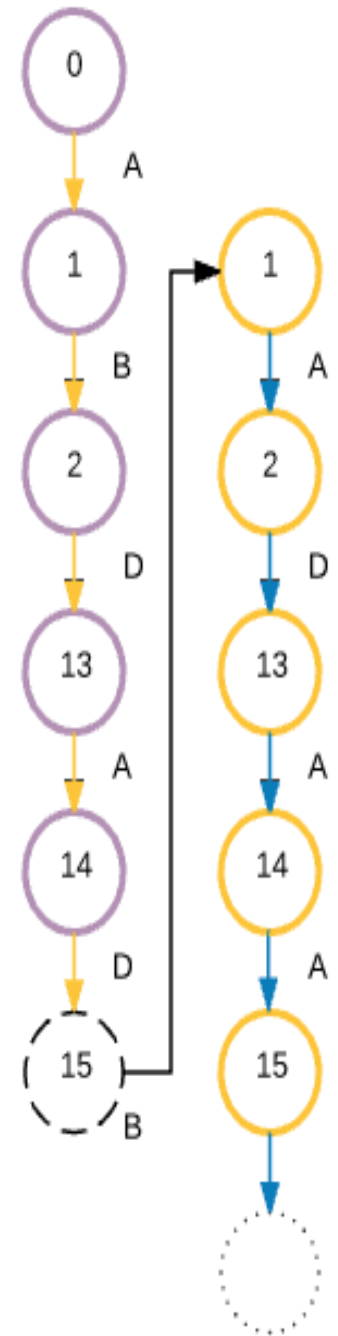
Mr. Connor: That's why he is the richest man in America.

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?

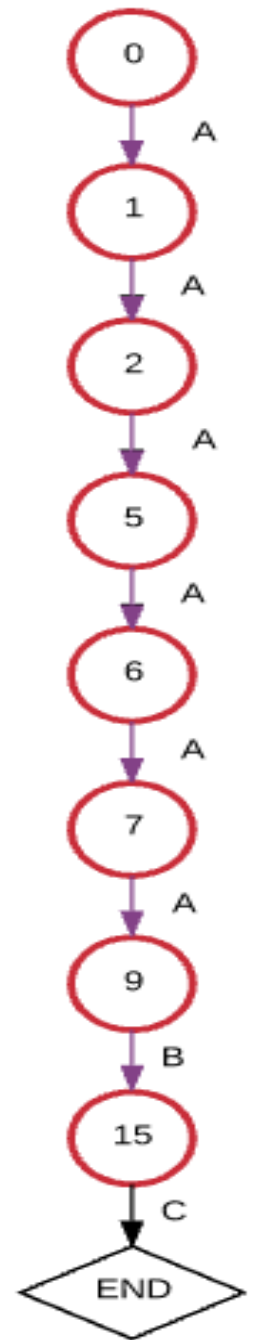
Peer: What do you need help with?

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

Maya Israel

College of Education

University of Illinois-Urbana Champaign

misrael@illinois.edu

Twitter: @misrael09