Developing academic reading skills of NNS graduate students in STEM

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Background

The challenges faced by non-native speakers in STEM (Science, Technology, Engineering, Mathematics) in reading scientific research documents are well known. These include limited specialized vocabulary, lack of familiarity with the structure and organization of such documents and their level of detail and formality, limited knowledge of complex syntax, and few strategies and tactics to help them read more efficiently and effectively.

Objectives

Identify specific user-friendly, self-access solutions that enable students to manage their reading load in a more efficient and effective manner. Participants will analyze the language, structure, organization, composition and construction of model research articles and one authentic journal article chosen from their major field to achieve a better understanding of the relationship of their various parts, and how the parts work to create a coherent whole.
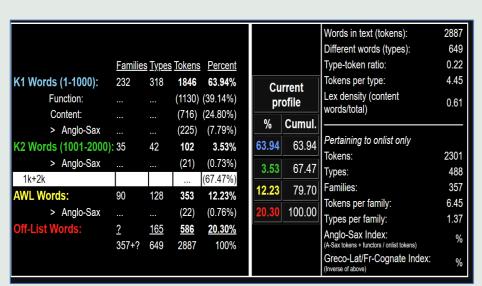
Materials

Course materials are adapted from authentic research articles. **Student-sourced materials** are short RAs from their area of study. These are vetted for suitability by the instructor, and must be approved for use on the course. Students apply the skills and strategies learned using course materials to their own specialist RA.

Limited specialist vocabulary

Students compile a target vocabulary list using Lex Tutor and the AWL Highlighter and Gap fill webtools, and calculate the readability of their document based on their own lexical knowledge. They create quizzes of AWL and specialist vocabulary that they use throughout the course.
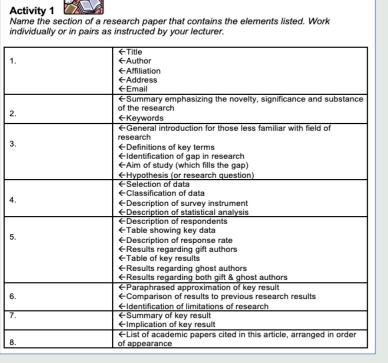

Lack of familiarity with the structure and organization of RAs

Students learn the macro organization and identify the major moves in each section of their specialist RA before learning how paragraphs are structured and developed.
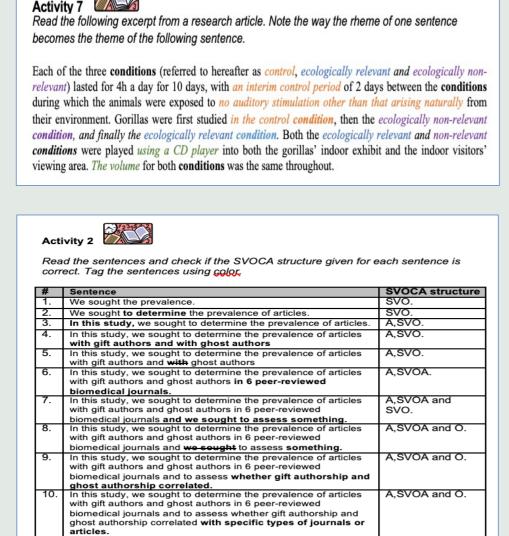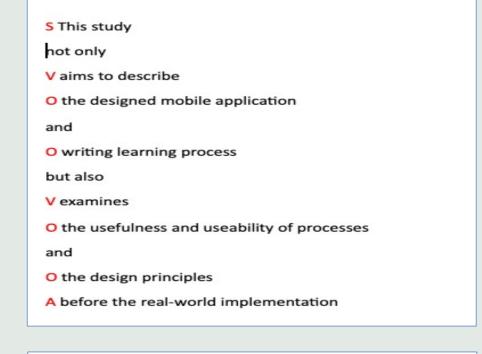

Limited familiarity with complex syntax and grammar

Students are introduced to SVOCA analysis, theme/rheme organization of paragraphs, the use of conjunctives and transitions, passive voice, nominalization, and the role of subject and finite verb.

Outcomes

Strategies and tactics to help students read more efficiently and effectively

- Pre-reading

Take note of the authors, their institutional affiliations and the publisher of the paper

Use keywords and title to determine relevance to your topic

List questions you want answered from your reading

Look at the visuals: tables, graphs, charts, images, diagrams, etc.

Know the content and purpose of each section:

Intro: Why?   Method: How?   Results: What?   Discussion: So what?

Know where key summaries typically appear

Know the funnel structure of scientific writing,

Understand ways the relationship of ideas is expressed in research writing

- On-task

Read the title, abstract and conclusions first

Find the RQ/purpose/aim at the end of the Intro; read the overview, if provided

Read systematically, but not in the order of the article

Use subheadings and the numbering system to understand organization in sections

Reflect on how this study relates to your own topic, or research question

Use the subject and finite verb of sentences to predict content

Answer Key Questions:

Why is this study being done?

What is the RQ, hypothesis or underlying thesis?

How was the research conducted?

What are the most significant findings of the study?

What are the weaknesses in their argument?

Highlight key info as you read, making notes in margins

- Post-task

Reread highlighted sections and confirm you have found the info you need

Revisit the questions you prepared before reading the RA

Verbally summarize each section of the RA in a paragraph

Draw a diagram of the Method used

Bullet point the main findings, and secondary / corollary findings

Paraphrase the conclusion in your own words

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