Conducting discourse analysis using videographic software

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Background

- An aspect in qualitative research.
- Provides a more holistic view of events and situations (Collier & Collier, 1986).
- Mirror with memory (Collier & Collier, 1986; Mehan, 1979)
- Allows more complete analysis (Ratcliff, 1996)
  - Repeated watching: reducing possibility of premature inference and conclusion.
  - Microanalysis of behaviour that is not observable any other way by comparing individual frames of the event.
- Multiple analysts
  - Reliability of descriptions and constructs (Lancy, 1993)
  - Triangulation (Mehan, 1979)
Videographic Components

- Video artifacts
  - Records of social activity, local meanings and disciplinary, and cultural knowledge (Skukauskaite, Liu, & Green)
  - ≠ reality
- Video transcripts
  - Text format
  - Preferred for detailed analysis.
- Videographic software
  - Offers an alternative to transcription
  - Complementary to transcription (e.g. combine with focused transcription)
  - Coding, comparison, linking video segments to one another, linking video to text and other visual data (Ratcliff, 2004)
  - Facilitates multiple observers to analyse and compare.
  - Softwares: Transana, Nudist, Studiocode, etc.
Video Analysis

- Theoretical approaches:
  - Research on subject matter content, neo-Vygotskian, classroom discourse, conversation analysis and ethnomетодology in sociology, ethnography of communication, interactional sociolinguistics, discourse analysis in anthropology and linguistics, context analysis. (Erickson, 2006)
Presentation focus

- To illustrate a process of developing a coding scheme using videographic software (StudioCode).
- A case study on students’ difficulties in solving mathematics problems that involve fractions and fractional thinking.
- Focus of analysis: From pair interactions, we study students’ conceptions and reasoning about fractions.
- Analytical approach: Constant comparative data analysis (Glaser & Strauss, 1967)
  - Inductive process of generating categories of instances in the data and comparing categories (among instances, instances to categories, and categories to categories)
- Artifacts: Video records of 7 primary school pairs.
Development of Coding Scheme

Approach: Constant comparative data analysis

Step 1: Watch and review video 1

Step 2: Identify open codes for categories
  1. Text orientation
  2. Model representation
  3. Computational procedure
  4. Evaluation
Development of Coding Scheme

Approach: **Constant comparative data analysis**

Step 3: Define **sub-categories** to specify instances in Video 1
Video Coding 1
Development of Coding Scheme

Approach: **Constant comparative data analysis**

Step 4: Analyse: “what did the students think resulting in the actions they evidently did?”

<p>| | | | | | | | | |</p>
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<thead>
<tr>
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<td>00:04:45.00</td>
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Find instances
Sample of Analysis

**Model 1**

\[
\begin{array}{c}
\text{Men} \\
\text{Women}
\end{array}
\]

# married men = # married women (monogamy)

# men ≠ # women

**Model 2**

\[
\begin{array}{c}
\text{Men} \\
\text{Women}
\end{array}
\]

# married men = # married women (monogamy)

# men = # women

**Model 3**

“men” is partitioned into the same number of parts as “women”.
Sample of Analysis

**Calculation 1**

Fractional relationship conceived:

\[
\frac{2}{3} + \frac{3}{5} = 1 \frac{4}{15}
\]

**Calculation 2**

Fractional relationship conceived: (Part-whole)
Frac. Married adults = # shaded parts / # parts
**Frequency & Duration**

Statistics for FT&ZY_Q1_TimelineV3.
Number of rows: 16

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<th>total time</th>
<th>%</th>
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<td>00:00:34.72</td>
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<tr>
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<tr>
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<tr>
<td>HKF</td>
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2 x 2 matrix: “conceptions” vs “categories”
# Matrix and Timeline

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<tr>
<th>Text Orientation</th>
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<th>Model Representation</th>
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<td>Alignment</td>
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<td>Procedure</td>
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<td>Calculation 1</td>
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<tr>
<td>Calculation 2</td>
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<td>1</td>
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<tr>
<td>Evaluate - Rep</td>
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<td>ZY &amp; FT</td>
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<td>1</td>
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<tr>
<td>ZY</td>
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<td>1</td>
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<tr>
<td>HKF</td>
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</tbody>
</table>

### Timeline Diagram

- **Model 1**
  - Partition 1
- **Model 2**
  - Partition 2
- **Model 3**
  - Partition 3
- **Model 4**
  - Partition 4
- **Model 5**
  - Calculation 1
  - Calculation 2
  - Calculation 3
  - Calculation 4

- **CR1(M=M=W)** | Align
- **CR2(M=W)** | C
- **CR3(FMD=FWM)** | CR1(M=M=W)
Development of Coding Scheme

Approach: Constant comparative data analysis

Step 5: Refinement of codes

Model 3 is derived from model 2: “men” is partitioned into the same number of parts as “women”.

![Diagram showing Model 2 and Model 3]

Define new code: Partition
Refining code
Refining coding scheme
Development of Coding Scheme

Approach: **Constant comparative data analysis**

Step 6: Use coding scheme to code video 2

The students in video 2 drew totally different model from the students in video 1:

**Model 3**

\[
\begin{array}{c}
\text{Men} \\
\text{Women}
\end{array}
\]

\[
\begin{array}{c}
\text{Married} \\
\text{Shaded}
\end{array}
\]

\[
\frac{5}{8}
\]

Fractional relationship conceived:
Per (Part-whole)
Frac. Married adults = 
\# shaded parts / \# parts

**Model 4**

\[
\begin{array}{c}
\text{Men} \\
\text{Women}
\end{array}
\]

\[
\begin{array}{c}
\text{Married} \\
\text{Shaded}
\end{array}
\]

\[
\frac{2}{8}
\]

Put calculation into **Calculation 2**
Coding scheme generated from Video 1 & 2

- Text Orientation (T)
- Model Representation (R)
- Computational Procedure (P)
- Evaluation (E)
- Reading (B)
- Analysing (A)
- Partitions 1 and 2
- Calculations 1, 2a, 2b, 2c
- Evaluate - Answer (X)
- Evaluate - Representation (Y)
- Evaluate - Computational Procedure (Z)
Development of Coding Scheme

Approach: Constant comparative data analysis

Step 6: Use coding scheme to code video 3

There is a sign of stabilisation, the students in video 3 drew Model 1 and did calculation 1. There is an additional model drawn:

Model 5

Fractional relationship conceived:
(Part-whole)
Frac. Married adults = # shaded parts / # parts

Put calculation into Calculation 2
Coding scheme generated from Video 1, 2 & 3
Development of Coding Scheme

Approach: Constant comparative data analysis

Continue this iterative process until video 7.
Coding scheme generated from 7 videos

- No additional model types
- Adding 2 partition types and 4 calculation types
What this coding scheme tells us?

Relationship reflected in the students’ models:
1. Number of married men = number of married women (monogamy) Model 1 and model 2)
2. Number of men ≠ number of women (Model 1 and model 3)
3. Number of men = number of women (Model 2 and model 5)
4. Number of men = 3/5 number of women (Model 3)
5. Number of married men = 2/3 number of married women (non-monogamy) (Model 3)
6. Number of married men = 10/9 number of married women (non-monogamy) (Model 5)
7. Number of married adults = number of married men (Model 4)
8. Unit size of men = unit size of women (Model 3, model 4, and model 5)
What this coding scheme tells us?

2. Frac. Married adults (of adults) = Frac. Married men (of men) + Frac. Married women (of women) (Cal 1: Pair 1, 2, 3, 4, 6, 7)
3. Frac. Married adults + Frac. Unmarried adults = the whole (Cal 5, 6: Pair 4, 7)

Students’ conception of fractions on the results of the calculations:
1. Fraction (>1): The value represented by units in the model (Cal 4, 5: Pair 7)
2. Fraction (>1): The “whole” (Cal 6: Pair 4, 7)
3. Fraction (>1): Part-whole fraction of two wholes (Cal 1: Pair 1)
4. Fraction (>1): Part-whole fraction of one whole (Cal 1: Pair 3, 4)
The process of video data analysis is cyclical.
Constant changes in the coding scheme and the change of coding.
Saturation of the coding scheme:
  - Stabilised: model
  - Not yet stabilised: calculation and partition
Development of the coding scheme is time-consuming
  - After “stabilised”: saves time in extending the analysis to a larger scale of video data (e.g. for pattern analysis).
Benefits of Using Videographic Software

- Play specific instances
- Play parts or all instances under a specific category
- 2 x 2 Matrix: Save time, common occurrence, exportable to excel format.
- Save time in modifying coding scheme, refinement of coding (as compared to manual modification)
- Integration of transcripts in the timeline: Analyse interaction and discourse.
- Creates movie clips
Thank You!!!

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