Tracing spontaneous spatial text-learning strategies in late elementary education: comparing trace data, digital writing pen data and eye tracking data

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Introduction

Spontaneous spatial text-learning strategies are associated with better learning outcomes (Fiorella & Mayer, 2017).

- Less is known about this strategy use in late elementary education $\iff$ increasing academic demands for independent text study (Duchesne, Ratelle & Roy, 2011).

- How can we capture these strategies in detail at this age? $\iff$ The present study compares three different methodologies to investigate these strategies in fifth and sixth grade.

<table>
<thead>
<tr>
<th>STUDY 1: Offline trace data</th>
<th>STUDY 2: Online trace data</th>
<th>STUDY 3: Eye tracking data</th>
</tr>
</thead>
<tbody>
<tr>
<td>644 students from 17 classes</td>
<td>18 students from 12 classes</td>
<td>44 students from 4 classes</td>
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<tr>
<td>Students studied a 500-word informative text. They were allowed to use scratch paper.</td>
<td>Students schematized a 300-word informative text with a Livescribe® digital writing pen.</td>
<td>Students studied a digital mind map of an informative text. The SR Eyelink Portable duo® was used for eyetracking.</td>
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<tr>
<td>Scratch papers were analyzed with a detailed scoring rubric (e.g., scoring structure, color use, integrating key words, content etc.).</td>
<td>Pencast analyses (e.g., writing periods, elaboration approaches, construction steps)</td>
<td>Area of interest (AOI) and scan path analyses (ongoing).</td>
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</tbody>
</table>

**ADVANTAGES**

- Straightforward data gathering
- Permits assigning overall quality scores of (spatial) text-learning strategy use
- Uncovers (meta-)cognitive strategies such as planful approach and evaluating
- Applicable during regular classroom tasks

**CONCERNS**

- Some (meta-)cognitive strategies are not revealed (e.g., planful approach, monitoring, reviewing)
- Interpretation of students’ strategic actions during pre- and post writing
- Technical errors = data loss
- Expensive technology
- Students cannot interact with the material
- Brief materials studied for a short period

CONCLUSION & IMPLICATIONS for research and practice

- Time and labor intensive though promising methodologies
- Substantiate measures with concurrent think aloud or retrospective interviews
- Possible correlations with self-report measures?

- Promising for (online) modeling explicit strategy instruction by means of pencasts or EMME (eye movement modeling examples).

QUESTIONS

- Suggestions for the efficient analysis of eye tracking data?
- (How) can we attune tasks and measures to study multiple document literacy?

MORE INFORMATION

- Study 3: manuscript in preparation.
- A more detailed reference list can be obtained from the author of this poster.