



# To make a long story short: A rubric for assessing graduate students' academic and popular science writing skills



Tzipora Rakedzon\*, Ayelet Baram-Tsabari

Department of Education in Science and Technology, Technion-Israel Institute of Technology, Haifa 32000, Israel

## ARTICLE INFO

### Article history:

Received 17 March 2016

Received in revised form

21 November 2016

Accepted 16 December 2016

### Keywords:

Rubric

Writing assessment

Second language writing

Second language writing assessment

Rating scale development

Rating scales

## ABSTRACT

Graduate students are future scientists, and as such, being able to communicate science is imperative for their integration into the scientific community. This is primarily achieved through scientific papers, mostly published in English; however, interactions outside of academia are also beneficial for future scientists. Therefore, academic writing courses are prevalent and popular science communication courses are on the rise. Nevertheless, no rubrics exist for assessing students' writing in academic and science communication courses. This article describes the development and testing of a rubric for assessing advanced L2 STEM graduate students' writing in academic (abstract) and popular science writing (press release). The rubric was developed as part of a longstanding academic writing course, but was modified to include a module on science communication with the lay public. Analysis of student needs and the literature inspired a pre-pilot that assessed 16 descriptors on 60 student works. A subsequent, adjusted pilot version on 30 students resulted in adaptations to fit each genre and course goals. In the third round, a modified, final rubric tested on 177 graduate students was created that can be used for both assessment and comparison of the genres. This rubric can assess scientific genres at the graduate level and can be adapted for other genres and levels.

© 2016 Elsevier Inc. All rights reserved.

## 1. Introduction

Rubrics are useful for instruction and evaluation (Andrade, 2005), and research has supported the use of rubrics in teaching and learning (e.g. Osana & Seymour, 2004; Reitmeier, Svendsen, & Vrchota, 2006), evaluating programs (Dunbar, Brooks, & Kubicka-Miller, 2006; Knight, 2006), assessing student work (Campbell, 2005; Reddy & Andrade, 2009), and identifying the effectiveness of courses and areas for improvement in instruction (Dunbar et al., 2006; Reddy & Andrade, 2009; Song, 2006). Researchers have continually supported the use of rubrics, as they promote objectivity, consistency, reliability, and validity in assessment (Boettger, 2010; Crusan, 2015; Crusan, 2010; Dempsey, PytlikZillig, & Bruning, 2009).

Specifically, rubrics have been employed in assessing L2 writers, and often aim to assess various essay genres at the high school and undergraduate level (Crusan, 2010; Knoch, 2009a,b; Polio, 1997). In assessing academic writing, existing rubrics are mostly used for large-scale, standardized tests evaluating predetermined topics to determine student needs before enrolling in an academic program (Educational Testing Services, 2005; Knoch, 2009a). However, few studies have investigated academic writing courses for graduate students and their outcomes, and rubrics for such cases are lacking: those that have assessed such courses or interventions tend to employ a range of assessment devices, including error and

\* Corresponding author.

E-mail addresses: [hutzipi@campus.technion.ac.il](mailto:hutzipi@campus.technion.ac.il), [hutzipi@gmail.com](mailto:hutzipi@gmail.com) (T. Rakedzon), [ayelet@technion.ac.il](mailto:ayelet@technion.ac.il) (A. Baram-Tsabari).

vocabulary analysis (Boscolo, Arfé & Quarisa, 2007; Ferris & Roberts, 2001; Storch & Tapper, 2009). Furthermore, there are few studies on assessing popular science writing (Baram-Tsabari & Lewenstein, 2013) and almost no systematic evaluation of learning outcomes in training programs (Baram-Tsabari & Lewenstein, 2016) despite the fact that the number of science communication courses at the university level is rising (COMPASSonline, 2013). This highlights the need to evaluate the pedagogy and programs teaching future scientists good written communication skills.

Despite the aforementioned studies, researchers have noted a lack of research on the development of writing scales (Banerjee, Yan, Chapman, & Elliott, 2015; Knoch, 2009b, 2011; Lallmamode, Mat Daud, & Abu Kassim, 2016; Sasaki & Hirose, 1999). This article describes the development of a rubric for rating specific goals of graduate level academic writing in advanced L2 STEM students, including acquisition of a contrasting style, i.e. popular science writing. This quantitative scoring rubric provides for a more standardized evaluation of writing outcomes that can be easily applied to assess the progress and effectiveness of a graduate writing course.

## 2. The need to develop a new rubric

### 2.1. Academic versus popular science writing

Both academic and popular writing styles pose a great challenge to scientists. Academic writing is necessary for integration and promotion within the scientific community, and presents specific hurdles for L2 writers (Leki, Cumming, & Silva, 2010; Paltridge, 2004). Academic writing often adheres to the standard IMRAD (Introduction – Methods – Results – Discussion) (Bertin, Atanassova, Larivière, & Gingras, 2015; Day & Gastel, 2012; Sollaci & Pereira, 2004; Swales & Feak, 2012; Wu, 2011) structure. Courses in academic writing often teach typical scientific article structures, as well as a variety of English proficiency issues as sentence structure, proper punctuation, and vocabulary usage. The academic writing style tends to be concise and formal, and employs technical language targeting an educated professional audience. Several academic genres make up this type of communication, including scientific papers, books, reviews, and letters. There is much research on the problems of academic writing, often concentrating on language. These studies have analyzed the language of writing scientific papers for peer reviewed journals in terms of self-mentioning (Hyland, 2001), hedging (Hyland, 1996; Hyland, 2007), meta-discourse<sup>1</sup> (Hyland & Tse, 2004), lexical bundles<sup>2</sup> (Chen & Baker, 2010), and plagiarism (Pecorari, 2003) to mention a few.

Academic writing is not the only way to publish and disseminate science. Popular science texts have existed since the 17th century, when even Galileo “[worked] hard to communicate the new discoveries in physics and astronomy” (Massarani & Moreira, 2004; p.75–76). Many popular science genres have emerged such as books, newspaper and magazine articles, and even more recent channels such as blogs and press releases, which are increasingly used to communicate science to the non-expert public. Popular science writing often employs a contrasting structure, beginning with the conclusion and bottom line, and continuing with less essential information to the public such as the methodology and background. It often uses different rhetorical devices including narrative and humor, and generally avoids overly technical language.

The public is highly interested in reading about science. The Eurobarometer survey (2013) found that roughly half of all Europeans are interested in scientific developments (53%), and 41% of all Americans reported they were “very interested” in new scientific discoveries (National Science Board, 2016). Teaching popular science genres also helps scientists fulfill their civic responsibility of informing the public, enabling people to make more educated decisions about their lives. It can help students and scientists become more aware of the importance of the target audience when writing, and the “language (that is appropriate) for different audiences: for experts, for students, for industry, and for practitioners” (Hyland, 2010).

While academic writing programs are prevalent in universities around the world, there are few programs that train scientists how to write and communicate with the lay public, and even fewer that focus on graduate students, the scientists of the future (Crone et al., 2011). Such programs, usually referred to as science communication courses or workshops, prepare scientists and future scientists to share research. These science communication courses and workshops are targeted at scientists who have training and often extensive experience in academic writing to enable them to better communicate with the public on issues requiring decision making in the modern world (Royal Society, 1985). For all these reasons, it is important to create a rubric to assess advanced academic and popular science writing.

### 2.2. Existing rubrics and rating scales

The most common rubric types are holistic and analytic. Holistic rubrics assess the overall quality of a student writing outcomes, providing a single score (Crusan, 2010). The analytic rubric is based on multiple scales for assessing writing, and can be designed for a specific writing assignment, audience, and purpose (Crusan, 2010). For assessing writing tasks, analytic rubrics should be either theoretically (as on current Second Language Acquisition (SLA) theory), empirically, or syllabus based (Alderson, 2005). Turner and Upshur (2002) and Upshur and Turner (1995) also argue that rubrics devised using L2 writing test outcomes are preferred over the theoretically based, which have been shown to produce scores with

<sup>1</sup> Meta-discourse refers to “devices writers use to organize their texts, engage readers and signal their attitudes” (Hyland & Tse, 2004; p.156).

<sup>2</sup> Lexical bundles are frequently used word combinations.

Download English Version:

<https://daneshyari.com/en/article/4935787>

Download Persian Version:

<https://daneshyari.com/article/4935787>

[Daneshyari.com](https://daneshyari.com)