Inviting Students to Reflect: Meta-Discourse Tool in Knowledge Forum

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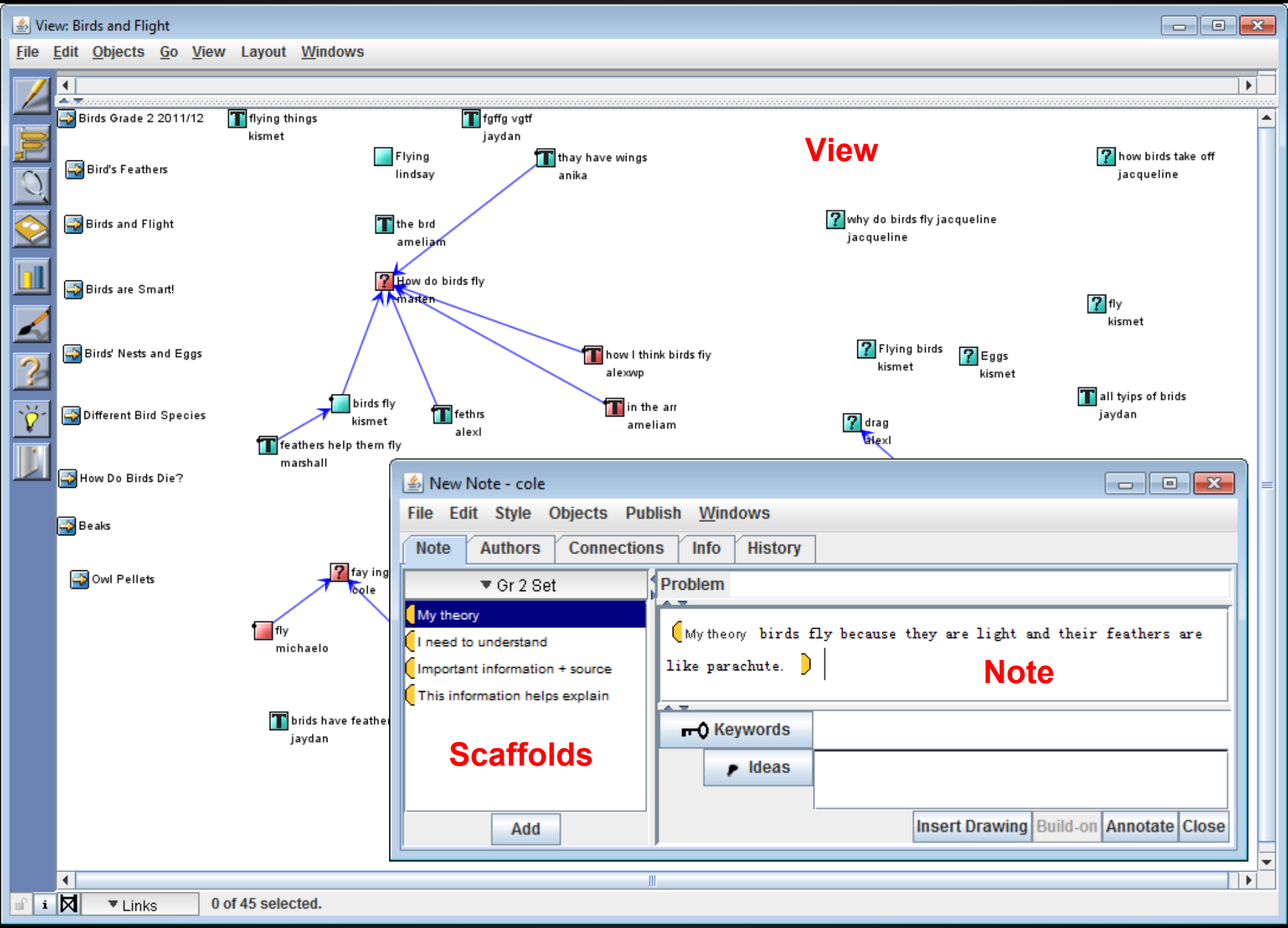
Agenda

- Background
  - Knowledge Building
  - Ways of contributing
  - Metadiscourse
- Research questions
- Research methods
  - Metadiscourse tool
  - Design
  - Data analysis
- Results and discussion
- Conclusion

Knowledge Building

- Theory and Pedagogy
  - Knowledge building may be defined as the production and continual improvement of ideas of value to a community.
  - It engages learners in the full process of knowledge creation from an early age.
  - Learners take collective cognitive responsibility to advance public knowledge in their community.
  - Knowledge-building discourse as collaborative problem solving rather than argumentation.
- Technology
  - Knowledge Forum


View: Birds and Flight
File Edit Objects Go View Layout Windows
Birds Grade 2 2011/12
flying things kismet
fgffg vgtf jaydan
Flying lindsay
thay have wings anika
how birds take off jacqueline
Bird's Feathers
Birds and Flight
the brd ameliam
why do birds fly jacqueline jacqueline
Birds are Smart!
How do birds fly marten
fly kismet
Birds' Nests and Eggs
how I think birds fiy alexwp
Flying birds kismet
Eggs kismet
Different Bird Species
birds fly kismet
fethrs alexl
in the arr ameliam
all tyips of brids jaydan
feathers help them fly marshall
drag alexl
How Do Birds Die?
Beaks
Owl Pellets
fay ing cole
fly michaelo
brids have feather jaydan
New Note - cole
File Edit Style Objects Publish Windows
Note Authors Connections Info History
Gr 2 Set
My theory
I need to understand
Important information + source
This information helps explain
Scaffolds
Add
Problem
My theory birds fly because they are light and their feathers are like parachute.
Note
Keywords
Ideas
Insert Drawing Build-on Annotate Close
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Ways of Contributing

Main categories	Sub categories
I Questions	1-Explanatory question 2-Design question 3-Factual question
II Theorizing	4-Proposing a theory 5-Supporting a theory 6-Improving a theory 7-Alternative theory
III Obtaining Information	8-Asking for Evidence 9-Reporting Experimental Results 10-Testing Hypotheses 11-Introducing New Information 12-Introducing New Fact/Experience 13-Identifying a Design Problem 14-Improving a Design Problem
IV Working with Information	15-Supporting an Idea 16-Discarding an Idea 17-Weighing Different Ideas 18-Accounting for Conflicting Ideas or Theories
V Syntheses and Analogies	19-Synthesizing 20-Making a Comparison or Analogy 21-Making a Rise-above
VI Supporting Discussion	22-Drawing a Diagram 23-Giving an Opinion 24-Mediating Discussion

Note: Chuy et al., 2010, Chuy et al., 2011

Metadiscourse

Discourse about discourse:

- how the discourse is progressing?
- where it is headed?
- what is hampering progress?
- what types of contribution are needed?
- ...

Research Questions

1. With teacher's guidance and help from tools, to what extent can young students be engaged in metadiscourse?
2. By participating in metadiscourse, to what extent can students expand their contribution repertoires?
3. Do metadiscourse and more diverse contributions lead to greater knowledge advancement?

Meta-Discourse Tool

How it functions

- extracts log data of scaffold use in a view
- presents students' scaffold use in a bar chart

View: Our ideas about why birds fly

File Edit Objects Go View Layout Windows

Bird Study in Grade Two

Birds and the Environment

migrating
anna d.

birds migrat
Rahim A.

earth
mira l.

populer bird
rachel d.

thermals
rachel d.

bird's
mira l.

why
mira l.

why birds have feathers
Rahim A.

rearest bird in the world
Rahim A.

DONT
Adam G.

b birds
blaede c.

predetors
anna d.

dead food
Aman A.

birds of pray
rachel d.

honey cone bones
anna d.

Not all birds need honeycomb bor
henry d.

not all birds have honeycombs
Rahim A.

crows are amazing
anna d.

hoeney coen's
mira l.

No they don't
Nikita K.

yes they do
anna d.

stronger and lighter
Ayleen F.

feathers
Ayleen F.

birds
elliot t.

to be
suvan j.

feathers
anna d.

honeycomb bones
Rahim A.

birds som
Rahim A.

bones lice us
myles c.

predetors and birds
Rahim A.

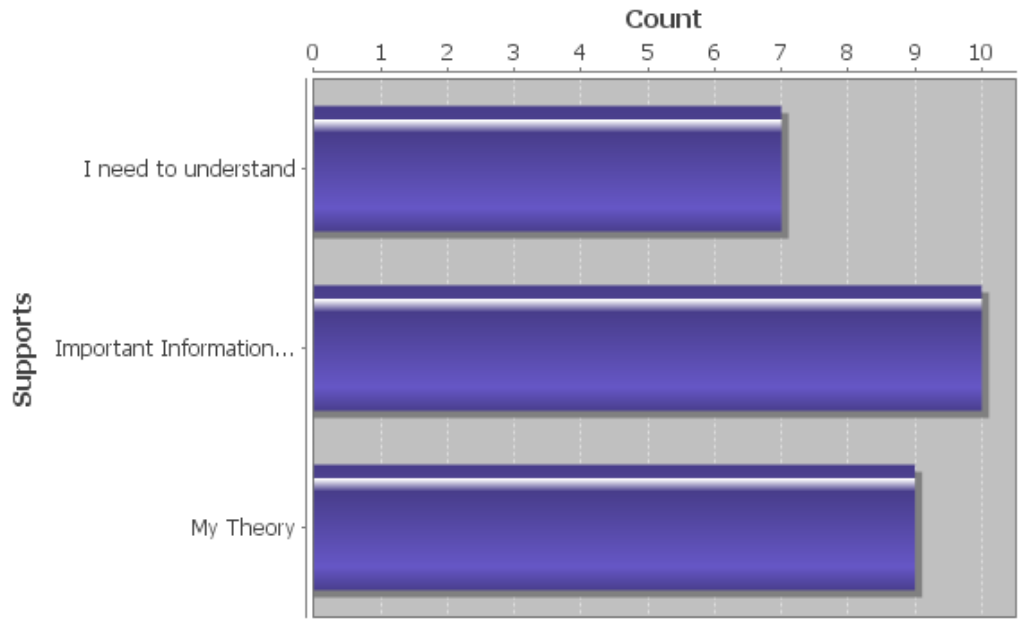
adam
Adam G.

huting
myles c.

birds of prey
elliot t.

Scaffold Tracker

Scaffold Use in View - Our ideas about why birds fly



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Research Methods

- Participants
  - 22 Grade 2 students in 2011/2012 school year

Group	Experimental	Control
Student count	11	11
Metadiscourse discussion	Yes	Yes
Using Metadiscourse tool	Yes	No

- Procedure
  - 21 students were randomly assigned to two groups.
  - Both groups were working on the same view about "Birds" for 4 months.
  - Both groups participated in repeated “metadiscourse sessions”.
  - The experimental group was introduced to the Meta-Discourse tool and used it to mediate their reflective discussion.

Research Methods

Data analysis: Content Analysis

1. Ways of contributing
   a. contribution categories: 6 main categories (e.g. questions, theorizing, obtaining information, etc.) and 24 subcategories.
   b. contribution measures
      i. # of notes
      ii. # of contributions
      iii. contribution richness
      iv. contributor diversity on main categories
      v. contributor diversity on subcategories

2. Knowledge advancement
   a. Scientificness: 4 levels (Zhang, Scardamalia, Lamon, Messina, & Reeve, 2007)

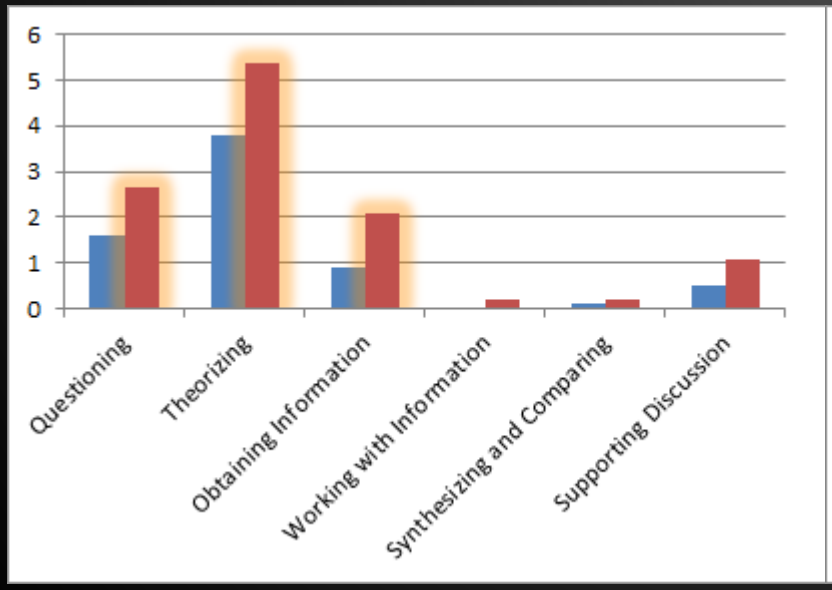
Results

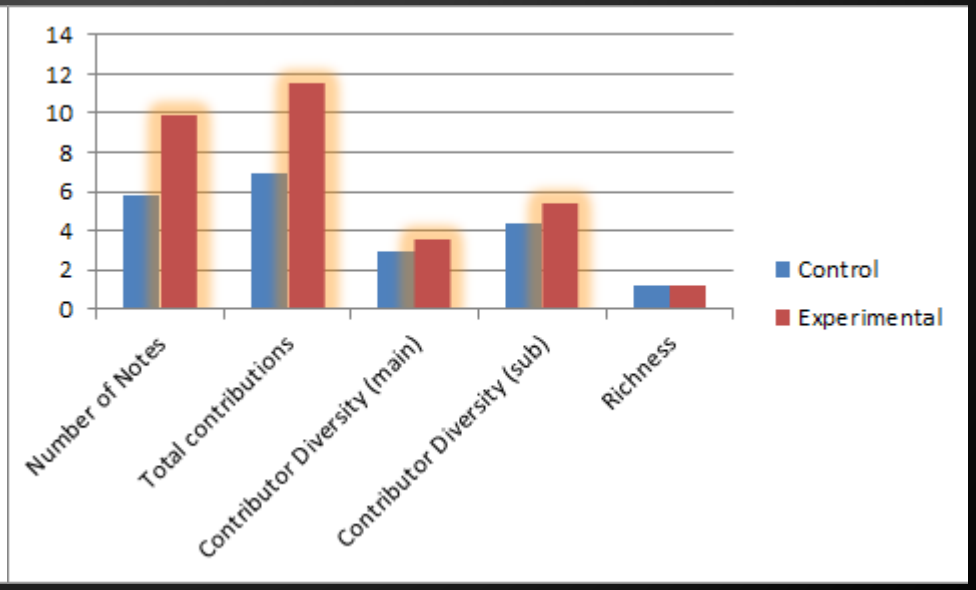
1. Baseline comparison: How did the experimental and control groups perform in grade 1?

No significant difference on any measures, including all ways of contributing categories, contribution measures, and scientificness levels.

Results

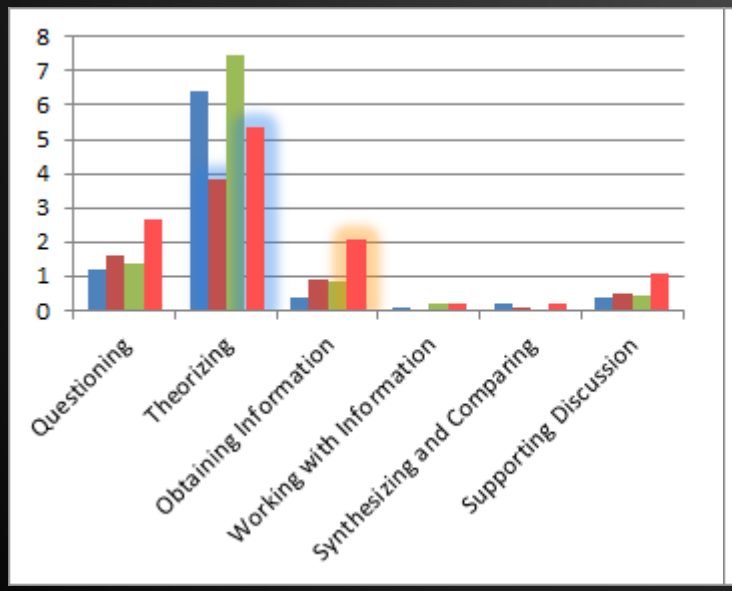
2. Did the experimental group contribute more diversely than the control group?
   - Significantly higher contribution on three subcategories: "*proposing theories*", "*asking factual questions*", and "*introducing new facts or information*" ($p < .05$).
   - Significantly higher *number of notes*, *number of contributions*, and *contributor diversity (main and sub)* ($p < .05$).

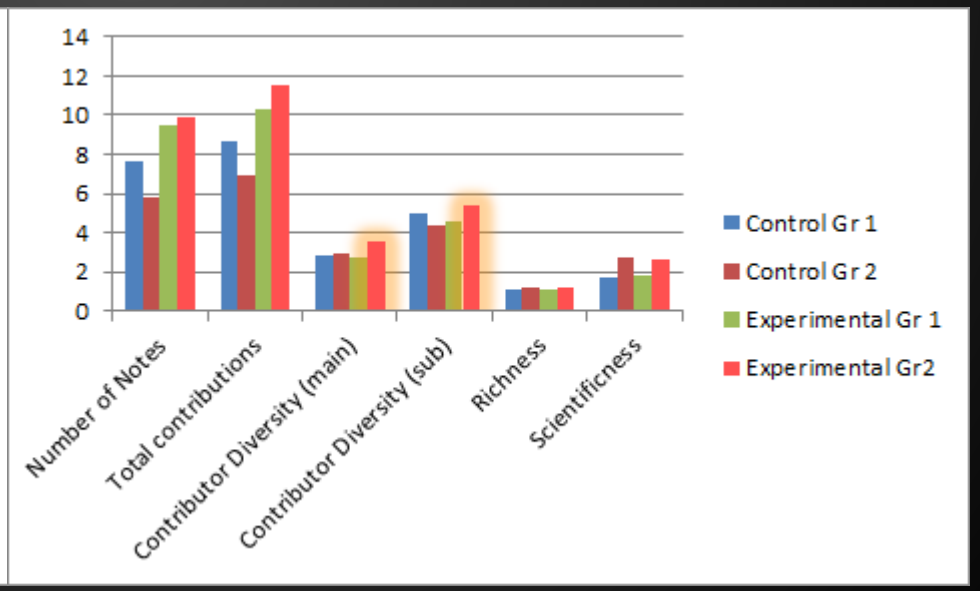




Results

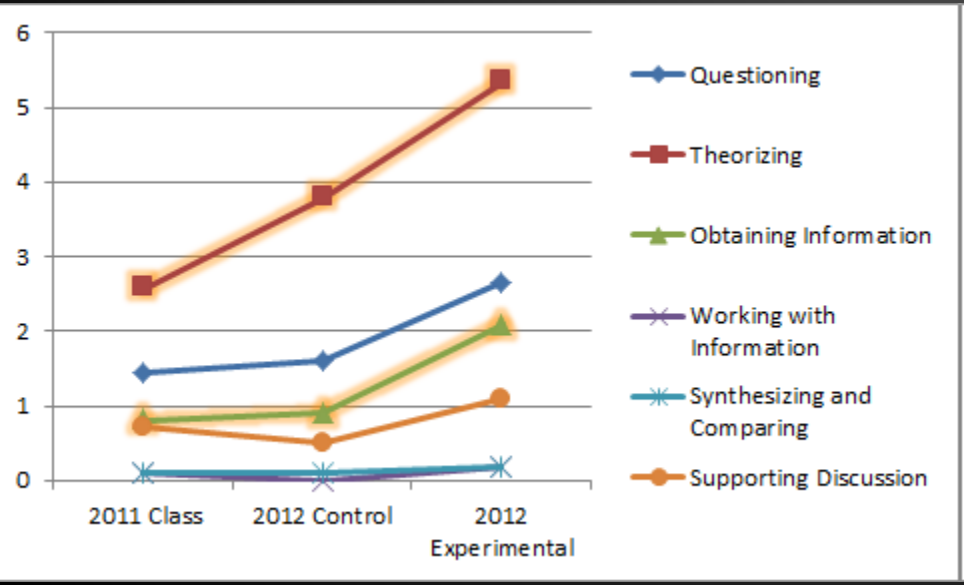
3. Did the experimental and control groups performed better than one year ago when they were in grade 1?
   - Experimental group: Significantly higher contribution on "*Obtaining Evidence*" main category, and higher score on "*contributor diversity main categories*".
   - Control group: Not significantly better on any of those measures.

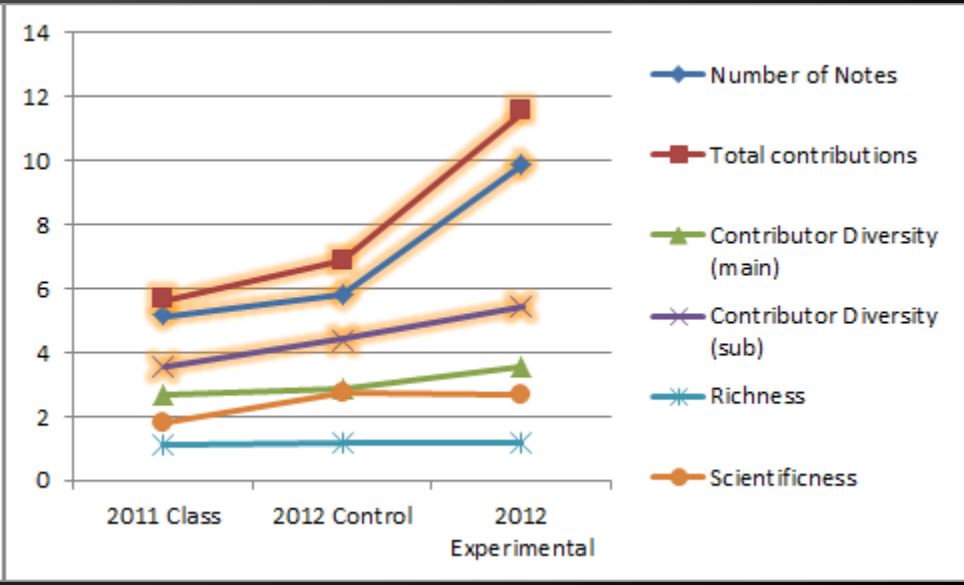




Results

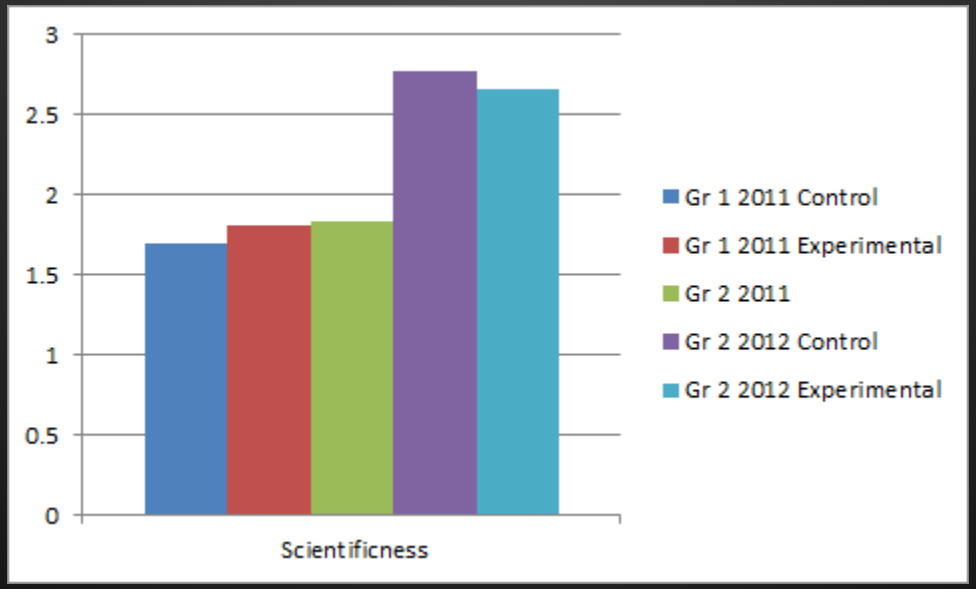
4. Did the experimental and control groups in the grade 2 class 2012 perform better than the grade 2 class 2011?
   - The experimental group did significantly better than the grade 2 class 2011 on "*Theorizing*" and "*Obtaining Evidence*" main category, and had higher scores on "*contributor diversity (main and sub)*", "*number of notes*", and "*total contributions*".
   - The control group did not perform significantly better on any of those measures.





Results

5. Did the experimental group achieve more knowledge advancement?
   - Difference on *sicentificness* scores is not significant between the experimental and control groups.
   - However, the grade 2 class 2012 achieved significantly more scientific understanding than either grade 1 2011 or grade 2 2012.



Conclusion

- Students as young as grade 2 can be engaged in metadiscourse with help from teacher and tools.
- The Meta-Discourse tool, combined with metadiscourse sessions, helps young students make a greater number and more diverse types of contributions to their own dialogue.
- More particularly, grade 2 students who have access to this tool tend to introduce more information into their dialogue, which is usually scant for this age level.
- The tool did not show a significant impact on knowledge advancement, which might more depend on either developmental stage or classroom discourse.

Thank you!

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