Relating argumentative knowledge with external representations

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CABLE

Collaborative Argumentation-based Learning
* in open domains
* to broaden and deepen the space of debate
* but that’s hard…!
Supporting CABLE

* with diagrams students have to construct during their discussion
* to construct, research and manipulate own representation of the space of debate
* argumentative and collaborative affordances: structure and relations
DREW
Argumentative diagrams

* Structure of argumentation is not linear
* Multiple relations
* Argumentative or causal structure
Study

* 60 students, 3 classes, upper secondary education
* Discuss two cases on GMOs in pairs
* In DREW, chat with text or diagram
* 3 conditions:
  – label boxes in diagram
  – label relations in diagram
  – no labeling in text
# Labels

<table>
<thead>
<tr>
<th>Label box</th>
<th>Label arrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claim</td>
<td>➔ Because</td>
</tr>
<tr>
<td>Argument in favour</td>
<td>➔ But</td>
</tr>
<tr>
<td>Argument against</td>
<td>➔ And</td>
</tr>
<tr>
<td>Support</td>
<td>➔ Thus</td>
</tr>
<tr>
<td>Counter</td>
<td>➔ Such as</td>
</tr>
<tr>
<td>Example</td>
<td></td>
</tr>
</tbody>
</table>
Breadth and Depth of the Space of Debate

<table>
<thead>
<tr>
<th>Breadth</th>
<th>5 main topics (environment, health)</th>
<th>Chat</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14 subtopics</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Depth</td>
<td>claim</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>support/ alter</td>
<td>1/1</td>
<td>4/3</td>
</tr>
<tr>
<td></td>
<td>counter/rebuttal</td>
<td>0.5/2</td>
<td>0.5/1</td>
</tr>
<tr>
<td></td>
<td>evidence</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

No differences in broadening and deepening the space of debate between conditions
Closer look at diagrams

1. General appearance of the diagram
2. Label use
3. Relating knowledge
4. Task-approach
1. General appearance of the diagram

* Most diagrams: claim, several arguments in favour, several arguments against, one or two going a level deeper (e.g. evidence), 50% is on first level
* Label-relations (M=2.0; SD=1.3) significantly more levels than label-box (M=1.7; SD=.98); t(328) = -2.83; p<.05
Leo and Rachel
all 1st order relations
2. Label use

Label boxes
* 9 labels per diagram
* 71 % correct use
* most used: argument in favour and arg. against
* 16% of boxes has no label

* also label relations
* no talk about labels

Label relations
* 9 labels per diagram
* 80% correct use
* most used: because and but

* 1% of relations has no label

* do not label boxes
* no talk about labels
3. Relating knowledge (1)

* Students do relate arguments together: 45% relations between, 55% relations within students

* Analyses of argument/ knowledge structures is problematic (Oostdam, 1991; Mephu-Nguifo, Baker & Dillenbourg, 1999; Schlesinger et al., 2001)

* cause-consequence instead of premise-conclusion; students take big steps
3. Relating knowledge (2)

Amels-relations:
* Contrast arguments 30%
* Contrast topics 15%
* Contrast perspectives 0%
* No contrast 55%

Label relations group scored more contrasting relations than the label boxes group; t(166) = -1.97; p = .05
Nr of contrast arguments is equal across conditions (29%), but contrast topics happens twice as much in labeling relations (20%) than in labeling boxes (10%)
4. Task-approach

* Deepening in chat and/or diagram (p < .05)
  - diagram only: less claims
  - Mostly chat: more counters
  - Both chat & diagram: more evidence
  - Total: diagram only < mostly diagram < both chat and diagram < mostly chat

* Use of diagram
Annet and Megan consolidation in diagram

- Argument voor: er kan ook meer werkgelegenheid ontstaan als een deel van de graan gebruikt wordt om te verbouwen. (graan gemodificeerd tegen hitte)
- Argument tegen: er komt meer armoede
- Stelling: GEMODIFICEERD GRAAN ETIOPIE
- Argument voor: Er is minder hongerstroom
- Onderbouwing: Door prijsstijgingen van het gemodificeerde graan. Daardoor worden de boeren erg afhankelijk van de producenten.
- Argument tegen: arme boeren worden steeds arm terwijl producenten steeds rijkter worden
- Want
John and Jude
controversy in diagram
Discussion

Although students did broaden and deepen their space of debate together, our diagrams with labeling did not especially support that.

Why not?

1. Theory is not right
2. Students do not know how to construct (and inspect) representations
3. Too many variables interfering
Thank you