



DISCREPANCY IN THE ENGLISH LANGUAGE SUBJECT AND ENGLISH CONTENT USED FOR SCIENCE SUBJECTS IN SECONDARY SCHOOLS IN TANZANIA

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Abstract:

The mediating role of the English language in all subjects for secondary schools, except for the Kiswahili subject, is the driving factor for this study. Thus, the study sought to determine the discrepancy between the English language subject and the English content for science subjects in secondary schools. The following objectives were formulated herein: to examine the discrepancies in teaching pedagogies for English Language subjects and Science subjects in secondary schools, and to evaluate the effectiveness of language content used for English subjects and Science subjects in relation to overall Grade Point Average in examinations. A case study research design was incorporated in this study, and the qualitative research approach was dominant here, except for simple descriptive statistics used for demographic information of respondents. The study was conducted in six districts within the Mbeya region. Here, a simple random sampling technique was used for selecting schools, and the same purposive sampling method was employed for teachers and subjects taught in secondary schools. Selected English language teachers and selected Science teachers were interviewed, and classroom observation and documentary review were the primary data collection tools used for this study. Data were qualitatively analysed through coding of related information and subjecting it to themes. From the study findings, it was established that active learning, cognitive strategy, assessment and evaluation and differentiated instruction formed the basis for the discrepancy in English Language subjects and English content used for Science subjects. The findings suggest that Science subjects utilise comparatively less English content, and assessment tools for these subjects require alternative practices, such as practical items and fill-in-the-blank exercises. Therefore, there are differences in their performance.

Keywords: discrepancy, English language subject, English language content, science subjects

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1. Introduction

The escalating urge for English as a global facet of communication, relations, and information is evidenced in schools around the world. In response to such affirmation of global trends, non-native English-speaking nations have increasingly developed pedagogies in trying to use English to mediate meanings in other subjects (Hashim, 2018). Educational policymakers around the globe have thus instigated innovative and effective programs involving students' cognitive, linguistic and academic achievement (Mukminin *et al.*, 2019). Such innovations encompass the integration of Science subjects into the academic realm by using English language content to mediate meanings in these disciplines.

Moreover, the mediating role of the English language in subjects that do not have a historical link to it is increasingly becoming common in developing nations that tend to incorporate the language for science subjects (Mukminin *et al.*, 2018). English language teachers and Science teachers use multiple modalities that engage students in varied ways and provide another source of abundance (Santos *et al.*, 2012). Students are supported-up in increasingly challenging texts by strategic differential instructions (Syaiful *et al.*, 2018). The foregoing discussion posits that the overall goal of education is to level up the performance of English language subjects and Science subjects by using the most relevant approaches to the subjects.

2. Study Objective

2.1 General Objective

The general objective of this study is to determine the discrepancy between English language subjects and English content for science subjects in secondary schools.

2.2 Specific Objectives

The following objectives were formulated herein;

- 1) To examine the discrepancies in teaching pedagogies for the English Language subject and the Science subjects in secondary schools.
- 2) To evaluate the effectiveness of language content used for the English subject and Science subjects in relation to the overall Grade Point Average in the Examination.

3. Literature Review

Studies have linked performance in Science subjects to students' reading comprehension ability as a primary role of linguistic features for science performance (Nadine *et al.*, 2019; Leiss *et al.*, 2017). Most of these arguments are ambivalent, especially when looking into discrepancies in the English content. Cooper *et al.* (2014) suggest that teaching and learning pedagogies in the English language subject correlate with content in Science

subjects. This notion highlights the urgent need for a solid linguistic foundation before delving into the Science subject's content.

In Tanzania, the English language is independently taught as a subject and is used for the mediation of meaning in all subjects, except for Kiswahili, in secondary schools in Tanzania (URT, 2023). Science subjects in Tanzania secondary schools are classified into Biology, Chemistry and Physics, and are all introduced for the first time in form one. Performance in English language subjects in the national examination in Tanzania has been comparatively not been up to par with science subjects (see National examination results between 2019, 2020, 2021, 2022 and 2023). Studies that have been conducted to explain the reason for such performance in English language subjects against Science subjects in National examinations have come up with results such as policies that inhibit English language learning from public primary schools (Mtana, 2013), teaching and learning approaches such as communicative approaches and methodology as devised by these particular teachers (Biseko, 2016) and socio-economic status of Tanzanian parents to provide instructional materials and to make academic follow up of their children at home (Libent, 2015). In light of such provision, it is imperative to attest to the gap in the discrepancy between English language as a subject and English content for Science subjects.

The consummate teaching and learning practice should exhibit perfection in the end goal of secondary education. Positive academic performance in subjects being the ultimate goal, viable teaching pedagogy that embraces the use of English as a mediating language for Science subjects should be embraced (Mtana, 2013; Libent, 2015; Biseko, 2016; Syaiful *et al.*, 2018). Despite English being the language of mediating meanings in other subjects, it is salient to understand how performance in Science subjects is better than performance in English language subjects, regardless of being a communicative tool itself. The present teaching and learning situation in Tanzania gives the English language subjects enough privileges, including more teaching hours in a week, as well as guidance that it should be used throughout the secondary school environment for communication purposes (URT, 2023). Furthermore, the English language subject has sufficient instructional materials and comprehension books for grammar and competence (Mukminin *et al.*, 2018), making its language content more comprehensive for desired performance. On the other hand, Science subjects have comparatively fewer hours in a week, are more practical and use scientific terms, some of which cannot be found within English subjects. Based on this notion, it is imperative to determine the discrepancy between English language subjects and English content for Science subjects in secondary schools.

4. Materials and Methods

4.1 Research Design and Approach

The study adopted a case study research design. This design refers to an in-depth research design that primarily uses a qualitative approach. The case study design was

instrumental in investigating respondents in public secondary schools, who were engaged in data collection exercises.

The qualitative research approach was picked for this study, whereas the quantitative approach was only applicable for demographic information of respondents by using simple descriptive statistics for frequencies and percentages.

4.2 Study Area

The study was conducted in the Mbeya region, and the selected districts for this study included Mbeya urban, Rungwe district, Chunya, Mbarali, Kyela and Busokelo district. The choice of Mbeya district for this study is aligned with a number of factors, including the report by the National Examination Council on the sharp difference in the performance of students in English language subjects and Science subjects for form two and form four examinations (URT, 2023). Therefore, there is a need to expound on this phenomenon.

4.3 Sample Size

The sample size for the study population was determined by the Morgan and Krejcie formula since the study involves finite populations. The formula was categorically used for teachers in respective schools. Out of the six schools identified in six districts within the Mbeya region, the pilot survey identified that there was a total population sample of 56 teachers. According to Krejcie and Morgan's formula, a number sample size of 56 results in 48. Based on this provision, a total of 48 respondents were picked for this study.

4.4 Sample Methods and Techniques

A non-probability sampling method was embraced in this study. Purposive sampling was employed to select teachers as respondents. This was necessary, bearing in mind that the study hinged on discrepancies in English language teaching and the English content used for other disciplines. Therefore, there is a need to select teachers for this case purposively. Only teachers for English language subjects and teachers for Science subjects were picked as a sample in this study.

4.5 Data Source

This study obtained data from two sources: primary and secondary. The primary source involved interviews between the researcher and the respondents. Observation also aided in determining the classroom teaching practice, the content of English language Subjects and English content for Science subjects. Secondary sources of data encompassed documentary reviews such as lesson plans, textbooks, schemes of work, policy papers, schemes of work and published journals with discussion on discrepancies in content in relation to subject performance.

4.6 Data Analysis Methods

Data was analysed qualitatively, such that non-numerical data was examined to extract meaning, patterns, as well as insights. Data obtained from interview transcripts, open-ended survey responses and observation notes on English language subjects and English content for Science subjects were put through related codes for themes. Here, codes were assigned to segments of data on homogenous concepts so as to enable the researcher to organise and categorise the material.

The researcher sought to identify trends aligned with established themes, aiming to uncover patterns in English content and relationships that reveal discrepancies between language teaching practices and Science teaching practices, particularly in relation to academic performance.

4.7 Ethical Consideration

Before embarking on the data collection exercise, informed consent of the participants was obtained, whereby the researcher asked, ahead of time, respondents to either agree or disagree to undertake the questions asked. The intention of the study was communicated to them in writing. Again, matters of ethics were reviewed through a written letter from the Open University of Tanzania directed to the respective government authorities in the Mbeya region and to individual respondents, explaining to them the intention of the study. Lastly, the researcher observed behavioural conduct by not revealing the names of respondents or their exact locations.

5. Results

5.1 Response Rate

Table 3.1 below shows the response rate by highlighting the number of people who showed up for an interview.

Table 3.1: The Response Rate per District

| District | Expected respondents | Available respondents | Teachers English Science | | % difference |
|--------------|----------------------|-----------------------|-----------------------------|-----------|--------------|
| Mbeya urban | 11 | 8 | 3 | 5 | 72.7 |
| Rungwe | 7 | 4 | 2 | 2 | 57 |
| Chunya | 5 | 4 | 1 | 3 | 80 |
| Mbarali | 9 | 5 | 3 | 2 | 55.5 |
| Kyela | 7 | 6 | 4 | 2 | 85.7 |
| Busokelo | 9 | 3 | 1 | 2 | 33 |
| Total | 48 | 30 | 14 | 16 | 62.5 |

Source: Research field (2024).

From Table 3.1 above, the results show that Kyela had a higher percentage of respondents who showed up for an interview, whereas Busokelo had the fewest number of respondents, in percentage, who turned up for the interview. A number of factors can

justify such a response rate gap, including time factors and personal issues that determined the presence/absence of respondents for the interview. Overall, 62.5% of respondents showed up for the interview, which denotes that the results obtained from the field could be verified as accurate.

Also, from the table above, it can be noted that there was a comparatively large number of Science teachers, at 16, compared to English language teachers at 14, who showed up for the interview. The slight difference in the number of subject teachers indicates that there is possibly rich information obtained from the field, with respect to discrepancies in English language subjects and English content for Science subjects.

5.2 Analysis of Data

The results are based on the study objectives, which are summarized as:

- 1) Examination of discrepancies in teaching pedagogies for the English Language subject and Science subjects in secondary schools,
- 2) Assessment of the effectiveness of language content used for the English subject and Science subjects in relation to the overall Grade Point Average in the Examination.

3.2.1 Codes

Major themes have been formed from codes. Table 3.2 below demonstrates the formation of themes based on raw information given during the interview session.

Table 3.2: The Thematic Data

| Objectives | Codes | Themes |
|---|--|------------------------------------|
| a. Discrepancies in teaching pedagogies | Teaching hours | Active learning |
| | Number of periods | |
| | Examination hours | |
| | Language content between lessons | Cognitive strategy |
| | Interactive activities | |
| b. Effectiveness of language content | Performance in the English subject | Assessment and evaluation |
| | Performance in Science subjects | |
| | Discrepancies in the level of understanding | Differentiated instructions |
| | Education policies and practice | |

Codes for themes: Researcher (2024).

5.3 Thematic Analysis

Below is a thematic analysis of data that was obtained from the research field.

5.3.1 Discrepancies in Teaching Pedagogies

Discrepancies in teaching pedagogies were characterized by active learning and cognitive strategy. These main themes formed the idea behind English language learning practices for the subject language and the English language content for Science subjects.

a. Active Learning

In this category, respondents offered that there was a variance in the number of hours allocated for English language subjects compared to Science subjects. For the English language. Interview results posit that the English language had more teaching hours in a week compared to Science subjects. Table 3.3 below demonstrates how active learning is subjected to differences in time allocation for the English language against Science subjects.

Table 3.3: The basis for active learning

| Class | Subject | Hours per week | Exam hours | Extra task |
|---------|-----------|----------------|------------|---------------|
| F1 & F2 | English | 5 | 2.30 hours | Comprehension |
| F3 & F4 | | 6 | 3.00 hours | Literature |
| F1 & F2 | Physics | 3 | 3.00 hours | Theory |
| F3 & F4 | | 4 | 3.00 hours | Practical |
| F1 & F2 | Chemistry | 3 | 2.30 hours | Theory |
| F3 & F4 | | 4 | 3.00 hours | Practical |
| F1 & F2 | Biology | 3 | 2.30 hours | Theory |
| F3 & F4 | | 5 | 3.00 hours | Practical |

Source: Researcher (2024).

b. Cognitive Strategy

Cognitive strategy encompasses the variance in language content between English language subjects and English content for Science subjects. Respondents noted that in teaching English lessons, English is used throughout, unlike in Science subjects, where the content is relatively complex and phrases and terminologies are predominantly English. From observation, it was also noted that Science teachers struggled to use the correct vocabulary when mediating content for their respective disciplines.

Interactive activities in science subjects, particularly Biology and Physics, were more pronounced in practical aspects, engaging physical materials, borrowed languages in English, scientific names, and scientific concepts that lack English content support. Additionally, it was observed that concepts and ideas were often crammed, with most words and letters accompanied by related structures in textbooks and science laboratories.

5.3.2 Effectiveness of Language Content

a. Assessment and Evaluation

Table 3.4 below illustrates the academic performance in the NECTA examination GPA summary for three years: 2021, 2022, and 2023.

Table 3.4: Cumulative performance for three years

| Subject | Mbeya urban | Rungwe | Chunya | Mbarali | Kyela | Busokelo |
|---------|-------------|--------|--------|---------|-------|----------|
| Eng | 3.0 | 3.2 | 3.3 | 3.9 | 3.7 | 3.2 |
| Phy | 3.4 | 3.5 | 3.5 | 3.9 | 3.6 | 3.3 |
| Bio | 3.0 | 3.2 | 3.3 | 3.9 | 3.7 | 3.2 |
| Chem | 3.4 | 3.6 | 3.5 | 3.9 | 3.6 | 3.4 |

Source: URT (2023).

From Table 3.4 above, it is evident that the overall performance of students in national examinations varies. Notably, part of the discrepancy in performance could be attributed to the language content used in teaching English language subjects and English content for Science subjects.

b. Differential Instructions

There is a discrepancy in the level of understanding regarding students' current language proficiency levels, learning styles, and interests. Here, the researcher tested the cognitive ability of students through written English in both papers to ascertain their cognitive levels. Regarding this, it was established that the time allocated for English subjects was insufficient to grasp in-depth concepts of the subject, due to the large volumes of literary books and the complexity of the subject matter. Unlike science subjects, which featured multiple-choice questions and answers, this approach employed true or false questions and answers.

From the sampled examination papers, it was established that the marking of English examinations was subjective. It relied heavily on the marker's readability, attitude, and conscience, which were also influenced by their handwriting. This may explain why performance in Science subjects was recorded as high, owing to its direct answers and less linguistic understanding. According to the findings, most students in public secondary schools are victims of a Kiswahili background mentality, and the English language content is relatively complicated. This, in turn, affects their performance in Science subjects.

Policies that establish clear standards for English language proficiency ensure that ELL programs have defined goals and benchmarks. Again, information from the field revealed that the programs lacked clear definitions, and speaking and using English across other disciplines were subject to the students' own rules. No rules exempted students from using languages other than English in the school environment. The case for Science subjects differed, as English language content in these subjects is primarily pronounced during the actual learning process, making it more interactive and engaging for students through formulas and practical applications.

The findings provided that Tanzania's education policies encouraged the integration of language learning with content areas in science to promote a more comprehensive learning experience, helping students apply language skills in various contexts. The provision emphasises that existing education policies are crucial for providing insightful instruction, which in turn informs effective teaching practices that

cater to the diverse needs of learners. This is a vital aspect for addressing disparities and enhancing students' performance in both English and Science subjects.

6. Discussion

The discussions are based on the research findings as presented in the study objectives. Supporting literature is employed herein to relate information obtained from the research field and other research on the same phenomena.

6.1 Discrepancy in Teaching Pedagogies for English Language Subjects and Science Subjects

Active learning encompasses teaching hours, number of periods and examination hours for English language subjects and Science subjects. From the field, the provision that discrepancy in English language subjects and English content for Science subjects is supported by Hammond (2014), who offers that students are supported up to increasingly challenging texts by strategic and differentiated instruction. Similarly, Kibler *et al.* (2014) argue that having a lengthy number of hours for classroom instruction affects the general performance in a subject. Such assertions may explain why the Tanzania education policy allocates more time for English language subjects to facilitate understanding in Science subjects.

The study found that discrepancies in English language subjects and English content for Science subjects are evidenced in the topics for the two disciplines. Here, respondents indicated that the complexity of these English language topics increases with the upward trend of the academic ladder. A number of books need to be reviewed, and instructions are put in the English language. This assertion aligns with Udui's (2017) argument that certain topics in the English language curriculum for senior secondary school are perceived as difficult by both students and teachers. It also examined difficult topics vis-à-vis English language achievement (Udui, 2017). According to a report by Zanzibar Rural and Urban Secondary Schools (2016), the reasons for difficulty with such topics include poor reading and study skills, lack of motivation, dislike of the English language, limited experience with the subject, and ineffective teaching methods.

6.2 Effectiveness of the English Language Subject and the English Content for the Science Subject

This section aimed to assess the effectiveness of the English language and content in Science subjects in identifying discrepancies related to academic performance. The discussion delves into the discrepancy levels of understanding and education policy and practices.

The established study findings on the effectiveness of English, both as a subject and as content for Science subjects, are evident and supported by Dada *et al.* (2015), saying that the modern view of language teaching emphasizes the need to teach the components of language interactively. Udui (2017) adds that with this approach, the knowledge of

one aspect complements the other. Peng (2014) compliments the current statement by adding that in the practice of using the English language as a subject, and a language for content, proficiency in its oral form should be the focus of initial instruction in the English language, literacy skills build on oral proficiency, and the knowledge of grammar is believed to enhance reading comprehension, writing, and summary.

The strength of the English language is evidenced by its being a language of instruction in Tanzania for secondary and tertiary education (URT, 2022). This confirms similar studies in Nigeria, Oribabor (2014), that English has remained instrumental in formal learning throughout institutions. The use of English for Science subjects and subsequent performance on the same. In addition, (ibid) explains that it is a requirement for the country, an essential prerequisite for further education. At least a pass (P7) in English is a requirement even for science-based students.

According to Heppt *et al.* (2015), the majority of studies show consistent results for linguistic features such as technical terms. In contrast, the findings are a lot more ambivalent when looking into item word count. As stated above, secondary analyses are not consistent (Stiller *et al.*, 2016). Furthermore, they argue that an increased word count with embedded clauses resulted in an overall increase in item difficulty and consequently in a decrease in students' performance on a chemistry test. This provision can be generalized to other Science subjects for relevance, based on their pedagogical implications.

7. Recommendations

Study results have revealed that there is empirical evidence supporting the discrepancy between English language subjects and English content for science subjects in secondary schools in Tanzania. Based on the findings, this study recommends that policymakers should develop a unified framework for academic English across all secondary school subjects. This framework would standardize vocabulary, sentence structures, and discourse patterns, thereby providing students with a consistent foundation for learning scientific concepts.

For practitioners, the study recommends integrating science-based reading materials and technical vocabulary into English lessons to help students better comprehend and apply English in a scientific context.

8. Conclusion

The study determined the discrepancy between English language subjects and English content for science subjects in secondary schools. Whereby, comparison was drawn between English, Chemistry, Biology and Physics in order to ascertain discrepancies in teaching pedagogies for the English language subject and science subjects. Also, the study evaluated the effectiveness of language content used for the English subject and Science subjects in relation to the overall Grade Point Average in the Examination. The results

showed that the number of hours allocated for the English subject was inadequate; therefore, students could not comprehend in-depth concepts of the subject owing to the large volumes of literary books and the limited comprehension of the subject. Whereas, Science subjects were characterized with relatively stronger vocabulary use, against English, with more multiple-choice questions and answers, and a true or false questions and answers approach. Performance in English exams appears to be subjective, relying heavily on the marker's personal judgment, attitude, and even the student's handwriting. This subjectivity may explain why students performed better in science subjects, which often have more direct answers and require less linguistic interpretation.

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Conflict of Interest Statement

The author declares no conflicts of interest.

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