Integrating Human and Machine Document Annotation for Sensemaking

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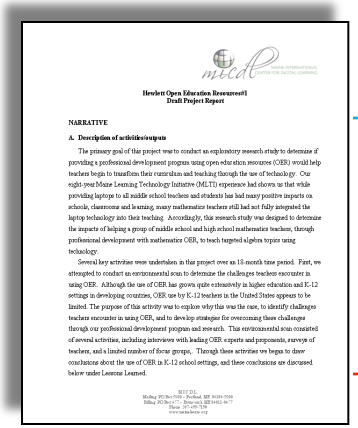
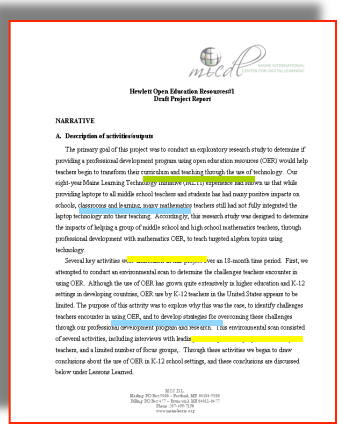
Hewlett Grant Report Project

report



template

XIP-annotated report



olnet open learning network

KMi

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Discourse analysis with the Xerox Incremental Parser

Detection of salient sentences based on rhetorical markers:

BACKGROUND KNOWLEDGE:

Recent studies indicate …

… the previously proposed …

… is universally accepted ...

CONRASTING IDEAS:

… unorthodox view resolves …

paradoxes …

In contrast with previous hypotheses ...

... inconsistent with past findings ...

GENERALIZING:

... emerging as a promising approach

Our understanding ... has grown exponentially ...

... growing recognition of the importance ...

NOVELTY:

... new insights provide direct evidence ..... we suggest a new ... approach ...

... results define a novel role ...

SIGNIFICANCE:

studies ... have provided important advances

Knowledge ... is crucial for ... understanding

valuable information ... from studies

SURPRISE:

We have recently observed ... surprisingly

We have identified ... unusual

The recent discovery ... suggests intriguing roles

OPEN QUESTION:

… little is known …

… role … has been elusive

Current data is insufficient …

SUMMARIZING:

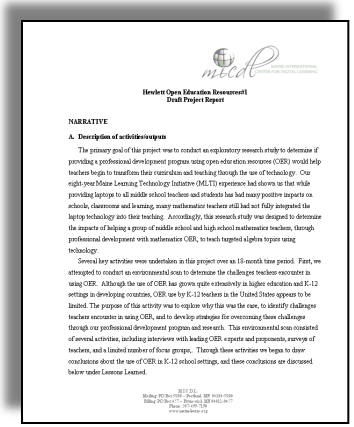
The goal of this study ...

Here, we show ...

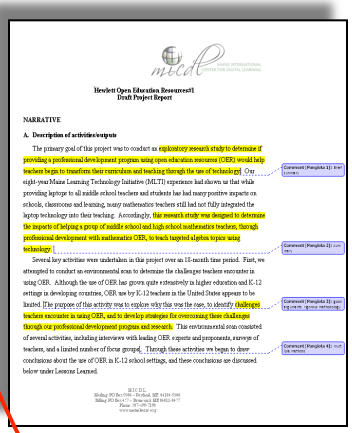
Altogether, our results ... indicate

Human annotation and machine annotation

report

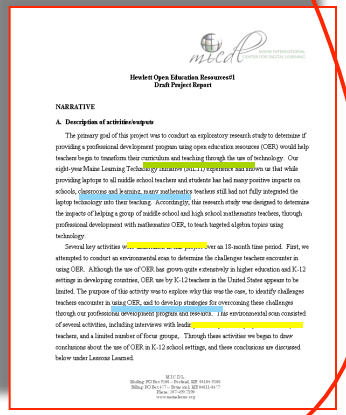


human-annotated report



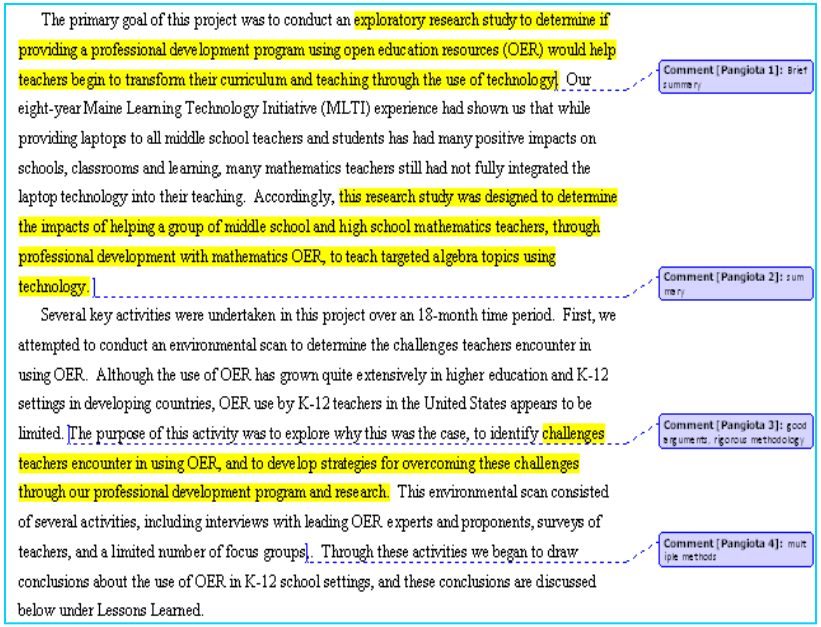
template

XIP-annotated report



Human annotation and machine annotation

1.



The primary goal of this project was to conduct an exploratory research study to determine if providing a professional development program using open education resources (OER) would help teachers begin to transform their curriculum and teaching through the use of technology. Our eight-year Maine Learning Technology Initiative (MLTI) experience had shown us that while providing laptops to all middle school teachers and students has had many positive impacts on schools, classrooms and learning, many mathematics teachers still had not fully integrated the laptop technology into their teaching. Accordingly, this research study was designed to determine the impacts of helping a group of middle school and high school mathematics teachers, through professional development with mathematics OER, to teach targeted algebra topics using technology.

Several key activities were undertaken in this project over an 18-month time period. First, we attempted to conduct an environmental scan to determine the challenges teachers encounter in using OER. Although the use of OER has grown quite extensively in higher education and K-12 settings in developing countries, OER use by K-12 teachers in the United States appears to be limited. The purpose of this activity was to explore why this was the case, to identify challenges teachers encounter in using OER, and to develop strategies for overcoming these challenges through our professional development program and research. This environmental scan consisted of several activities, including interviews with leading OER experts and proponents, surveys of teachers, and a limited number of focus groups. Through these activities we began to draw conclusions about the use of OER in K-12 school settings, and these conclusions are discussed below under Lessons Learned.

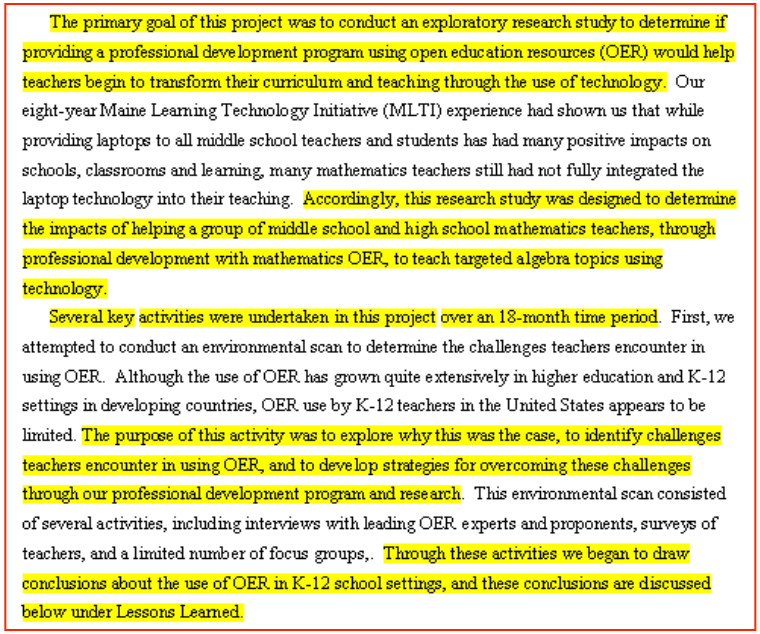
Comment [Pangiota 1]: Brief summary

Comment [Pangiota 2]: summary

Comment [Pangiota 3]: good arguments, rigorous methodology

Comment [Pangiota 4]: multiple methods

~19 sentences annotated



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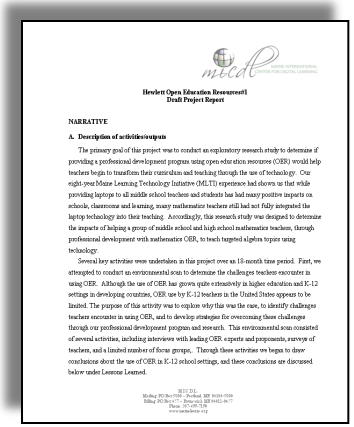
22 sentences annotated
11 sentences = human annotation
2 consecutive sentences of human annotation

2. 71 sentences annotated

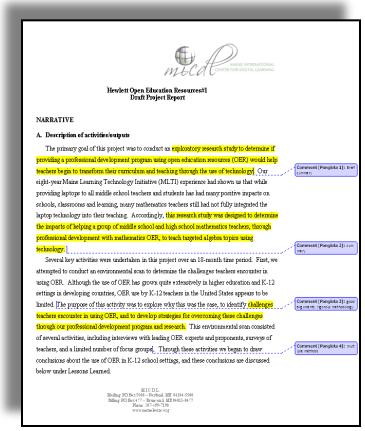
59 sentences annotated
42 sentences = human annotation

Template and machine annotation

report

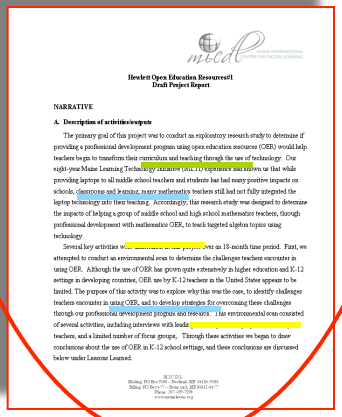


human-annotated report



template

XIP-annotated report



Template and machine annotation

Interesting **questions** raised within the article itself:	• There is no empirically based understanding of the challenges of using OER in K-12 settings • No real value of expert panels, as it yields no empirical research on the topic and opinions expressed are not necessarily from K-12 • While at first blush it may appear K-12 teachers are not using OER; they are in fact using these types of materials (in the form of free resources over the internet), but there are issues with recognition and definition of what OER is • While at first blush it may appear K-12 teachers are not using OER; they are in fact using these types of materials. So practices of modification happen, but they are either not shared or mediated openly • Issues of confidence/time constraints: Even with mentoring and after the training, only a small percentage was motivated to share & publish openly; peripheral participation also persisted in online forums (teachers lurking, but not posting) • Challenges remain and relate to the adoption of any new practice or the development of new curricular resources; here important issues about a) awareness; b) relevance of existing materials & c) expertise/confidence, time-constraints in making effective use of OER; d) framework for recognizing teacher concerns levels: self-concerns, task concerns, and impact concerns. Partially answered question: Are teachers motivated enough to improve student learning? PD work was refocused on helping teachers gain greater expertise and confidence with the technology first, did we see teachers begin to use OER in changing their practice.

Human: ✓ XIP: ✓

Human: x XIP: x

Human: x XIP: x

Human: x XIP: x

Synthesis

Human: ✓ XIP: ✓

Human: ✓ XIP: ✓

Total report: 3 Human: ✓ 3 XIP: ✓

5 Human: x 5 XIP: x

2 Synthesis

The same field on the same report in 4 different templates

Interesting issues in the report:

1. An expert consultation was an effective way to refine definitions and develop a view of the emerging area of OER.
2. The 4 areas identified for the objectives of the project (i.e. sustainable cost/benefit models; intellectual property rights; incentives and barriers; and, Improving access to OER)

- Cost can be improved and cost of content development reduced by sharing and reusing
- That there is a risk in 'doing nothing', given that OER offers opportunities for institutions
- Imbalance between production and use of OER

- IPR issues,
- barriers to OER adoptions
- mapping of OER activities
- productions and use of OER
- institutional policies
- IPR and open content licenses;
- Models for sustaining OER programmes
- Motivations, benefits and barriers for institutions producing OER,
- Usability, quality and validation issues regarding the use of OER

(Because the summary report doesn't give any info in this area I had to look at the full report):

1. The risk of doing nothing. Universities and colleges should act and join the OER movement now. Stakeholders, policy makers, HE and other players will be affected by the growth of OER.
2. The increase in non-formal and informal learning will increase demand for assessment / recognition of competence outside formal learning settings.
3. HE grants seldom come with a requirement to share with the general public.
4. Promotion of public-private partnerships (at national and provincial level) to combine know-how and resources as well as sharing / reducing risks.
5. The existing copyright regime is the most serious barrier to faster growth of the OER movement.
6. The build-up of a better knowledge base on the production and use of digital learning resources.
7. Informal learning using OER can be expected to grow. Can be opportunity to promote lifelong learning and meet some of the needs of an ageing population.
8. Countries deciding on neutral stand towards open or commercial educational resources.
9. The need to rethink long-term preservation of digital data.
10. Increased awareness and clear policies should be high on the OER agenda.
11. Due to intensified competition for funding, OER initiatives are looking at ways to establish loyal user communities, strong brands, increased site usability and high quality resources.
12. Grant-receiving OER initiatives devoting percentage of amount to evaluation activities (example of OpenLearn devoting 12%).
13. Making it possible to search for resources across repositories on an international level (example of GLOBE–SchoolNet).

2 semi-structured interviews

Human	XIP
Abstraction: re-phrasing, combining, ranking	Extraction
Based on rhetoric + content Rhetoric: sometimes commonplace, advertisement	Based only on rhetoric
Unequal outcome: depends on interest, availability, attention → might overlook issues	Steady output, but omissions due to parser errors
Time-consuming	Rapid
Length a problem	Length no problem

2 semi-structured interviews

Human

XIP

The annotation has no correlation with the document structure

Intuitive for expert to understand XIP annotation

Would you use it?

What's your impression?

The machine helped me

To what extent would you trust XIP?


What's your impression?


ευχαριστώ

cohere

>>> make the connection

To what extent can we combine results of

human distillation of knowledge and *machine annotations*

into a:

unique ***interactive map***,

which any other participant can use to explore, make sense of and enrich the results of analysis?

cohere

>>> make the connection

Viewed through the lens of contemporary social web tools, Cohere sits at the intersection of

- ✓ web annotation (e.g. Diigo; Sidewiki),
- ✓ social bookmarking (e.g. Delicious), and
- ✓ mindmapping (e.g. MindMeister; Bubbl)

using data feeds and an API to expose content to other services.

With Cohere, users can :

- collaboratively annotating the Web,
- Engaging in structured online discussions,
- leveraging lists of annotations into meaningful knowledge maps.

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Integration and representation of machine and human analysis

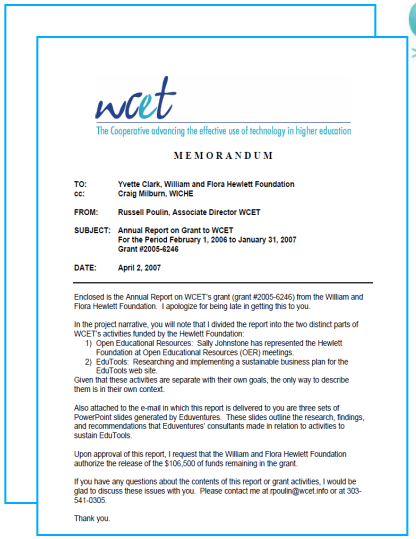
We plan to validate the integration of XIP and human analysis results (Web forms) into Cohere's maps. To do so we will:

1. Design and develop a ***Cohere import for XIP*** results
2. Design and develop a ***Cohere import for the Web Forms*** filled by the analyst
3. Create ***mash-up views*** of the results customizable by report, theme, geographical area, time etc,
4. Create specific HGR ***search and reporting interface***, to enable Hewlett to generate more traditional reports on the results of analysis.

1. Bringing XIP results into Cohere

Design and develop a Cohere import for XIP results

XIP:



wcet
The Cooperative advancing the effective use of technology in higher education

MEMORANDUM

TO: Yvette Clark, William and Flora Hewlett Foundation
cc: Craig Milburn, WICHE

FROM: Russell Poulin, Associate Director WCET

SUBJECT: Annual Report on Grant to WCET
For the Period February 1, 2006 to January 31, 2007
Grant #2005-6246

DATE: April 2, 2007

Enclosed is the Annual Report on WCET's grant (grant #2005-6246) from the William and Flora Hewlett Foundation. I apologize for being late in getting this to you.

In the project narrative, you will note that I divided the report into the two distinct parts of WCET's activities funded by the Hewlett Foundation:

1) Open Educational Resources: Sally Johnstone has represented the Hewlett Foundation at Open Educational Resources (OER) meetings.
2) EduTools: Researching and implementing a sustainable business plan for the EduTools web site.

Given that these activities are separate with their own goals, the only way to describe them is in their own context.

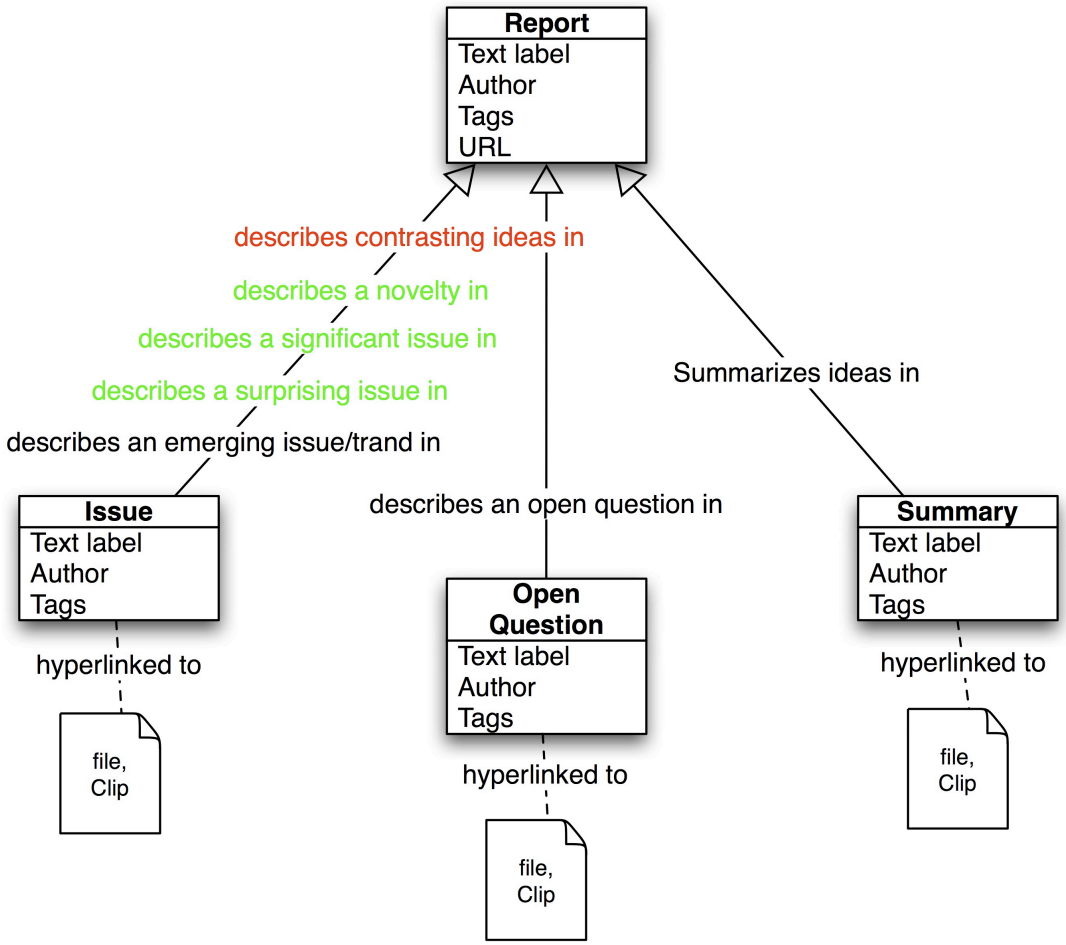
Also attached to the e-mail in which this report is delivered to you are three sets of PowerPoint slides generated by Eduventures. These slides outline the research, findings, and recommendations that Eduventures' consultants made in relation to activities to sustain EduTools.

Upon approval of this report, I request that the William and Flora Hewlett Foundation authorize the release of the $106,500 of funds remaining in the grant.

If you have any questions about the contents of this report or grant activities, I would be glad to discuss these issues with you. Please contact me at rpoulin@wcet.info or at 303-541-0305.

Thank you.

Information schema for the import: what data we imported and how we visualized them



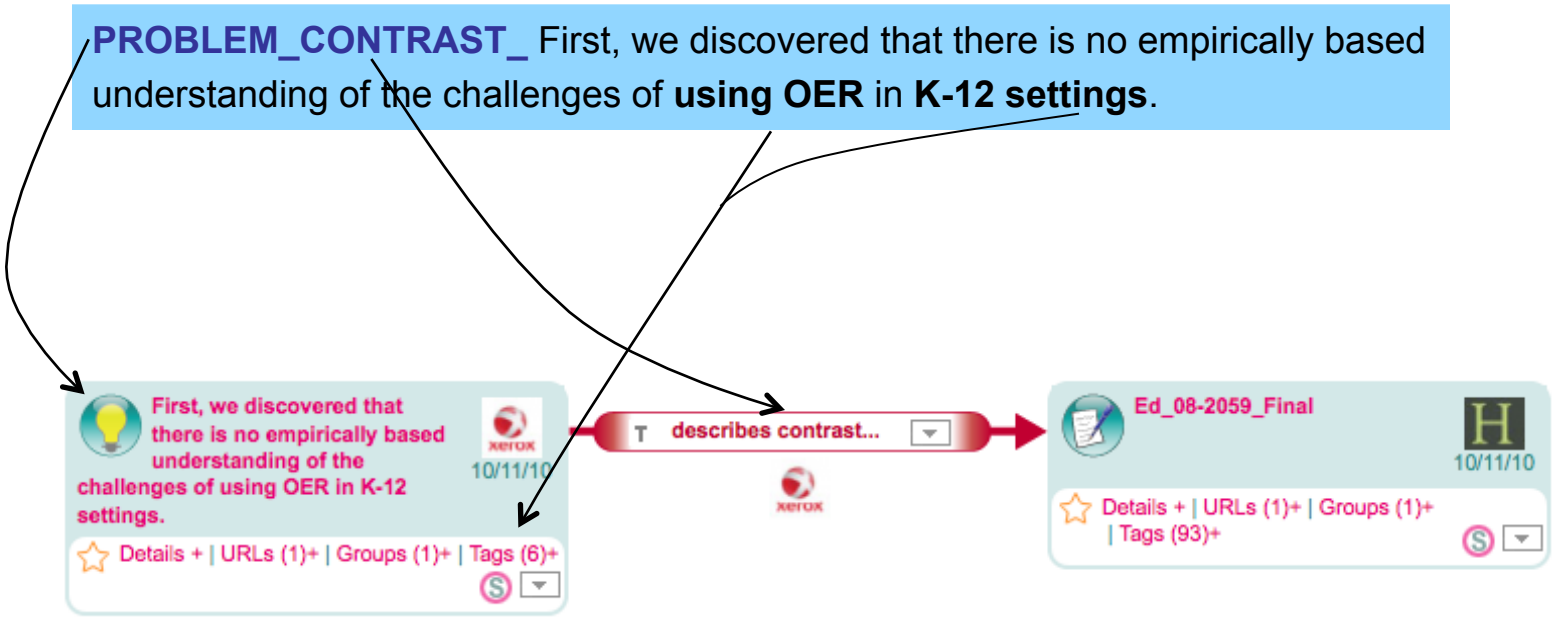
Legend

Main Classes (visualized as) Nodes types
Report
Issues
Summary
Open Questions

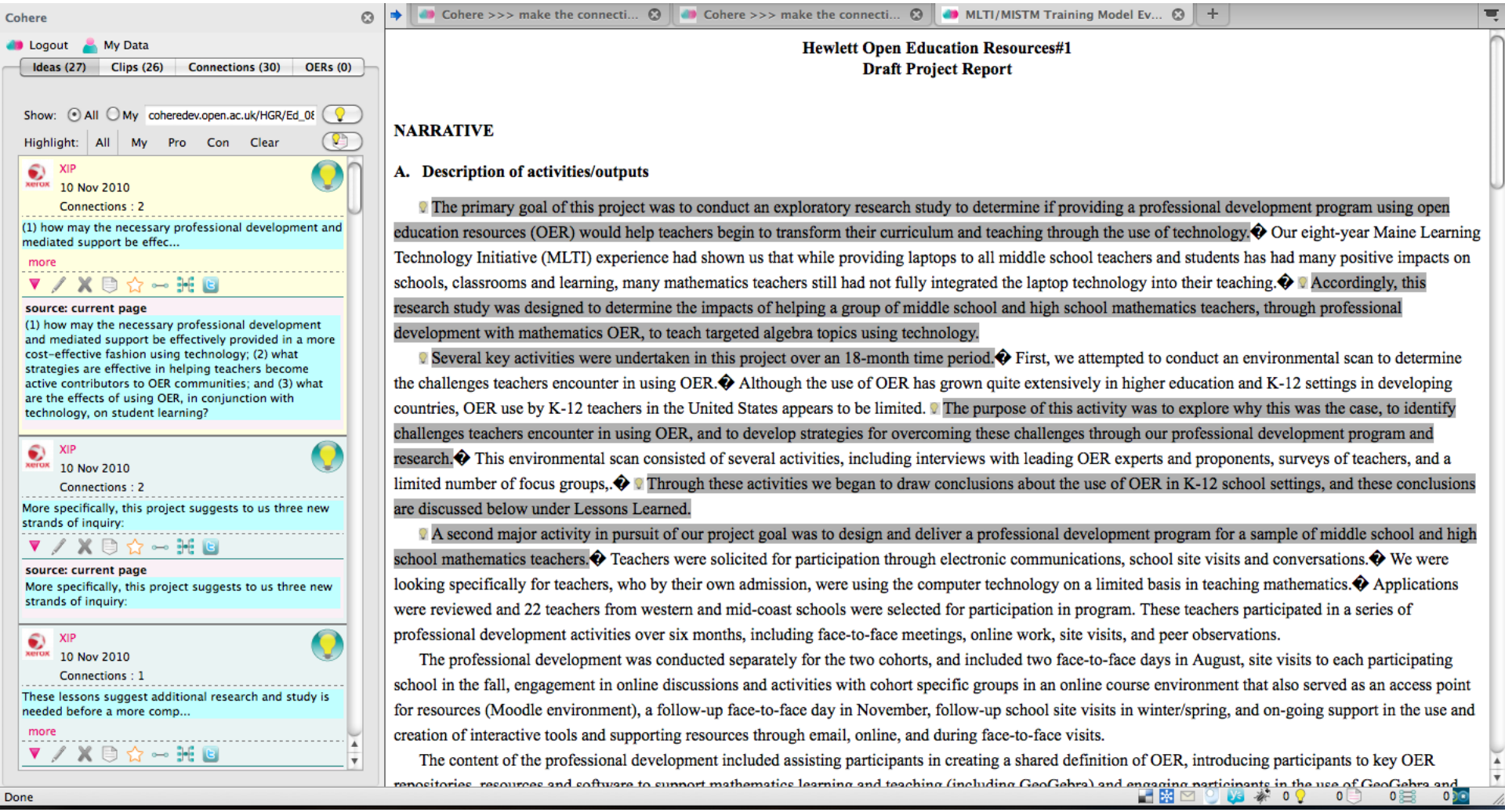
Sub Classes for Issue (visualized as) semantic connections
contrast = describes contrasting ideas in
surprise = describes a surprising issue in
novelty = describes a novelty in
significance = describes a significant issue in
generalization = describes an emerging issue/trand in

Noun Phrases (visualized as) Tags

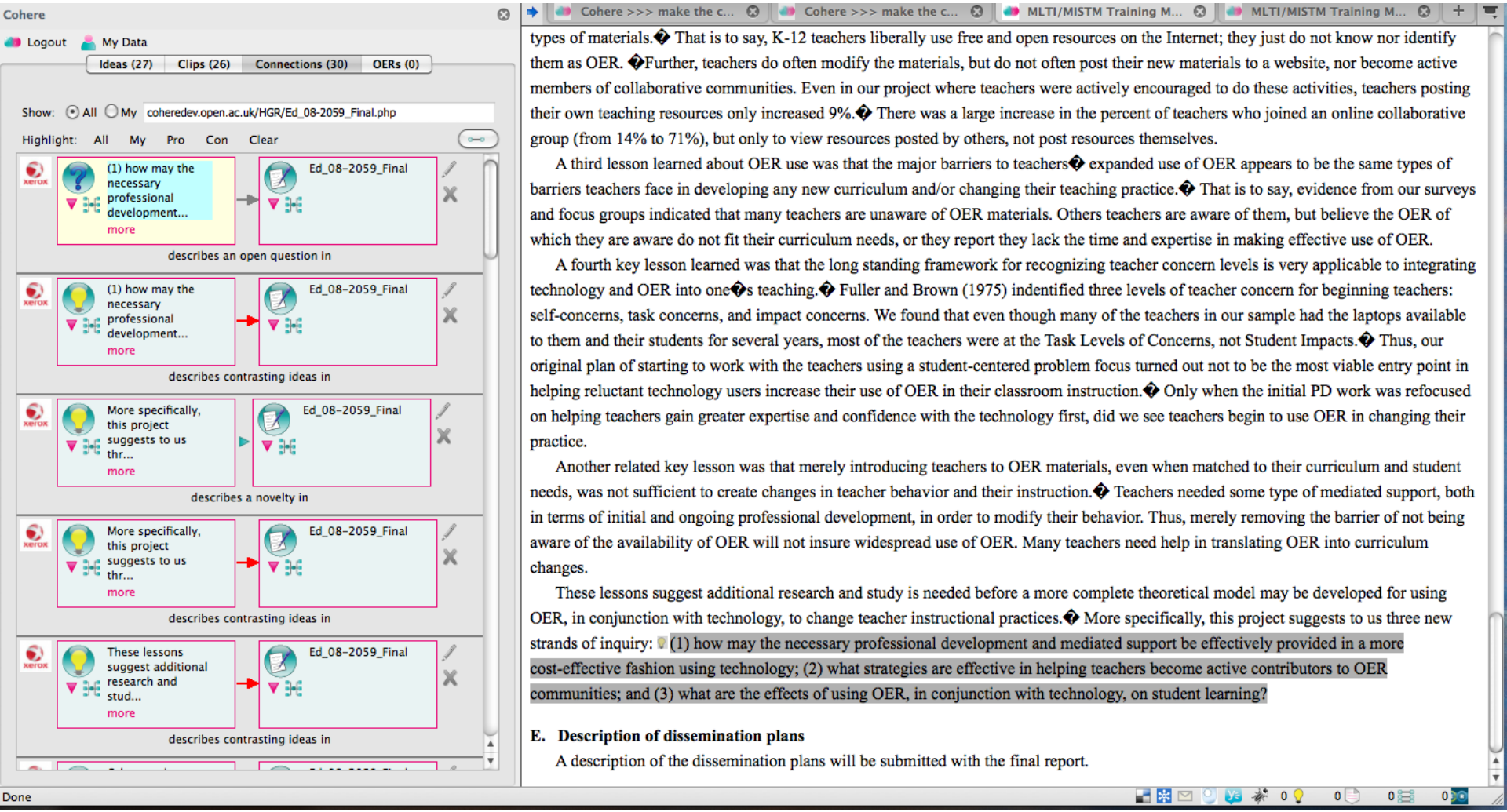
XIP annotations to Cohere



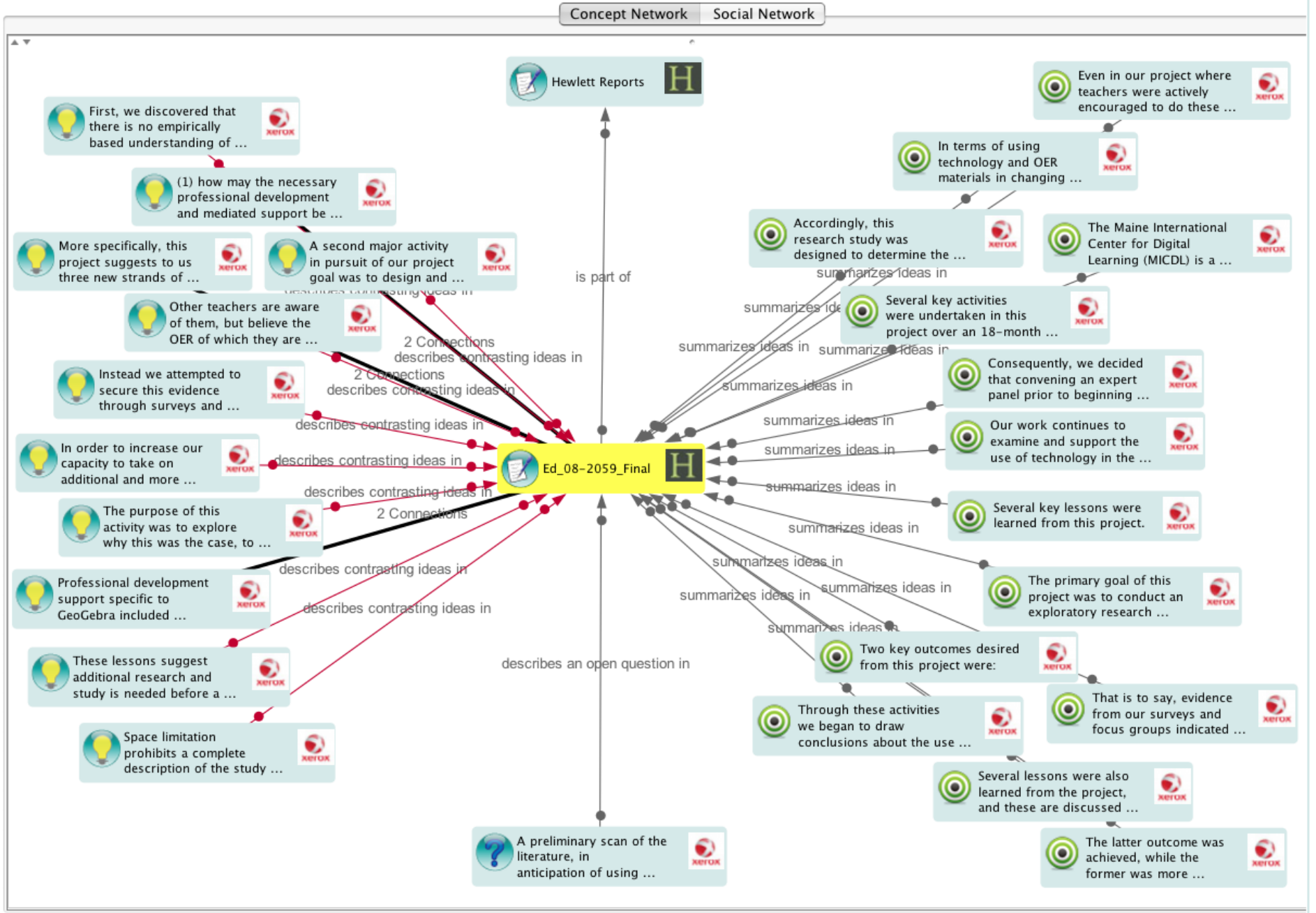
Browsing annotations from text



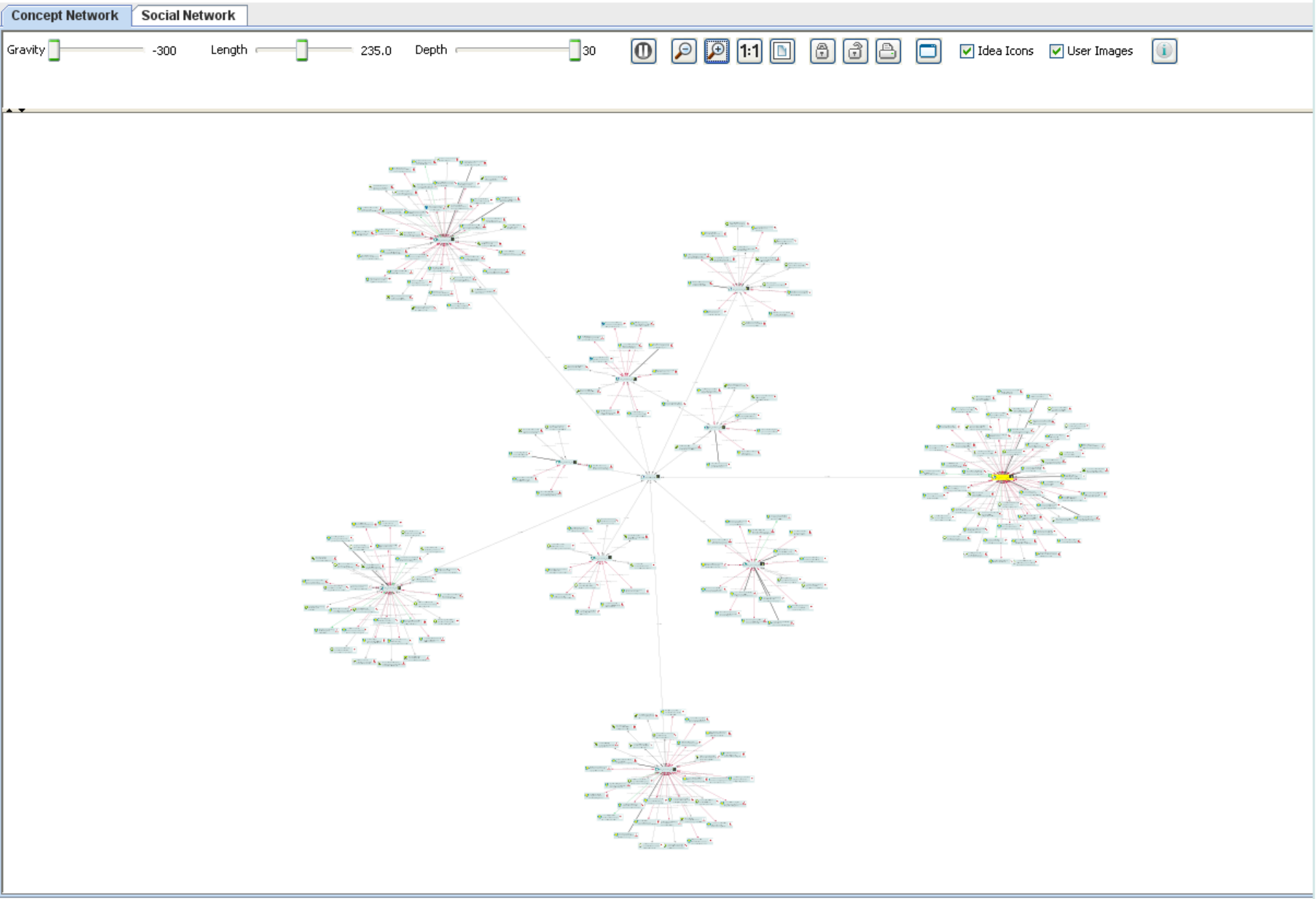
Browsing annotations from text



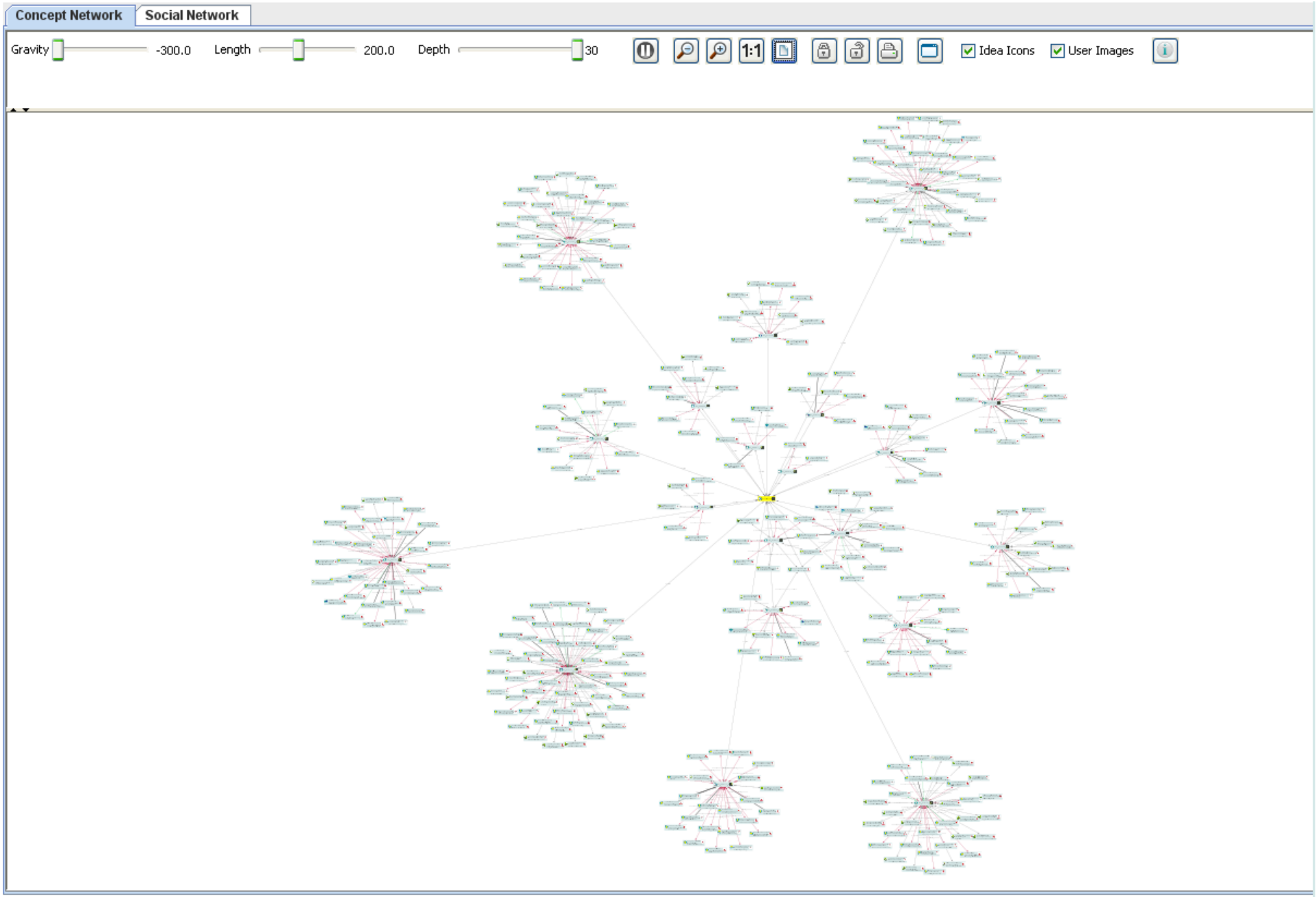
Cohere result



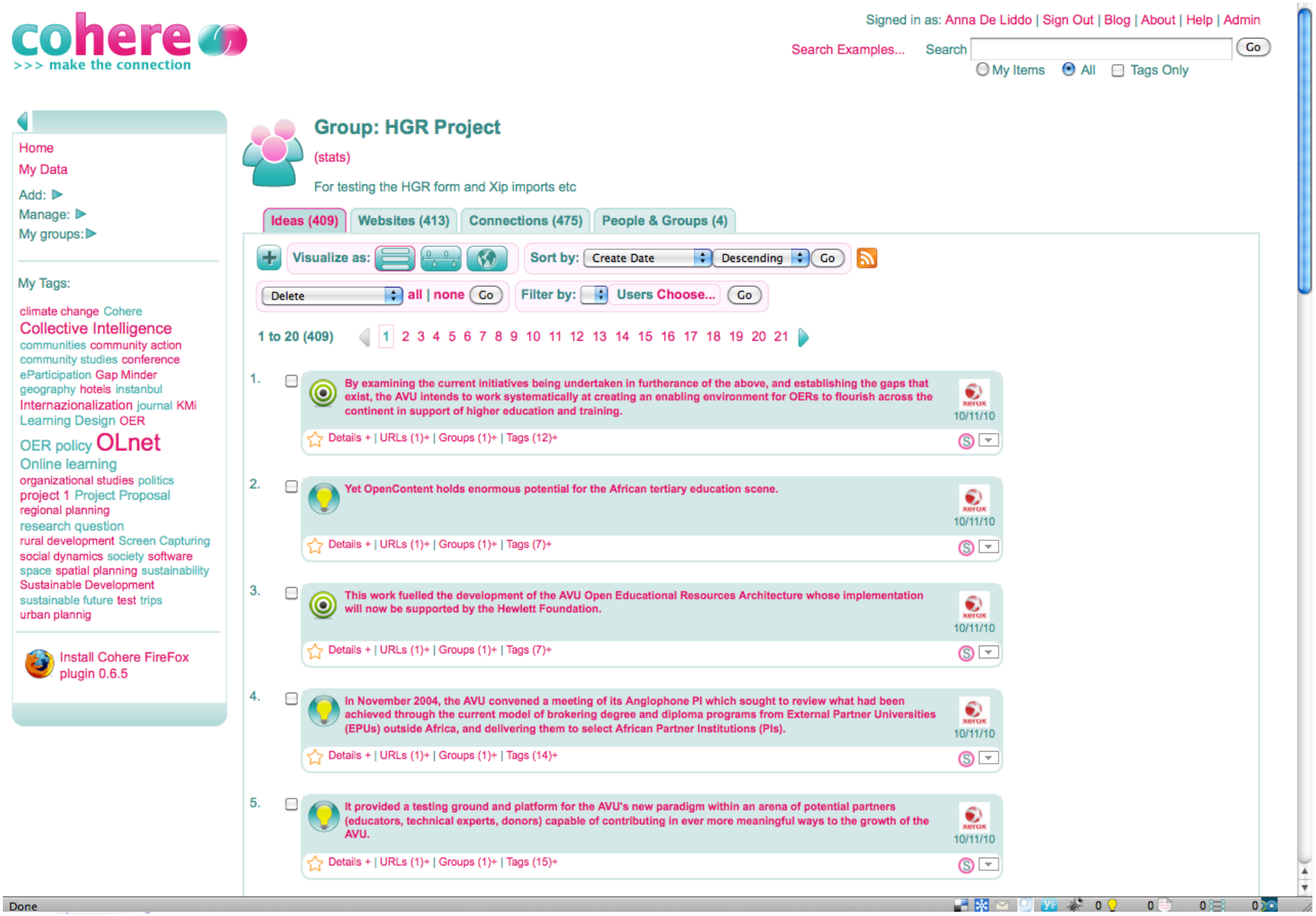
Cohere result: 10 reports



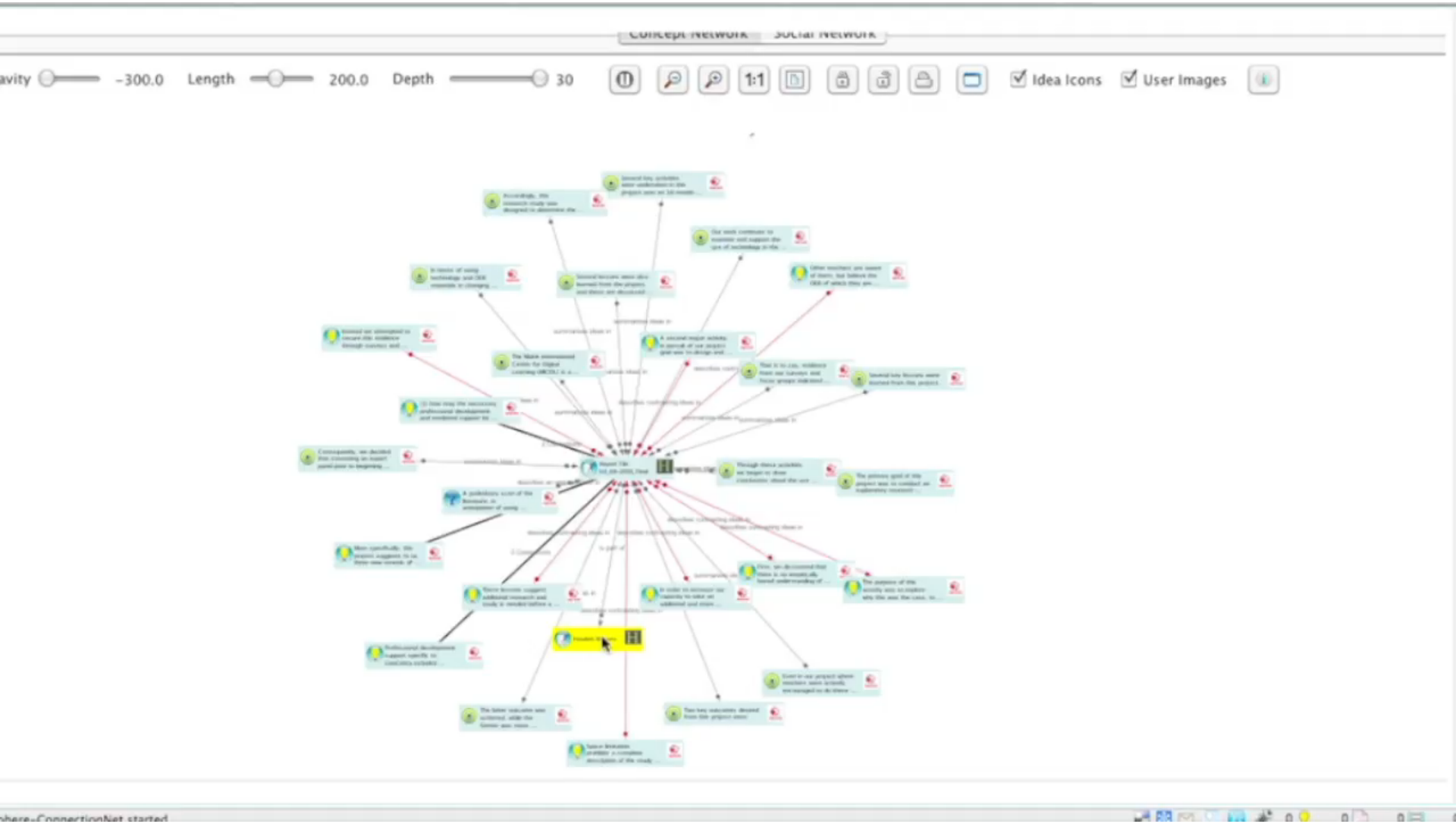
Cohere result: 20 reports



Automatic generation of tags to spot connections



Searching the network by semantic connection



Stats on Machine annotation results

Stats for XIP
in group HGR Project

SUMMARY

Name	Item	Count	Action
Most Popular Link Type	describes contrasting ideas in	237	view all
Most Popular Node Type	Idea	253	view all
Most Connected Idea	Ed_04-4117_Final	63	view all
Most Connected User	XIP	908	view all

Link Types

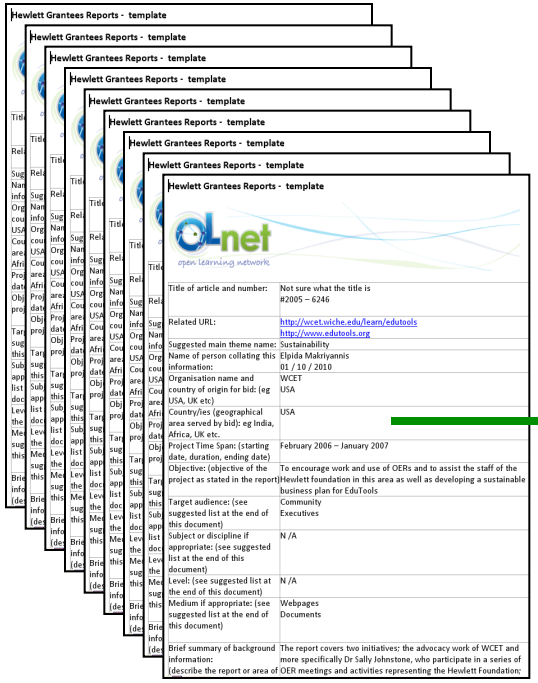
Name	Count
describes contrasting ideas in	237
summarizes ideas in	127
describes a significant issue in	43
describes a novelty in	26
describes an open question in	16
describes an emerging issue in	3
describes a surprising issue in	2

Node Types

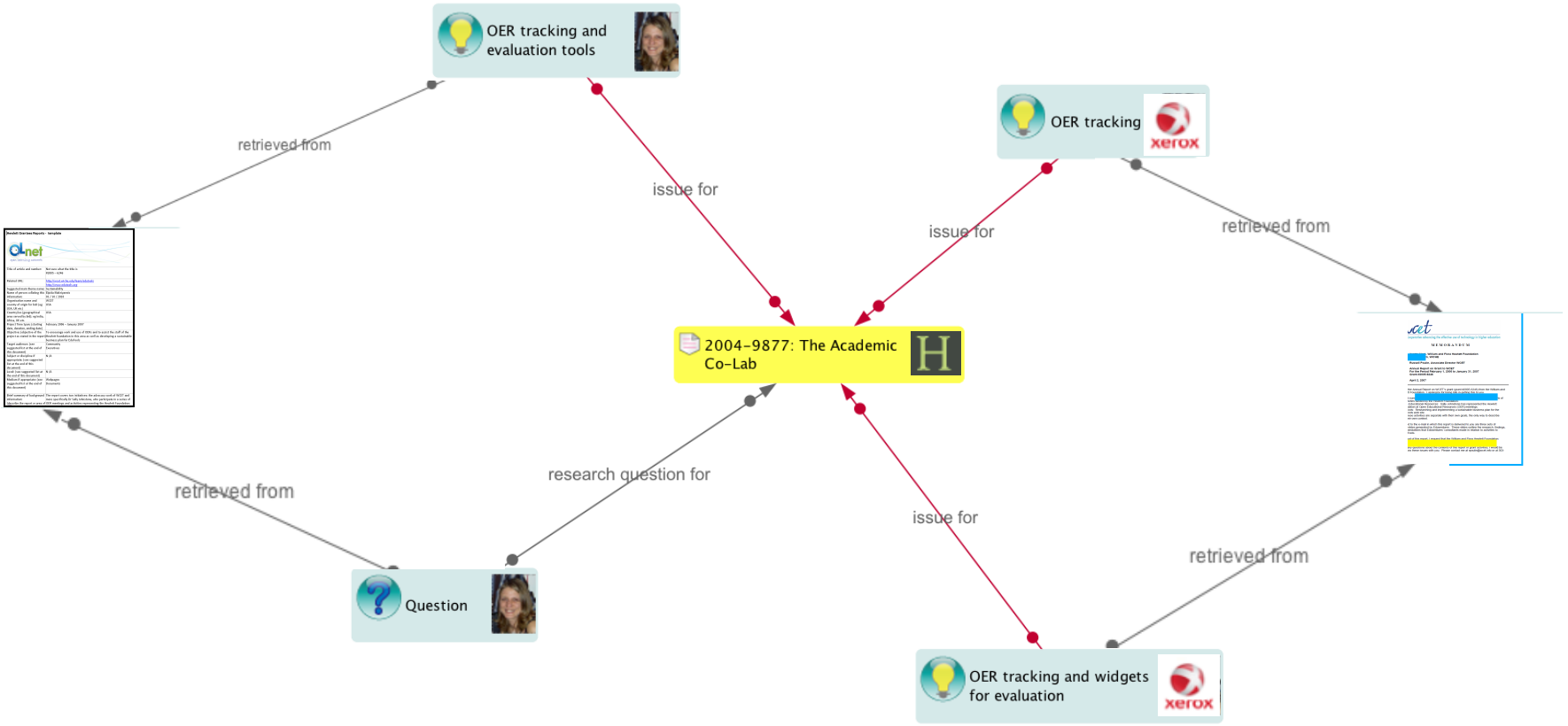
Name	Count
Idea	253
Summary	126
Question	8

Next steps

2. Design and develop a Cohere import for the Web Forms filled by the analyst



What the Results will look like?



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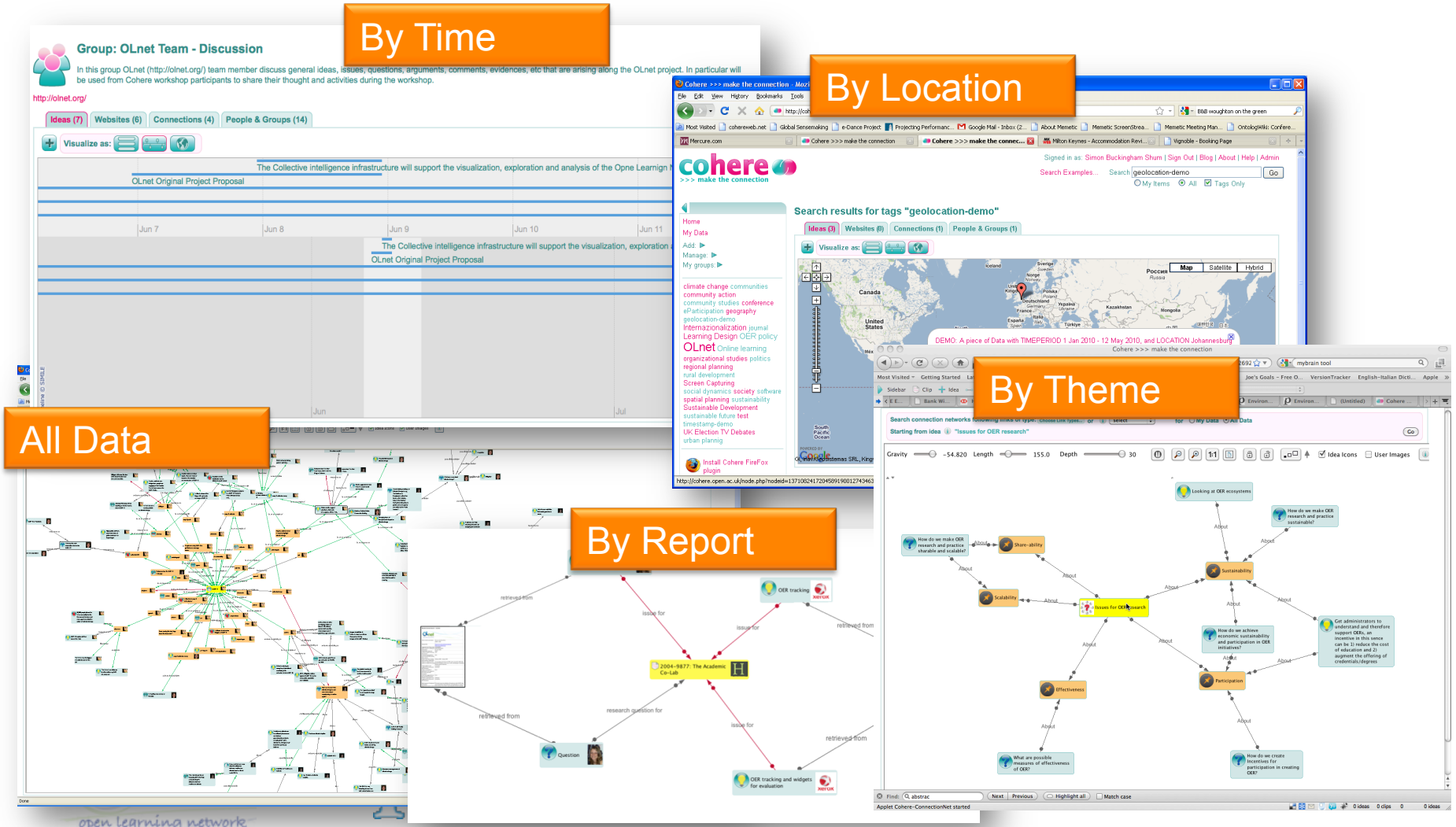
Creating mash-up views of results

3. Create mash-up views of results
4. Create specific HGR search and reporting interface



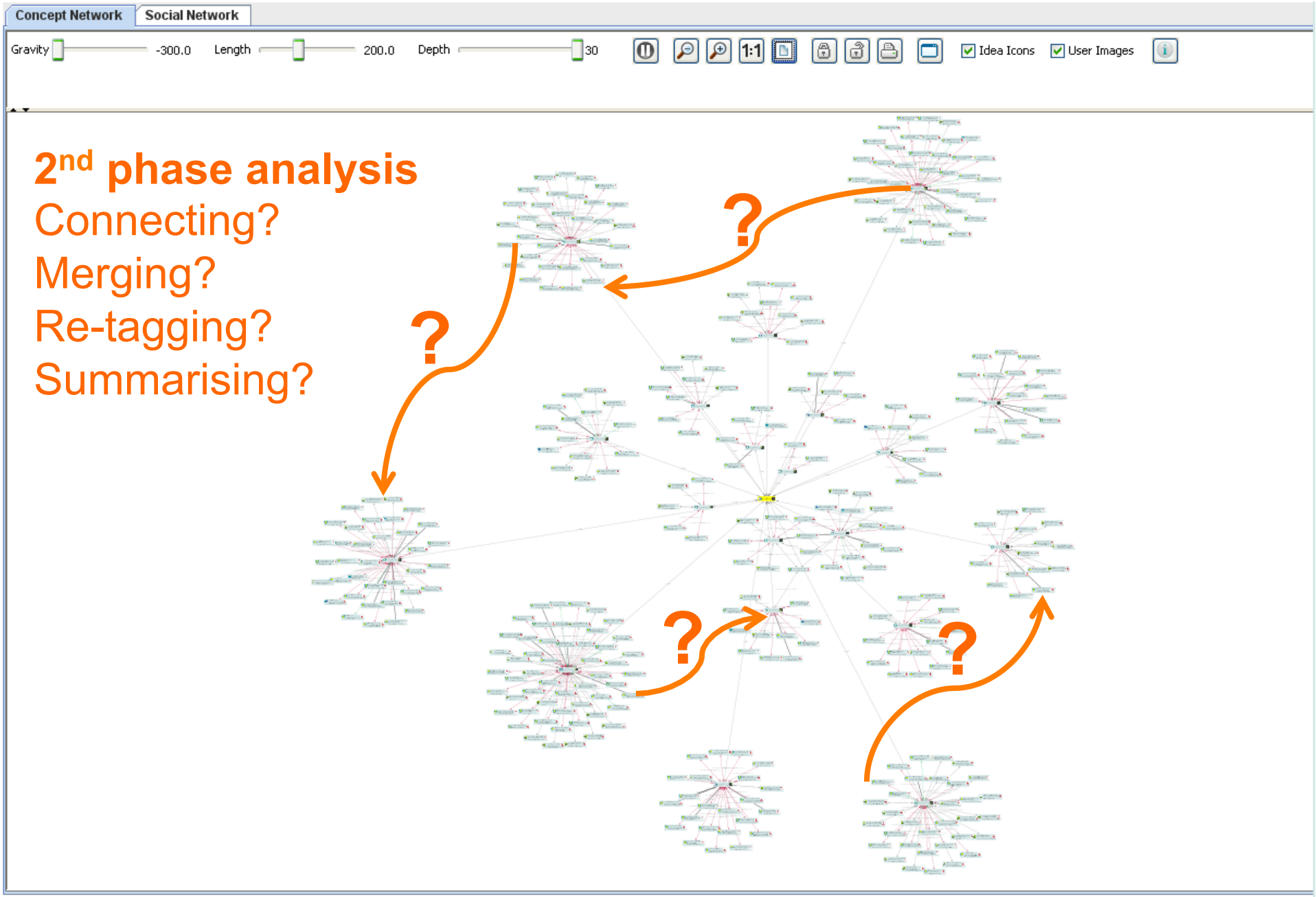
The past 6 weeks

- Technical progress:
  - Adaptation of XIP analysis of scientific papers to project reports
  - XIP annotation of the reports
  - Design and execution of XIP import to Cohere
- Comparative observations (corpus study + interviews):
  - Similarities:
    - often similar basis for annotation: rhetoric
  - Differences:
    - analysts sometimes abstract – the machine extracts
    - analysts have attitudes
    - analysts overlook – the machine makes errors

The next 6 months

- Validate the integration of XIP into Cohere
  - Does Cohere visualization enhance XIP results?
  - Does it help in sensemaking of the analyzed text?
- Making sense of sensemaking…

Making sense of the sensemaking…



Theoretical questions for future work

- How to **evaluate** human and machine annotation and sensemaking? – no gold standard
- How to **make optimal use of both human and machine annotation**?
  - How to exploit machine consistency while reducing information overload and noise?
  - How to exploit the unique human capacities to abstract, filter for relevance etc.?
- How to **cope with visual complexity** (new search interface, focused and structured network searches, collective filtering)?

References for XIP discourse analysis

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