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# Assessing the quality of arguments in students' persuasive writing: A case study analyzing the relationship between surface structure and substance

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## ABSTRACT

In the present case study, 125 high school students in Hong Kong wrote argumentative essays following a modified Toulmin model that included claims, counterargument claims and rebuttals. From these, 6 exemplary essays in terms of their surface structure by the standards of the modified Toulmin model were selected and analyzed for their perceived quality of reasoning. This evaluation of quality was arrived at via questionnaire responses from 46 doctoral students who rated the 20 most common reasons advanced in the 125 essays. Findings revealed several patterns of inadequacies in the reasoning of the 6 cases, exposing the need to bring greater attention to the quality of reasoning in students' persuasive writing. An integrated assessment framework and analytic scoring rubric for argumentative writing are thus developed and recommended as a general guide for classroom use, taking into account both argumentative structure and substance.

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The ability to use the written word to persuade a reader to consider, or take on the beliefs or ideas of the writer has been explored in depth in recent years. Much of this analysis has focused on the argumentative elements proposed by Stephen Toulmin (1958; 2003) whose model of argumentation includes features that require support for claims as well as consideration for alternative viewpoints. This model, and variations of it, has been used in many studies to assess the strength of students' ability to argue, and often the findings show some deficiencies in student argumentation. Many of these studies that assess the success or failure of persuasive ability (e.g., Nussbaum & Kardash, 2005; Wolfe, Britt, & Butler, 2009), however, tend to value the presence of these elements, particularly counterargumentation, over the quality of reasoning, or substance, contained within the argumentative elements. For example, in a sample essay, the supporting of claims with evidence, or in Toulmin terms, "data," and the rebutting of a fully supported counterargument may appear, on the surface, as though a student has followed a recommended surface formula of good argumentation; however, if the meaningful content within those elements, such as the data and grounds that support the counterclaims and rebuttals, are inaccurate or irrelevant, or lacking logical structure and coherence (Sampson & Clark, 2008), the reader may remain entirely unconvinced. In other words, the surface structure, or shell of the argument, may appear appropriate, or even exemplary, but the actual substance could still be exceedingly weak. Such a statement is not meant to undermine the efficacy of using models of argumentative elements for assessing persuasive ability in students. Indeed, such models or templates are necessary for encouraging

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students to support their claims, while seriously considering counterclaims and rebutting them (Graff & Birkenstein, 2006). However, without a comprehensive model that goes beyond a simple checking, or frequency count, of these elements, i.e., a model that also considers the perceived quality of reasoning in each element, there remains some doubt about the persuasiveness of an argument. Accordingly, the present exploratory study, using the argumentative writing of secondary school students in Hong Kong, investigates how the quality of reasoning in an argumentative essay can be assessed and compared with its argumentative structure in order to capture a fuller picture of an essay's persuasiveness.

## 1. Review of literature

### 1.1. Toulmin model of argumentation

The ability to persuade is an essential component of everyday life. Argumentation, while related to persuasion, is a more formalized process often appearing in written form. Toulmin (1958, 2003) is frequently credited with isolating the elements of good argumentation via his framework of *claim*, *data*, *warrant*, *backing*, *qualifier* and *rebuttal*. Here, the *claim* is the initially stated conclusion; the *data* are the facts supporting the claim; the *warrants* establish connections between the data and the claim; *backings* state the assumptions on which the warrants rest; *qualifiers* place limits on the strength of the claim and *rebuttals* are arguments that refute or are exceptions to the elements of the argument.

Interest in argumentation has benefited particularly from studies carried out in the teaching of the natural sciences, under the belief that “scientific rationality requires a knowledge of scientific theories, a familiarity with their supporting evidence, and the opportunity to construct and/or to evaluate their interrelationship” (Von Aufschnaiter, Erduran, Osborne, & Simon, 2008, p. 102). However, the findings in many of these studies have reached similar conclusions about the deficiencies in students' argumentative skills. In a review article of studies on science students' argumentation performance, Sadler (2004) notes that poor argumentation skills are common: “In terms of argumentation problem areas, the reviewed studies cited a tendency for students to make claims without adequate justifications and a glaring lack of attention to opposing positions in the form of counterpositions and necessary rebuttals” (p. 523).

The elements of argumentation have also been investigated in studies outside of the natural sciences. Many of these (Baron, 1995; Coffin, Hewings, & North, 2012; Nussbaum & Kardash, 2005; Perkins, Faraday, & Bushey, 1991; Wolfe, 2012; Wolfe & Britt, 2008) have noted the tendency to ignore arguments opposing those of the writer, or what is termed the “myside bias,” first coined by Perkins (1985). Recognizing alternative views, however, is an essential part of argumentation (Kuhn, 1991; Leitão, 2003). Supporting this claim is a meta-study on argumentative texts by O'Keefe (1999) who found that two-sided messages, i.e., those that included counterarguments and refutations, were more persuasive than those that ignored counterarguments (unless they were selling a product). Persuasiveness in this case “was assessed through measures such as opinion change, post communication agreement, behavioral intention, behavior and the like” (p. 214). Likewise, in a study with a similar focus, Wolfe et al. (2009) found that both the persuasiveness and perceived quality of argumentation were increased by the presentation and rebuttal of counterarguments.

While the Toulmin framework has been important for highlighting the need to address alternative viewpoints when making claims, some researchers have had difficulty reliably applying the model because the arguments presented by students can often be classified under more than one element. Sampson and Clark (2008), for example, provided examples of statements made by students that could be classified as any one of claims, warrants, qualifiers or rebuttals depending on the perspective of the reader. Simon (2008) also notes that “claims are sometimes implicit in argumentation discourse and have to be deduced, plus identifying data, warrants and backings can be ambiguous” (p. 288). Such unstated positions naturally make coding difficult. Because of this “layer of complexity that is often unnecessary for analytic purposes” (Nussbaum & Kardash, 2005, p. 70), a number of studies on students' argumentative writing have adapted or simplified the Toulmin framework in order to better enable reliable classification of argumentative elements (Németh & Kormos, 2001; Nussbaum & Kardash, 2005; Nussbaum & Schraw, 2007; Stapleton, 2001; Qin & Karabacak, 2010; Varghese & Abraham, 1998).

### 1.2. Quality of reasoning

Another issue, which is key to the present study, is the overemphasis on structural elements of argumentation at the expense of quality of logic and evidence. Sampson and Clark (2008) observe:

Unfortunately, because the majority of the research using Toulmin's argument framework has focused on the field-invariant features of an argument, we know very little about how well arguments constructed by students adhere to the criteria shared by the scientific community for judging quality. (p. 452)

In their prior work, Clark and Sampson (2007) found that students' arguments often contained inaccurate scientific ideas even though the structure of their arguments was relatively sophisticated. Simon (2008) further echoes this stance in claiming that “by focusing on the structure of arguments, researchers do not explore the content of argumentation, so this perspective has limitations for evaluating the quality of evidence” (p. 288).

Because of this concern about the substance of students' arguments, some researchers have sought alternative frameworks to measure the quality of argumentation that go beyond the simple structural framework based on Toulmin elements. In the field of informal reasoning and argumentation, three criteria are often proposed and used to assess the soundness of

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