

Text Complexity Assessment: Applications and Questions

Dr. Sowmya Vajjala
AbacusNext, Toronto

CALICO 2018

31 May 2018

Text Complexity and Language Instruction

Lot of new developments are happening in automatic readability assessment and text simplification research.

- ▶ How does it matter for actual language instruction?
- ▶ To whom does it matter in instructional settings? - teachers or students or both?
- ▶ Does everything make sense in a computational approach to research on this topic?

Use in language teaching

- ▶ Choosing linguistically appropriate reading materials
- ▶ Choosing the text to create questions about vocabulary/grammar use
- ▶ Adapting existing reading materials to the student's level

To whom does it matter? - Both teachers and students!

Use in language teaching - 1

Choosing linguistically appropriate reading materials

- ▶ There could be a lot of material on a topic you want to discuss in class.
- ▶ But is everything written in a way students can understand at a certain grade level?
- ▶ Automatic Readability Assessment deals with computational models of such grade determination
- ▶ Although most of the work is in research, there are some real world, ready to use software.

Tagging texts with a grade: TextEvaluator

- ▶ TextEvaluator by ETS is a software tool that automatically analyzes a given text and gives back:
 - ▶ grade level placement for that text
 - ▶ likely challenging aspects of the text in terms of comprehension difficulty

More details at: <https://www.ets.org/c/23491/>

Tagging texts with a grade: TextEvaluator

Download Report Print Report Email Report

Submitted: 5/29/2018 5:45:03 AM
notentered.txt
TextEvaluatorSM Feedback for "Applied Linguistics"

Text Complexity is
Within
Target Grade Computed: 12

TextEvaluator
Complexity Score
1340

Summary

Text Formatting Attributes	
Word Total:	332
Sentence Total:	20
Average Words Per Sentence:	16.6
Paragraph Total:	4
Average Words Per Paragraph:	83.0
Quoted Words Total:	16
Genre:	Informational



Tip

If these values are not consistent with your expectations, please review our [TextEvaluator formatting guidelines](#).

Difficulty Relative to Target Grade	
Dimension of Variation/Component Score	Value
Sentence Structure	
Syntactic Complexity (Higher Values Indicate Higher Complexity)	59
Vocabulary Difficulty	
Academic Vocabulary (Higher Values Indicate Higher Complexity)	90
Word Unfamiliarity (Higher Values Indicate Higher Complexity)	87
Concreteness (Lower Values Indicate Higher Complexity)	13
Connections Across Ideas	
Lexical Cohesion (Lower Values Indicate Higher Complexity)	52
Interactive/Conversational Style (Lower Values Indicate Higher Complexity)	17
Level of Argumentation (Higher Values Indicate Higher Complexity)	40
Organization	
Degree of Narrativity (Lower Values Indicate Higher Complexity)	74
Overall Text Complexity	
TextEvaluator Complexity Score	1340

All component scores are reported on a scale that ranges from 1 to 100. Overall text complexity scores are reported on an alternative quantitative scale that ranges from 100 to 2000. The AboutTextEvaluator document provides additional information about each scale.

<https://textevaluator.ets.org/textevaluator/Docs/AboutTextEvaluator.pdf>

Tagging texts with a grade: SyB

Let us take a quick look at another tool SyB
<http://complexityweb.org>

Ranking texts by their complexity in a search engine

`http://sifnos.sfs.uni-tuebingen.de/FLAIR/`

Use in language teaching - 2

Using automatic readability/complex analysis to choose sentences to be converted into questions (to check vocabulary, syntax, comprehension etc)

<https://spraakbanken.gu.se/larkalabb/>

Use in language teaching - 3

Automatic Text Simplification

Adapting existing reading materials to the student's level

Text Adaptation Tool:

<https://dl.acm.org/citation.cfm?id=1614166>

[This is still very much a research problem - no readily usable tool for language learners yet, as far as I know]

Does Everything Make sense?

- ▶ How do such grade assessment tools work?

Does Everything Make sense?

- ▶ How do such grade assessment tools work?
- ▶ Extracting language features from texts, give it to a "model" (let us say Linear Regression), and get a grade level.

Does Everything Make sense?

- ▶ How do such grade assessment tools work?
- ▶ Extracting language features from texts, give it to a "model" (let us say Linear Regression), and get a grade level.
- ▶ How is that model built?

Does Everything Make sense?

- ▶ How do such grade assessment tools work?
 - ▶ Extracting language features from texts, give it to a "model" (let us say Linear Regression), and get a grade level.
 - ▶ How is that model built?
 - ▶ Using a set of pre-graded texts, with grades typically decided by textbook writers, teachers etc. as the gold-standard.
- What is a possible problem with that?

Where is the reader in the picture?

- ▶ Computational models are trained based on expert/teacher judgements.
- ▶ Yet, we are doing it primarily for the readers.

Where is the reader in the picture?

- ▶ Computational models are trained based on expert/teacher judgements.
- ▶ Yet, we are doing it primarily for the readers.
- ▶ What is a "Grade 2" text, if we don't know what is a "Grade 2" reader like?
- ▶ Ideally: the training data for such automated models should be grounded in data from reader-text interaction.
- ▶ In reality: Such data is difficult to acquire.

How do we address this issue?

- ▶ Experiments: do students show differences in reading comprehension when they read texts at different grade levels?
- ▶ Software: Backed by student reading comprehension data, along with text characteristics

Additional questions that come up:

- ▶ What is a good way to test and evaluate comprehension?
- ▶ Can we make the evaluation process less burdensome for teachers by automating parts of it?

-open research questions.

Take home message

- ▶ There are ready to use tools, which can support choosing grade appropriate texts for a given topic.
- ▶ However, ultimately, different students learn differently, and have different levels of language proficiency.
- ▶ ... which the tools don't cover (yet!)
- ▶ Whether these tools really work in a given classroom setting is something we should investigate!!

Thanks!
Questions?

contact: vbsowmya @ gmail .com