Issues in the Analysis of Online Asynchronous Discussions

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Maria A. Rodriguez
Justyna Ciszewska-Carr
Collaborative learning supported by online asynchronous communication in university-based courses
Purpose

Present an overview of issues and lessons learned related to content analysis of online asynchronous discussions
Outline

1. Overview of content analysis (Elizabeth)
2. Validity (Maria)
3. Syntactic vs. semantic units of analysis (Justyna)
4. Reliability (Justyna)
5. Latent vs. manifest content (Maria)
6. Open discussion
Problem solving

Critical thinking

Problem solving

Cognitive dimension

Knowledge building

Critical thinking

Argumentation

Knowledge building

Argumentation
Content analysis: Purpose

Observe, identify, describe, classify, measure engagement in social & cognitive processes

- Did discussants engage in____________?
- In what ways they engage in it?
- How much did they engage in it?
Content analysis: Process

- Define the construct
- Operationalize construct with instrument
- Select unit of analysis
- Code behaviors in transcript
- Verify agreement between coders
- Triangulate
- Analyze and interpret results
Methodological issues

Validity

Reliability

Semantic vs. syntactic units

Manifest vs. latent content
Validity
Activity 1

Problem solving is

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Problem-solving instrument

2 Categories

Problem formulation
- 2 processes
- 11 indicators
- 11 examples

Problem resolution
- 3 processes
- 8 indicators
- 8 examples
<table>
<thead>
<tr>
<th>Process</th>
<th>Indicator</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining problem space</td>
<td>Agreeing with problem as presented in OAD</td>
<td>… there is a problem with getting students to speak French in the classroom, or for that matter to get the teacher to speak French in the classroom.</td>
</tr>
<tr>
<td></td>
<td>Specifying ways that the problem manifests itself</td>
<td>The reality is that students will use English, or their first language to communicate as often as possible.</td>
</tr>
<tr>
<td></td>
<td>Redefining problem within problem space</td>
<td>Perhaps the ultimate question really should be: when should L1 be used in the classroom, what contexts make it acceptable and beneficial to speak English instead of French?</td>
</tr>
<tr>
<td></td>
<td>Minimizing and/or denying problem</td>
<td>I would argue that you can indeed use English in the Core French classroom.</td>
</tr>
<tr>
<td></td>
<td>Identifying extent of problem</td>
<td>It seems to me that this issue of French/English use in the classroom will be one of the biggest challenges we will face as teachers.</td>
</tr>
<tr>
<td></td>
<td>Identifying causes of problem</td>
<td>My understanding of the problem is that Core French teachers are unsure of how much French to use because they don’t know how much their students will understand.</td>
</tr>
<tr>
<td></td>
<td>Articulating a problem outside problem space</td>
<td>I believe it is true that non-English speaking children are losing their mother tongue through the education system. Look at the focus of our ESL programmes.</td>
</tr>
<tr>
<td>Building knowledge</td>
<td>Identifying unknowns in knowledge</td>
<td>How can we reach those students who have below grade level skills, and provide them with some understanding of the target language?</td>
</tr>
<tr>
<td></td>
<td>Accessing and reporting on sources of information</td>
<td>According to the author, pupils should be allowed to use English between themselves while working in teams.</td>
</tr>
<tr>
<td></td>
<td>Identifying value of information</td>
<td>This article was not effective in teaching me about this problem.</td>
</tr>
<tr>
<td></td>
<td>Reflecting on one’s thinking</td>
<td>Once again, the negative view I previously had on this problem is becoming increasingly more positive.</td>
</tr>
<tr>
<td>Process</td>
<td>Indicator</td>
<td>Example</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Identifying Solutions</strong></td>
<td>Proposing solutions</td>
<td>I feel teachers need to use French more if they expect their students to use it.</td>
</tr>
<tr>
<td></td>
<td>Hypothesising about Solutions</td>
<td>I believe that if a teacher were to make mistakes and correct them in front of a class, it would ease the students' minds about making mistakes themselves and enable them to correct themselves.</td>
</tr>
<tr>
<td><strong>Evaluating Solutions</strong></td>
<td>Agreeing with solutions proposed by others</td>
<td>I agree strongly with participant 6's views. Especially for Immersion students.</td>
</tr>
<tr>
<td></td>
<td>Weighing &amp; comparing alternative Solutions</td>
<td>I sincerely believe that using the target language 100% of the time creates a stagnant environment for learning. On the other hand, too much use of English would only serve to 'baby' students.</td>
</tr>
<tr>
<td></td>
<td>Critiquing solutions</td>
<td>While I agree somewhat with participant 3, I think some students at lower levels may become too frustrated when trying to learn the language when a teacher uses only French.</td>
</tr>
<tr>
<td></td>
<td>Rejecting solutions judged unworkable</td>
<td>I don’t think it is right to start the year off with a solid plan of attack.</td>
</tr>
<tr>
<td><strong>Acting on Solutions</strong></td>
<td>Planning to act</td>
<td>Personally, I have decided to speak English the first day of classes.</td>
</tr>
<tr>
<td></td>
<td>Reaching conclusions, or an understanding of the problem</td>
<td>The methods which all of these sources have suggested prove that language use in the classroom is a major problem, but is also easily mended with use of the proper tools, and creativity.</td>
</tr>
</tbody>
</table>
Threats to validity

- Construct under-representation
- Construct irrelevance
- Lack of discriminant capability
Construct under-representation: Definition

The inability of an instrument to adequately define or encompass important aspects of the construct\textsuperscript{3,4}
Construct under-representation: Example

**Category:** PROBLEM FORMULATION  
**Process:** *Defining problem space*

<table>
<thead>
<tr>
<th>A</th>
<th><strong>Indicators</strong></th>
<th>B</th>
<th><strong>Indicators</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agreeing with problem as presented</td>
<td></td>
<td>Agreeing with problem as presented</td>
</tr>
<tr>
<td></td>
<td>Specifying ways that the problem manifests itself</td>
<td></td>
<td>Specifying ways that the problem manifests itself</td>
</tr>
<tr>
<td></td>
<td>Identifying extent of problem</td>
<td></td>
<td>Redefining problem within problem space</td>
</tr>
<tr>
<td></td>
<td>Identifying causes of problem</td>
<td></td>
<td>Minimizing and/or denying problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identifying extent of problem</td>
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<td></td>
<td></td>
<td>Identifying causes of problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Articulating problem outside problem space</td>
</tr>
</tbody>
</table>
Construct irrelevance: Definition

The tendency to include irrelevant constructs distinct from, or surplus to the intended construct to be measured\textsuperscript{3,4}
Construct irrelevance: Example

Recognising group presence \neq \text{Problem Formulation and Resolution}

Recognising group presence = Collaboration
Discriminant capability: Definition

Discriminant capability refers to the ability of an instrument to “readily and unambiguously [permit] placing of conference content into discrete and useful categories”\(^5\)
Discriminant capability: Example

Avoiding ambiguity in wording and lack of exclusivity between terms:

Understanding the nature of the problem *and* the ways in which it manifests itself

Specifying ways that the problem manifests itself
Validity:
Lessons learned

- ✓ is key as a starting point in content analysis
- ✓ requires systematic and detailed consideration
- ✓ requires repeated testing
Unitizing
It is very important to try and get parents involved for this reason. Parents are very important role models to their children. It is important to try to get parents involved so their children will look at their school as a place of importance to their own lives. Laura also noted that it was important to give parents the message that the school cares. This caring message should come from the people that they have contact with every day i.e.: their teachers, the principal, and other school staff.
Types of units of analysis

Semantic vs. Syntactic

Semantic: Theme, idea, meaning
Syntactic: Sentence, paragraph, message
Identifiability

Are sentences and paragraphs easily identifiable in the transcripts?

Reliability

Will the coders be able to agree on the units?
Discriminant capability

Do the units discriminate between behaviors?

Feasibility

Will coding the units be feasible in terms of time and resources?
Data sources

- Online learning module for Problem Formulation and Resolution
- Month-long discussion
- 1 problem and 8 tasks
- Problem = parental involvement in schools

- Fall 2004 @ Memorial
- Discussants were 7 graduate and 3 undergraduate students from 2 Counselling psychology courses
Choice of semantic units: Maria vs. Justyna

It is very important to try and get parents involved for this reason. Parents are very important role models to their children. It is important to try to get parents involved so their children will look at their school as a place of importance to their own lives. Robert also noted that it was important to give parents the message that the school cares. This caring message should come from the people that they have contact with every day i.e.: their teachers, the principal, and other school staff.
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Agreement in unitizing

<table>
<thead>
<tr>
<th>Discussant</th>
<th>Maria</th>
<th>Justyna</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>B</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>C</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>D</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>E</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>F</td>
<td>30</td>
<td>41</td>
</tr>
<tr>
<td>G</td>
<td>47</td>
<td>44</td>
</tr>
<tr>
<td>H</td>
<td>26</td>
<td>38</td>
</tr>
<tr>
<td>I</td>
<td>30</td>
<td>65</td>
</tr>
<tr>
<td>J</td>
<td>80</td>
<td>57</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>393</strong></td>
<td><strong>457</strong></td>
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</table>
Agreement in unitizing

<table>
<thead>
<tr>
<th>Discussant</th>
<th>Maria</th>
<th>Justyna</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>B</td>
<td>29</td>
<td>29</td>
</tr>
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<td>C</td>
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<td>35</td>
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<td>D</td>
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<td>40</td>
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<tr>
<td>E</td>
<td>32</td>
<td>32</td>
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<tr>
<td>F</td>
<td>35</td>
<td>35</td>
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<tr>
<td>G</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>H</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>I</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>J</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>355</strong></td>
<td><strong>355</strong></td>
</tr>
</tbody>
</table>
Unitizing:
Lessons learned

- Coding cannot begin until the units have been defined.

- Definition of the units will depend on the context and characteristics of the discussion.

- Effective choice of unit will involve balancing the different issues.
Reliability
Activity 3

Read the following excerpt. Refer to the PFR instrument (handout) to associate a category, process, and an indicator with the excerpt.

In rural settings the distance from a student’s home to the school may be great and this will hinder involvement from the parents… In some cases, parents do not have the resources available to be regularly involved in the school because of socio-economic factors.

Problem ___________________ (formulation or resolution)
Process _________________
Indicator _________________
Inter-rater reliability: Definition

Extent of agreement between independent coders$^6$
Inter-rater reliability:
Example

<table>
<thead>
<tr>
<th>Country</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>5.4</td>
</tr>
<tr>
<td>Russia</td>
<td>6.0</td>
</tr>
<tr>
<td>USA</td>
<td>3.2</td>
</tr>
<tr>
<td>Germany</td>
<td>4.9</td>
</tr>
<tr>
<td>Italy</td>
<td>3.6</td>
</tr>
</tbody>
</table>
Measuring reliability

Cohen’s kappa - chance corrected measure
<table>
<thead>
<tr>
<th>Kappa</th>
<th>Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 → 0.40</td>
<td>poor</td>
</tr>
<tr>
<td>0.40 → 0.75</td>
<td>fair to good</td>
</tr>
<tr>
<td>0.75 → 1.00</td>
<td>excellent</td>
</tr>
</tbody>
</table>
Value of agreement between Maria & Justyna^8

Total agreement

0.591
Reliability: A complex issue

Sources of difference

- Discussion tasks
- Discussants
- Number of coding decisions
Differences in agreement across discussants

<table>
<thead>
<tr>
<th>Discussant</th>
<th>Reliability value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.638</td>
</tr>
<tr>
<td>B</td>
<td>0.853</td>
</tr>
<tr>
<td>C</td>
<td>0.390</td>
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<tr>
<td>D</td>
<td>0.702</td>
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<tr>
<td>E</td>
<td>0.891</td>
</tr>
<tr>
<td>F</td>
<td>0.668</td>
</tr>
<tr>
<td>G</td>
<td>0.714</td>
</tr>
<tr>
<td>H</td>
<td>0.596</td>
</tr>
<tr>
<td>I</td>
<td>0.907</td>
</tr>
<tr>
<td>J</td>
<td>0.706</td>
</tr>
<tr>
<td>MEAN</td>
<td>0.707</td>
</tr>
</tbody>
</table>
Reliability: Lessons learned

- Reporting reliability as a percentage agreement can be misleading.
- A single measure of inter-rater reliability will mask many other sources of difference.
- A focus on many variables can provide insight into intricacies of agreement.
Latent content
Activity 4

Read the following excerpt. What question would you ask this discussant in a subsequent interview situation to gain more insight into his approach to problem resolution?

My first initial reaction to reading your 2 plans of action was excitement, as they are being currently implemented and are most importantly successful in creating a school community, parents included! Good job! I saw many positives to what you and your schools are doing for your children and their parents.
Manifest content

↓

Observed behaviors

↓

Transcript analysis

↓

Which behaviours discussants engaged in
How much they engaged in those behaviours
Latent content

Intended behaviors

Interviews

Why discussants didn’t engage in certain behaviours

Why they favoured some behaviours over others
Examples from interviews

Why discussants didn’t engage in critiquing solutions:

A
I disagreed with [discussant 15] to a certain extent .... I remember when I was writing that comment I spent a lot of time rewording ... so that it wouldn't come off as being too critical.

B
When I reflect back to people, a lot of times it is to congratulate, them, support them, and compliment them.... You want to point out to people "Hey, that's a good idea!" ... not "That's no good!" That's not the way I operate in real life.
Examples from interviews

Why discussants favored proposing solutions:

A

When faced with a problem, automatically I just think to myself ‘What can I do to solve this problem?’

B

I am more of a solution person [because] in life there are always going to be problems.
Examples from interviews

Why discussants favored using experience:

A

I [shared my experience] because others may only have had the perspective from the school.

B

I really identified with the problem and different solutions that we come up with at work … [I was] dealing with my own experience and what other people said. I just kind of built on that.
Latent vs. manifest content: Lessons learned

- A form of triangulation to provide more in-depth and meaningful results
- Requires protocols or approaches to help discussants engage in meta-cognitive activity
Content analysis: Conclusions

- Can provide detailed insight into discussants’ performance.
- Provides insight into the effectiveness of the discussion.
- There are issues within issues.
- Is complex, problematic, and onerous.
Content analysis: Complexity

coders
validity
manifest content
reliability
Latent content
identifiability
Unit of analysis
discriminant capability
Inter-rater reliability
Construct under-representation
Construct irrelevance
Tasks
Feasibility
Discussants

Notes


Online bibliography

Online Asynchronous Discussion in Teaching and Learning: A Bibliography
http://www.ucs.mun.ca/~emurphy/biblio.htm

• Content Analysis
• Moderating/Facilitating/Structuring
• Communities
• Collaboration/Interaction
• Quality Improvement
• Problem Formulation and Professional Practice
• Evaluating/Grading
• General
• Critical Thinking
• Participation
• Case Studies
Bibliography


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Thanks, Gracias, Dziękujemy