Discourse-Centric Learning Analytics

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A key indicator of meaningful learning is the quality of contribution to discourse.

**Sociocultural perspective on learning**

“highlights the possibility that educational success and failure may be explained by the quality of educational dialogue, rather than simply in terms of the capability of individual students or the skill of their teachers.”

We look at discourse as a key indicator for learning and explore discourse analysis as a method to identify where and how learning happens.

(Mercer 2004)
Discourse as the Tool to Think Collectively

Discourse analysis focuses explicitly on language as social action

Discourse and Argumentation

are the tools through which people can

compare their thinking, explore ideas, shape agreement, and identify or solve disagreements.

If discourse is the tool through which learners think collectively, then discourse outcomes and discourse analysis can provide indicators to better understand the learning processes (Mercer 2000)
The most established online dialogue environments render discourse chronologically, rather than logically, reflecting most strongly the sequence of contributions rather than their conceptual structure: for instance a Facebook dialogue….
Aurélie Miché 22 October at 17:57 Reply • Report
Woua, i love them all. Unfortunately, Vane i won't be able to be part of the exciting expedition for your birthday. I will be in Paris with a bunch of 30 excited students. Sorry and disappointed.
Love.
Lili

Van Lopez 26 October at 19:43 Reply • Report
Hi guys, it seems also Dinar is traveling on the 5th .. Maca & Joan are also away, Lili too .. If you want we can postpone it for the weekend after .. although we have the KMi XMAS dinner on the 10 Friday, so it will have to be a short one Saturday-Sunday ... Your call!
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hola chiquitos! I've got some friends visiting from saturday 11D to monday 13D so I will not be available that weekend ..

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Ciao Belli, just an info that there is no KMi christmass dinner on the 10th anymore! So in principle following w-e may work as well.
BACIII

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Beyond threaded forums: tools for structuring and mapping issues, dialogue and argumentation

Online Deliberation: Emerging Tools Workshop
Online Deliberation 2010, Leeds UK (30 June – 2 July)
www.olnet.org/odet2010

ESSENCE: E-Science, Sensemaking & Climate Change
ESSENCE workshop, KMI, Open University
http://events.kmi.open.ac.uk/essence
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we discuss what it mean to use Cohere’s online dialogue environment to monitor online learning activities and develop useful learning analytics, by starting on the analysis of the online discourse which learners are involved in.

We demonstrate how discourse analytics can enable a deeper understanding of the online discourse, of the participants to the discourse and the social and learning dynamics.
Multisensory definition of augmented reality

Augmented reality allows a richer interaction with books

Augmented reality allows us to tell engaging stories about the world

Augmented reality is fun
By looking at the post type table it is possible to evaluate learner’s performance connecting the discourse outcomes with the specific learning goal.
# Table on Links’ Type -> Learners’ Attitudes

<table>
<thead>
<tr>
<th>Link Types</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>is an example of</td>
<td>42</td>
</tr>
<tr>
<td>builds on</td>
<td>17</td>
</tr>
<tr>
<td>is consistent with</td>
<td>17</td>
</tr>
<tr>
<td>responds to</td>
<td>11</td>
</tr>
<tr>
<td>uses/applies</td>
<td>10</td>
</tr>
<tr>
<td>challenges</td>
<td>10</td>
</tr>
<tr>
<td>evidence relating to</td>
<td>6</td>
</tr>
<tr>
<td>supports</td>
<td>6</td>
</tr>
<tr>
<td>is analogous to</td>
<td>6</td>
</tr>
<tr>
<td>illustrates</td>
<td>5</td>
</tr>
<tr>
<td>is inconsistent with</td>
<td>2</td>
</tr>
<tr>
<td>improves on</td>
<td>1</td>
</tr>
<tr>
<td>solves the problem</td>
<td>1</td>
</tr>
<tr>
<td>refutes</td>
<td>1</td>
</tr>
<tr>
<td>causes</td>
<td>1</td>
</tr>
</tbody>
</table>
Comparing Users’ Usage of link types
Stats for Rebecca

Compared Thinking (privacy included)

- China reduces greenhouse gas emissions by 40-45% by 2020 [Details*, URLs (1)+, Groups (2)+]
- Stolen emails suggest scientists shield data and suppress others’ work [Details +, Groups (2)+]
- Volcanic eruptions induce climate change [Details +, URLs (3)+, Groups (2)+]
- Would holding meetings on Climate Change in say, The Maldives or Bangladesh, rather than trendy, chic watering holes in the Northern hemisphere bring about a greater sense of urgency and action by the World Leaders? [Details +, URLs (1)+, Groups (1)+]
- Robust conclusion: warming of the climate system is unequivocal [Details*, URLs (1)+, Groups (1)+]
- Kenya is threatened to the drought [Details +, URLs (1)+, Groups (1)+]
- #China [Details* +, URLs (1)+, Groups (2)+]
- Challenges [Details +, URLs (2)+, Groups (2)+]
- World’s cold, wet and dry periods were the result of alternating short-term and long-term climatic cycles [Details* +, URLs (1)+, Groups (2)+]
- Maldives Cabinet Holds Underwater Meeting [Details +, Groups (2)+]
- Yes, the Earth is really getting warmer [Details +, Groups (3)+]
- Global warming is associated with drought in some countries [Details +, Groups (2)+]
Stats for Rebecca

Compare Thinking

Stolen emails suggest scientists shield data and suppress others' work. 15/12/09

Reference: Reference from The New York Times- DOT EARTH - Blog on Science 2/12/09

challenges
Use ClimateWizard to see how climate has and is projected to change in specific areas.

is inconsistent with...

COMPUTER MODELS ARE NOT RELIABLE

Details + | URLs (1)+ | Groups (1)+

15/12/09

7/1/09
Analytics Per Group: Discourse network statistics

A Social-Semantic Network of Discourse Elements
Discourse network structure = Concept Network + Social Network
Concept Network Analysis and Visualization - links distributions enable to infer learning topics distribution
Concept Network Analysis and Visualization
Concept Network Analysis and Visualization
Social Network

Diagram showing a network of connections with nodes labeled as follows:
- Patrick McAndrew
- Eleftheria Vakriyanis
- Cinza Alevizou
- Anna De Lidio
- Katarzyna Rozinska
- Andreia Inamorato dos Santos
- Svetlana Krysheva
- Karen Cropper
- Janet Dyson

The network is visualized with different connection strengths indicated by the lines and colors.
Social Network Analysis and Visualization

Outdegree = measure of users’ activity
Indegree = indirect measure of relevance of a user’s posts.

<table>
<thead>
<tr>
<th>Learners</th>
<th>Outdegree</th>
<th>Learners</th>
<th>Indegree</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>11</td>
<td>L6</td>
<td>11</td>
</tr>
<tr>
<td>L2</td>
<td>7</td>
<td>L3</td>
<td>7</td>
</tr>
<tr>
<td>L3</td>
<td>6</td>
<td>L1</td>
<td>5</td>
</tr>
<tr>
<td>L4</td>
<td>4</td>
<td>L4</td>
<td>4</td>
</tr>
<tr>
<td>L5</td>
<td>4</td>
<td>L2</td>
<td>4</td>
</tr>
<tr>
<td>L6</td>
<td>3</td>
<td>L8</td>
<td>4</td>
</tr>
<tr>
<td>L7</td>
<td>3</td>
<td>L5</td>
<td>2</td>
</tr>
<tr>
<td>L8</td>
<td>2</td>
<td>L7</td>
<td>2</td>
</tr>
<tr>
<td>L9</td>
<td>2</td>
<td>L11</td>
<td>2</td>
</tr>
<tr>
<td>L10</td>
<td>1</td>
<td>L10</td>
<td>1</td>
</tr>
<tr>
<td>L11</td>
<td>0</td>
<td>L9</td>
<td>1</td>
</tr>
</tbody>
</table>
Social Network Analysis and Visualization
Conclusions

We have motivated a focus on learners’ discourse as a promising site for identifying patterns of activity which correspond to meaningful learning and knowledge construction.

We are interested in the rhetorical role that a user’s contribution is making to a document or conversation and the nature of the connection to other contributions using semantic relationships.

Using the Cohere system as an experimental vehicle, we have presented examples of learning analytics to better understand:

- learners’ attention
- learners’ rhetorical moves within the online discussion
- learning topics distribution
- learners’ social interactions
Future Work

- Embed learning analytics into different areas within the Cohere’s UI

- Investigating computational linguistics tools for automatically detecting rhetorical gestures within text documents
  
  (in collaboration with XEROX Research Europe, Agnes Sandor
  
  http://olnet.org/node/512)

- Ability to set software agents to monitor the discourse network -- Moving toward user-defined semantic network analysis.
Many Thanks

Anna De Liddo
References for Cohere


