A Writing Support Tool for Distance Students

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Abstract: This paper describes SuperText, a computer program designed to support productive expository writing processes among students at a distance teaching university. Being able to write well is an important communication skill, and the writing process can help to build and clarify the writer's knowledge. Computers can support this by providing a medium to externalise and record the writer's cognition. Appropriate representations for such externalisation are uninstantiated idea labels, instantiated text units, and a variety of relationships between these items. SuperText uses these representations to support a range of writing styles. It provides several independent 'Views' that represent the structure of the evolving document through expanding hierarchies, each with a variety of presentations. Allied to these Views is a text work space providing access to a database of continuous text nodes. Taken together, these provide an ability to represent global and intermediate structures of the document well beyond that of conventional editors. These aspects were all rated highly by students participating in a series of field trials of SuperText.

Why address student writing?

- Communication skills
 - Knowledge building

Computer support for writing

Externalise cognition

Knowledge representation and manipulation

Support process

Not just product

Knowledge structures in writing

• Idea labels
Uninstantiated items

• Continuous text units

Instantiated items

Relationships

Free Network Hierarchical Linear

Classical writing process (1)

Flower & Hayes

- Many constraints at different levels
- Constraint management through task partitioning
- Goal-directed planning
- Progression from freedom to constraint
- Series of representations

Classical writing process (2)

Scardamalia & Bereiter

Two models:

- "Easy" Knowledge Telling as an extension on conversation
- "Hard" Knowledge Transformation through tension between content space and rhetoric space
- Series of representations

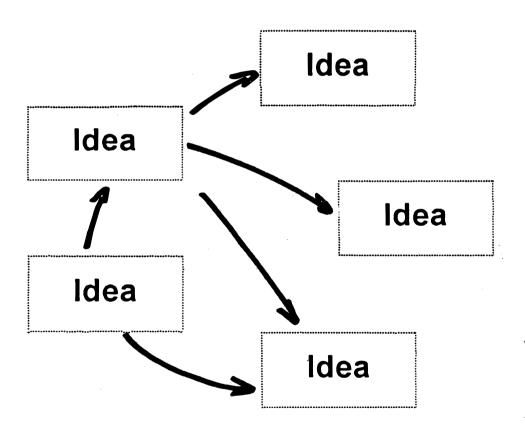
Content space

Unordered Isolated Fragmented

Knowledge Building Rhetoric space

Structured Connected Instantiation

Classical writing representation (1)



Classical writing representation (2)

Main idea 1

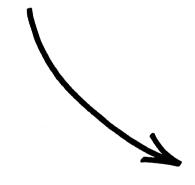
Sub idea 1.1

Sub idea 1.2

Main idea 2

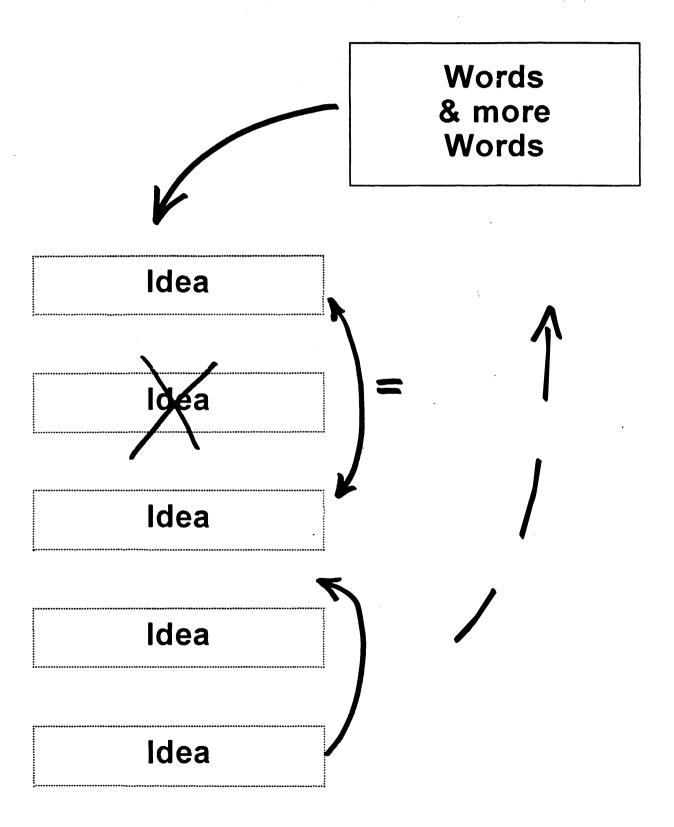
Sub idea 2.1

Sub idea 2.2



Words Words & more Words

Romantic writing representation



Underlying mental models (1)

Storage Models - Classical Writing

Ideas are distinct entities that can be:

- stored in long-term memory
- manipulated in short-term memory

Knowledge building occurs by

structuring ideas during planning

Manipulating idea labels (ie, planning)

- increases efficiency
- simplifies reworking

Underlying mental models (2)

Connectionist Models → Romantic Writing

Ideas emerge:

- from parallel brain activity
- between many simple elements
- in response to external stimuli

Knowledge building occurs by synthesising a fully expressed and coherent response to a particular stimulus

Attempts to isolate and manipulate ideas are:

- contrived
- interfere with real understanding

SuperText

Goal

Provide passive writing support for students' active knowledge building activities

Subgoals

- Distance learning
- Range of writing styles (Classical to Romantic)
 - Emphasise process (not product)

Tools

Multiple, linked spaces for:

- Uninstantiated items (structure)
- Instantiated items (continuous text)
- Hierarchical relationships

SuperText tour (1)

```
Note 25 =
                                ____ View 1 ____
                                                        = Use Count is 5 =
    -Begeman, Michael
     GIBIS: A Hypertext Tool for Exploratory Policy Discussion
    -Bernstein, Mark
     The Bookmark and the Compass: Orientation Tools for Hypertext Users
     -Campagnoni, FR
     └ Information Retrieval Using a Hypertext-Based Help System
    -Conklin, Jeff
     Hypertext: An Introduction and Survey
     ☐ GIBIS: A Hypertext Tool for Exploratory 'Policy Discussion
    -Danielsen, K
     -Multi-Dimensional Outlining
   Note 25 — PreView —
                                                            - Use Count is 5
  The Bookmark and the Compass: Orientation Tools for Hypertext Users
   * Bernstein Mark
  * ACM SIGOIS Bulletin, 9(4), Oct 88, pp 34 - 45
  Hypertext (HT) can vary from almost-linear to emphatically non-linear.
   .. more ..
F1: Help F2: Navigate F3: Modify F4: Display F5: View F6: File F7: Print F8: Ex Esc: Exit
```

SuperText tour (2)

— Note 25 ————	View 2 — Use Count is 5 —
1. Authoring	Con White and and
1.1. Authoring Considerations	for Hypertext, Editing, and Managing Hypertext.
1.3. Writing & Reading Hypert	
2. Cartographic issues	
2.1. Context and Orientation	in Hypermedia Networks
	for Exploratory Policy Discussion
2.3. The Bookmark and the Com	pass: Orientation Tools for Hypertext User
 Content and structure indepe A Database Model for Fle Writing & Reading Hypert 	xible Hypertext Database Systems
4. Hierarchies and heterarchies	
4.1. Context and Orientation	in Hypermedia Networks
	PreView —————————— Use Count is 5 ——
	ientation Tools for Hypertext Users
* Bernstein Mark	
* ACM SIGOIS Bulletin, 9(4), Oct	
Hypertext (HT) can vary from alm	ost-linear to emphatically non-linear.

F1:Help F2:Navigate F3:Modify F4:Display F5:View F6:File F7:Print F8:Ex Esc:Exit

SuperText tour (3)

```
Cartographic issues
   ├Context and Orientation in Hypermedia Networks
  gIBIS: A Hypertext Tool for Exploratory Policy Discussion
   The Bookmark and the Compass: Orientation Tools for Hypertext Users
 -Content and structure independence
= Note 25 ========== Text ====
                                                        = Use Count is 5 =
The Bookmark and the Compass: Orientation Tools for Hypertext Users
* Bernstein Mark
* ACM SIGOIS Bulletin, 9(4), Oct 88, pp 34 - 45
Hypertext (HT) can vary from almost-linear to emphatically non-linear.
Presentation, layout and links all offer orientation cues to HT viewers
(cf cues provided by books).
Maps & Indexes (Tables of Contents)
* Strictly hierarchical systems: local navigation through parents,
siblings and children of current node
* Unstructured systems: long-range info shown by links between documents
(eq Intermedia); fisheye views suppress remote detail.
Is automatic cartography satisfactory? Manual cartography instead (eg
HyperGate). (Semi-automatic cartography? eg Guided Tours & Tabletops in
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F1: Help F2: Nav F3: Modify F4: BlkFns F5: NoteView F7: Print F8: Export F9: Refresh Esc

Experimental Results

Rank	Mean	Devia- tion	Result
1st	0.95	0.12	Strong agreement: the different hierarchical representations are very useful.
2nd	0.87	0.16	Strong agreement: the multiple views are very useful to quite useful.
3rd	0.85	0.17	Strong agreement: the expandable hierarchies are very useful to quite useful.
5th	0.84	0.17	Strong agreement: the user prompts are very useful to quite useful.
7th	0.74	0.19	Strong agreement: Super- Text is quite reliable.
7th	0.73	0.21	Fair agreement: using SuperText to represent one's thinking about a topic is easy to very easy
20th	0.64	0.35	Some agreement: the SuperText method will be quite helpful in future essay preparation.

