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Socio-Dynamic Errors in the Assessment of Readability Using the Cloze Approach

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Abstract
This study explored socio-dynamic errors associated with the use of cloze in determining readability of texts. This study employed a causal comparative design. The study was conducted in Enugu State of Nigeria. Two secondary schools were drawn from each of the three socio-cultural zones of Enugu State. One passage was developed from each zone in such a way that the contents of the passages reflect popular practices, artifacts, and issues that are relevant to the zone. Errors were recorded with respect to individual cloze passages across students of the three socio-cultural groups. Frequencies and Chi-square test were employed in data analysis. Results reveal significant socio-dynamic errors relating to figure- ground incongruence and proximity conflicts in determining readability using the cloze approach.
KEY WORDS: cloze, socio-dynamic, readability, comprehensibility, figure-ground, fixed-ratio, proximity

1.1 Introduction

Readability refers to the assessment of the difficulty that a reader of a certain level of skill may have in reading a piece of connected written discourse or text (Abonyi, 2007). Readability could also be conceived in terms of the success of a reader in reading a text or written document (Etim and Umoh, 1983). Readability of text could also be employed as a measure of the extent to which effective communication exists between the writer and the reader of the text. In the broadest sense, readability is the sum total (including interactions) of all those elements within a given piece of printed materials that affect the success which a group readers have with it (Dale and Chall, 1988). The success according to Dale and his colleague is the extent to which they understand it, read it at optimum speed and find it interesting. This encompasses comprehension, fluency and interest. Mclaughlin (2001) viewed readability from the reader's perspective and defined readability as the degree to which a given class of people find certain reading matter compelling and comprehensible. McLaughlin (2001) in his definition stressed both the characteristics of the reader as well as the degree of 'compellingness' of the text. This implies that the definition of readability needs to be based on the characteristics of the reader insofar as it is assumed that people will tend to continue to read only that which they understand. Readability and reading comprehension have been used interchangeably in a number of discourses. Although in grammar readability may not be synonymous to comprehension, it has been conventionally adopted to explain comprehension. Since learning depends on comprehension and retention of new information (Berk, 1999), a lot of emphasis has been placed on reading comprehension in schools.

In our school system a number of textbooks have been recommended for use without subjecting them to due processes of textbook evaluation in terms of the readability (Nworgu, 1988). Insofar as the readability of materials used in teaching and learning is essential in students academic growth the task of evaluating on regular basis the readability of text materials in use by schools should constitute major preoccupation of educators. In the same vein also, evaluation in reading should not lose sight of the fact that readability measures need to be examined in terms of prevailing circumstances especially when it has been confirmed that conceptual projections are principal functions in reading comprehension.

Reading, readability and comprehensibility have been conceived in terms of perceptual organization (Lahey, 2004). Lahey argued that text materials are raw visual sensations and as such are like the unassembled parts of a washing machine that must be put together before it can be put into use. Some of the ways in which the eyes and the brain organize visual sensation were described by Gestalt in the 1930s. Gestalt advanced five basic principles to explain perceptual organization. They are figure-ground, contiguity, proximity, similarity and closure. Cloze originated from the Gestalt Theory of CLOSURE in psychology founded by Max Wertheimer et al in 1880s. Within this theory the law of closure is very important. It shows the natural tendency of human beings to perceive unfinished or incomplete figure as complete. This means that they fill in the gap in broken patterns. In language, patterns are linguistic in nature. The man credited with being the first to design the new classic test called a cloze test is Wilson Taylor in 1953. He defined the cloze unit as any single occurrence of a successful attempt to produce accurately a part deleted from a message by deciding from the context that remains what the missing part should be.

Two broad types of cloze exist. The fixed ratio type involves the deletion of every n^{th} word in a passage i.e. every 5^{th}, 6^{th}, or 10^{th} word. The deletion of every 5^{th} word is the standard deletion. The other one is the variable ratio type which involves the deletion of content words that are rich with meaning e.g. nouns, verbs, adjectives or any other part of speech. This type has the advantage of concentrating on particular structures. So cloze procedure is a technique by which words are systematically deleted from a reading passage and are replaced by blanks (i.e. completion tests) in the area of word deletion. In ordinary comprehension tests, words are selected subjectively for deletion. In a cloze test words are selected systematically. The cloze procedure deals with blanks that are contextually interrelated. It does not deal with isolated blanks. When Taylor (1953) first developed the cloze technique, it was to be employed in a number of ways ranging from assessing the readability of prose to the construction of instructional exercises for teaching remedial reading. Since then emphasis on cloze technique has been exclusively restricted to the estimation of readability of materials used for classroom instructions and to measure reading comprehension (Eneh, 2002). Although cloze has been widely used in assessment of readability, major predicaments associated with its application in readability assessment have been neglected by researchers in the fields of reading comprehension.

Although Gestalt identified five basic principles in perceptual organization, it must be clearly appreciated that the first four principles are embedded in the principle of closure. Since perceptions are socio-dynamic based on the Gestalt and constructivists views, the application of cloze in the assessment of readability is thus faced with a number of socio-dynamic issues. It therefore becomes very imperative that we explore the socio-dynamic implications of the cloze approach in readability assessments.

1.2. Objectives of the Study

The objective of this study is to determine the socio-dynamic errors in the assessment of readability using the cloze approach. Specifically this study isolated errors related to:

(a). figure- ground incongruence
(b). proximity conflicts
(c). fixed ratio

1.3. Research Questions

What socio-dynamic errors are associated with figure- ground incongruence in determining readability using the cloze approach?

What socio-dynamic errors are associated with proximity conflicts in determining readability using the cloze approach?

What socio-dynamic errors are associated with fixed ratio approach in determining readability using the cloze approach?

1.4 Hypotheses

HO_1: The errors associated with figure- ground incongruence in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

HO_2: The errors associated with proximity conflicts in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

HO_3: The errors associated with fixed ratio approach in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

2. Research Method

This study employed a causal comparative design. The population for the study is all the senior secondary class 3 students in Enugu State of Nigeria. In drawing the sample the researchers took into consideration the three main socio-cultural groups in Enugu State of Nigeria. These are the Nsukka zone, Awgu Zone and the Udi zone. Two secondary schools were drawn from each zone for this study. In each zone all the class 3 students in the selected schools were used for the study. Three cloze passages were developed for this study. One passage was developed from each zone in such a way that the contents of the passages reflect popular practices, artifacts, and issues that are relevant to the zone. The passages were asses for reliability using the Kendal's' W and the three passages (passages A, B and C) yielded inter-rater reliability indices of 0.73, 0.71 and 0.76 respectively. The passages were administered to the students by the regular English language teachers in the various schools used for the study. Errors were recorded in frequencies with respect to individual cloze passages across students of the three socio-cultural groups. Simple frequencies were used to answer the research questions while the Chi-square test of independence was employed in testing the null hypotheses that guided this study.

3. Results

3.1. Research Questions

Research Question 1:

What socio-dynamic errors are associated with figure-ground incongruence in determining readability using the cloze approach?

Table 1: Frequency of figure-ground incongruence errors on cloze passages drawn from each of the three socio-cultural contexts for students of the three socio-cultural zones

Zones	Frequency of Errors		
	Passage A (From Udi Context)	Passage B (From Awgu Context)	Passage C (From Nsukka Context)
Awgu	**9**	**2**	**13**
Nsukka	**12**	**10**	**3**
Udi	**2**	**11**	**12**

As shown in Table 1, the frequency of errors is very minimal in cloze passages drawn from students' socio-cultural background implying that the validity of cloze approach as a measure of readability is socio-culturally determined. As shown in Table 1 the students from Udi socio-cultural zone recorded only two errors on the passage drawn from their socio-cultural context while their counterparts from Awgu and Nsukka recorded error frequencies of nine and twelve from the same passage. On the other hand for the passage drawn from the Awgu socio-cultural context, students from Awgu also demonstrated marginal advantage and had only two errors with Nsukka and Udi recording ten and eleven errors respectively. The situation is the same for Nsukka where the error recorded by students from Nsukka socio-cultural context on cloze passage drawn from the Nsukka context is only three while Awgu and Udi had error frequencies of thirteen and twelve respectively.

Research Question 2:

What socio-dynamic errors are associated with proximity conflicts in determining readability using the cloze approach?

Table 2: Frequency of proximity conflicts errors on cloze passages drawn from each of the three socio-cultural contexts for students of the three socio-cultural zones

Zones	Frequency of Errors		
	Passage A (From Udi Context)	Passage B (From Awgu Context)	Passage C (From Nsukka Context)
Awgu	**11**	**8**	**8**
Nsukka	**9**	**2**	**2**
Udi	**3**	**10**	**13**

Result in Table 2 also reveals that errors committed by the students in the cloze passages are socio-dynamic. This implies that the frequency of errors vary across passages for students of differing socio-cultural groups with the error frequency being very minimal when students are attempting cloze passages drawn from their own socio-cultural context.

Research Question 3:

What socio-dynamic errors are associated with fixed ratio approach in determining readability using the cloze approach?

Table 3: Frequency of errors associated with fixed ratio approach on cloze passages drawn from each of the three socio-cultural contexts for students of the three socio-cultural zones

Zones	Frequency of Errors		
	Passage A (From Udi Context)	Passage B (From Awgu Context)	Passage C (From Nsukka Context)
Awgu	**6**	**3**	**2**
Nsukka	**5**	**3**	**1**
Udi	**6**	**3**	**1**

Summary of result in Table 3 reveals that errors committed in fixed ratio cloze passages does not discriminate across socio-cultural groups. As shown in Table 3 the frequency of errors is almost uniform in the three passages for students of the three socio-cultural groups.

3.2 Hypotheses

HO_1: The errors associated with figure- ground incongruence in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

The frequency of errors committed across the three socio-cultural groups in relation to the cloze passages that were drawn from essays that bother on the three socio-cultural groups for the figure-ground incongruence, proximity conflicts and fixed ratio approach respectively were subjected to chi-square tests of independence at 95% confidence level. Summary of result is presented in Tables 4, 5 and 6

Table 4: Chi Square test of independence of errors associated with figure- ground incongruence on socio-cultural groups

Zones	**Observed & Expected Frequency of Errors**			**$\chi 2$ calculated value**	**α**	**$\chi 2$ Critical value**
	Passage A (From Udi Context)	Passage B (From Awgu Context)	Passage C (From Nsukka Context)			
Awgu	**9 (7.5)**	**2 (7.5)**	**13 (9)**	**19.66**	**0.05**	**9.49**
Nsukka	**12 (7.8)**	**10 (7.8)**	**3 (9.4)**			
Udi	**2 (7.8)**	**11 (7.8)**	**12 (9.4)**			

Table 4 reveals that the chi-square calculated value is 19.66 while the critical value at 95% confidence level is 9.49. The decision rule is to reject the null hypothesis if the calculated value exceeds the critical value. Based on this rule, the researchers rejected the null hypothesis and concluded that the errors associated with figure-ground incongruence in determining readability using the cloze approach depends significantly on the socio-cultural background of the learners.

HO_2: The errors associated with proximity conflicts in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

Frequencies of errors based on proximity conflicts were used to test this hypothesis. Summary is presented in Table 5

Table 5: Chi Square test of independence of errors associated with proximity conflicts on socio-cultural groups

Zones	**Observed & Expected Frequency of Errors**			**$\chi 2$ calculated value**	**α**	**$\chi 2$ Critical value**
	Passage A (From Udi Context)	Passage B (From Awgu Context)	Passage C (From Nsukka Context)			
Awgu	**11 (7.3)**	**2 (6.4)**	**8 (7.3)**	**16.22**	**0.05**	**9.49**
Nsukka	**9 (6.6)**	**8 (5.8)**	**2 (6.6)**			
Udi	**3 (9.1)**	**10 (7.8)**	**13 (9.1)**			

As shown in Table 5, the calculated value is 16.22 while the critical value at 95% confidence level is 9.49. Based on the decision rule the researcher also rejected the null hypothesis and concluded that the errors associated with proximity conflicts in determining readability using the cloze approach depends significantly on the socio-cultural background of the learners

HO_3: The errors associated with fixed ratio approach in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

Frequencies of errors based on fixed ratio approach were used to test this hypothesis. Summary is presented in Table 6

Table 6: Chi Square test of independence of errors associated with fixed ratio approach on socio-cultural groups

Socio-cultural Zones	**Observed & Expected Frequency of Errors**			**$\chi 2$ calculated value**	**α**	**$\chi 2$ Critical value**
	Passage A (From Udi Context)	Passage B (From Awgu Context)	Passage C (From Nsukka Context)			
Awgu	**6 (6.2)**	**3 (3.3)**	**2 (1.5)**	**0.35**	**0.05**	**9.49**
Nsukka	**5 (5.1)**	**3 (2.7)**	**1 (1.2)**			
Udi	**6 (5.7)**	**3 (3)**	**1 (1.3)**			

Result of data analysis in Table 6 shows that the chi-square calculated value (0.35) is less than the critical value at the given probability level. Because the calculated value is less than the critical value, the researchers upheld the null hypothesis and concluded that the errors associated with fixed ratio approach in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners

4. Discussions

Results presented in Tables 1 and 4 reveal errors associated with figure ground incongruence in attempting cloze passages are socio-dynamic. As shown in Tables 1 and 4 students commit more errors in attempting cloze passages that were not drawn from their socio-cultural contexts. This raises obvious issues in the use of cloze for assessment of readability and comprehensibility of passages.

The figure-ground principle holds that whenever we perceive a visual stimulus, part of what we see is the centre of our attention, the figure and the rest is the indistinct ground. This takes us some steps to constructivist's view of concept formation and problems that may arise should two readers form divergent concepts of a given object/event described in a reading discourse or textual material. There is usually the tendency for two learners to form two different wholes from a piece of disconnected text in a situation where their views of a given concept are at variance. In such a situation an individual with the same conceptual frame as the assessor of the cloze test is favoured. The technical implication of this figure-ground incongruence is that no cloze test has scorer reliability and should not be subjected to inter-rater reliability measure. Should such a situation arise (and it is very obvious) evaluation of readability using the cloze procedure becomes subjective and will depend solely on the assessors' perceptual frame.

In Tables 2 and 5 errors associated with proximity conflicts also varied significantly among students of different socio-cultural zones for the passages that were drawn from the three socio-cultural contexts. The Gestalt principle of perception states that parts of a visual stimulus that are close together will be perceived as belonging together (Hayes, 1998). In many pieces of written discourse it is evident that textual materials that are proximal do not and cannot be classified as a unified whole. This situation may be more glaring in science textbooks where contradictory concepts are sometimes juxtaposed for the purpose of clarifications. Proximity of texts therefore does not imply similarity in meaning and cannot be used as a guide for transcribing wholes from disjointed textual materials. In the first instance textual materials should not be seen as a DNA helix that must always replicate in a similar fashion based on stereotyped base pairs (Abonyi, 2007). If that is the case then errors associated in determining readability based on proximity inference cannot be overlooked.

Results presented in Tables 3 and 6 reveals that errors associated with fixed ratio based cloze passages are not socio-dynamic. As shown in Table 6 the errors associated with fixed ratio approach in determining readability using the cloze approach does not depend significantly on the socio-cultural background of the learners. The fixed and variable ratio approaches are utilized in developing a cloze passage. For the fixed ratio approach a cloze test developer may decide to delete the 4^{th}, 5^{th} to nth word in a passage but for the variable ratio approach the cloze test developer may chose to delete only specific significant technical terms in the passage. Because deleting format does not target any technical term, it is assumed that no socio-cultural group will have advantage over the other. It is therefore not surprising that the frequencies of errors are uniform across the three groups of students in the three passages. It must however be noted that if readability is accepted as comprehensibility of passages then the fixed ratio model raises a few questions especially when the text is drawn from a technical field. Take for example an assessment of readability of physics textbook where the cloze test developer chose the 4^{th} word in the text and for the whole passage the 4^{th} word did not pick any technical words in physics rather words like were, would, must were deleted. At the end of the exercise what the cloze measured as it pertains to physics were void and of no consequence. It is funny to think of readability in situations where extent of comprehension and use of important terms in a given field are not determined.

5. Conclusion and Recommendations

So far a fair attempt has been made to explain the technical implications of the application of the cloze as measure of text readability especially in situations when readability and comprehensibility are used synchronously. While this paper is not an attempt to disown cloze as a measure of readability, users of cloze in the assessment of readability must not lose sight of its limitations and the need to:

(a). ensure that for any given cloze test, there is figure-ground congruence so that readers who share diverse concepts with the assessor are not misunderstood and disadvantaged.

(b). ensure that proximity factors are completely isolated in developing a cloze test as a measure of readability and comprehensibility. Cloze test developers must appreciate the fact that juxtaposition of varying concepts enhances contrast and higher order learning.

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