

Small Words, Big Challenges: Identifying the Difficulties in Learning the English Article System

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Background

Domain: English Article System

Learners: Adult ESL Students

Classroom Motivations

Grammar errors in writing affect more than estimations of language competency [Master, 1997]

Student need: Error analysis of student essays shows article errors represent approximately 15% of all errors

Learning Sciences Motivations

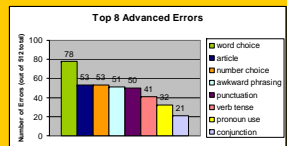
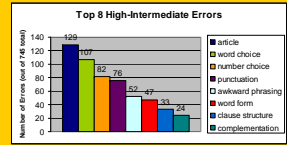
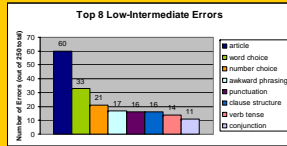
Language learning domain advantageous for studying role of positive, negative, and no transfer

Develop successful intelligent tutoring systems for ill-defined domains that provide insight into how students learn

Research Questions

R1: Is detecting and correct articles errors within a paragraph more difficult than only producing the correct response?

R2: What rules and heuristics do students employ when solving editing tasks?



Data Collected from PSLC English LearnLab, Summer 2005

Method

Participants: 6 students (3 male, 3 female)

All native Chinese speakers

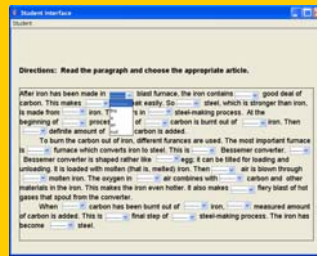
Think-Aloud Methodology

Task

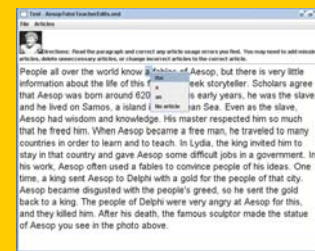
2 paragraphs of differing levels of difficulty
One with each interface, order of presentation counterbalanced

| | Intermediate Text | Advanced Text |
|---------|--------------------|--------------------|
| Group 1 | Menu | Controlled-Editing |
| Group 2 | Controlled-Editing | Menu |

Interface Types



Menu
Students select articles from drop-down menus



Controlled-Editing (CE)
Detect and correct errors
Limited Types of Editing (insert, delete, change)

Difficulty Factors Analysis

Student performance was analyzed based on three difficulty factors (essay difficulty, interface, and knowledge component).

The following adjustment was made to account for the likelihood of guessing using the menu-based interface:

$$m = m_{\text{adjusted}} + (1 - m_{\text{adjusted}})^{1/3}$$

| Knowledge Component | Intermediate Level Essay | | | Advanced Level Essay | | | Combined | | |
|-----------------------------------|--------------------------|-------------|-------------|----------------------|-------------|-------------|-------------|-------------|-------------|
| | CE | Menu | Menu adj | CE | Menu | Menu adj | CE | Menu | Menu adj |
| nonspecific, count, plural | 0.67 | 0.33 | 0.00 | | | | 0.67 | 0.33 | 0.00 |
| nonspecific, count, sing | 0.67 | 0.87 | 0.81 | 0.22 | 0.48 | 0.22 | 0.42 | 0.64 | 0.46 |
| nonspecific, mass | 0.50 | 0.50 | 0.26 | 0.67 | 0.60 | 0.41 | 0.57 | 0.57 | 0.36 |
| unique by anticipation | | 1.00 | 1.00 | 0.00 | 0.67 | 0.51 | 0.00 | 0.83 | 0.76 |
| unique by definition | 0.00 | 0.92 | 0.88 | | | | 0.00 | 0.92 | 0.88 |
| unique by entailment | 0.83 | 0.78 | 0.67 | | | | 0.83 | 0.78 | 0.67 |
| unique by prior utterance | 0.86 | 1.00 | 1.00 | 0.30 | 0.74 | 0.62 | 0.41 | 0.81 | 0.71 |
| unique by specified order or rank | | | | 0.50 | 0.83 | 0.76 | 0.50 | 0.83 | 0.76 |
| unique for a given setting | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| unique for all | 0.67 | 1.00 | 1.00 | 0.33 | 1.00 | 1.00 | 0.50 | 1.00 | 1.00 |
| Grand Total | 0.68 | 0.84 | 0.77 | 0.32 | 0.68 | 0.53 | 0.46 | 0.74 | 0.62 |

Conclusions and Future Work

Contrary to initial expectations, the performance difference between the two interfaces is not very large. Suggesting that the majority of the difficulty lies with producing the correct response and not in detecting the errors. Future studies plan to examine which task leads to robust learning as measured through long-term retention, and transfer to writing and speaking.

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