Information Problem Solving
Unraveling involved processes and designing instruction

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Information problem solving

- **Skills, knowledge and attitude to**
  - define the information need;
  - identify sources;
  - judge and select relevant information from the sources;
  - organize the information found;
  - present the information into a coherent product;
  - construct knowledge.
Unraveling the IPS-process


Participants: expert-novice study

• **Experts:**
  • 5 PhD students in the field of Educational Technology in their final year

• **Novices:**
  • 5 Psychology freshmen from the University of Maastricht
Set up: expert-novice study

Task:
write in 90 minutes an article for a consumers magazine (± 400 words) about food that is out of date

Instrument to analyze the thinking aloud protocols:
• main skills
• sub skills
• regulation
Information Problem Solving
a skill decomposition

**Analysis**

- Define information problem
  - Read task
  - Concretise problem
  - Activate prior knowledge
  - Clarify task requirements

- Search information
  - Internet skills
  - Derive search terms
  - Judge search results

- Scan information
  - Internet skills
  - Scan site
  - Judge scanned info

- Process information
  - Read info
  - Elaborate on content
  - Judge processed info

- Evaluate process
- Evaluate product
- Organise and present information

**Synthesis**

- Formulate problem
  - Outline the product
  - Structure the product
  - Formulate text
  - Elaborate on content

**Regulation**

- Orientation on task
- Orientation on time
- Monitoring / steering
- Evaluate process

**Time Orientation**

- Orientation on task
- Orientation on time

**Elaboration on Content**

- Judge search results
- Judge scanned info

**Information Problem Solving**

- Define information problem
- Scan information
- Search information
- Organise and present information

**Analysis**

- Define information problem
- Process information
- Evaluate product

**Synthesis**

- Evaluate process
- Evaluate product
- Organise and present information

**Regulation**

- Orientation on task
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**Time Orientation**

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**Elaboration on Content**

- Judge search results
- Judge scanned info
Process of evaluating


Set up: evaluation behavior study

• Participants: 23 students from secondary education

• Tasks: 12 tasks: 4 science / 4 geo. / 4 language
  • example: Young people use MSN and SMS a lot. Does this have an influence on their language proficiency?

• Procedure: each student accomplished 2 tasks while thinking aloud (30 per task)
Results: evaluation behavior study

- Students do not evaluate in a sophisticated way
- Sources are hardly evaluated on usability and reliability
- Information is being judged on the connection to the task, the amount of information and the language
Evaluation and role of prior knowledge

Evaluation and role of prior knowledge

Participants:
• 20 psychology students (freshmen) (12 men and 8 women; age M = 20.2, SD = 4.07)
• 17 psychology teachers (University) (7 men and 10 women; age M = 39.5, SD = 12.33)

Task:
• Two tasks (reliability of human memory and altruism)
• Each task had a Google-like result page (SERP) with 17 links
• Select and prioritize information and rank the best five sites (10 minutes)
Eye-movements
Results: evaluation and prior knowledge

• The domain experts do evaluate the reliability of the sites significantly more often than the novices
• The novices used more superficial criteria for evaluation (statements like: this seems ok, or that may be useful)
• The selected sites of the experts were of a higher quality and a relation with the use of sophisticated criteria
Conflicting information and prior attitude

Set up: participants and task

- 63 students (31 girls, 32 boys); secondary pre-university education
- Reading materials: 1 neutral text introducing videogames, 6 texts in favour and 6 texts arguing against violent videogames
- Task: write essay of 300 to 500 words on the relationship between violent videogames and aggressive behaviour
- Prior attitude: 6-item questionnaire to assess attitudes
- Coding essays: borrowed, added, transformed / neutral, positive, negative (slightly or strongly biased)
Results: effect of prior attitude

• Participants with more pronounced prior attitudes:
  • were more likely to write essays that were strongly biased or at least leaning toward one side of the debate
  • were more likely to adopt a positive position in their essays.
  • prior attitude was positively associated with the proportions of added content

• Participants with more neutral prior attitudes.
  • were more likely to acknowledge the inconclusive nature of the topic in their essays,
  • essays also included more borrowed information, and less added information.
IPS and instructional design


Embedded instruction

• Setting:
  • 15 lessons
  • IPS embedded in history class
  • Focus on evaluation of sources and information

• Tasks:
  • Role play: Treaty of Versailles
  • Cartoon about Hitler
  • Game in with events had to be set in chronological order
# Process worksheets

<table>
<thead>
<tr>
<th>Address</th>
<th>Judgement</th>
<th>Use?</th>
</tr>
</thead>
</table>
| **Example**
http://members.lycos.nl/oorlogstijd/index.html | This is a private site of an 18 year old girl. Not that much text. No references. Not reliable. Author is not a known person. | No |
Supportive information
Mindmap and discussion
Results of embedded instruction

- Students become more critical regarding the evaluation of web sites
  - More use of criteria like:
    - Author
    - Organization behind the site
    - Type of site ....

- Students of the experimental condition performed significantly better on the history exam than the students of the control condition