MULTI-LEVEL STUDENT ESSAY FEEDBACK IN A LEARNER CORPUS

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Russian Error-Annotated Learner English Corpus
(School of Linguistics, Higher School of Economics)
Objectives

- Error statistics across the ‘best’ and ‘worst’ essays

- Selection of lexical and syntactic complexity features as indicators of a successful / unsuccessful text

Ultimate goal:
Automatic essay feedback that a student can get after uploading his / her essay in the corpus
Experiment setup

Collection:
• 1000 essays describing graphs
• 1000 argumentative essays

With focus on:
• ‘best’ (graded 75% and over) - 33 essays
• ‘worst’ (graded 30% and lower) - 43 essays
## Error analysis

<table>
<thead>
<tr>
<th></th>
<th>Essays scored 75% and higher</th>
<th>Essays scored lower than 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of all error tags in one essay</td>
<td>19</td>
<td>19.5</td>
</tr>
<tr>
<td>Minimum and maximum number of all error tags</td>
<td>3 to 60</td>
<td>10 to 66</td>
</tr>
<tr>
<td>Average number of syntactic errors</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Average number of discourse errors</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
IELTS

• the number of words, relevance to the topic in the question, and coverage of all parts of the question (Task Achievement/Task Response)
• organisation, connection of sentences and paragraphs with logical links and referential tools, no or little repetition (Coherence and Cohesion)
• use of appropriate academic words and collocations, use of paraphrase to avoid repetition, correct spelling (Lexical Resource)
• use of a variety of grammatical forms, combination of short and complex sentences, and not too many grammatical mistakes (Grammatical Range and Accuracy)
Lexical evaluation with REALEC-Inspector

1. Number of words in the essay
2. Average length of a sentence in the essay
3. Length of the longest sentence in the essay
4. Average length of word in the essay
5. Length of the longest word in the essay
6. Number of words of each level of CEFR in the essay
7. Number of words from the COCA frequency lists
8. Number of academic words in the essay (with/without repetitions)
9. Number of repetitions of words used in the essay.
10. Number of linking words and expressions in the essay
Lexical evaluation with REALEC-Inspector

Number of words: 290
Average sentence length: 18.875 words.
Max sentence length: 32 words.
Average word length: 5.10104529617 letters.
Max word length: 18 letters.

CEFR
A1: 49
A2: 16
B1: 11
B2: 7
C1: 1
C2: 0
Unclassified: 38
Stopwords: 36

Frequency:
1-500: 39
501-3000: 36
>3000: 47

Academic words: 71 (51 unique)
Word repetitions: 44 ("children", 6) is the most repeated
Linking phrases: 12
Pearsons collocations: 7 (5 unique)
Distribution of linking tools number: good essays vs bad essays
Linking tools statistics

**Linking Phrases**

There are 12 introductory phrases.

*Comparison*: 0

*Time and sequence*: 5

*then*: 2

*now*: 2

*nowadays*: 1

*Addition*: 4

*also*: 3

*moreover*: 1

*Cause and Effect*: 0

*Conclusion and summary*: 1

*in conclusion*: 1

*Examples*: 1

*for example*: 1

*Concession*: 0

*Repetition*: 0

*Giving reasons, explanations*: 0

*Contrast*: 1

*however*: 1
Collocations statistics

Pearsons Collocations

There are 7 collocations, 5 of which are unique.
- nuclear family
- dominant position
- closer look
- wide range
- modern society
## Lexical complexity parameters: ‘best’ vs ‘worst’

<table>
<thead>
<tr>
<th>Parameters for automated lexical inspection</th>
<th>Essays scored 75% and higher</th>
<th>Essays scored lower than 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task 1</td>
<td>Task 2</td>
</tr>
<tr>
<td>1) Average number of words in the essay</td>
<td>203</td>
<td>292</td>
</tr>
<tr>
<td>2) Average length of a sentence in the essay (N words)</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>3) Length of the longest sentence in the essay</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>4) Number of academic words in the essay (with/without repetitions)</td>
<td>41/28</td>
<td>69/51</td>
</tr>
<tr>
<td>5) Number of linking words and expressions in the essay</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>6) Number of collocations from the Pearson ACL (with/without repetitions)</td>
<td>0,8/0,8</td>
<td>0,73/0,73</td>
</tr>
</tbody>
</table>
Syntactic complexity

Parsed with UD-Pipe (Straka et al. 2015)

It is an example.

# newdoc
# newpar
# sent_id = 1
# text = It is an example
1  it it  PRON  PE  Number=Sing|Person=3|PronType=Prs 4       subj _ _
2  is be  AUX|VA  Mood=Ind|Number=Sing|Person=3|Tense=Pres|VerbForm=Fin 4      cop _ _
3  an a  DET|RI  Definite=Ind|Number=Sing|PronType=Art 4    det _ _
4  example example NOUN  S Number=Sing 0  root _  SpaceAfter=No
5  . .  PUNCT  FS  _  4  punct _  SpaceAfter=No
Syntactic complexity

Syntactic depth
   Calculated as max path length to the root (2-10)

Subordination
   # adverbial clauses (advcl): when, where, why..
   # relative clauses (acl:relcl)
   # other adnominal clauses, incl. participle groups
      and which-clauses
## POS and syntactic parsing

### Subordinate clause types per essay

<table>
<thead>
<tr>
<th>Grade Cat</th>
<th>mean.acl</th>
<th>mean.acl:relcl</th>
<th>mean:advcl</th>
</tr>
</thead>
<tbody>
<tr>
<td>best</td>
<td>3 ± 0.82</td>
<td>3.25 ± 0.85</td>
<td>5.41 ± 1.07</td>
</tr>
<tr>
<td>worst</td>
<td>1.21 ± 0.42</td>
<td>1.43 ± 0.38</td>
<td>1.86 ± 0.5</td>
</tr>
</tbody>
</table>

### Correlation of the syntactic features

<table>
<thead>
<tr>
<th></th>
<th>MeanDepth</th>
<th>N_acl</th>
<th>N_acl:relcl</th>
<th>N_advcl</th>
<th>N_AllSubordCl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>0.203</td>
<td>0.397</td>
<td>0.462</td>
<td>0.599***</td>
<td>0.630</td>
</tr>
<tr>
<td>MeanDepth</td>
<td></td>
<td>0.375</td>
<td>0.311</td>
<td>0.179</td>
<td>0.346</td>
</tr>
<tr>
<td>N_acl (adnominal clauses)</td>
<td></td>
<td></td>
<td>0.355</td>
<td>0.383</td>
<td>0.698</td>
</tr>
<tr>
<td>N_acl:relcl (relative clauses)</td>
<td></td>
<td></td>
<td></td>
<td>0.548</td>
<td>0.785</td>
</tr>
<tr>
<td>N_advcl (adverbial clauses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.867</td>
</tr>
</tbody>
</table>
Mean syntactic depth of sentences by essay type and grade category

[Boxplot diagram showing syntactic depth for essay types and grade categories]