Error coding in the TREACLE project

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Introduction

Aim of paper:
• To present ongoing work on error coding in the TREACLE project
Error coding in the TREACLE project

- Introduction
- The TREACLE project
- Error coding process
- Intercoder reliability study
- Preliminary results
- Conclusions
What is the TREACLE project: Introduction

**TREACLE**: Teaching Resource Extraction from an Annotated Corpus of Learner English.

- Participants in the project:
  - Universidad Autónoma de Madrid (UAM)
  - Universitat Politècnica de València (UPV)
What is the TREACLE project:

Aims of TREACLE:

• To profile grammatical skills
  ▫ of Spanish university learners of English
  ▫ at various proficiency levels

• To develop proposals for re-designing curriculum

• To develop teaching materials focused on Spanish students needs
What is the TREACLE project:

- Two stages in the first part of the project:
  - **Automatic syntactic analysis**
    - which structures the students are getting right in their output and at what level
    - which structures they are still developing; and which they do not yet use
  - **Computer-aided error analysis**
    - find out what they tend to get wrong at each level
What is the TREACLE project: Corpus

Two corpora:

- Wricle Corpus (UAM) (Rollinson & Mendikoetxea 2008)
- UPV Learner Corpus (Andreu et al., 2010)

Shared characteristics of corpora:
- metadata carefully recorded
- proficiency levels identified through Quick Oxford Placement Test (UCLES 2001)
The TREACLE project: Corpus

UPV Learner Corpus:
- Part of the MiLC corpus (Andreu et al., 2010)
- 950 written compositions (180,000 words)
- from UPV students of all levels
- Mostly on the topic of Immigration
The TREACLE project: methodology

Wringe Corpus (Rollinson & Mendikoetxea, 2008)

- 750 essays (approx. 1,000 words each)
- Spanish learners of English, from Filología Inglesa
- We use 521 of these essays (approx. 500,000 words)
- On topics of Immigration, Gay marriages and Traffic
The TREACLE project: methodology

• Error annotation using *UAM Corpus Tool* (O’Donnell, 2008)
  ▫ Manual annotation, based on coding scheme

• Coding criteria document (20 pages long):
  ▫ Criteria for segmentation
  ▫ Criteria for annotation

• Inter-coder reliability studies
The TREACLE project: coding process

1. Select text containing error.

2. Provide the corrected text here.

3. Assign features to current segment here.
The TREACLE project: The error scheme

- Error scheme devised by the research team
  - Ability to change the scheme as needed
  - Glosses to help coders
  - Contains 113 errors at most delicate level
- Five main error types + uncodable error:
  - Lexical errors
  - Grammatical errors
  - Punctuation errors
  - Pragmatic errors
  - Phrasing errors
The TREACLE project: principles behind error scheme

- Error scheme maps onto organisation of grammar topics within EFL courses
  - Pedagogical goals – want to recover errors relevant to each topic
- Focused on the grammatical phrase where the error occurs, not on the part of speech of the error

  e.g. *very browner
  Adverb but functioning in an adjectival phrase
The TREACLE project: coding example

Example of error coding with *UAM CorpusTool*

*“this results are ...”*

Major category type: **Grammatical**

some grammatical rule is broken (wrong class for slot, word order, agreement problem, missing but necessary element, present but unnecessary element, etc.)

Next level of delicacy:

**Noun Phrase**

**Determiner-error**
The TREACLE project: how far are we in the coding process?

• Error coding is still at an early stage:
  ▫ 126 texts coded, with 52,000 words
  ▫ 6,540 errors

• Our aim is to double this by the end of 2011
The TREACLE project: intercoder reliability study

We performed two inter-coder reliability studies to:

- Refine the error scheme and coding criteria document.
- Ensure all coders were complying with the coding criteria.

- Average inter-coder reliability not high (~70%)
- But this is expected with:
  - Disagreements as to exact segment extent initially
  - Selection from 113 codes at most delicate level
  - In both studies, some participants had not been properly trained in using the scheme.
The TREACLE project: intercoder reliability study

Individual coding + consensus meetings

- Minimal segmentation, i.e. Select amount of text necessary to make correction of erroneous form:
  
  e.g. *in the other hand

- Code as regards what the learner has written rather than what they should have written:
  
  e.g. the car of John -> John’s car: determiner problem or postmodifier problem? - principle of coding what students do - postmodifier error.
The TREACLE project: some preliminary results of coding process

Number of errors decreases with higher proficiency level
The TREACLE project: some preliminary results of coding process

Grammar errors account for 44% of all errors
The TREACLE project: results

- A1s and B1s highest number lexical errors, which then decline as proficiency increases.
- Grammar errors increase steadily from A1 to B1, then drop.
The TREACLE project: results
Grammar errors at each level

- NP errors high – improves with proficiency
- PP next highest within Grammar category
The TREACLE project: results
NP errors

Determiners = 65% of NP errors and 30% of all grammar errors. How much time is spent on these in EFL programmes?
The TREACLE project: results NP errors - Determiner search

<table>
<thead>
<tr>
<th>Pretext</th>
<th>Contained</th>
</tr>
</thead>
<tbody>
<tr>
<td>o contaminating movements, increase in</td>
<td>a 30 %</td>
</tr>
<tr>
<td>a 30 % the rail bus, develop even more</td>
<td>the public transport</td>
</tr>
<tr>
<td>Secondly,</td>
<td>the education at school</td>
</tr>
<tr>
<td>ces, they have reached their position on</td>
<td>the other society</td>
</tr>
<tr>
<td>having the same rights like</td>
<td>the other people</td>
</tr>
<tr>
<td>to adopt</td>
<td>some children</td>
</tr>
<tr>
<td>that</td>
<td>the children</td>
</tr>
<tr>
<td>e twenty of december, Holand legalized</td>
<td>the marriage</td>
</tr>
<tr>
<td>ber, Holand legalized the marriage and</td>
<td>the adoption</td>
</tr>
<tr>
<td>and let too</td>
<td>the marriage and adoption</td>
</tr>
<tr>
<td>In Canada in</td>
<td>curious, because the civil marriage</td>
</tr>
<tr>
<td>that the amount of cars within</td>
<td>the population</td>
</tr>
<tr>
<td>is increasing</td>
<td></td>
</tr>
</tbody>
</table>
The TREACLE project: What can we do with these results?

- Use these profiles to adjust the teaching curriculum: determining which grammatical features need to be taught, in what order, and with what degree of emphasis.
The TREACLE project: Conclusions (1)

- Methodology
- Results obtained from the error coding
  - Number of errors decreases with greater proficiency
  - Types of errors by students change at different levels of proficiency
The TREACLE project: Conclusions (2)

• Potential applications of the study –

• Typical amount of teaching given to grammar topics - not always proportional to the learners’ needs as shown by the errors they make:
  ▫ Large proportion of determiner errors, but determiners not given much attention
  ▫ Minimal teaching of prepositions, but students struggle with them at all levels
  ▫ Teaching of verb phrase given too much time?
The TREACLE project: Suggestions and further research

- We propose to reinforce those grammar areas where errors are made.
- Need to distinguish between explicit teaching of concepts vs. on-line drilling and practice.
- Error analysis not in isolation – it needs to be seen in the context of what the students are attempting and getting right.
- Later work will explore learner types based on the experimental vs. cautious learners.
Thank you

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Web page TREACLE: http://www.uam.es/treacle
Number of general errors per 1,000
Subtypes of lexical errors per 1,000 words
Errors coded by researchers in TREACLE to date:

✓ 126 texts (total words: 55,583)
✓ 17 by A1 (2,436 words)
✓ 39 by A2 (11,392 Words)
✓ 26 by B1 (9,713 Words)
✓ 25 by B2 (13,620 Words)
✓ 14 by C1 (13,322 Words)
✓ 5 by C2 (5,100 Words)
The TREACLE project: Example 1 ICRS Segmentation

‘The education in Spain is a subject that given a lot of play because for one people this system of education is great, but for other people is awful.’

<table>
<thead>
<tr>
<th>Consensus: grammar-error: np-error: determiner-error: determiner-choice-error</th>
<th>some</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ R7</td>
<td>✓</td>
</tr>
<tr>
<td>✓ R1</td>
<td>✓</td>
</tr>
<tr>
<td>✓ R2</td>
<td>✓</td>
</tr>
<tr>
<td>✓ R5</td>
<td>✓</td>
</tr>
<tr>
<td>× R4 grammar-error: np-error: premodifier-error: incorrect-premodifier-category</td>
<td>✓</td>
</tr>
<tr>
<td>× R3 lexical-error: wordchoice-error: other-wordchoice-error</td>
<td>✓</td>
</tr>
</tbody>
</table>

ven a lot of play because for one people this system of education is g

<table>
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<tr>
<th>Consensus: grammar-error: np-error: determiner-error: determiner-choice-error</th>
<th>some people</th>
</tr>
</thead>
<tbody>
<tr>
<td>× R6 grammar-error: np-error: determiner-error: determiner-choice-error</td>
<td>some people</td>
</tr>
</tbody>
</table>
The TREACCLE project: Example 2 ICRS Error code assigned

Example 2 below shows some of the doubts the coders had initially as regards the exact identification of the error type:

‘there are a lot of players who have an important paper’.

- Disagreements like this were solved during the consensus meetings.

<table>
<thead>
<tr>
<th>Consensus: lexical-error: wordchoice-error: other-wordchoice-error: noun-vocab-error</th>
<th>role</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ R4</td>
<td>✓</td>
</tr>
<tr>
<td>✓ R1</td>
<td>✓</td>
</tr>
<tr>
<td>✗ R7 phrasing-error: transferred-phrasing</td>
<td>✓</td>
</tr>
<tr>
<td>✗ R6 lexical-error: wordchoice-error: transferred-word: borrowing</td>
<td>✓</td>
</tr>
<tr>
<td>✗ R3 lexical-error: wordchoice-error: false-friend</td>
<td>✓</td>
</tr>
<tr>
<td>✗ R2 lexical-error: wordchoice-error</td>
<td>✓</td>
</tr>
</tbody>
</table>
The TREACLE project: results
Lexical errors

• Errors in spelling and lexical transfer – A1.
• Word choice, generally decreases with proficiency.
• Note: spelling errors can be typos (carelessness) or lack of knowledge of TL forms.