



# POOR ENGLISH SKILLS? THERE'S AN AI FOR THAT

Machine-learning tools can correct grammar and advise on the style and tone of presentations – but they must be used with caution. **By Alla Katsnelson**

**W**hen Yanina Bellini Saibene began her career in data science at the National Institute of Agricultural Technology in La Pampa, Argentina, she was not fluent in English. She had learnt a little English at secondary school, but her family couldn't afford the extra courses she would have needed to master the language, and at university she focused on science.

That lack of English mastery, she says, held her back. English is the universal language of science, yet Bellini Saibene was limited to publishing in Spanish-language journals, making her work largely invisible to a wider audience. "Sometimes I wonder how much humanity loses because we are redoing things that aren't published in English," she says.

Her early efforts at written English often landed poorly. The comment of one reviewer for an English-language journal, suggesting that she "go back to school", left a particularly nasty sting that lingers 15 years later. At the time, her only recourse was to ask colleagues for writing help or to pay for manuscript-writing and editing services. The fees were astronomical, Bellini Saibene says, and she couldn't justify the expense. But she has other options now.

A growing suite of free or low-cost online tools can translate text, check spelling, correct grammar and even detect whether the tone of the text is appropriate, providing crucial aid to people who are not proficient in written English. These tools are powered by the same natural-language-processing

models that underlie capabilities such as predictive text and voice-to-text transcription, and are largely targeted at ordinary users. Yet researchers can use them to polish their writing in everything from manuscripts and grant applications to social-media posts. The tools won't write papers or applications for you, but they can offer scientists – particularly those for whom English is a second language – a strong grammatical steer.

## Tools for brushing up

Bellini Saibene says that with assistance from an app called DeepL Translate and a writing aid called Grammarly, her writing in English has improved markedly. "I'm at a point where sometimes I start writing in English," she says.

Grammarly is available as a plug-in that is

compatible with a range of apps and platforms – including Microsoft Office, Google Docs, Gmail, Slack and Overleaf (an online editor for the LaTeX typesetting language), as well as a keyboard app for mobile devices. It has both free and paid versions. The free version corrects grammar, spelling and punctuation; checks that writing is concise; and signifies the tone of your text by displaying appropriate emojis (for instance, an image of a button-down shirt to denote formality). The premium version, which starts at US\$12 per month, also suggests alternative wording, tracks consistency of spelling and punctuation, makes suggestions for tone and detects plagiarized text.

Aarón Morelos-Gómez, a materials scientist at Shinshu University in Nagano, Japan, uses Grammarly's free version. He says he appreciates how many different writing environments the software supports, as well as its ability to convert text from American English to British English and back again, a feature that is useful because some journals prefer one or the other. His students put their manuscript drafts through Grammarly before submitting them to him. It's far from perfect, Morelos-Gómez says, but "as a first brush-up tool, it's fine".

Bellini Saibene prefers the premium version because of its suggestions for simplifying or shortening text – although "you have to be careful" to make sure that the changes don't go too far, she says. She also likes the synonyms that the premium version provides, as well as its suggestions for wording changes to reflect a particular tone. "I am a new English speaker and writer," she says. "Sometimes I don't know how my words are going to sound to someone else."

Other tools are more specifically aimed at research-minded authors. Writefull, for instance, is based on an artificial intelligence (AI) that is trained on academic publications. This means it can recognize scientific terms and offer grammar and style suggestions that align with academic writing, says Hilde van Zeeland, chief applied linguist at Writefull, which is based in Amsterdam. (Digital Science, a minority stakeholder in Writefull, is a subsidiary of Holtzbrinck Publishing Group, which owns Springer Nature. *Nature* is editorially independent of its publisher.)

Writefull has plug-ins for both Microsoft Word and Overleaf, and uses widgets to address specific elements of a scientific paper. The Sentence Palette widget, for example, helps users to construct sentences from phrases that occur in papers on which the algorithm was trained, and the Paraphraser widget rewrites sentences, allowing authors to add variety or nuance to their text, van Zeeland says. The Title Generator uses an abstract to suggest a title, and the Abstract Generator, launched in June, produces an

abstract from an article's text. (Both free and premium versions of the software have these widgets. But the premium tier, starting at \$5.46 per month, provides a wider range of suggestions and results.)

Vitor Ramos, a doctoral student in electrical and computer engineering at the Federal University of Rio Grande do Norte in Natal, Brazil, uses both Writefull and DeepL Translate. "I use [Writefull] extensively to edit all kinds of academic and technical writing and communication – not just papers," he says. To make a given paragraph sound natural, he sometimes writes it first in English, then in Brazilian Portuguese – his first language – and compares DeepL's translations of both versions with his own attempts. Other translation tools such as Google Translate also work, he says, but he finds that DeepL Translate "yields much better quality with scientific and technical literature".

Another tool, Paperpal, is currently used mainly by academic publishers and is embedded into the submission interfaces of some 300 journals, including titles from the Institute of Electrical and Electronics Engineers and the American Chemical Society. (*Nature* journals do not use Paperpal, according to

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a spokesperson.) Researchers can upload their manuscript to a participating journal to receive a Paperpal 'preflight' check, which flags issues with grammar and language as well as departures from the journal's requirements in areas such as references, tables, citations and conflict-of-interest statements. For \$29 per manuscript, authors receive an automated in-depth edit suggesting fixes for these issues, shown as revisions in Microsoft Word's track-changes feature.

But "AI is not magic", says Nishchay Shah, chief technology officer at Paperpal's parent company, Cactus Communications in Mumbai, India. Not all the edits will make sense, he says, so researchers should go through the suggested changes one by one. But he estimates that more than three-quarters of the suggestions are on target, and the company is working to improve on that. Paperpal has released a beta version of a Microsoft Word plug-in as well as a web-based version for researchers to write in a browser.

Other online tools can help people to boost their English-language writing and communication skills. For example, DeepL's free dictionary app, Linguee, gives nuanced translations of phrases and idioms. An interactive, AI-based voice tool called ELSA can

help people to improve cadence and pronunciation, which can be especially helpful when preparing scientific presentations. And a database called Academic Phrasebank, developed by John Morley, a linguist at the University of Manchester, UK, contains more than 3,000 phrases harvested from papers across different fields, which can serve as common structural elements in academic writing. For those for whom such phrases do not spring readily to mind, having a list to choose from can be a time-saver, says Morley, who has been developing the resource since the 1980s.

### **The importance of community**

Although online tools can be enormously helpful, researchers should not rely on them too heavily, advises Tracy Volz, director of the engineering communications programme at Rice University in Houston, Texas. Developing your own writing abilities will be better in the long run. "If you are leaning very hard on these tools to choose the right words and the right grammar for you, and you are not a sophisticated reader of your own work, then your work could be full of errors that you aren't even aware of."

In any event, it's often not a lack of solid English skills on the author's part that trips up a paper, notes Anna Clemens, an academic-writing coach based in Prague. When reviewers criticize the writing in a manuscript, what they often mean is that the paper is unclear or poorly organized. That's a problem that all writers can face, she says, whether English is their primary language or not. "What everyone struggles with is, how do I actually tell a story in my paper?" Clemens encourages students to try to articulate the key idea of their paper in a few short, well-worked-out English sentences. They can then reuse and build on that language as they write.

Bellini Saibene agrees that writing tools are just one aspect of mastering scientific writing in English. To deepen your intuitive understanding of the language, she advises, read voraciously and try to mimic how the people whom you look up to write.

Also, find a community of colleagues who are willing to help, she suggests. For her, that community is R-Ladies, a networking group that aims to expand gender diversity among developers in R, the statistical programming language popular with scientists. Today, Bellini Saibene often co-authors papers with other researchers in that community, and she regularly asks colleagues to give her feedback on manuscripts before submitting them.

"When you find a place where people listen to you, respect you, help you, teach you, and learn from you," she says, "it's priceless. It helped me with my language."

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