

THE KTH GUIDE TO SCIENTIFIC WRITING: SPARKING A CONVERSATION ABOUT WRITING

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ABSTRACT

The *KTH Guide to scientific writing* was created with the aim of supporting students and faculty with scientific writing in English. The guide is rooted in the typical writing genres of a technical university, and draws on examples of these to explore sentence structure, punctuation, text flow, and scientific style. Since its launch, the guide has become an integral part of classroom practice in the department of Language and Communication, and an online resource for all students and faculty at KTH. This paper presents our findings from the first stage of our evaluation of the guide. The evaluation consists of a short reflective questionnaire for users. We have begun to collect responses to the questions, and to conduct an inductive thematic analysis (ITA) to identify emerging themes.

KEY WORDS

scientific writing, academic writing, English language, communication skills, interpersonal skills, CDIO Standards 2, 9

INTRODUCTION

Internationalisation is now “deeply embedded in the structure and strategies” of Higher Education Institutions (HEIs) (Bond, 2021: 3), and this is reflected in the growth of English as a medium of instruction (EMI). In Sweden, a study of five Swedish HEIs (Malmström and Pecorari, 2022) found that two-thirds of the teaching on Master’s degrees is conducted in English, and that even on courses where Swedish is the official language of instruction, approximately half the required reading comprises texts written in English. English is even more prominent in doctoral studies in Sweden, where 93% of theses and research articles are written in English. The prevalence of English in Swedish HEIs is strongest in STEM, which has the highest proportion of international students, researchers, and teaching staff.

These statistics throw the question of language use into sharp relief, particularly in universities which identify as bilingual or multilingual. Language is central to effective knowledge communication, and thus central to the functioning of the university itself. The importance of engineering communication is reflected in the CDIO standards’ focus on interpersonal skills, including “communication, and communication in foreign languages” ([CDIO Standard 2: Learning Outcomes](#)), and Bond makes a compelling case for a more integrated approach to language across HEIs in her book *Making Language Visible in the University: English for Academic Purposes and Internationalisation* (2021).

One strategy for achieving greater visibility and discussion of language in HEIs is the creation of official university language policies that attempt to articulate and enhance the role of

language in university practice. At our university, *KTH Royal Institute of Technology*, a language policy has been in place since 2010. *The KTH Language Policy* outlines the parallel status of Swedish and English, alongside a wider commitment to plurilingualism. It also encourages “clear language” and “high-quality communication”, but does not go on to define exactly what is meant by these terms.

The KTH Guide to scientific writing was created to help students to understand what constitutes clear language and effective communication in English scientific writing, and to develop sound writing strategies. The guide is also intended to support faculty life-long learning, as reflected in the CDIO Standards ([CDIO Standard 9: Enhancement of Faculty Competence](#)) and KTH’s *Future Education Principles* (Leif, 2022). It also aims to support lecturers in one of their most important roles, i.e. to “socialize their students into discourse practices of the academic community” (Basturkmen et al. 2014: 443). The guide is rooted in the typical writing genres of a technical university, and it draws on examples of these to explore key areas of scientific language and discourse in English.

In this paper, we introduce *The KTH Guide to scientific writing*, present the initial findings of our evaluation process, and discuss the potential impact of these findings on writing practices and on the development of the guide. We begin by describing the guide. We then discuss a number of other commonly used writing resources. This is both in order to acknowledge the influence of these resources on our work at KTH, and to explain why we believe the addition of a bespoke KTH guide to scientific writing benefits our students, our colleagues, and the institution as a whole. We go on to explain the principles underpinning the KTH guide, and provide some examples which illustrate these. We then discuss the process used to evaluate and develop the guide, a process which has served to spark the beginnings of a conversation among students and faculty about how we write.

DESCRIPTION OF THE KTH GUIDE TO SCIENTIFIC WRITING

The KTH guide comprises an introduction, a glossary of grammatical terminology, and sections on sentence structure, punctuation, text flow, and scientific style. The introduction on the home page outlines the aims of the guide and the principles which underpin it. It also defines “scientific writing” as the highly technical writing “produced by scientists for other scientists” (Hofmann, 2020: 10), comparing it with the less technical “science writing” aimed at a more general audience. We mention how writers might use the information in the guide as a shared reference to inform conversations about language use and writing. We make it clear that questions of linguistic usage are often not straightforward, not even for linguists:

[The KTH guide] may even help to settle an argument when you are working with co-writers or participating in supervision meetings! We don’t pretend that there are always easy, straightforward answers to questions of language or conventions, or that everyone agrees on these things. What we try to do in this guide is to suggest why a particular choice may be most suitable and effective in a particular context.

A REVIEW OF WRITING GUIDES AND TOOLS

Many universities have produced their own online writing guides, such as [Purdue OWL](#) and [AWELU](#). Some resources specifically address students ([University of Colorado](#)) and some specifically address academics and researchers ([University of Edinburgh](#)). These guides typically include information on common genres of academic writing, referencing and language use. The content is comprehensive and detailed, and most academic writers will find information pertinent to their work. However, these guides are written with a university-wide readership in mind, and STEM students may struggle to relate to material which does not fully

reflect the technical genres they typically engage with. Creating the KTH guide allowed us to build explanations around examples of text which engineers could easily relate to, often examples of writing produced by KTH students and faculty.

A key handbook for many engineering students and researchers is *The IEEE Guide to Writing in the Engineering and Technical Fields* (Kmic and Longo, 2017). The IEEE guide is characterized by a comprehensive analysis of engineering genres and examples. A particular strength of this guide is the emphasis on writing as a series of choices or “writing decisions”, not simply a set of rules and prescriptions, an approach which also informs the KTH guide. However, the IEEE guide has a great deal of explanatory text, which some students, especially those at the beginning of their studies, may struggle to navigate for self-study or quick reference. In the KTH guide, our aim was to provide short explanatory texts which can be read quickly and easily, and which relate directly to examples provided.

A useful resource for KTH students and faculty closer to the social sciences is the [APA style guide](#). This guide sometimes takes a more prescriptive approach than the KTH guide. For example, it states: “Use a serial comma (also called an Oxford comma, Harvard comma, or series comma) between elements in a series of three or more items. This contrasts with the KTH guide, where this type of usage is presented as more of a choice dependent on context or, sometimes, even personal preference.

A number of practitioners report on the process of creating bespoke institutional guides. Economou and James (2017) designed a “research writing tool” for medical fields. Christiansen et al. (2014) report on the development of a guide for engineers. One question that arose during the latter’s design process was how to encourage staff to use the guide as part of their courses. As the authors state, “[i]f the guide becomes one faculty member’s writing guide rather than a departmental writing guide, neither the authors nor the department will have accomplished their goal” (2014: 4). Indeed, if guides like this are to be integral to “making language visible in the university” (Bond, 2021), there needs to be ‘buy-in’ across university faculty. Moreover, as Guerin et al. (2017) report, doctoral supervisors may receive insufficient guidance on how to support their students in the writing process. We are promoting the KTH guide among all students and faculty at KTH, and using it to facilitate dialogue among them.

In addition to writing guides, a number of editing tools such as Grammarly are commonly used, and innovations such as ChatGPT throw up particular opportunities and challenges in academia. More traditional resources such as dictionaries and thesauruses also play a role, as do sites such as [Academic Phrasebank](#). As teachers, we are open in our discussions with students about these tools, encouraging strategic but critical usage.

PRINCIPLES UNDERPINNING THE KTH GUIDE TO SCIENTIFIC WRITING

We felt strongly that the KTH guide should be rooted in a principled pedagogy. The first principle reflects our aim to situate the guide in the local and international context of KTH. The second principle reflects the view that language and writing conventions are dynamic and diverse in nature. The third principle reflects the notion that writing is a social practice, involving context and writer choice, and “not simply a technical and neutral skill” (Street, 1984, 7-8). Implicit within these principles is the idea that the guide should be an evolving entity, and that the writing community at KTH should have a sense of ownership of the guide. This is also to acknowledge that there are areas where there will undoubtedly be gaps in our knowledge, or misunderstandings about certain disciplinary conventions.

Reflecting the Local and International Context at KTH

A scientific writing community can be viewed as a *community of practice* (Lave and Wenger, 1991) of which newcomers can become active members if offered opportunities for meaningful “peripheral participation”. We aim to make the guide relevant both to students as they integrate into the discourse practices of their discipline, and to faculty as they guide their students in this process and develop their own life-long skills. We therefore selected exemplars which reflected typical writing practice at KTH, such as degree projects and research papers. As well as this local focus, we also acknowledge the international context by covering aspects of regional variation such as US/UK spelling. We intend to expand on this and to include discussion of English as a lingua franca (ELF) as the guide develops.

Reflecting the Diverse and Dynamic Nature of Language and Writing Conventions

In order to reflect the diverse and dynamic nature of language, it is necessary to represent language as more than a set of rules and prescriptions, acknowledge variation (social, regional, historical), and indicate where there may be room for choice and individual preference. This approach entails the avoidance of excessive or arbitrary prescription and acknowledgement of the reality of language usage in scientific writing today. The prescriptive-descriptive dichotomy is something which has always been part of discussions about language and language teaching. In simple terms, prescriptivists are interested in telling people how they “ought to speak and write” while descriptivists are interested in talking about how people “actually do speak and write” (Huddleston and Pullum, 2005: 5). According to the leading expert on language change, Jean Aitchison, prescriptivism often means that “invented language rules often get confused with genuine language rules” (1997: 5). One of the aims of the KTH guide is to help writers recognise this distinction, and to understand that even genuine rules may be subject to present-day variation or change over time. This is currently reflected in the guide’s explanations, and in the labelling of examples. The guide does use *incorrect/correct* labels where there is a clear grammatical issue, but it also uses other labels in attempt to acknowledge variation and complexity, and to acknowledge where there is a continuum rather than a strict right or wrong dichotomy. These labels include: *problematic/better*; *less formal/more formal*; *wordy/more concise*. The KTH guide also reflects the fact that writing conventions can vary across disciplines and even among individuals. We try to acknowledge where these conventions are not always as transparent or consistent as might be expected, and where they are, moreover, sometimes contested.

Reflecting the Idea of Writing as Social Practice

The KTH guide aims to reflect the idea of writing as social practice, as opposed to a purely technical or neutral skill (Street, 1984). As writers construct a text and construct meaning, they make conscious and unconscious choices in terms of content, organisation and language. These choices are dependent on a range of factors which relate directly to the writer’s audience and purpose, institutional power structures, and the dominance and privileging of particular literacy practices (Street, 1984). The KTH guide is intended to provide writers with the knowledge and tools to make informed choices in this context.

Examples from the KTH Guide which Reflect Variation and Writer Agency

Users of a language need to follow certain “genuine” grammatical rules (Aitchison, 1997) in order to be understood and meet the expectations of readers, and this will determine some of the choices they make. For example, statements in English usually require a subject-verb word order (*the vehicle [subject] is powered [verb] by an electric motor*), and if this rule is broken (*is powered by an electric motor the vehicle*), the text will not make sense or read well.

Other areas of grammar are less straightforward, however, comma use being a good example. Some commas are integral to the meaning of a sentence, and therefore grammatically necessary in a sentence like: *The data, which was gathered over two years, was analysed using various packages*. If the commas were removed, the meaning would change to imply that there was other data in addition to that which had been collected over two years. The guide provides simple rule-based information on this comma use in the section on *Relative clauses*. In contrast, where commas are optional, the guide provides advice which reflects this fact:

It is optional to use an Oxford comma before *and*, *but*, and *or* to separate coordinate phrases and clauses. However, an Oxford comma can often make a sentence clearer by separating elements and reducing the possibility of ambiguity.

We also wanted to be open about the unclear or contested nature of some academic and scientific conventions, as demonstrated by this introduction to active and passive voice: There is some debate about the role of the passive voice in scientific writing, and writers often receive contradictory or confusing advice about this. Traditionally, passive structures were favoured (Leong, 2020); however, both passive and active structures play a role in modern scientific writing.

A related question, one frequently asked by our students, is whether personal pronouns can be used in scientific writing. The KTH guide addresses this question by contrasting two articles in *The Lancet*, one using personal pronouns, the other using the passive voice, thus demonstrating the acceptable variation that exists in academia, even within the same journal:

Methodologies are often described using the passive voice (often combined with the active voice), underlying the focus on what is done, rather than who is doing it, as in example (1). However, today, it is also common to see methodologies written using *we*, as in example (2). Note that these two examples both come from the same journal, *The Lancet*. It is important to establish if there is a preferred approach in your field and write accordingly.

(1) This retrospective, total population cohort study was done using data from Swedish nationwide registers. [...] Two outcomes were evaluated.

(2) In this systematic review and network meta-analysis, we searched, without language restrictions, the Cochrane Schizophrenia Group's specialised register [...]. We included randomised controlled trials [...].

Having seen these examples, the students can then, as advised here, approach their own field with an open mind to see what is conventional.

CURRENT WORK

Since its publication on KTH's website in August 2022, our focus has been to introduce the KTH guide in our scientific writing courses and trial its content with our students. To this end, we have updated our teaching material with references to recommendations and examples in the guide, and we have created online quizzes on Canvas, our learning management system, which test the students' understanding of the guide's content. The guide has already become an important feature in KTH's provision of training in scientific writing in English, and we are also working to promote its use more widely in the university via colleagues in schools and the library.

While we introduce the guide in our academic writing courses, we have also begun to evaluate its content and usability. We have created a survey using interactive presentation software where we ask the following questions:

1. What can you find in the KTH guide that reflects your current practice as a writer?
2. What can you find in the guide that you think might help you improve your writing?
3. What can you find in the guide that surprises you, or appears to contradict your instincts or something you heard in the past?
4. What would you like to see changed in the guide or added to the guide in order to support you in your writing?

While Question 1 reflects the idea of the guide as something that builds on users' previous knowledge, Question 2 encourages users to explore new strategies that may enhance their writing. Question 3 draws users' attention to the fact that, while some questions concerning language use may have a definitive answer, many others are complex, context dependent, or contested. Question 4 invites users to influence the future development of the guide. The survey is part of an ongoing evaluation process which we hope will keep the guide up to date and relevant to the KTH writing community.

PRELIMINARY RESULTS AND DISCUSSION

We have thus far collected 168 responses (106 bachelor/masters; 50 doctoral; 12 faculty). Here, we discuss a number of interesting themes that have so far emerged from our data analysis. We also provide examples of how we have begun to revise and extend the guide in response to feedback from users.

Is it OK to repeat?

Topics which generated a high number of responses were the use of repetition and parallel structures (structures combining new information with repetition of known information), with 43 mentions in total. Strategic use of repetition, including the use of parallel structures, is advocated in the KTH guide as a means of helping a reader navigate a text easily. Repetition is believed to reduce the amount of processing required by the reader so that they are "freer to attend to the overall message" (Tyler, 1994: 686). Some respondents demonstrate awareness of the importance of repetition and parallel structures, the latter of which, in the words of one respondent, "help the reader understand the message more easily". However, the advice to repeat is sometimes met with confusion or resistance. One respondent stated their reluctance to use these strategies as they were "boring", a comment which reflects a, in our experience, fairly common, and potentially problematic belief that students are expected to display the breadth of their linguistic knowledge over and above conveying ideas in a clear way. Other respondents appeared unsure about the guide's advice to repeat, stating that it is something they were not used to, or, as one stated, surprised to see "so advocated". Another respondent asks:

"Is it okay to repeat the last phrase of [the] previous sentence at the beginning of the next sentence right away?"

This particular question appears to refer to the common given-to-new information structure in English, where the beginning of a sentence refers back to the theme of the previous sentence, repeating or summarising it, before adding new information. This does not necessarily involve the very last phrase of the previous sentence, but it is possible, e.g.:

Texts are often organised using given-new information structures. These structures can enhance the flow of a text.

The given-to-new principle, with its integral use of repetition or summary, is covered in detail in the guide and was specifically mentioned by 13 respondents, either as something they recognise, or as a new concept, albeit one they may instinctively employ:

“... I have used it before but not knowing the theories.”

These responses suggest that better understanding of how repetition functions in a text can help writers to reflect on current practice. This may lead to the adoption of more effective strategies or the reinforcement of currently successful ones.

But I was told something different

Respondents' comments on potentially useful strategies (Question 2) spanned the entire content of the guide, including parallel structures, inclusive language and given-to-new information structure. In response to both Questions 2 and 3, a number of respondents explicitly reflected on guide content which seemed to contradict current practice, or previous instruction or recommendations. Some of these related to issues around repetition, as detailed in the previous section. Some other comments were connected to differences between English and the respondents' first language in terms of sentence structure and punctuation use. One comment related to perceived tensions between writing strategies at school and university:

“I was not aware of the importance of writing concise [sic], as I'm not unfamiliar with trying to push the word limit in schoolwork.”

Another respondent appreciated the punctuation section as they had been confused by Grammarly's suggestions on commas. The KTH guide explains where commas are grammatically necessary, or where they are more of a style choice.

Respondents sometimes reacted to parts of the guide where particular academic writing myths were questioned or dispelled. This included some responses to the guide's position on the acceptable use of both active and passive voice in scientific writing, together with the potential inclusion of personal pronouns, which may contrast with prescriptions users have previously encountered. Respondents were sometimes surprised by this information, pleasantly surprised in this particular case:

“Maybe a bit (positively though) surprised by the discussion regarding active/passive voice.”

Another respondent was encouraged to hear that active voice may be “better” than passive voice in some contexts, and one faculty member commented on the negative effect that over-prescription or misunderstanding in this area can have on the writing process:

“It is OK to use both passive voice and “we” in academic writing. But many spend time trying to avoid this.”

These responses suggest that the KTH guide can be a useful shared resource to help students and faculty explore tricky and contested issues together, and that it can help writers respond to suggested edits from tools such as Grammarly in a critical way.

We know but we don't know!

Faculty members had a particular response to the guide related to their experience in scientific writing and their role as educators. Although they were generally familiar with the contents of the guide, half these respondents appreciated that it provided a summary, “refresh”, or one-stop shop, or made them reflect on language and writing issues in a new way. As one respondent commented on guidelines for objective and inclusive language:

“We all know them informally, but the guide puts these down more concretely.”

One doctoral student with extensive experience also appreciated the revision opportunities afforded by the guide:

“... I've worked in communication for 20 years. But that doesn't mean I don't need to revise [these writing strategies] again! :-)”

However, some aspects of the guide were in fact new to some of these experienced writers, or at least in the way that they were presented in the guide, including inclusive writing, restricted use of the pronoun 'one' (compared with Swedish, for example), and the use of Latinate words to increase formality.

These responses suggest that the KTH Guide can clarify or extend faculty literacy practice, and also help faculty articulate linguistic matters in discussion with students.

REVISING THE KTH GUIDE TO SCIENTIFIC WRITING

Revisions to the guide are largely based on responses to Question 4. These include:

- Adapting the preamble at the start of each section to conform to KTH guidelines on accessibility;
- Developing the section outlining conventional use of active and passive to make the link to personal pronoun use clearer;
- Adding more examples of gendered or biased language along with more inclusive alternatives;
- Incorporating a note suggested by one doctoral student (working within a more social science than technical tradition of robotics) regarding the convention-challenging use of 'her' as a general pronoun;
- Adapting the tone of the text in places to incorporate more caution around usage guidelines, reflecting comments we received on variation across disciplines.

A significant issue for respondents (Question 4) related to difficulties in navigating the guide and the lack of an integrated search function. We are currently exploring these issues with KTH Digital Education.

CONCLUSION

The KTH Guide to scientific writing is an ongoing project, the aim of which is to create a writing tool which meets the diverse needs of our university writing community, and which, with the input of this community, will evolve over time to better meet those needs. We are conscious that the creation, use and ongoing evaluation of the guide affords a unique opportunity to make language and the way we write more visible and more widely discussed across the university. Currently, we only have a small number of responses from faculty. It is important to collect more data from this group and also use this process to promote use of the guide as a shared reference on KTH programmes.

We are at an early stage of data analysis, so are limited in terms of the conclusions we can draw at this time. However, the responses we have so far analysed suggest that the guide:

- Can help students to reflect on current literacy practices, promoting change as well as reinforcing positive strategies;

- May constitute a useful shared resource for students and faculty navigating tricky or contested areas of language and discourse, while also promoting critical use of writing tools such as Grammarly;
- Can support faculty development and help faculty articulate linguistic matters when discussing student writing.

As we collect and analyse more data through questionnaires and focus groups, we will be able to better understand how the guide is used and how it can be further developed to meet the needs of scientific writers.

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