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Do words matter: Investigating the association between linguistic features of accounting examinations and marks

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The use of linguistic features in school assessments, as well as the impact of these factors on the outcome of assessments have received limited attention in the literature. With this study I aimed to analyse linguistic features of accounting examinations. A quantitative technique, using tests for correlation, was employed to analyse the Grade 12 National Senior Certificate accounting examinations from 2011 until 2021. Advanced textual analysis software was used to identify connections between specific linguistic features and the marks obtained in these examinations. The findings of this study suggest that increasing the levels of linguistic features associated with analytical thinking, emotional tone and big words, which may be assumed to promote comprehension, may in reality be counterproductive, consequently potentially resulting in poorer marks attained in assessments in the future. The findings of this study are important for the creators of assessment to consider when developing accounting assessment. Given the effect of linguistic features on assessment results as identified in this study, it contributes to the debate on the use of certain linguistic features in assessment.

Keywords: accounting; assessment; linguistics; National Senior Certificate; performance

Introduction

Accounting as subject is commonly referred to as the language of business. Accounting and its related processes and information systems establish a common language for businesses that allows investors and other stakeholders to assess financial information and make decisions based on that financial information (Abreu, 2015; International Accounting Standards Board [IASB], 2022).

Although accounting has been referred to as a business language for many decades, Avery (1953) suggests that there appears to be some debate about whether the accountant's vocabulary has achieved a level of comprehension such that accounting may be regarded as an art or a branch of scientific knowledge in and of itself. Although the concept of accounting as a language of business continues to be a relevant topic, the effect of language and the use of linguistic features within the accounting subject have, however, received limited attention in the literature. When evaluating the concept of whether the use of specific linguistic features has an effect on assessment, the literature which is predominantly from outside South Africa (such as; Cruz Neri, Guill & Retelsdorf, 2021; Feser & Höttecke, 2021; Höttecke, Feser, Heine & Ehmke, 2018) focuses heavily on the subjects of mathematics and sciences, while literature on the use of linguistic features in accounting and accounting assessment is scarce both within South Africa and internationally. Furthermore, at the school level, this area of research has received even less attention. Accounting as subject differs significantly from science, technology, engineering, and mathematics (STEM)-related subjects. Accounting as subject is a distinct discipline based on the nature of the learning outcomes and, therefore, requires specific focus.

Turning the focus to learner performance in the Grade 12 National Senior Certificate (NSC) accounting assessment in South Africa, it is noted that the average mark earned by learners who acquire a score of at least 30% in these examinations has historically fluctuated significantly when compared year on year (Department of Basic Education [DBE], Republic of South Africa [RSA], 2022). The impact of linguistic features on assessment and their impact on learner performance in Grade 12 NSC examinations are largely unknown. Although this study focused on the South African setting, the purpose of this study was to determine whether the use of specific linguistic features in the question papers had any statistically significant correlation with the average scores achieved in the accounting Grade 12 year-end examinations for those learners achieving a mark of 30% and above, the results could be applied within a South African and international context. The research question was: What is the relationship between the averages obtained in the Grade 12 NSC accounting examination and specific linguistic features used in those assessment question papers? This study contributes to the current body of knowledge by examining a variety of linguistic features over an extended period in order to determine their impact. These findings may aid creators of Grade 12 NSC accounting examinations and other accounting assessment in gaining a better understanding of the effect of specific linguistic features on the outcome in terms of learner marks achieved.

The remaining structure of this article is as follows. The introduction is followed by the literature review in which I examine literature on the effect of using linguistic features in assessment. This is followed by the methodology, in which I describe the process followed to answer the research question, which is followed by the results, findings, and a discussion of the identified correlations, with the conclusion ending the article.

Literature Review

The literature review starts with a discussion of the theoretical underpinning of the research question, which is followed by an understanding of the literature on the effect of comprehension on academic achievement in assessment.

Theoretical underpinning

Understanding the effect of linguistic features on academic performance, literature notes that to be academically effective, learners must develop linguistic competencies beyond the use of daily language registers (Schleppegrell, 2004). From a theoretical perspective, Just and Carpenter (1980), through the theory of reading, suggest impact of certain words on comprehension. It is suggested that theoretically certain words may require the reader to use a greater cognitive processing capacity level. It is suggested that certain words such as infrequent words may impact processing levels and comprehension (Just & Carpenter, 1980). This study extends the theory of reading to examine specific linguistic features and their impact on comprehension and consequential learner performance in accounting assessment.

Teachers must support learners in developing their competencies by delivering texts, such as textbooks, workbooks, and assessment, at an appropriate linguistic level that enables both comprehension of specific topics and the acquisition of new linguistic repertoires (Eberts, Hollenbeck & Stone, 2002). Additionally, assessment must include text, and therefore linguistic features, that are understandable by all learners to avoid construct-irrelevant variation and item bias. Beinborn's (2016) research on text comprehension and readability demonstrates that the difficulty of a text is determined not only by its lexical and syntactic structures, but also by its cognitive structuring, cohesion, semantic redundancy, and the reader's prior knowledge.

The effect of comprehension on academic achievement in assessment

Numerous studies have demonstrated that reading comprehension has an effect on overall academic achievement (Cooper, Moore, Powers, Cleveland & Greenberg, 2014; McGee, Prior, Williams, Smart & Sanson, 2002). While it is self-evident that simplifying texts improves their readability, research to date has been inconsistent. It has been demonstrated that while great textual cohesion should boost a text's comprehensibility, it might cause comprehension issues for learners with a high degree of knowledge (Cruz Neri et al., 2021). It is, therefore, important for creators of assessment, who may have good intentions with adding additional linguistic features, to understand within a specific subject that the effect of these linguistic features may be detrimental to learners' academic performance.

Because comprehension of a written task is important for completion, learners must have sufficient reading comprehension to process assignments, beginning with letter and word decoding, and moving to connecting sentences to form a cohesive mental image (Francis, Snow, August, Carlson, Miller & Iglesias, 2006; Hall, Kowalski, Paterson, Basran, Filik & Maltby, 2015). Reading comprehension has been identified as a necessary component of science education and scientific literacy (Martin, 1993; Yore, Hand, Goldman, Hildebrand, Osborne, Treagust & Wallace, 2004) as science can only be built, altered, and transmitted via the use of language (Yore et al., 2004). Numerous studies have established a substantial correlation between learners' reading comprehension and performance in science modules (Bird & Welford, 1995; Cromley, 2009; O'Reilly & McNamara, 2007). Good readers routinely beat struggling readers in science, despite the fact that their scientific knowledge may be comparable, which highlights the critical importance of reading comprehension for science success. However, limited research has been conducted on the comprehension and performance of accounting learners as a result of linguistic features used in assessment.

Additionally, some data indicate that specific textual qualities, such as grammar or word count, have a substantial effect on the association between reading comprehension and science performance, which means that item difficulty varies when linguistic features are altered (Prophet & Badede, 2009; Rivera & Stansfield, 2004). Contributing to the mixed results seen in the literature, studies such as that by Llosa, Lee, Jiang, Haas, O'Connor, Van Booven and Kieffer (2016) demonstrate that avoiding difficult-to-understand terminology consistently throughout an assessment has no effect on the difficulty of the test. Only the use of dictionaries and glossaries was found to be useful in reducing item bias. While linguistic simplification had no significant effect on mathematical items, Haag, Heppt, Roppelt and Stanat (2015) found that it provided a small benefit to learners with intermediate language proficiency.

The literature shows the importance of comprehension in an assessment to achieve learning outcomes in terms of measurable academic performance. Key to understanding the value of linguistic features in assessment performance is understanding that mixed results have been noted across disciplines and subjects. The complexity of linguistic features, although potentially perceived to have a positive potential effect on learner comprehension, may result in the opposite occurring and the learners instead not being able to understand the assessment.

Methodology

Research Approach, and Sample and Analysis

In order to answer the research question, What is the relationship between the averages obtained on the Grade 12 NSC accounting examinations and specific linguistic features used in those assessment question papers?, the linguistic features were quantified using the Linguistic Inquiry and Word Count (LIWC)-22 textual analysis software program. The statistical analysis program, Statistica, was then used to determine whether any correlations existed between the averages obtained in the South African Grade 12 NSC accounting assessment for learners who earned a final grade of 30% and above and the linguistic features used in those examination question papers. A scale of -1 to 1 is used as the descriptor for the correlation analysis. In this study I examined learners who earned a final grade of at least 30%, as this group represents the majority of accounting learners.

The sample for this study was the Grade 12 NSC accounting assessment question papers from 2011 to 2021, spanning an extended period to ensure statistical power in identifying correlations. Additionally, the period for analysis included a pre-COVID-19 (coronavirus disease) pandemic and a post-COVID-19 period. Accounting was chosen as the focus of this study because it represents a unique type of subject. By focusing on a single subject, I was able to identify the effect of specific linguistic features that could be used in the future for accounting assessment. As a result of this study, it is suggested that further research into other subjects is warranted.

Textual Processing Module

LIWC-22 has been used in various research papers as an appropriate tool to measure narratives and linguistic tones (Boyd, Ashokkumar, Seraj & Pennebaker, 2022). For the purposes of this study, various linguistic features in the form of summary features, linguistic dimensions, and psychological processes were evaluated; their meaning and sub-categories are summarised in Tables 1, 2, and 3.

Table 1 Summary of linguistic features and their meaning (Boyd et al., 2022)

Summary of linguistic features	Meaning
Analytical thinking	Metric of logical, formal thinking
Clout	Language of leadership, status
Authentic	Perceived honesty, genuineness
Emotional tone	Degree or positive or negative tone
Words per sentence	Average words per sentence
Big words	Percentage of words seven letters or longer

Table 2 Linguistic dimensions and their meaning (Boyd et al., 2022)

Linguistic dimensions	The linguistic dimension is measured through the use of the words below
Total function words	the, to, and, I
Total pronouns	I, you, that, it
Personal pronouns	I, you, my, me
First person singular	I, me, my, myself
First person plural	we, our, us
Second person	you, your, yourself
Third person singular	he, she, her, his
Third person plural	they, their, them, themselves
Impersonal pronouns	that, it, this, what
Determiners	the, at, that, my
Articles	a, an, the, a lot
Numbers	one, two, first, once
Prepositions	to, of, in, for
Auxiliary verbs	is, was, be, have
Adverbs	so, just, about, there
Conjunctions	and, but, so, as
Negations	not, no, never, nothing
Common verbs	is, was, be, have
Common adjectives	more, very, other, new
Quantities	all, one, more, some

Table 3 Psychological processes (Boyd et al., 2022)

Psychological processes	The psychological processes are measured through the use of the words below
Drives	we, our, work, us
Affiliation	we, our, us, help
Achievement	work, better, best, working
Power	own, order, allow, power
Cognition	is, was, but, are
All-or-none	all, no, never, always
Cognitive processes	but, not, if, or, know
Insight	know, how, think, feel
Causation	how, because, make, why
Discrepancy	would, can, want, could
Tentative	if, or, any, something
Certitude	really, actually, of course, real
Differentiation	but, not, if, or
Memory	remember, forget, remind, forgot
Affect	good, well, new, love, bad, wrong, too much, hate
Positive tone	good, well, new, love
Negative tone	bad, wrong, too much, hate
Emotion	good, love, happy, hope, bad, hate, hurt, tired
Positive emotion	good, love, happy, hope
Negative emotion	bad, hate, hurt, tired

Sources of Data

NSC examination results and assessment question papers were obtained from the DBE's website (DBE, RSA, 2022), which ensures reliability and validity of the data. The LIWC dictionary is integrated into the LIWC software program, which I purchased under a research licence.

Ethical Considerations

I obtained ethical clearance from the Research and Ethics Committee of my university of employment. All information used in this study was publicly available on the South African DBE's website at the time of this study.

Results

The results for the Grade 12 NSC accounting assessment in terms of the average mark achieved for those achieving a mark of 30% or above in the assessment fluctuated significantly over the period under review (cf. Table 4). In addition, the total word count per assessment also differed significantly, which suggests on a surface level that the creators of the assessments may have engaged in various linguistic features.

Table 4 Results per year and assessment compilation (DBE, RSA, 2022)

Year	Average mark achieved for the year-end assessment (for those with a mark of 30% or above)	Word count
2011	61.6%	4,451
2012	65.6%	4,606
2013	65.7%	4,694
2014	68.0%	3,918
2015	59.6%	3,925
2016	69.5%	3,868
2017	66.1%	3,898
2018	72.5%	3,946
2019	78.4%	4,039
2020 Paper 1	75.5%	2,495
2020 Paper 2	75.5%	3,031
2021 Paper 1	74.7%	2,458
2021 Paper 2	74.7%	3,333

Note. The 2020 and 2021 examination consisted of two question papers; prior to this, the accounting subject had only one question paper.

Table 5 Results for summary features

Summary features	Correlation coefficient
Analytical thinking	-0.046
Clout	0.103
Authentic	-0.697*
Emotional tone	-0.198
Words per sentence	0.273
Big words	-0.509

Note. *Correlation is significant at the 0.05 level (2-tailed).

Table 6 Results for linguistic dimensions

Linguistic dimensions	Correlation coefficient
Total function words	-0.312
Total pronouns	-0.181
Personal pronouns	-0.481
First person singular	*0.176*
First person plural	*-0.456*
Second person	*-0.493*
Third person singular	*-0.357*
Third person plural	*0.241*
Impersonal pronouns	0.199
Determiners	-0.455
Articles	-0.346
Numbers	-0.082
Prepositions	-0.008
Auxiliary verbs	-0.561*
Adverbs	0.324
Conjunctions	0.107
Negations	-0.447
Common verbs	-0.303
Common adjectives	0.386
Quantities	0.456

Note. *Correlation is significant at the 0.05 level (2-tailed).

Table 7 Results for psychological processes

Psychological processes	Correlation coefficient
Drives	0.112
Affiliation	-0.195
Achievement	0.378
Power	0.101
Cognition	-0.694*
All-or-none	-0.246
Cognitive processes	-0.691*
Insight	-0.807*
Causation	-0.046
Discrepancy	-0.078
Tentative	-0.471
Certitude	-0.035
Differentiation	-0.415
Memory	0.000
Affect	0.302
Positive tone	0.056
Negative tone	0.457
Emotion	-0.215
Positive emotion	-0.254
Negative emotion	-0.144

Note. *Correlation is significant at the 0.05 level (2-tailed).

Discussion

The results of the textual analysis are presented in three sections: firstly, based on summary features, followed by analysis using linguistic dimensions, and then concluded by an analysis using psychological processes in assessment. The interpretation of the results from the correlation as shown in Table 4 can be interpreted in two ways: firstly, a positive coefficient indicates that an increase in the level of the specific linguistic feature results in an increase in the average assessment mark, while a negative coefficient indicates that an increase in the level of the specific linguistic feature results in a decrease in the

average assessment mark; secondly, an asterisk indicates a significant correlation at a 95% confidence level.

Summary Features

The results of the summary features, as shown in Table 5, provide insight into a variety of linguistic features measured as part of the Grade 12 NSC accounting examinations. A total of six summary features are reported. The results firstly show negative associations between the features *analytical thinking*, which refers to the use of logical and formal thinking features; *emotional tone*, which refers to the degree of positive or negative tone used; and *big words*, being words with seven or more characters. These negative associations suggest that perhaps perceived logic and formal thinking, and the use of emotional tone and big words, do not contribute to increased performance when the perceived language of accounting is muddled by the use of these linguistic features. This is consistent with the notion of Eberts et al. (2002) who suggest that teachers support learners in order to enable comprehension, however, specific attention must be placed on appropriate linguistic features to aid comprehension.

Although the metric, *authentic*, which refers to the perceived use of honesty, may suggest a positive connotation with comprehension, a significant negative association has been noted. This suggests that learners perhaps approach the subject of accounting with a cautious outlook and question the intention of the assessment creator regarding whether their intention is to challenge the learner. Although noted as insignificant, positive associations are noted with the use of the *clout* and *words-per-sentence* features, which suggests that when assessment creators use language of leadership and status and reduce the words per sentence, learners are better able to comprehend the question. The reduction of words per sentence is consistent with the findings of Prophet and Badede (2009) that show an association between reading comprehension and academic performance in the subject, science.

Although various studies have identified an effect of comprehension on overall academic achievement (Cooper et al., 2014; McGee et al., 2002), specific features seem to have greater importance compared to others with specific reference to understanding the assessment of accounting.

Linguistic Dimension Analysis

The results of the evaluation of linguistic dimensions, as shown in Table 6, indicate mixed results for the various linguistic dimensions. The only significant association noted is for auxiliary verbs, which show a significant negative association between the use of this feature and the assessment averages achieved. Noteworthy is the juxtaposition between quantities and numbers, where quantities appear to provide clarity that results in a positive association, whereas numbers do not necessarily provide sufficient context to aid the learner in completing a question.

Analysis using Psychological Processes

The final step of the linguistic feature analysis involved examining the psychological processes features used in the assessment, the results of which are shown in Table 7. Significant associations, in the form of negative associations, are only noted in *cognition* and its sub-component features. These results suggest that the use of psychological processes in Grade 12 NSC accounting examinations are ineffective linguistic features to employ to increase assessment marks.

Conclusion

The application of linguistics and the dimensions associated with the use of particular texts in assessments is an area of literature that has received little attention in South African secondary education. This study adds to understanding the effect of certain linguistic features on performance in assessment. The findings may help assessment creators in and outside South Africa to appreciate the significance of word choice for an assessment within a subject such as accounting. In accounting learners are frequently given instructions based on which they are then required to produce a product that is frequently highly dependent on the set of facts provided. With this study I found that certain linguistic features may result in negative effects on assessment results, which include the use of words associated with analytical thinking, emotional tone and big words. This study contributes to linguistic research outside of traditional language and instead focused on accounting, which in turn is often referred to as the universal business language.

Although this study was performed over an extensive period of time, the study focused only on accounting examinations in the National Senior Certificate; the results may, therefore, differ from other subjects. A further limitation is the specific word lists used in order to identify the linguistics features being assessed; this could be made extended in future research projects. As an exploratory study, I aimed to spark discussion about the use of linguistics in non-language modules and to call into question the perceived benefit of adding more words to result in easier assessment, while it has been discovered that this is not the case. However, a thorough understanding of the specific types of words and linguistics is critical for making assessment more understandable to learners which might result in higher grades.

Notes

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