Effects of electronic outlining on students’ argumentative writing performance

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“Writing is easy. All you do is stare at a blank sheet of paper until drops of blood form on your forehead.”

Gene Fowler (1890-1960)

Example of an outline

Previous research

Outlines help improving overall text quality.
Outlines decrease cognitive load while writing

Why this research?

• Importance of writing in society and education
• Daily use of computers
• Many functions are left unexplored
• Electronic outlining has received little attention
Research questions

1. What is the effect of an electronic outline tool on students’ writing products?
2. What is the effect of an electronic outline tool on students’ perceived mental effort?
3. What is the effect of repeated use of the outline tool?

Method

- 34 students in 10th grade
- 2 argumentative texts
- Within-subjects & between-subjects design

<table>
<thead>
<tr>
<th></th>
<th>Task 1</th>
<th>Task 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-O+ Condition</td>
<td>No tool</td>
<td>Tool</td>
</tr>
<tr>
<td>(N = 18)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O+O+ Condition</td>
<td>Tool</td>
<td>Tool</td>
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<tr>
<td>(N = 16)</td>
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</tbody>
</table>

Writing task

- Written instruction
- 15 minutes
- 60 minutes elaboration
- Evaluation of text quality
  - Structure presentation ($r = 0.87$)
  - Elaboration of argumentative structure ($r = 0.35$)

Cognitive load

- Subjective 5-point Likert scale for cognitive load
  - Paas (1992)

Results

- Students do not spontaneously use the outline tool
- Students quickly appropriate the outline tool
- The outline tool improves quality of text structure
Results

Structure elaboration

![Graph showing structure elaboration](image)

- Condition O-O+
P = .037
- Condition O+O+
P = .010

Task 1 | Task 2
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<tbody>
<tr>
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<td>12.5</td>
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<td>13</td>
<td>13.5</td>
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Results

- Students do not spontaneously use the outline tool
- Students quickly appropriate the outline tool
- The outline tool improves text structure
- Students experience less cognitive load during writing

Results

Structure presentation

![Graph showing structure presentation](image)

- Condition O-O+
P = .066
- Condition O+O+
P = .005

Task 1 | Task 2
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</tbody>
</table>

Results

- Students do not spontaneously use the outline tool
- Students quickly appropriate the outline tool
- The outline tool improves text structure
- Students experience less cognitive load during writing

Results

Cognitive load

![Graph showing cognitive load](image)

- Condition O-O+
P = .003
- Condition O+O+
P = .007

Task 1 | Task 2
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<td>5</td>
</tr>
</tbody>
</table>

Results

- Students do not spontaneously use the outline tool
- Students quickly appropriate the outline tool
- The outline tool improves text structure
- Students experience less cognitive load during writing
- Positive effects on writing products are more prominent for repeated tool-use

Future research

- Expand design: condition without outline tool (O-O-)
- Focus on writing process (Inputlog)
- More objective measure for cognitive load
- Improve text evaluation
More information?

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