Using a Simple Guide to Help Students Write Better Abstracts

Anna Karin Roo & Rochelle H. Holm

Summary: Students in science, technology, engineering, and mathematics (STEM) often write abstracts for research assignments but may not understand the purpose of an abstract. This paper presents the pilot of a simple guide for writing abstracts which gave student support to two undergraduate Malawian ELL students for their undergraduate research assignment. The two students and the instructor found the handout was helpful for the students to develop technical writing skills for the abstracts.

Keywords: abstract, ELL, ESOL, STEM, student support, technical writing

Introduction

The abstract is a specialized form of academic writing used for peer-reviewed research articles or conference proceedings, as an overview covering the need for a research project, the method used in the research project, and the research findings (Bahadoran et al., 2020). Ultimately, an abstract is used to 'sell' the research that has been conducted to an audience. This can pose difficulty for those who are entering science, technology, engineering, and mathematics (STEM) fields where abstracts are often not required until a higher education setting. It can become an even greater difficulty when the student researcher is an English language learner in a higher education environment where the abstract genre is not regularly taught in discipline or composition courses. This leads to STEM students in higher education having to identify how to write an abstract through a self-taught process. This paper describes the pilot of a simple handout describing the purpose of the scientific abstract and what should be included in an abstract and providing lessons learned from a Malawian University.

Background to the project?

There has been limited work on the abstract genre with the majority of existing work conducted on abstracts in the field of applied linguistics. Lorés (2004) conducted a genre analysis of published abstracts in linguistics and observed that the abstracts followed one of two patterns: either an introduction, methods, results, discussion (IMRD) format or a create a research space (CARS) format. Al-Khasawneh (2017) compared applied linguistics abstracts written by native and non-native English speakers and observed both types of writers had similar purpose, method, and product rhetorical moves. However, the two groups differed when writing the introduction and conclusion moves of the abstract where native writers were more likely to use these rhetorical moves. Parkinson (2017) conducted a genre analysis study of student laboratory reports and observed a student abstract should consist of five moves:

- stating aim,
- introducing topic,
- stating method,
- stating results, and
- proving discussion.

Those rhetorical moves identified by Parkinson were used in the handout given to the students for this project.

Globally, higher education instructors have tried to identify ways to introduce students to the genre and the to help them develop the ability to write abstracts. Dias (2020) developed a genre instruction pedagogy using process writing to give students abstract writing skills. Further, Klimova (2020) developed a scaffolding tool for students to write abstracts for qualification papers. These pedagogical tools may help students become more confident and develop skills needed for the abstract writing process. However, real world examples of practice in the field, especially in a low-income setting, remain limited.

Students studying science at a Malawian university have to conduct an undergraduate research project before earning their degrees. The instructor for the course typically provides no formal classroom instruction on how to write the abstract. The assignment instructions mainly focus on how to conduct the research project, and the

students often have to teach themselves how to write an abstract. In Malawi, science classes are not offered to students until secondary school. Further, science instruction and textbooks are conducted in English, though for many students English is not their first language.

Relevant to the context of this project, which occurred during the spring of 2020 and the global outbreak of COVID-19, students who are in a distance learning form of instruction are at even greater disadvantage, having fewer resources or reduced in-person instructor access to prepare for courses or exams (Chawinga & Zozie, 2016). Further, within the African context, Kumwenda et al. (2017) explained that early career researchers who attended a scientific writing and communication workshop struggled to secure mentorships which would allow them to have professional research trajectories. If such early career researchers also needed to learn how to write documents such as abstracts to advocate for their own research, they would be at a greater disadvantage than peers in inner circle English-speaking countries.

The aim of this paper is to report a case study of a simple abstract handout designed with instructions about the purpose of an abstract and genre moves identified in undergraduate student laboratory reports.

Methods

To explore how students learn to write abstracts, interviews were conducted with two undergraduate students and the instructor to discover how students feel about writing abstracts and what they learned about abstracts following the pilot of a simple handout. This was followed by practice writing an abstract with their own research.

The two students were interviewed together via Skype at the beginning of their projects to learn what they knew about abstracts. Following that interview, a handout (see Appendix) was given to the students. (The instructor made no other changes to how the assignment was presented for this study.) The handout outlined the moves identified by Parkinson (2017) for student laboratory report abstracts and tips for technical writing from a U.S. university writing center. This handout included an example abstract from a published article related to the students' field of study. The handout was designed to meet the needs of the students and to be in line with the requirements of the instructor.

After the research projects were completed and the instructor had given feedback to the students, a second interview was conducted with each student individually via phone. The two students were given the questions at least 24 hours before the interview. Because of loud background noise, one student was asked to write responses to the second interview questions in addition to the phone interview.

Results and Discussion

From the initial interview, both students (one male and one female) stated the purpose of an abstract is to cover the main points of a study. However, this is not the full purpose of a scientific abstract. They understood it should be written in the past tense and after the study has been completed. The students also shared that they felt it was more difficult to write about scientific concepts than everyday topics because of the technical terms and concepts in the subject matter. Both students said that they were average writers in English, but when it came to writing for science they felt their writing skills became poor, or would improve only after multiple drafts. However, the course instructor ranked both students as above average among their classmates in terms of written and verbal English communication skills.

After having reviewed the simple handout and having taken time for writing revision, the students reported feeling more confident about their abstract writing during their second interview. One student wrote a 2-page abstract, which was more than was required. The other student was content with his scoring because this was the first time he had written an abstract. The interviews also revealed the following comments:

> *Student 1: [The handout] really helped me, because then I at least had a picture of what I had to write. Like now I acknowledge what must be in the abstract. Because even though you go online and Google something, if you bring a person a document, […] then just explained thoroughly what has to be in an abstract so it was easier to understand.*

> *Student 2: [The handout] was useful as it helped me a lot concerning on how best to come up with a good scientific writing ability on different studies in my life.*

> *Instructor: That handout was a very good tool to use with these students as their instructor because it was based on other fisheries research from other students in the department so they could better relate and understand. My students are more responsive when their research is mirroring what I present. So for example if I would have presented something in the theology field they may not have understood that as closely as presenting a mirror of their field of study. So the handout was very useful. … But [the handout] would need to be individualized for different departments.*

In response to instruction about abstracts the instructor stated:

> *"Where instructors very deliberately teach a student the importance of an abstract, how to write one and provide successful examples of other students in that field. So not using a generalized abstract, but using something very specific for example fisheries or environmental science. And so, not lumping in the abstract with other research methodologies, really dedicating time to explaining why it's important as well as instruction on how to do it."*

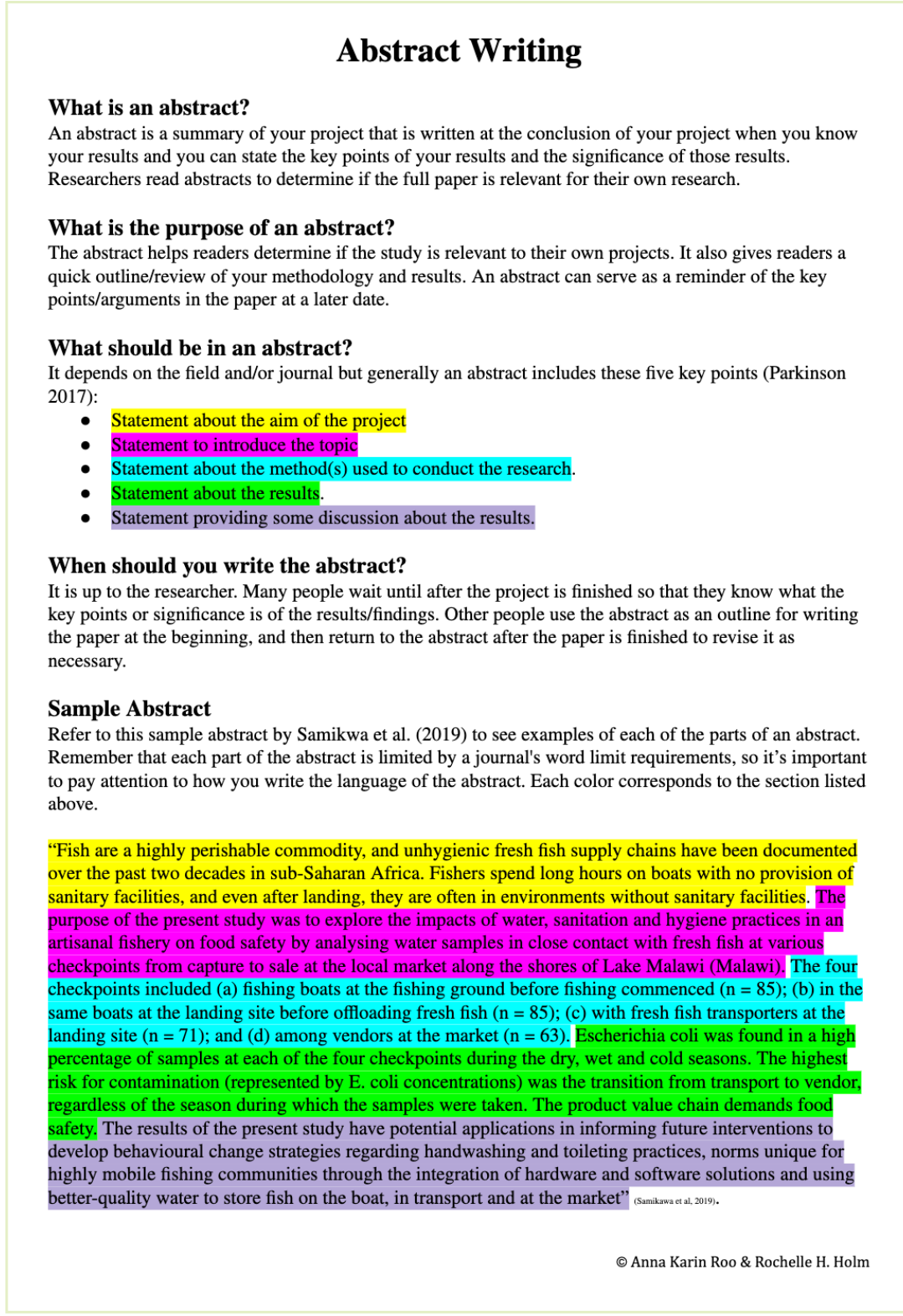
Conclusion

Identifying the need for instruction on abstracts is key to helping higher education STEM instructors be able to present information in such a way to help students succeed. Providing students with a handout on writing abstracts specific to their field of study gives students a tool in the absence of dedicated instruction time.

This study suggests that using the developed handout on how to write the abstract for the research project was effective in sub-Saharan Africa and is a low-cost approach that can be modeled globally. The students in this pilot study demonstrated the ability to write better abstracts and appeared to feel more confident about writing the abstract during the second interview in comparison to the first interview. When students have the resources and tools to explore writing for STEM courses, they will have the tools to succeed in their future careers in STEM.

Appendix

Click to expand the image.



Abstract Writing

What is an abstract?

An abstract is a summary of your project that is written at the conclusion of your project when you know your results and you can state the key points of your results and the significance of those results. Researchers read abstracts to determine if the full paper is relevant for their own research.

What is the purpose of an abstract?

The abstract helps readers determine if the study is relevant to their own projects. It also gives readers a quick outline/review of your methodology and results. An abstract can serve as a reminder of the key points/arguments in the paper at a later date.

What should be in an abstract?

It depends on the field and/or journal but generally an abstract includes these five key points (Parkinson 2017):

- Statement about the aim of the project
- Statement to introduce the topic
- Statement about the method(s) used to conduct the research.
- Statement about the results.
- Statement providing some discussion about the results.

When should you write the abstract?

It is up to the researcher. Many people wait until after the project is finished so that they know what the key points or significance is of the results/findings. Other people use the abstract as an outline for writing the paper at the beginning, and then return to the abstract after the paper is finished to revise it as necessary.

Sample Abstract

Refer to this sample abstract by Samikwa et al. (2019) to see examples of each of the parts of an abstract. Remember that each part of the abstract is limited by a journal's word limit requirements, so it's important to pay attention to how you write the language of the abstract. Each color corresponds to the section listed above.

"Fish are a highly perishable commodity, and unhygienic fresh fish supply chains have been documented over the past two decades in sub-Saharan Africa. Fishers spend long hours on boats with no provision of sanitary facilities, and even after landing, they are often in environments without sanitary facilities. The purpose of the present study was to explore the impacts of water, sanitation and hygiene practices in an artisanal fishery on food safety by analysing water samples in close contact with fresh fish at various checkpoints from capture to sale at the local market along the shores of Lake Malawi (Malawi). The four checkpoints included (a) fishing boats at the fishing ground before fishing commenced (n = 85); (b) in the same boats at the landing site before offloading fresh fish (n = 85); (c) with fresh fish transporters at the landing site (n = 71); and (d) among vendors at the market (n = 63). Escherichia coli was found in a high percentage of samples at each of the four checkpoints during the dry, wet and cold seasons. The highest risk for contamination (represented by E. coli concentrations) was the transition from transport to vendor, regardless of the season during which the samples were taken. The product value chain demands food safety. The results of the present study have potential applications in informing future interventions to develop behavioural change strategies regarding handwashing and toileting practices, norms unique for highly mobile fishing communities through the integration of hardware and software solutions and using better-quality water to store fish on the boat, in transport and at the market" (Samikawa et al. 2019).

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