

# *Beyond rubrics: Using functional language analysis to evaluate student writing*

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## *Abstract*

*This paper describes an alternative approach to the ever popular rubrics-based writing assessment. The approach, called functional language analysis, provides a set of analysis strategies that enable teachers to evaluate the content, organisation, and style of student writing based on tangible textual evidence.*

Writing is a significant language and literacy skill that is essential to students' academic success in school. Despite its importance, many students struggle with academic writing. In the United States, for example, roughly three-quarters of 4th, 8th, and 12th graders performed below the proficiency level in a recent National Assessment of Educational Progress (Persky, Daane & Jin, 2003). In New Zealand, the Ministry of Education (2006) reported that many secondary students write no better than their primary school counterparts. In Australia, concern about students' writing performance has also mounted, as is evident in the recent inclusion of writing as part of the national assessment of literacy and numeracy (MCEETYA, 2008). In recognition of this situation, leading scholars and organisations (e.g., Beard, Myhill, Riley & Nystrand, 2009; Christie & Derewianka, 2008; Graham & Perin, 2005; National Commission on Writing, 2003) have called for greater attention to the subject of writing in school and proposed ambitious agendas and new pedagogical models for improving students' written communication skills. It is suggested that a revolution of sort in the teaching and learning of writing is needed in order to develop more effective and proficient writers.

## *What's wrong with rubrics?*

An area of writing instruction that is in need of reforming is classroom assessment. The main goal of any classroom assessment should be to inform instruction (IRA & NCTE, 2009). In the case of writing, classroom assessment should help teachers not only identify students' levels of performance but, more importantly, provide insights into students' strengths and needs for the purpose of planning instruction and remediation. Popular assessment

techniques, such as rubrics, fall short of these goals, however. Widely used in the classroom, the rubric is regarded by many as an exact, efficient, and objective tool for evaluating student writing. In rubrics-based writing assessment, teachers develop several score levels, such as 1 to 6, with a description of what is expected at each level in terms of mechanics, content, organisation, vocabulary, and grammar. A tool for evaluating student writing highly recommended for and widely used by school teachers in the United States is the six traits writing rubric. Figure 1 describes what an exemplary piece of writing (Level 6) should look like under the six-traits writing rubric.

### Figure 1: Six-traits writing rubric: Level 6

Ideas and content:	* Exceptionally clear, focused, engaging with relevant, strong supporting detail
Organisation:	* Effectively organised in logical and creative manner * Creative and engaging introduction and conclusion
Voice:	* Expressive, engaging, sincere; * Strong sense of audience; * Shows emotion, humour, honesty, suspense or life.
Word choice:	* Precise, carefully chosen; * Strong, fresh, vivid images
Sentence fluency:	* High degree of craftsmanship * Effective variation in sentence patterns
Conventions:	* Exceptionally strong control of standard conventions of writing

from <http://school.discoveryeducation.com/schrockguide/assess.html>  
(Accessed on 20 February 2010)

One problem with this rubric is that it is neither exact nor objective. It does not, for example, give teachers any hint of what it is that makes a piece of writing 'exceptionally clear, focused, engaging' and 'effectively organised'. Nor does it specify what 'high degree of craftsmanship' entails. Moreover, the rubric does not elaborate on what it means to be 'creative', 'effective', 'engaging', 'expressive', 'strong', and 'fresh'. Teachers are left wondering what textual evidence to look for when evaluating a text's content, organisation, and language use. Often, they have to rely on their own intuition and discursive knowledge in making judgment calls. This can be especially troubling, because teachers are rarely trained to understand the discursive features of writing (Louden, Rohl, Gore, Greaves, Mcintosh, Wright, Siemon & House, 2005; Schleppegrell, 2004) and they often feel ill equipped to evaluate student writing in linguistic terms (Harper & Rennie, 2009; Hammond & Macken-Horarik, 2001). In fact, many teachers usually do no more than point to errors in the more obvious aspects of writing, such as spelling, capitalisation, punctuation, subject-verb agreement, tense, and idiomatic expressions (Christie & Derewianka, 2008; Martin, 1996; Schleppegrell, 2004).

Another problem with the rubric is that it focuses on grammatical forms with little attention to their functions. For example, the rubric calls for variation in sentence patterns, but fails to specify which kind of variation is appropriate for which type of text. While syntactic variety and complexity for its own sake may enhance a text's status, it does little to improve its discursive quality and functionality (Myhill, 2008). Researchers (e.g., Martin, 1989; Schleppegrell, 2004) have shown that different genres and registers draw on different constellations of lexicogrammatical features that enable a text to mean what it does in a particular context. For example, factual genres in the academic context, such as reports and explanations, tend to use sentences that are grammatically simpler but lexically dense and that contain abstract nouns and expanded noun groups, whereas personal genres such as recounts and narratives often use sentences that are grammatically more complex, stringing together coordinate and subordinate clauses. These differences are a reflection of the fundamental differences in the ways different disciplinary experts read, write, and think.

The rubric's indifference to genre- and register-specific requirements is also found in its undue emphasis on personal involvement with the topic (e.g., *expressive, emotion, humour, honesty, suspense, vivid images, creative, and engaging introduction and conclusion*). Some researchers (see, for example, Biber, Johansson, Leech, Conrad & Finegan, 1994; Schleppegrell, 2004) have pointed out that unlike narrative genres where personal involvement and voice are valued, academic texts, particularly those of factual genres, often feature a more objective, abstract, and authoritative style of writing that encourages personal detachment. Martin (1996, 2002) further demonstrated that academic texts are typically organised in 'waves of abstraction' that make the introduction and conclusion paragraphs as well as the beginning and ending sentences of each paragraph highly nominalised and abstract. This pattern of text organisation, Martin suggested, facilitates information flow and development of argument. Therefore, blind adherence to certain grammatical forms or styles without regard for their functions can result in texts that have little rhetorical power and unexpected communicative effects.

It is clear that the rubrics-based assessment has its limitations and problems (see also Wilson, 2006 for a different critique of rubrics). On one hand, rubrics encourage the teacher to pigeonhole individual students into a certain proficiency level; on the other hand, they fail to provide specific, concrete, genre/register-sensitive criteria that will enable the teacher to render a more objective and valid judgment. As such, rubrics give the teacher little insights into what exactly makes a text more or less effective/valued and are marginally useful for informing writing instruction.

In this paper, we propose an alternative approach to rubrics-based classroom assessment. The approach, called functional language analysis (Fang & Schleppegrell, 2008, 2010), offers a set of analytical tools that enables teachers

to focus *systematically* on the language choices students have made in their writing and evaluate whether these choices are appropriate for the particular task at hand and effective for presenting information, creating discursive flow, and infusing perspectives. The approach recognises that language is the primary medium through which student writing is communicated and assessed in school. It foregrounds the important role of teachers in understanding the discursive features of writing and in using that knowledge to inform writing assessment and instruction. In the remainder of the paper, we discuss the theoretical basis of functional language analysis and illustrate the power of the approach in evaluating student writing and in guiding writing instruction.

### ***Functional language analysis: a description***

Functional language analysis is grounded in systemic functional linguistics, or SFL (Halliday & Matthiessen, 2004). According to SFL, language is a semiotic resource for making meaning, and the kinds of meaning made are influenced by the social and cultural context in which they are exchanged. As an interlocking system of grammatical choices, language enables speakers and writers to make different kinds of meaning for different purposes and contexts. SFL also provides a metalanguage, a language for talking about language, that makes visible the varied ways language constructs texts in different genres and registers. It offers an array of analytical tools for evaluating texts and their effectiveness in meaning making.

From a SFL perspective, every use of language, whether spoken or written, involves saying something about the world (*the experiential meaning*), connecting what is said by some kind of logic (*the logical meaning*), enacting a social relationship of some kind (*the interpersonal meaning*), and presenting a message in a coherent way (*the textual meaning*). The experiential meaning refers to meaning about what human experience is represented in language; it is realised through the grammatical system of transitivity. The transitivity system construes the world of human experience into a manageable set of process types, typically realised by verbal groups of various kinds, such as doing (e.g., *jump, grow*), sensing (e.g., *think, believe*), relating (e.g., *be, have*), and saying (e.g., *talk, say*). These processes are often accompanied by participants, typically realised in noun groups, and circumstances, typically realised in adverbial groups or prepositional phrases.

The logical meaning refers to meaning about logical links and dependency relationships among clauses; it is typically realised through logical connectives of various types (e.g., *moreover, for example, because, if, however*) and projecting verbs (e.g., *say, state, know, believe*). SFL recognises four major clause types – main clause, hypotactic clause, paratactic clause, and embedded clause (Schleppegrell & Colombi, 1997). The main clause is the only clause in a simple sentence, the dominant clause in a hypotactic clause complex, or the

initiating clause in a paratactic sequence. Hypotactic clauses include adverbial clauses (e.g., those introduced by conjunctions such as *if*, *when*, *because*, and *however*), clauses projected through verbs of saying or thinking (e.g., *think*, *know*, *say*), and non-restrictive relative clauses (e.g., He found the stolen bag, which was later returned to its owner). They are dependent on but not a part of another clause. Paratactic clauses are connected to the main clause through either mere juxtaposition (as in direct quotations) or the use of coordinating conjunctions (e.g., *and*, *or*). An embedded clause is both dependent on and part of another clause in which it is embedded (e.g., He found the bag that had been reportedly stolen). These clauses can be combined in many different ways, allowing language users to construe different logical links (e.g., elaborating, enhancing, extending) and dependency relationships (e.g., coordinate, subordinate) between meanings.

The textual meaning refers to meaning about how language users organise their intended messages so that these messages are ‘cohesive, coherent and well-crafted’ (Christie & Derewianka, 2008, p. 24); it is realised through the Theme/Rheme system of language as well as patterns of cohesion. The Theme/Rheme system describes the structural configurations by which the clause is organised as a message. Clauses in English text typically begin with something that is familiar or already known to the reader and then moves on to present something new. The part of the clause that is the point of departure for the message is called Theme and the rest of the clause is called Rheme. Linguistic devices such as reference (e.g., pronouns, demonstratives), synonyms and antonyms, and conjunctions also enable language users to create texts that are internally cohesive and make sense.

The interpersonal meaning refers to meaning about people’s relationship with and attitudes toward each other; it is realised through mood, modality, and other appraisal resources of language (e.g., attitudinal lexis). The mood system allows language users to make statements (normally expressed in declarative clauses), ask questions (normally expressed in interrogative clauses), and issue commands (normally expressed in imperative clauses). Modality and other appraisal resources, on the other hand, enable language users to (a) talk about possibility, certainty, usuality, normality, seriousness, necessity, obligation, etc.; (b) express and amplify their attitudes and feelings towards people, ideas, or things; and (c) enact a particular kind of relationship with the audience (Martin & Rose, 2003; Martin & White, 2005).

Every text (and each clause in the text) simultaneously encodes these four strands of meaning, and it is the grammatical systems of language that enable the text (and clause) to mean what it does. Given the systematic relationship between meaning and grammar, a functional analysis of the language patterns in a text can reveal how meaning is constructed in the text. For example, if teachers want to find out about the content of a text, which concerns the experiential meaning, they can analyse the transitivity patterns

in the text. If teachers are interested in evaluating the way a text is organised, which involves both textual and logical meanings, they can examine the Theme/Rheme structure and cohesion patterns, as well as clause types and clause combining strategies, in the text. If teachers are concerned with the style of writing (e.g., how the author interacts with the reader or the author's perspective in the text), which is part of the interpersonal meaning, they can analyse mood, modality, word choices, and other appraisal resources. Table 1 shows the kinds of functional language analysis strategies that are appropriate for evaluating the three key areas of writing – content, organisation, and style – that are often the focus of classroom writing assessment and instruction.

**Table 1. Writing components, evaluation questions, and functional language analysis strategies**

Writing Components	Evaluation Questions	Functional Language Analysis Strategies
Content	<ul style="list-style-type: none"> <li>* What is going on in this text?</li> <li>* What does the author tell us?</li> </ul>	<ul style="list-style-type: none"> <li>* Analyse transitivity patterns (e.g., participants, processes, circumstances)</li> </ul>
Organisation	<ul style="list-style-type: none"> <li>* How does the author organise this text?</li> <li>* Is the text well organised?</li> <li>* By what logic is the text produced?</li> </ul>	<ul style="list-style-type: none"> <li>* Analyse Themes/Rheme patterns</li> <li>* Analyse cohesion patterns</li> <li>* Analyse clause types and clause combining strategies</li> </ul>
Style/Tone/Voice	<ul style="list-style-type: none"> <li>* How does the author of this text interact with the reader?</li> <li>* What is the author's perspective?</li> <li>* What is the tone of the text?</li> </ul>	<ul style="list-style-type: none"> <li>* Analyse mood</li> <li>* Analyse modality</li> <li>* Analyse word choices and other appraisal resources</li> </ul>

***Applying functional language analysis in writing assessment***

In this section, we illustrate the power of functional language analysis in evaluating student writing. Presented in Table 2 are two texts, both belonging to the report genre, or more specifically, descriptive report. Text 1 (134 words) is composed by a ninth grader in response to an explicit request by his language arts teacher to assume the role of a scientist author and write a formal report about one of his most familiar and favorite animals for an educational audience. Text 2 (129 words), excerpted from a U.S. middle school science textbook (Science Voyages, 2000), is a report about fish and presumably written by a science education expert.

Descriptive report is one of the major genres of schooling (Martin, 1989; Schleppegrell, 2004; Veel, 1997). It describes attributes, properties, behaviors, etc. of a single class or entity in a system of things. While the exact form (or textual realisation) of the genre can vary from one instance to another and

**Table 2. Two sample science reports**

<p><b>Text 1: Crocodiles</b> (134 words)</p>	<p>I am writing about crocodiles. Crocodiles lived when the dinosaurs lived. Crocodiles can live in water. Crocodiles can live on land or in water. They have good vision at night. They have big mouths. They like to eat in the sun. They can open their mouth really wide. They can close it really tight. They eat chicken like us. They like to eat outside of water. They eat fish. They eat raw meat. They swim in lakes. They play in grass. They are born out of big eggs. They watch their nest carefully, so their eggs won't get scrambled. They carry their young in their mouth. They live in soggy sand, 'the babies'. They have rough skin. They can crawl up a tree with a purse on. They like alley water. They are reptiles. (by a 9th grade student)</p>
<p><b>Text 2: Fish</b> (129 words)</p>	<p>Fish are ectotherms that live in water and use gills to get oxygen. Gills are fleshy filaments that are filled with tiny blood vessels. The heart of the fish pumps blood to the gills. As blood passes through the gills, it picks up oxygen from water that is passing over the gills. Carbon dioxide is released from blood into the water. Most fish have fins. Fins are fanlike structures used for steering, balancing, and moving. Usually, they are paired. Those on the top and bottom stabilise the fish. Those on the side steer and move the fish. Scales are another common characteristic of fish, although not all fish have scales. Scales are hard, thin, overlapping plates that cover the skin. These protective plates are made of a bony material. (written by a science expert, from Glencoe, 2000, p. 579)</p>

change over time, it has nonetheless evolved some general language patterns that remain fairly stable across instances and time, making it distinct from other genres. According to Martin (1989), for example, a report usually starts with general classification, followed by successive elements contributing to a description, such as types, parts and their functions, qualities, uses, habits, and so on. Some of the grammatical features of the genre include generic participants, clauses with linking verbs (e.g., *be*, *have*), verbs in present tense (*are*, *stabilise*), technical vocabulary (e.g., *ectotherms*, *reptiles*), nominalisations (e.g., *eruption*, *diversity*), and expanded noun groups with embedded clauses (e.g., *fleshy filaments that are filled with tiny blood vessels*) and other modifiers (e.g., prepositional phrases). These features are functional for science reporting, as they enable the author to talk about a class rather than a specific individual (via generic participants); to identify a class of things that is being reported on and attribute various characteristics to it (via linking clauses); to situate a report as objective and universal rather than particularistic (via verbs in present tense); to construct specialised knowledge (via technical vocabulary); to coin technical terms, summarise data, distill information, and create text flow (via nominalisations); and to pack information (via expanded noun groups) (Schleppegrell, 1998). Understanding these features and their

functions in meaning making can help teachers better evaluate the quality of students' reports and design instruction that increases students' awareness and use of these features in their report writing.

### Content

Let us first examine the content of the two sample reports using functional language analysis. This can be done at the clause level by analysing the transitivity patterns in these texts. Within the transitivity system, analysis can be done on the processes and accompanying participants and circumstances. We will focus on processes and participants in our analysis, as a substantial amount of content in reports is conveyed through these two grammatical elements.

Each process type in the transitivity system construes a distinct kind of human experience, and in science reports the kind of experience construed is typically that of classifying, categorising, and attributing, which calls for the use of relating processes, typically realised in linking verbs such as *be* and *have*. Other process types, such as doing processes, are used to augment the generalisation and classification statements made in the relating processes. Table 3 shows the number and percentage (in parenthesis) of each process type across the two texts. In Text 1, the doing processes figure prominently, with 18 out of 25 clauses (72%) used to describe when crocodiles live, where they live, what they eat, where they swim and play, where they are born, how they watch their babies, and so on. These doing processes are interjected with 4 (16%) relating processes, which describe the attributes of crocodiles (i.e., *have good vision, have big mouth, have rough skin, are reptiles*), 1 (4%) sensing process that describes what crocodiles like (i.e., *like alley water*), and 2 (8%) process complexes that combine sensing with doing (i.e., *like to eat in the sun, like to eat outside of water*). However, it is not clear how these processes complement and reinforce each other in the presentation of content.

**Table 3. Process types in the two sample reports**

Categories	Text 1 (Crocodiles)	Text 2 (Fish)
Doing Process	18 (72%)	7 (44%)
Sensing Process	1 (4%)	0 (0%)
Saying Process	0 (0%)	0 (0%)
Relating Process	4 (16%)	9 (56%)
Process Complex	2 (8%) (sensing + doing)	0 (0%)

Unlike Text 1, Text 2 contains mostly relating processes (realised in linking verbs *be* and *have*), with 56% (9 out of 16) of the clauses used to classify, define, and characterise fish (e.g., *fish are ectotherms; gills are fleshy filaments ...; fins are fanlike structures ...; scales are hard, thin overlapping plates...*). The doing process



clauses (e.g., *pumps, passes, picks up, is released, steer and move*), which constitute 44% of the total clauses in the text, complement the relating process clauses by providing further information about how the different body parts of fish (e.g., gills, fins, scales) work.

In science reporting, students are expected to present specialised content that is technical, dense, and abstract. A major carrier of this content is the grammatical participant, typically realised in noun groups of varying complexities. Science reports typically draw on technical nouns (*mitosis, arthropod*) to create scientific taxonomies, nominalisations (e.g., *deforestation, frequency*) to make generalisations and distill information, and expanded noun groups (e.g., *well-defined intracellular bodies that perform specific functions for the cell*) to pack a large amount of information. An examination of the noun groups in the two sample reports reveals the following patterns (see Table 4). Text 1 uses 1 technical noun (*reptiles*), 1 nominalisation (*vision*), 22 pronouns (e.g., *I, they*), and 0 expanded noun groups. Text 2, on the other hand, has 9 different technical nouns (e.g., *ectotherms, gills, filaments, oxygen, vessels, carbon dioxide, fins, scales, plates*), 1 nominalisation (*those protective plates* in clause #16 is used to summarise *hard, thin, overlapping plates that cover the skin* in clause #15), 2 pronouns (*it, they*), and 9 expanded noun groups (e.g., *ectotherms that live in water and use gills to get oxygen; fleshy filaments that are filled with tiny blood vessels; fanlike structures used for steering, balancing, and moving; those on the top and bottom; hard, thin, overlapping plates that cover the skin*). These data

**Table 4. Noun groups (bolded) in the two sample reports**

Text 1	Text 2
<p>I am writing about <b>crocodiles</b>. <b>Crocodiles</b> lived when the dinosaurs lived. <b>Crocodiles</b> can live in <b>water</b>. <b>Crocodiles</b> can live on <b>land</b> or in <b>water</b>. <b>They</b> have <b>good vision</b> at <b>night</b>. <b>They</b> have <b>big mouths</b>. <b>They</b> like to eat in the <b>sun</b>. <b>They</b> can open <b>their mouth</b> really wide <b>they</b> can close it really tight. <b>They</b> eat <b>chicken</b> like <b>us</b>. <b>They</b> like to eat outside of <b>water</b>. <b>They</b> eat <b>fish</b>. <b>They</b> eat <b>raw meat</b>. <b>They</b> swim in <b>lakes</b>. <b>They</b> play in <b>grass</b>. <b>They</b> are born out of <b>big eggs</b>. <b>They</b> watch <b>their nest</b> carefully, so <b>their eggs</b> won't get scrambled. <b>They</b> carry <b>their young</b> in <b>their mouth</b>. <b>They</b> live in <b>soggy sand</b>, 'the babies'. <b>They</b> have <b>rough skin</b>. <b>They</b> can crawl up a <b>tree</b> with a <b>purse</b> on. <b>They</b> like <b>alley water</b>. <b>They</b> are <b>reptiles</b>.</p>	<p><b>Fish</b> are <b>ectotherms that live in water and use gills to get oxygen</b>. <b>Gills</b> are <b>fleshy filaments that are filled with tiny blood vessels</b>. <b>The heart of the fish pumps blood to the gills</b>. As <b>blood</b> passes through the <b>gills</b>, it picks up <b>oxygen</b> from <b>water that is passing over the gills</b>. <b>Carbon dioxide</b> is released from <b>blood</b> into the <b>water</b>. <b>Most fish</b> have <b>fins</b>. <b>Fins</b> are <b>fanlike structures used for steering, balancing, and moving</b>. Usually, <b>they</b> are paired. <b>Those on the top and bottom</b> stabilise the fish. <b>Those on the side</b> steer and move the fish. <b>Scales</b> are <b>another common characteristic of fish</b>, although not all fish have <b>scales</b>. <b>Scales</b> are <b>hard, thin, overlapping plates that cover the skin</b>. <b>These protective plates</b> are made of a <b>bony material</b>.</p>

suggest that the content presented in Text 2 is more technical and dense than that conveyed in Text 1. Although the two texts are roughly equal in length (134 words vs. 129 words), Text 2 uses considerably more technical nouns and expanded noun groups, which carry substantial ideational content, and sharply fewer pronouns, which carry little ideational content, than does Text 1.

The analysis of processes and participants shows a pronounced difference in the nature of content presented in the two sample reports. Text 1 construes commonsense knowledge through the use of doing verbs and noun groups with simple structures (e.g., pronouns; nouns without modifiers; nouns with just an article, determiner, demonstrative, and/or adjective). The report has the flavor of a story, where the emphasis is on presenting a sequence of actions (e.g., *swim, play, watch, carry*). Text 2, on the other hand, construes technical knowledge through the use of technical nouns and expanded noun groups with embedded clauses and prepositional phrases, as well as linking verbs that connect these noun groups. It is more characteristic of a science report, where the emphasis is on classifying, defining, and characterising a class of organisms or objects in the natural world.

### Organisation

Let's now turn to the organisation of the two reports. There are many elements that contribute to a text's organisation. These include Theme/Rheme structuring, cohesion (e.g., co-reference, co-classification, conjunction), and clause combining strategies. We will focus on the patterns of Thematic progression in these texts. To this end, we will first identify the kinds of Themes used and then track how these Themes develop through text. Consistent with Halliday and Matthiessen (2004, p. 64), we identify the part of a clause that serves as the point of departure (or the orientation) of the message as Theme and the remainder of the message (i.e., the part in which the Theme is developed) as Rheme. Different kinds of Themes indicate different approaches to text organisation (Schleppegrell, 2004). Academic, particularly scientific, texts typically thematise noun groups that are lexicalised, abstract, and dense; whereas everyday texts typically thematise items that are pronominalised. Table 5 lists the clause Themes used in the two texts.

As the table shows, the two reports differ noticeably in their choice of Themes. Text 1 thematises mostly 'crocodiles' and its pronominal reference 'they'. The Themes in Text 2 are much more varied. It thematises 'fish' and its various body parts (e.g., *gills, heart, fins, scales*). In terms of Thematic progression, it is clear from Table 5 that Text 1 features a reiterating pattern because the Theme 'crocodiles' and its reference 'they' are repeated in successive clauses. This reiterating pattern of Thematic progression, while enabling the author to sustain a focus on crocodiles, results in a random listing of statements without any clear indication of how one clause relates to another. This can make the text not only confusing but also monotonous to read. Text 2, on

**Table 5. Clause themes in the two sample reports**

Text 1 (Crocodiles)	Text 2 (Fish)
<ol style="list-style-type: none"> <li>1. I</li> <li>2. crocodiles</li> <li>3. the dinosaurs</li> <li>4. crocodiles</li> <li>5. crocodiles</li> <li>6. they</li> <li>7. they</li> <li>8. they</li> <li>9. they</li> <li>10. they</li> <li>11. they</li> <li>12. they</li> <li>13. they</li> <li>14. they</li> <li>15. they</li> <li>16. they</li> <li>17. they</li> <li>18. they</li> <li>19. so their eggs</li> <li>20. they</li> <li>21. they</li> <li>22. they</li> <li>23. they</li> <li>24. they</li> <li>25. they</li> </ol>	<ol style="list-style-type: none"> <li>1. Fish</li> <li>2. gills</li> <li>3. the heart of the fish</li> <li>4. as blood</li> <li>5. it</li> <li>6. carbon dioxide</li> <li>7. most fish</li> <li>8. fins</li> <li>9. usually, they</li> <li>10. those on the top and bottom</li> <li>11. those on the side</li> <li>12. (those on the side)</li> <li>13. scales</li> <li>14. not all fish</li> <li>15. scales</li> <li>16. these protective plates</li> </ol>

the other hand, adopts both zig-zagging and reiterating patterns of Thematic progression (see Figure 2), which is typical of the organisation patterns found in science reports (Fang & Schleppegrell, 2008) and is an effective way for the author to accumulate information and at the same time create discursive flow. Specifically, the Rhemes in clauses #1 (*gills*), # 2 (*tiny blood vessels*), # 3 (*blood*), # 5 (*oxygen*), # 7 (*fins*), # 9 (*paired*), # 14 (*scales*), and # 15 (*hard, thin, overlapping plates that cover the skin*) are picked up to become, respectively, the Themes in clauses # 2 (*gills*), # 3 (*the heart*), # 4 (*blood*, which is repeated in clause #5), # 6 (*carbon dioxide*), # 8 (*fins*, which is repeated in clause #9), # 10 (*those on the top and bottom*) and # 11 (*those on the side*, which is repeated in clause #12), # 15 (*scales*), and # 16 (*these protective plates*). This way of structuring clause Themes and Rhemes allows the topic to be logically developed and makes the text more cohesive and interesting to read.

The analysis demonstrates that differences in Theme choices and Thematic patternings result in qualitative differences in the organisation of the two sample reports. Text 1 aggregates a random list of statements about the topic

Figure 2. Patterns of thematic progression in Text 2

Theme	Rheme
1. Fish	are ectotherms that live in water and use <b>gills</b> to get oxygen.
2. <b>Gills</b>	are fleshy filaments that are filled with tiny <b>blood vessels</b> .
3. <b>The heart</b> of the fish	pumps <b>blood</b> to the gills.
4. As <b>blood</b>	passes through the gills,
5. <b>it</b>	picks up <b>oxygen</b> from water that is passing over the gills.
6. <b>Carbon dioxide</b>	is released from blood into the water.
7. Most fish	have <b>fins</b> .
8. <b>Fins</b>	are fanlike structures used for steering, balancing, and moving.
9. Usually, <b>they</b>	are <b>paired</b> .
10. <b>Those on the top and bottom</b>	stabilise the fish.
11. <b>Those on the side</b>	steer
12. and [ <b>those on the side</b> ]	move the fish.
13. Scales	are another common characteristic of fish,
14. although not all fish	have <b>scales</b> .
15. <b>Scales</b>	are <b>hard, thin, overlapping plates that cover the skin</b> .
16. <b>These protective plates</b>	are made of a bony material.

(crocodile) without a clear focus, resulting in what Bereiter and Scardamalia (1987) called 'knowledge telling' or what Pea and Kurland (1987) dubbed as 'a memory dump'. The author, who is seemingly knowledgeable about crocodiles, simply translated his knowledge into words without making serious efforts to craft the presentation of this knowledge. Text 2, on the other hand, uses zig-zagging and reiterating patterns of Thematic progression to facilitate presentation of content and development of information flow. It shows

evidence of ‘knowledge transforming’ (Bereiter & Scardamalia, 1987) and rhetorical crafting.

## Style

Many factors contribute to the shaping of textual style. These include the use of mood and modality, as well as word choices. Because we are interested in examining how the author establishes the ‘authorial self’ (Christie & Derewianka, 2008, p. 15) in his/her interaction with the reader in the formal, academic context of schooling, we will focus on word choices in our analysis. Specifically, we will look at the choice of noun groups and other vocabulary items in the sample reports. Research has suggested that nouns are a sensitive indicator of textual style (Biber, Johansson, Leech, Conrad & Finegan, 1994; Fang, Schleppegrell & Cox, 2006; Quirk, Greenbaum, Leech & Svartvik, 1985). Texts that are written for different purposes and contexts often use nouns in distinct ways. In informal registers, for example, simple nouns are often used to name things and pronouns to establish endophoric (within-text) or exophoric (outside-text) references; whereas in more formal registers, nouns of varying complexities – particularly technical nouns, abstract nouns, and expanded noun groups – are often used to construe technicality, generalisation, agency, and density.

In the academic context, students are often expected to write in a style featuring technicality, density, and generalisation (Christie & Derewianka, 2008; Schleppegrell, 2004). This is especially true of science reports, which often adopt a technical, dense, abstract, authoritative, and formal style. Nouns are one of the key grammatical resources that enable the author to meet this expectation, as technical nouns create technical taxonomies, nominalisations synthesise information into abstract entities, and expanded noun groups pack a large quantity of information. Based on the analysis of noun groups presented earlier, we have noted that Text 2 draws heavily on technical nouns and expanded noun groups, which are connected by linking verbs *be* and *have*, to construct specialised knowledge and construe a more static world full of technical or virtual entities; whereas Text 1 relies primarily on simple nouns and pronouns, which work with action verbs to construct commonsense knowledge and construe a dynamic world full of action. In short, the analysis of noun groups suggests that Text 2 assumes a more technical, dense, and formal style of writing than does Text 1.

The stylistic difference between the two sample reports is also evident in other word choices. Text 1 uses an intensifier ‘really’ before adjectives (e.g., *really wide*, *really tight*), a conjunction with vague meaning (*so*), colloquial expressions (*get scrambled*, *the babies*), and a personal pronoun (*I*). These language choices betray an informal, interactive style that is more typical of spontaneous speech. Text 2, on the other hand, assumes a more detached, formal stance of writing that enables the author to present content in a more

objective and authoritative manner. This finding is further supported by the analysis of Theme choices earlier (see Table 5), which indicates that Text 1 uses Themes that are more typical of spontaneous speech (see, for example, Egginns, 2004) and Text 2 uses Themes that are more characteristic of academic registers (see, for example, Schleppegrell, 2004).

A summary measure of whether a text is written in a more or less formal/academic style is lexical density. The index measures the degree of formality in a text and can be calculated by dividing the number of content-carrying words (e.g., nouns, verbs, adjectives, some adverbs) over the number of non-embedded clauses in a text (Halliday, 1985). The higher the index, the more formal the text. The lexical density for Text 1 is 2.44, whereas that for Text 2 is 4.25. These indices corroborate the findings from our analysis of word choices above and are consistent with what has been found to be typical of informal everyday speech and the more formal, academic writing (Halliday, 1985; Christie & Derewianka, 2008).

### Summary

Our linguistic analyses reveal significant differences in the quality of the two sample reports. Text 1 contains mostly doing processes (constructed in action verbs) and generic participants (constructed in simple nouns). It presents a random listing of what crocodiles do with little evidence of rhetorical crafting. Moreover, the text uses colloquial vocabulary and a repeating pattern of Thematic progression, both typical of everyday conversational language. These pieces of evidence suggest that the author of Text 1 fails to meet the linguistic requirements expected (implicitly or explicitly) of him for the writing task. Text 2, on the other hand, can be considered an exemplary science report. It focuses on classifying, defining, and characterising fish. Information in the text is generalised and then elaborated through judicious use of doing processes to support relating processes. The zig-zagging and repeating patterns of Thematic development facilitate the presentation of information and the establishment of text flow. The use of technical nouns and expanded noun groups contributes to a dense, formal style of writing that positions the author as a content expert who presents information in an objective, authoritative manner.

### Discussion

Functional language analysis helps us identify the language patterns related to content, organisation, and style, giving us valuable insights into what makes a text successful/effective or less successful/effective. While we have focused only on one or two aspects of the grammar in each analysis of content, organisation, and style, it is important to note that additional analysis often yield convergent or complementary results, as language is an interlocking system of grammatical choices, with choices in one grammatical system often (albeit

not always) affecting choices in other grammatical systems. Through the analysis of processes and participants, we discover that Text 2 construes more specialised, technical content that classifies fish and attributes qualities to it; whereas Text 1 construes more everyday, commonsense content that describes a sequence of actions involving crocodiles. Through the analysis of Theme/Rheme, noun groups, and other word choices, we are able to conclude that Text 2 features a formal, objective, academic style of writing; whereas Text 1 takes on a more interactional, informal style of writing. Through the analysis of Theme/Rheme and process types, we find that Text 2 has an organisation structure that facilitates the presentation of information and the development of discursive flow, whereas the information in Text 1 is presented in a haphazard manner without any logical sequence. On the basis of the linguistic evidence generated from these analyses, we are then able to determine with some degree of certainty and objectivity the overall quality of Text 1 and Text 2. This is unlike in the rubrics-based assessment, where teachers often have to rely on their own intuition without having to consciously search for concrete linguistic clues to support their judgment in evaluating student writing.

Knowing the relative strengths and weaknesses of a text is a prerequisite for designing effective instruction that accentuates students' strengths and addresses their needs. Teachers using rubrics-based assessment may intuitively judge Text 1 as nontechnical, unorganised, unscientific, or non-academic, but they often are not able to pinpoint the exact sources of the failure (e.g., what is it about the organisation of the text that are not 'focused' or 'effectively organised in logical and creative manner' and in what way does the text demonstrate a lack of 'high degree of craftsmanship') and have little to say about how the text can be improved. Functional language analysis, on the other hand, provides teachers tools for understanding how a text is more or less successful, enabling them to identify linguistic issues that can be the focus of subsequent instruction or remediation. For example, Text 1 shows that the student author has a working knowledge of some basic features of the report genre (e.g., the use of generic nouns and timeless verbs), but is potentially unaware of other context-sensitive discursive features (e.g., density, technicality, abstraction) that he is expected to demonstrate in the writing. He also knows quite a few facts about crocodiles, but these facts are constructed in language patterns that approximate those of everyday spontaneous speech. Drawing on the functional language analysis strategies illustrated above, teachers can design lessons that give the student insights into (a) how the use of linking verbs enables the author to develop general statements that classify crocodiles as well as supporting details that attribute qualities to the animal, (b) how noun groups of varying complexities – particularly technical nouns, abstract nouns (i.e., nominalisations), and expanded noun groups – contribute to the construction of technical, abstract, and dense content, (c) how Theme choices impact the development of information flow and the organisation of

the text, and (d) how different language choices (e.g., verbs, nouns, vocabulary, Themes) affect the style of writing. These lessons can be made an integral part of the reading or writing workshop, where the student engages in reading/writing authentic texts and in comparing what he has written with similar texts written by disciplinary experts. Such targeted instruction is more likely to heighten the student's awareness of the role language plays in fashioning a text, enabling him to more successfully meet disciplinary expectations for language use in school-based tasks such as writing a science report.

Of course, we are not suggesting that teachers do frequency counts of every linguistic feature when evaluating student writing. Our intent in quantifying the linguistic variables in this article is to illuminate the power of functional language analysis in differentiating text quality. What the functional language analysis approach calls for is that teachers move beyond a rubric-ese mentality and focus instead on equipping themselves with deep knowledge about how language works in different genres and registers and then use that knowledge to guide them in (a) identifying the most salient and relevant linguistic features for evaluating a particular type of text, (b) generating systematic linguistic evidence that supports whatever judgment they render on the text, and (c) planning subsequent instruction or remediation that addresses student needs. The point of our linguistic excursion is to demonstrate the potential of explicit knowledge about language for a better understanding of students' discursive competence so that better pedagogical decisions can be made about how to improve student writing.

Despite recent recommendations that teachers and teacher candidates need to develop more explicit knowledge about language and linguistics (AATE, 1999; Adger, Snow & Christian, 2002; DfEE, 2000), current literacy textbooks and professional development materials are replete with strategies that teachers can use to engage their students in the processes of planning, drafting, composing, and sharing, but are short on strategies that give teachers insights into what exactly makes a text more or less effective/valued and that help them teach students to use language in ways that are expected of them in school-based tasks. And when language does become a focus during the writing process, attention is often given to such issues as spelling, punctuation, capitalisation, transition words, subject-verb agreement, verb tense, and idiomatic expressions. Prevalent literacy pedagogies rarely acknowledge the important role of teachers in both understanding the linguistic features of different written genres and registers and in teaching students to be aware of these features (Christie & Derewianka, 2008; Schleppegrell, 2004). Teacher education programs need to do a better job of preparing teachers to teach writing, helping them develop a sound understanding of how grammar can be used as a creative resource for making meaning, rather than as rules and conventions to be feared or memorised and mechanically applied in writing. When teachers are consciously aware of the particular linguistic require-



ments of different writing tasks, they will be better able to anticipate their students' needs, to evaluate their writing, to provide instruction that improves their writing skills and proficiencies, and to promote their academic success (Christie, 2002; Macken-Horarik, 2006; Schleppegrell, 2004).

### Conclusion

In academic writing, students are expected to display knowledge, be authoritative, and structure text in certain ways (Schleppegrell, 2004). These expectations call for the use of certain structural and lexicogrammatical features that are different from those used in the more commonsensical language of everyday life. Functional language analysis enables us to examine whether or not students meet these expectations in their writing. More importantly, it yields specific information about the strengths and weaknesses of student writing, making it possible for teachers to design effective intervention that addresses student needs. The approach overcomes the often vague, subjective nature of many popular assessment tools such as rubrics. It allows teachers to make explicit the specific linguistic requirements that are expected of students in school writing assignments. Teachers need to develop a solid understanding of the linguistic features that characterise different genres and registers in order to effectively use functional language analysis for assessment and instructional purposes. Recent scholarship in literacy education along the systemic functional framework (e.g., Christie & Derewianka, 2008; Droga & Humphrey, 2003; Fang & Schleppegrell, 2008; Locke, 2010) has provided valuable, teacher-friendly resources that can facilitate this development. With conscious linguistic knowledge and understanding, teachers will be better equipped to answer Myhill's (2009) recent call to develop student writers as designers along the three complementary and overlapping trajectories 'from speech patterns to writing patterns, from declaration to elaboration, and from translation to transformation' (p. 412).

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