Uncovering sequential patterns among idea advancement and productive interaction to understand the performance of dialogic collaborative problem solving

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Introduction

Method

Result Conclusion





Dialogic CPS:

How to talk to solve a problem together?



My theory...

I need to understand...

A better theory is...

Another theory is...

I agree/disagree with...



More cumulative but less temporal

Research Problem

How does dialogic interaction account for different outcomes of CPS?



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Participants

Around 300 fourth-grade students from 8 classes in 2 schools, grouped in 4.

Material & Instruments

Three structured openresponse mathematics questions

Social Anxiety Scale

Self-concept in Math

Enjoyment in Learning Math

Data collection

Demographics; Prior math & Chinese grade; Friendship; Peer evaluation

Audio of group discussions and written discourse;

Data analysis

Statistical (Cumulative & Temporal) Qualitative (Contextual & Narrative)



Selection Criteria: With similar demographics, prior grades, scores on self-concept, enjoyment, social anxiety, and friendship, and similar turns, but contrast outcomes.

Group ID: SY8005

Outcome: 7.67/10

Turns: 292

Group ID: SY9010

Outcome: 3.33/10

Turns: 258

Talk Moves

Intra-thinking

Self-Elaboration (S-EB) Self-Explanation (S-EP) Self-Speculation (S-SP)

Inter-thinking

Invite Self-Elaboration (I-S-EB) Invite Self-Explanation (I-S-EP) Invite Self-Speculation (I-S-SP) Invite Co-Elaboration (I-C-EB) Invite Co-Explanation (I-C-EP) Invite Co-Speculation (I-C-SP) Co-Elaboration (C-EB) Co-Explanation (C-EP) Co-Speculation (C-SP) Agree (AG) Disagree (DIS)

Idea Advancement

Knowledge

Accuracy

New Idea (NI) Refer Back (RB)

Correct (COR) Wrong (WNG)

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Inter_C-EB • Inter_I-C-EB • Inter_I-S-EP • Intra_S-EP • Item_Ice
 Inter_C-SP • Inter_I-S-EB • Intra_S-EB • Item_Bridge • Item_Snake

Quantitative Analysis

Cumulative statistics





Cumulative statistics





Qulitative Analysis

Xiao Ming bought two ice creams and four frozen suckers. He spent 22 Yuan in total. Xiao Lin bought one ice cream and three frozen suckers. She spent 14 Yuan in total. How much would one ice cream and one frozen sucker cost? Please write out detailed problem-solving process.



SY8005 (H)





Then for frozen sucker, one is one more than the other, use...use 22-14 first...(3s) equals 8 yuan... then...

Yao(M1), you don't do ... any more. (hard of hearing)

M2 8 divides 2, equals 4

Why? Their prices may not be the same.

M2 8 divides 2, equals 4. Listen to me (5s), 8 yuan ...

M1 Gan (M2), I wanna ask a question, ... (hard of hearing)

M2 It means 8 equals to one frozen sucker and one ice cream.

Then, how can we calculate the prices for one frozen sucker and one ice cream?

M2 One frozen sucker...

F1 I think we could calculate like this.

M2 Say it.

2 8, 16. Then they are two frozen suckers and two ice creams.
Then 2 8, 16. two frozen suckers 22-16. divide 2, then it is one.
Then you calculate! (4s) math problem again. I don't wanna do it anymore. I should quit.

Shoo——let me have a look.

SY9010 (L)





So one frozen sucker and one ice cream equals 8. So back to the figure above, we could know Ming has 2 frozen suckers and 2 ice creams...

- 2 Ah?! Four frozen suckers
- F3 Four frozen suckers (in soft voice)
- M4 I got it. I got it.
- F2 Four frozen suckers and two ice creams. Haha.
- M4 No, the 8 more yuan should be this ...
 - The 8 more yuan is this and this. After subtracting these two...
- M4 Two frozen suckers... (interrupt)
 - ² After subtracting these two, there is one and three frozen suckers
- M1 You two talked so much which amounts to nothing!
- F2 One ice cream and three frozen suckers.

No, this should be one group. One group costs 8. there are two groups.
 Two more left. The left money equals to the price of two frozen suckers.

- F2 That is exactly what I meant.
- M4 Then why did you say that again...

M1 You two talked so much which amounts to nothing! Haha, one ice cream and three frozen suckers...

Next please Xiao (M4) expressed his idea. What you just said is quite good. You should talk to the recorder.

Logically and temporally connected

Logically but not Temporally connected





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- ³ Four frozen suckers (in soft voice)
- M4 I got it. I got it.
 - 2 Four frozen suckers and two ice creams. Haha.
- M4 No, the 8 more yuan should be this ...
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- M4 Two frozen suckers... (interrupt)
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- F2 That is exactly what I meant.
- M4 Then why did you say that again...
- M1 You two talked nothing! Haha, one ice cream and three frozen suckers...
 F2 Next please Xiao (M4) expressed his idea. What you just said is quite good. You should talk to the recorder.





SY8005

- Responsive to others' voice
- Uptake and improve new ideas

SY9010

- Overlook to other's ideas
- More breaks of thinking flow

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Reciprocity

- Responsiveness to others' voice (intrainter-intra)
- Sustained dialogic thinking flow

Progression

- Shared understanding and mutual progress
- Converged knowledge co-construction

Thanks!

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