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A Incomensurabilidade em Thomas Kuhn e a Educação Profissional, Científica E Tecnológica: Um Ensaio Sobre Interdisciplinaridade e Prática no Ensino de Tecnologia das Construções

By Cristiane Alves Pereira Damasceno & Gustavo da Silva Salles

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Abstract- This work aims to demonstrate that the concept of Incommensurability, according to Thomas Kuhn, originally of the Exact Sciences, which explains the change between scientific theories in the Philosophy of Science, as well explains on the Technology of buildings, in Brazilian built environment, from the Colonial period to Contemporary. It was observed that the changes in scientific theories have occurred, in part, with assimilation of previous concepts and, part, with complete break between paradigms.

Keywords: incommensurability; education; philosophy of science; construction technology.

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A Incomensurabilidade em Thomas Kuhn e a Educação Profissional, Científica E Tecnológica: Um Ensaio Sobre Interdisciplinaridade e Prática no Ensino de Tecnologia das Construções

Cristiane Alves Pereira Damasceno [α] & Gustavo da Silva Salles [σ]

Resumo- **Este trabalho visa demonstrar que o conceito de Incomensurabilidade, segundo Thomas Kuhn, oriundo das Ciências Exatas, o qual explica a mudança entre teorias científicas, na Filosofia da Ciência e também as explica referente à Tecnologia das Construções, no ambiente construído brasileiro, do período Colonial ao Contemporâneo. Observou-se que as mudanças de teorias científicas ocorreram, em parte, com assimilação de conceitos anteriores e, parte, com ruptura total entre paradigmas.**

Palavras-chave: incomensurabilidade; educação; filosofia da ciência; tecnologia das construções.

Abstract- **This work aims to demonstrate that the concept of Incommensurability, according to Thomas Kuhn, originally of the Exact Sciences, which explains the change between scientific theories in the Philosophy of Science, as well explains on the Technology of buildings, in Brazilian built environment, from the Colonial period to Contemporary. It was observed that the changes in scientific theories have occurred, in part, with assimilation of previous concepts and, part, with complete break between paradigms.**

Keywords: incommensurability; education; philosophy of science; construction technology.

I. Introdução

A incomensurabilidade, do grego "*asýmmetron*", significa a ruptura entre duas teorias científicas, a qual ocorre quando o paradigma da teoria anterior não contempla a solução de todos os seus problemas, gerando um novo paradigma que os resolva eficientemente. O termo provem da Geometria grega e ganhou nova proporção epistemológica com Kuhn e Feyerabend, na Filosofia da Ciência (PETERS, 1974; FEYERABEND, 1976; KUHN, 2006; ABRAÃO, 2009).

Este trabalho demonstrará que o conceito Incomensurabilidade, originado nas Ciências Exatas, para explicar as mudanças de teorias científicas na Geometria grega e na Filosofia da Ciência, também explica as mudanças na Tecnologia das Construções, uma das disciplinas do Curso Técnico de Edificações, do eixo Infraestrutura, do Catálogo Nacional de Cursos Técnicos, do Ministério da Educação e Cultura do Brasil (MEC).

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II. A Perspectiva da Incomensurabilidade Como Elemento Interdisciplinar no Ensino de Disciplinas Técnicas

Segundo Abrahão (2009), a palavra incomensurabilidade vem do grego "*asýmmetron*". Peters (1974) a atribuiu ao pitagórico Hipasso. Fritz (1945) apud Roque (2012) pontua que a incomensurabilidade tenha sido descoberta durante o estudo do problema das diagonais do pentágono regular. Esses autores apontam para a origem grega de tal termo que foi concebido na Geometria Pitagórica. Contudo, esse vocábulo não se restringe à Geometria grega, pois no século XX, sob nova perspectiva, ganha nova proporção epistemológica em Kuhn e Feyerabend.

A incomensurabilidade foi empregada no século XX, por Kuhn e por Feyerabend em 1962, na Filosofia da Ciência (KUHN, 2006). As contribuições desses dois autores contemporâneos da Filosofia da Ciência apontam a incomensurabilidade como elemento importante para as mudanças científicas, entretanto este trabalho se restringirá à perspectiva de Thomas Kuhn. Thomas Samuel Kuhn era físico, graduado pela Universidade de Harvard e empreendeu esforços para identificar a estrutura, isto é, elementos constituintes do processo científico que motivam e operam profundas mudanças na História da Ciência, nomeando essas estruturas de "revoluções científicas" (KUHN, 2011).

Para o autor, as estruturas científicas apresentam ciclos que, posteriormente, proporcionam rupturas entre si, desencadeando revoluções científicas. Essas estruturas apresentam mudanças sequenciais, através de períodos que se alternam entre si no decorrer do desenvolvimento da ciência.

O período pré-paradigmático da ciência corresponde ao momento de incertezas científicas, em que não há consenso entre os membros da comunidade científica a respeito do paradigma. O paradigma compreende um conjunto de crenças,

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técnicas e valores compartilhados por uma comunidade, que serve como modelo para a abordagem e soluções de problemas. Nesse período, a escolha do paradigma consiste em disputas, cujo antagonismo presente entre os cientistas diz respeito à habilidade política dos mesmos em persuadir seus pares, na tentativa de estabelecer um novo paradigma (KUHN, 2012).

Nesse contexto, não está em evidência o desdobramento experimental, metodológico, deduções, induções ou análises metodológicas do paradigma, mas a habilidade do cientista em persuadir os demais membros da comunidade científica sobre a importância de aderirem ao novo paradigma.

Em Kuhn, o paradigma estabelece unidade e maturidade aos membros da comunidade científica, possibilitando condições de instrumentalização da teoria, ampliando e aprimorando suas técnicas, com o surgimento de instrumentos que auxiliarão na investigação dos novos fenômenos. Assim, o novo paradigma substituíra gradualmente as teorias mais antigas.

O paradigma estabelece unidade ao demonstrar sua eficiência em solucionar os problemas científicos, aos quais Kuhn denomina de "quebra-cabeças". A eficácia na resolução dos problemas possibilita a ampliação de seu campo de atuação, que implica o fortalecimento estrutural e o amadurecimento da ciência. Por outro lado, quando o cientista se depara com "anomalias", problemas que o paradigma vigente não consegue resolver, ocorre uma crise, a qual desencadeará a incomensurabilidade, ou seja, a ruptura entre os paradigmas.

Kuhn (2006) transpôs o conceito de incomensurabilidade da Geometria grega para o conhecimento científico, percebendo o conflito e a ruptura entre as teorias científicas. Camilo (2016) afirma, assim como Kuhn (2006), que as mudanças científicas resultam dos conflitos entre as teorias, ao longo da história, os quais encorajam a mudança científica, a criatividade e a inovação científica. Desta forma, a exemplo disso, se pode perceber as mudanças científicas na Tecnologia das Construções no Brasil.

III. Incomensurabilidade e Tecnologia das Construções

As técnicas construtivas antigas, à base de terra, datam de mais de dez mil anos, quando a humanidade começou a construir cidades (RIBEIRO, 2003). Empregavam materiais e recursos do próprio ambiente da edificação e se originaram do conhecimento nativo, vernacular ou popular (MARQUES; AZUMA; SOARES, 2009). Foram utilizadas técnicas diversas, como a taipa de mão, a taipa de pilão, o adobe e o tijolo (NEVES; FARIA, 2011).

Apesar de controverso, o termo "vernacular" se mostra, na atualidade, controverso e seus significados são amplamente discutidos, dentre as diferentes nuances de atribuídas por cada autor, que, contudo, harmonizam que a arquitetura vernacular se caracteriza pelo seu enraizamento no ambiente em que se insere, ligada às características históricas locais, que são passadas de geração em geração, incorpora a sabedoria coletiva da tradição, contemplando a relação dos materiais e soluções tecnológicas com o clima, topografia e outros fatores físicos e culturais locais (REIS; CASTRO, 2020).

A construção com barro no Brasil iniciou com as experiências e o "saber como" dos colonizadores portugueses, onde este foi a matéria prima principal das construções vernaculares no interior do Brasil Colônia, entre os séculos XVI e XIX (LEMOS, 1996).

O barro teve grande destaque como material de construção, por sua disponibilidade abundante em um país de economia incipiente, por permitir construir com poucos recursos financeiros e mínima força de trabalho especializada. Além disso, naquele período, a força de trabalho disponível era escrava, o que determinou a técnica com terra como mais apropriada, devido sua baixa complexidade de interpretação e execução (LEMOS, 1989).

Nas construções litorâneas, predominou a técnica construtiva à base de pedras, as cantarias, uma espécie de alvenaria de pedras argamassadas, devido ao tipo de solo local não ser apropriado para as técnicas com terra, por sua característica arenosa. Outro fator determinante foi a oferta abundante de pedras e a produção da cal, a partir da calcinação de blocos dos sambaquis, para a argamassa (LEMOS, 1989; KANAN, 2008).

Observa-se um primeiro conflito entre as técnicas construtivas antigas vernaculares utilizadas no Brasil interior e litoral: o primeiro paradigma, a tecnologia à base de terra crua, não contemplou a solução dos problemas climáticos impostos pelo litoral, ocorrendo a mudança científica para um segundo paradigma, a tecnologia de cantarias, neste caso, sem assimilação de conceitos da tecnologia anterior.

Silva et al. (2019), ao comparar resultados de ensaios de caracterização de argamassas, com a história da construção da edificação objeto de seu estudo, concluíram que se aplicaram técnicas construtivas semelhantes às utilizadas nos três primeiros séculos, no Nordeste brasileiro, cuja falha no paradigma, a execução de fundações sem impermeabilização, resultou em patologia construtiva, as umidades, caso que pode ser verificado em outras construções locais de mesma tipologia.

No Brasil, as tecnologias de construção não necessariamente sucederam umas às outras, pois foram utilizadas diversas técnicas construtivas em uma

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mesma edificação. Comumente, a taipa de pilão e a taipa de mão eram utilizadas simultaneamente, associadas ao adobe para preenchimento de vãos. O tijolo passou a ser incorporado posteriormente, sendo até hoje utilizado na maioria das construções no país. O concreto só foi mais utilizado como método construtivo, a partir da arquitetura moderna, em meados dos anos de 1920 (LEMOS, 1996).

As edificações de terra crua, quando comparadas a técnicas construtivas mais recentes, não apresentavam estabilidade, resistência e durabilidade satisfatórias, entretanto, se eficientemente protegidas da ação da umidade, por meio de beirais, poderiam resistir por longos períodos (LEMOS, 1989; PISANI, 2004).

Isto demonstra que as tecnologias construtivas antigas, naturalmente, apresentavam limitações, ou seja, as "anomalias" descritas por Kuhn (2006), acarretando que as soluções construtivas observadas por Lemos (1986), constituídas pela associação de tais tecnologias, de modo que o conjunto de técnicas supriu suas deficiências individuais, gerou novo paradigma composto pela assimilação associativa das metodologias.

As técnicas antigas, diante à Industrialização, aos poucos foram substituídas pelos métodos tradicionais, fundamentados inicialmente em alvenarias estruturais, onde posteriormente foram inseridas estrutura e fundação de concreto e aço, advento da invenção do cimento Portland em 1824, difundido em larga escala no Brasil em meados do século XX. A partir desta tecnologia, edifícios maiores e mais resistentes puderam ser erguidos (FEIBER, 2012; LEMOS, 1989), configurando novo paradigma.

As técnicas construtivas contemporâneas e de alta tecnologia, "*High-Tech",* se propõem a oferecer ao usuário espaços de máxima eficiência, em vez de espaços tradicionais, alterando mais uma vez o modelo construtivo (paradigma), então vigente. Surgiram a partir dos anos de 1970, se baseaiam em aço, vidro, alumínio, titânio, etc. e se utilizam de sistemas, tecnologias e materiais industriais, em programas comerciais e residenciais urbanos (COLIN, 2013).

Dentre estas tecnologias atuais que têm por premissa o conforto, a comodidade e a segurança ao usuário, se pode destacar a automação residencial, a qual tem por objetivo integrar diferentes tecnologias a fim de se automatizar uma edificação, com uso eficiente de energia elétrica (GOMES; TEIXEIRA; MAIA, 2021).

O avanço tecnológico na área da construção civil, associado a outros fatores, impactou o meio ambiente de modo negativo e levou a comunidade científica mundial a desenvolver metodologias construtivas sustentáveis.

A constante expansão das cidades, o crescimento da população e a ampliação da infraestrutura através da construção de edificações, em cujo processo a construção civil desempenha importante papel, contudo, dicotomicamente, também gera algum tipo de poluição (FARIAS; MARINHO, 2020).

Suscitada como nova teoria científica, a Bioarquitetura, contempla soluções frente ao problema ambiental, pois é o ramo da Arquitetura que visa à harmonização das construções com a natureza, de modo a gerar baixo impacto ambiental e redução de custos operacionais, cujas construções são desenvolvidas com materiais naturais adaptados ao clima do local e têm como premissa a preservação da natureza e a integração entre o homem e o meio ambiente. Caracterizam-se pelo baixo consumo de energia, telhados com vegetação, técnicas construtivas simples e aproveitamento ao máximo dos recursos naturais, como iluminação e ventilação naturais (CAVALCANTE, 2018).

Esta nova teoria apresenta um viés de reintrodução das técnicas construtivas antigas, como as com terra crua, em edificações contemporâneas, com contexto atual e objetivo de gerar ambientes diferenciados e readaptar a aplicação de materiais naturais com metodologias sustentáveis, o que se configura, mais uma vez, em uma nova teoria científica, neste caso, com assimilação de conhecimentos anteriores, demonstrando a característica cíclica da estrutura científica descrita por Kuhn (2011).

IV. Conclusões

Em resumo, as teorias científicas sofrem mudanças a partir do momento em que não contemplam a solução de problemas dentro de seu paradigma, cuja crise acarreta a ruptura deste modelo (incomensurabilidade), e sua substituição por novo paradigma que os solucione, em que pode, ou não, ocorrer a assimilação de conceitos da teoria anterior.

Neste trabalho foi demonstrado que a partir deste conceito utilizado para explicar a mudança científica no campo da Filosofia da Ciência, também se pode explicar tal fenômeno no campo da Tecnologia das Construções, cadeira do curso de Edificações e, de modo análogo, de outras disciplinas da Educação Profissional, Científica e Tecnológica, materializando a conexão interdisciplinar entre Conhecimento e Práxis. Além disso, foi observado que as mudanças de teorias científicas na Tecnologia das Construções no Brasil, ocorreram, em parte, com assimilação de conceitos anteriores e, parte, com ruptura total entre paradigmas.

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An Analysis of Explicit Subjective Modality Metaphors in Discussion Section of Linguistics Research Articles

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Abstract- Based on Halliday's theory of Grammatical Metaphor in Systematic Functional Linguistics (SFL), this paper delves into the distribution features as well as interpersonal meanings of modality metaphor in discussion section of Linguistics Research Articles (RAs). The discussion sections of 60 RAs in Applied Linguistics (2016-2020) were selected and the classification of explicit subjective modality metaphor from Halliday & Matthiessen, Huang and Fan was adopted in current study. The results show that epistemic modality metaphors take up the highest proportion in explicit subjective modality metaphor (84.8%), followed by boulomaic, evaluative and evidential modality metaphors. The reasons for this discrepancy are explained from the scientificity and objectivity of academic discourse and the multiple interpersonal meanings of epistemic modality in terms of raising different or supplementary viewpoints in a conciliatory way and strengthening negotiation between writers and readers.

Keywords: *explicit subjective modality metaphor, linguistics research articles, interpersonal meanings.*

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An Analysis of Explicit Subjective Modality Metaphors in Discussion Section of Linguistics Research Articles

Yue Bao [α] & Yi Zhang [σ]

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Keywords: explicit subjective modality metaphor, linguistics research articles, interpersonal meanings.

I. Introduction

Grammatical Metaphor (GM), as a critical link between semantic level and lexicogrammatical level, has played a pivotal role in Systematic Functional Linguistics since it was proposed by Halliday in 1985 (Cong, 2014: 74). According to Halliday (1985: 351), GM could be divided into Ideational Grammatical Metaphor and Interpersonal Grammatical Metaphor. The former one is mainly manifested as transitivity and realized by nominalization and verbalization while the latter consists of Mood Metaphor and Modality Metaphor. Stupendous research has been conducted upon Ideational Grammatical Metaphor with nominalization in its core (Halliday, 1999; Zhu & Yan, 2001). By contrast, scant research has been concentrated on modality metaphor. Modality referred to intermediate degrees such as "sometimes" and "perhaps" between positive and negative poles (Fan, 2001: 139) and acts as a major exponent of interpersonal function of language (Chang, 2001). When the speaker intends to show his opinion regarding possibility, modality is, in this case, coded as modal elements like "must," "usually," which are congruent realization of modality. Halliday supposed that the most congruent expression of modality is realized by modal verbs or adjuncts (Hu, 2020: 42). Comparatively, incongruent realization of modality manifests in a projected or embedded clause, which is modality metaphor (Halliday & Martin, 2004). To subsume modality metaphor under modality system, Halliday came up with explicit subjective and objective modality metaphors. By using explicit subjective modality metaphor, the expression of modality becomes a projection of speakers or authors' stance. Namely, in explicit metaphorically expressed modality, subjectivity is expressed by "I" or "we" (Fan, 2001: 153).

Discussion Section in Empirical Research Articles (RAs) is crucial in expounding the achievements and practical value of the research (Hess, 2004: 1239). In this section, the authors are supposed to compare the results with literature, interpret results, express their opinions and stance. Meanwhile, they need to convince readers of the significance and contribution of their research (Golmohammadi et al., 2014: 607).

Nevertheless, few investigations looked into the analysis of explicit subjective modality metaphor in academic discourse. Thus, the current study attempts to investigate the interpersonal meaning of explicit subjective modality metaphors in discussion section of linguistics RAs.

II. Theoretical Framework

a) Halliday's Modality System

Halliday (1985) classifies modality into mainly two types: modalization and modulation. If the clause is an "information" clause, which is a proposition congruently realized as indicative, this means either possibility or usuality; if the clause is a "goods and services" clause, which is proposal realized by imperative, it means either "is wanted to," relevant to a command, or "wants to," relevant to an offer; namely, either obligation or inclination (Figure 1).

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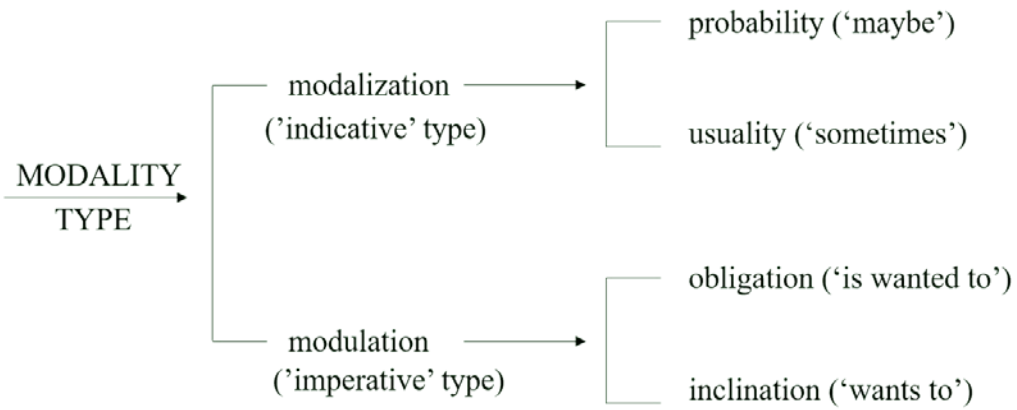


Figure 1: Types of Modality (Halliday, 1985:335)

In addition, orientation is the basic distinction that determines how each type of modality will be realized (Halliday, 1994: 355). Namely, it is distinction between subjective and objective modality, and between the explicit and implicit variants (Figure 2).

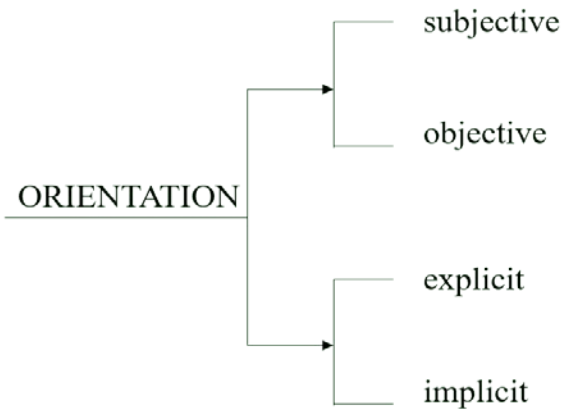


Figure 2: Orientations of Modality (Halliday, 1985: 358)

According to Halliday (1985), explicit subjective and objective patterns are metaphorical realization of modality and the examples are given in Table 1.

Table 1: Metaphorical Realization of Modality (Halliday 1994: 358)

ORIENTATION TYPE	Explicit Subjective (Modality Metaphor)	Explicit Objective (Modality Metaphor)
Modalization: probability	I think Mary knows.	It's likely that Mary knows.
Modalization: usuality		It's usual for Fred to sit quite quiet.
Modulation: obligation	I want John to go.	It's expected that John goes.
Modulation: inclination		

Explicit subjective modality metaphor includes probability in modalization and obligation in modulation. In these two situations, the clauses with modality represent a mental process to emphasize the subjectivity of the speaker, such as "I *believe*," "*I reckon*," "*I want*," "*I desire*" etc. Moreover, modified relational clauses that express a cognitive state or emotion can also clearly represent subjective orientation, which is also metaphorical (Chang, 2001). Such as:

(a) *I'm sure Mary'll know.* (**Probability**)
(b) *I'm willing for him to go.* (**Inclination**)

Halliday (1994:347) believed that in the two types of modalities, usuality and inclination, the speaker cannot express explicit subjective modal meanings.

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Nonetheless, Huang (2000) put forward a different view, assuming that it can be expressed by the first verb phrase of a verb phrase complex, such as:

(c) *I tend to wake up early in the morning. = I usually wake up early in the morning.* (**Usuality**)

b) *Realization of Explicit Subjective Modality Metaphor*

According to Halliday's (1994) definition and classification of modality metaphor as well as the complements of the realization of modality metaphor by Chang (2001) and Huang (2000), the realization methods of objective modality metaphor include two realization methods: (a) projection clauses like [I/we V that] and [I/we be ADJ that] and (b) verb phrase complex. In separate, projecting clauses, some verbs and adjectives are given in Table 2 and Table 3 by Fan (2001) and Hu (2020). And the realization methods are summarized in Table 4.

Table 2: Classification of Verbs in [I V that] Construction

Semantic Feature	Subclass	Members
Epistemic	Learn	learn, read
	Conjecture	allow, anticipate, believe, conjecture, deny, determine, doubt, expect, feel, foresee, guess, hold, infer, know, means, presume, realize, recognize, speculate, surmise, suspect, swear, trust
	Consider	acknowledge, deem, reckon, report, view, know, recognize, see, consider, imagine, remember, believe, think, feel, posit, suppose, suspect
	Estimate	count, estimate, guess, judge
	Discover	ascertain, deduce, determine, discover, find, guess, rationalize, realize, hear, learn, read
	Comprehend	grasp, understand
	Deduce	conclude, deduce, gather, infer, prove, reason, rationalize
Evaluative	Admire	admire, adore, affirm, appreciate, believe, dread, fancy, fear, lament, prefer, reaffirm, regret, resent, respect, stand, support, tolerate, treasure, trust, worship
	Accept	accept, understand
	Care	care, mind, wonder, worry
Boulomaic	Correspond	agree, disagree, decide
	Wish	dream, expect, hope, imagine, intend, mean, plan, propose, wish, desire, refuse, decline
	Allow	allow
Evidential	See	perceive, smell, see, taste, detect, feel, notice, sense

Table 3: Classification of Adjectives in [I/we be ADJ that] Construction

Semantic Feature	Subclass	Members
Epistemic	Certainty	certain, uncertain, undeniable, doubtful, convinced, sure, confident, optimistic, positive, skeptical,
	Perception	Mindful, aware
	Expectation	hopeful
Evaluative	Un/happiness	sad, tragic, distressing
	Dis/satisfaction	regrettable, disappointing, outrageous
	In/security	surprising, funny, encouraging
	Impact	interesting, impressive, exciting
	Quality	neat, nice, wonderful
	Composition	appropriate, proper

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Table 4: Classification of Explicit Subjective Modality Metaphors

	Semantic Feature	Explicit Subjective
Modality	Epistemic Evidential	[I/We V that] [I/We be ADJ] our opinion I/We tend to
Modulation	*Evaluative* *Boulomaic*	[I/We V that] [I/We be ADJ] our responsibility our desire/determination

III. Methodology

a) Research Questions

Concentrating on distribution and functions, this study is designed to answer the following questions:

(1) In linguistics RAs, what is the overall distribution of explicit subjective modality metaphors in discussion section?

(2) What are the interpersonal functions of explicit objective modality metaphors in discussion section of academic discourse?

b) Research Procedures

Firstly, based on Yang's (2006) specific study on the structure of linguistics RAs, the current research selected the discussion sections of 60RAs from Applied Linguistics (2016-2020), with a total of 95,665 words.

The second step was to identify modality metaphors in the corpus. Based on the definition elaborated by Halliday and the supplements for modality metaphor identification raised by other scholars, lists with search terms for explicit subjective were input in AntConc. Meanwhile, the selected modality metaphors were manually checked, sorted and classified.

Then, SPSS was utilized to conduct a quantitative analysis to reveal distribution features of explicit subjective modality metaphor in discussion section. Also, modality metaphors with different semantic features were compared with the assistance of Chi-square.

Finally, focusing on the original context, the interpersonal meaning of modality metaphors was analyzed to explain the reasons for different distributions.

IV. Results and Discussion

a) Distribution features of explicit subjective modality metaphor

It can be noted in Table 5 that in the current corpus, there are totally 48 different varieties of explicit subjective modality metaphors, with a total frequency of 171. Epistemic modality accounts for 84.8% of the total modality metaphors, much more than other types. Among these 145 epistemic modality metaphors, the pattern "*we/I find/found that*" is most popularly used explicit subjective modality metaphor (23 occurrences), followed by the pattern "*we believe that*" (14 occurrences) and "*we know that*" (10 occurrences). As for boulomaic modality metaphors, there are totally 19, accounting for 11.1%. Evaluative modality metaphors such as "*we question that*," "*we can appreciate that*" and evidential one including "*we felt that*" only take up a small fraction as a whole, 3.5% and 0.5% respectively.

Table 5: Distribution of Explicit Subjective Modality Metaphor

Realization Method	Semantic Feature	Examples in Corpus	Frequency	Percentage
Projection Clauses	Epistemic	we/I find/found that (23) we believe that (14) we know that (10) ...	145	84.8 %
	Boulomaic	we want to V that (6) we hope that (5) we expect that (3) ...	19	11.1%
	Evaluative	we question that (1) we can appreciate that (1) we were surprised that (1) ...	6	3.5%
	Evidential	we felt that (1)	1	0.5%
Total	*171*			*100%*

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b) Reasons for Discrepancy among Different Types of Subjective Modality Metaphors

i. *The Scientificity and Objectivity of Academic Discourse*

The first reason for the high proportion of epistemic modality metaphor is its role in accentuating scientificity and objectivity of RAs.

The pursuit of scientificity and objectivity is an essential feature of scientific discourse (Markkanen & Schroder 1997: 12). The epistemic modality demonstrates the author's certainty or uncertainty upon the hypotheses (Li, 2001). Compared with other subjective modality metaphors, epistemic ones emphasize that the views are simply derived from individual behavior instead of the main body in society, which in turn proves that the authors are pursuing the scientificity and objectivity of academic discourse. I this case, a range of mental verbs such as "believe," "think" or "argue" can be classified as belief evidentials (Hu, 1994), which are not fixed facts, but subjective judgments that are difficult to verify. Moreover, the author chooses a subjective projection to show the argument and takes on full responsibility for the certainty and modality of the information (Yang, 2015).

Example 1: We can conclude that only the English native speakers treat novel and regular metonymy differently, with the latter highly conventionalized, while the other native groups do not (for more details see Slabakova et al. 2013) (From RA 3).

Example 2: We would have seen a larger and wider effect of MTI had we been able to include more participants in our sample who had not attended any MTI. For example, we think (that) this would have led to a statistically significant effect of MTI on the Somali vocabulary measures, at least for lexical depth (From RA 37).

In Example 1, the form "*we can conclude that*," with an explicit subjective projection, gives a condensed summary for the results of the current study. It indicates the core finding as well as the certainty of the research. In Example 2, the author makes a reasonable and subjective prediction by using "we think that" pattern, which displays his subjectivity. The author claims that if more participants can be included in the sample, a more profound effect of Mother Tongue Instruction will be figured out. Thus, he or she surmises MTI will definitely exert an influence on Somali vocabulary measures. Undoubtedly, it is a prediction instead of the fact seen from the research. However, the author is willing to shoulder the responsibility for this claim, arguing that MTI will influence the development of biliteracy since he or she has conducted scientific research in this field.

ii. *According with the politeness principle*

(1) Raising different or supplementary viewpoints in a conciliatory way

In addition, sometimes it is common for authors to propose a view that is opposite or complementary to previous research. In this case, authors tend to express their opinions without damaging others' face (Hu, 2020) as is shown in Example 3.

Example 3: ***We might thus have to recognize that*** *some aspects of language knowledge are perhaps not as atomistic or discrete as 'desirable' for this purpose. In other words, we may wish to consider developing tests of lexicogrammar rather than 'pure' syntax or vocabulary tests, or integrating aspects of syntactic or phraseological properties of vocabulary into vocabulary tests* (From RA 24).

In Example 3, the author is explicit involved in the discourse by means of an explicit subjective projection "we might thus have to recognize that." It can be inferred that 'pure' syntax, vocabulary tests, integrated syntactic or phraseological properties of vocabulary were previously and consistently considered into vocabulary tests by researchers. However, the writer here points out that developing tests of lexicogrammar should also be taken into account. Compared with previous cognition, the writer's viewpoint is a complement.

(2) Strengthening negotiation between writers and readers

Subjectively projected propositions take first person pronouns i.e. I or we as the projector while objective ones resort to the non-interactant "it" or "there." Hyland (2008) emphasizes the interaction between the writer and the reader. It is often the case that writers and readers share common knowledge but writers need to adjust negotiation space by shortening distance between readers and themselves.

Example 4: Earlier we pointed out that the concern about vocabulary tests based on word family knowledge is that they may overestimate the lexical knowledge that learners can apply to reading. Based on the evidence from the two studies above and our text analysis by Morpholex, ***we contend that*** *this concern is exaggerated and further that there is little reason to reconsider the large amount of useful and influential research that is based on the word family as the unit of counting* (From RA 60). (Subjective)

In Example 4, readers show concern for vocabulary tests based on word family knowledge. Nevertheless, the author evaluates this concern that it is exaggerated. By employing the pattern "we contend that," the author can weaken the tension of this preposition, as a result of which, creating a negotiable atmosphere. In Example 10, the use of objective modality metaphor "it is possible that" shows that researchers are prone to air their views in a negotiable way, so as to enhance the academic inclusiveness and negotiation space of the research.

(3) Expressing the author's deliberativeness

"Pure opinion" is a pivotal component of the content that is subjectively projected (Aijmer, 1997; Simon-Vandenbergen, 2000). When the projection, no matter objective or subjective, is "pure opinion," it will

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exude the author's deliberative attitude toward his point of view.

Example 5: At the same time, ***we want to clarify that*** *we cannot assume causality based on these correlations, and we also have not controlled for the impact of, for example, participants' general cognitive ability as a possibly mediating factor in the results* (From RA 37).

As is shown in Example 5, an opinion that is we cannot assume causality based on these correlations is proposed by the author as an object clause followed by "we want to clarify that." Superficially, the subjective projection "we want to clarify that" conveys author's purpose and intention. More importantly, it emphasizes the author's opinion in a deliberative way. In Example 12, with the objective projection, the writer doubts the reliability of complicated formulae in accessing essays, further demonstrating writer's deliberateness.

V. Conclusion

The result of quantitative analysis clarifies that subjective modality metaphors are commonly utilized by writers in discussion section in Linguistics RAs. Among the annotated modality metaphors, Epistemic modality metaphors are most frequently used (84.8%), followed by boulomaic, evaluative and evidential modality metaphors.

The distinctive distribution difference can be explained from two perspectives. First, compared with other modality metaphors, epistemic modality metaphors contribute to pursuing scientificity and objectivity of academic discourse. More importantly, the interpersonal meaning of epistemic modality metaphor satisfies the politeness principle by raising different or supplementary viewpoints in a conciliatory way, strengthening negotiation between writers and readers as well as expressing the author's deliberativeness.

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Large-Scale Portuguese Language Evaluations: A Research on the Complexity of Texts that Support Items that Assess Reading

By Barbosa, Begma Tavares, Micarello, Hilda Linhares & Ferreira, Rosângela Veiga

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Abstract- This article discusses the theme of the complexity of texts that support large-scale assessment items in Portuguese language, based on the results of a survey in which 763 texts used in large-scale assessment items in Portuguese were analyzed. The research methodology consisted of item analysis supported by the theories of cognition, textual linguistics, and statistical parameters of the items based on the Item Response Theory, a three-parameter model. Based on the research carried out, four levels of complexity of the texts were defined. The results point to the relevance of clear criteria to define the complexity of texts in the development of new items and to a more precise description of performance standards based on the reading proficiency presented by the evaluated students.

Keywords: *reading assessment. large-scale assessment of the portuguese language. complexity of texts.*

GJHSS-G Classification: *FOR Code: 200499*



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Barbosa, Begma Tavares [α], Micarello, Hilda Linhares [σ] & Ferreira, Rosângela Veiga [ρ]

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Keywords: reading assessment. large-scale assessment of the portuguese language. complexity of texts.

I. Introduction

The research whose results are presented in this article was supported and financed by the CAEd Foundation, of the Federal University of Juiz de Fora. The objective of the research was to produce knowledge about the validity and reliability of items applied in systemic reading assessments in municipalities and states of the federation and also in national assessments. The research section dealt with in this article refers to the theme of the complexity of the texts that support these items.

Reading assessment is a challenging topic, as this is a complex and multidimensional construct[1]. Kleiman (2019, s/p) states that

> in reading comprehension, the following are involved: a text – a linguistic and cultural object that bears a meaning -; a reader - with knowledge, experience, skills and abilities; and a communicative situation of interaction between reader and author via written text, which largely determines *what* and *how* you understand.

In the specific case of this research, the focus is placed on the text as a linguistic object that carries a meaning and on the challenges it poses to the reader so that he/she is able to understand what he/she reads.

The theme of the complexity of texts that are used as support for items that assess reading in large-scale assessments of the Portuguese language has been presented as relevant, since the consideration of this complexity is essential for understanding the level of difficulty of the tasks proposed by the applied items in order to assess the reading proficiency of students in the different stages of basic education. In addition, clearer criteria for defining the complexity of texts contribute to greater reliability of the assessment instruments and, consequently, to the validity of the tests. According to Primi (2012, p.300), in psychometry the concept of validity "is related to the question that investigates whether the test is measuring the construct it proposes to measure". In this sense, since reading is a multidimensional cognitive activity, greater clarity about the nature of the reading activity that is being required by the items that compose the tests will result in a better adjustment of the test which is intended to be assessed at each stage of schooling.

Sousa and Hübner (2014) state that the option for a type of task to assess reading comprehension requires the clarification of the concept of reading that underlies this option. In the specific case dealt with in this article, the conception of reading has not only as its cornerstone the evaluation processes of this construct, but, mainly, the teaching practices is that reading is a subjective construction of meanings based on the meanings of the text, that is, the readers act on the text based on their experiences in a given culture. Faced with a text, the readers activate more or less formalized knowledge, such as those about texts and the language itself, acquired at school or out of it. In this way, the text does not carry a pre-existing meaning to the reading, that is, the meaning is not in the text, but it is constituted in the interaction between the reader and

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[1] In psychometrics, the construct is an intangible attribute, with variable manifestation between individuals, which can only be assessed indirectly, when expressed in the form of physical, emotional, attitudinal or cognitive performance. Available at http://portal.inep.gov.br/documents/186968/484421/Relat%C3%B3rio+Saeb+2017/e683ba93-d9ac-4c2c-8f36-10493e99f9b7?version=1.0. Access on December 10th 2019.

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the text. This, in turn, offers a set of clues that guide the reader in the meaning-building task that is reading.

The National Curriculum Parameters for the Portuguese Language (BRASIL, 1998, p.36) established a pragmatic turn in the teaching of the mother tongue by defining the text as a "basic teaching unit". This definition implies assuming that teaching the language is, mainly, teaching how to identify the clues that the text offers and to be guided by these clues to produce meaning for what is read.

More recently, the Common National Curriculum Base (BRASIL, 2017) for the Portuguese Language component maintained the emphasis on the text as a language teaching unit, by organizing the competences and skills of the curriculum in fields of action of the subjects in social life. Underlying the notion of fields of action is the assumption that subjects act in society through the texts that circulate in it and materialize in genres that have common characteristics, given the field of social life in which they circulate. In this sense, it is worth thinking that in teaching practices and, consequently, in assessment, a key issue is to define how the approach to texts progresses and what are the cognitive pathways of students in the interaction they establish with them. This interaction will depend on the structure of the text and the type of signal it offers the reader to build meaning for what is read. Thus, texts of the same genre may have different structures, which will require the reader to mobilize different skills.

In general, the complexity of texts is dealt with, in teaching practices and in large-scale assessments, based on the notion of textual genre. This notion has its origin in the studies of Mikhail Bakhtin, philosopher of language, who states: "Evidently, each particular utterance is individual, but each field of use of language elaborates its *relatively stable types of utterances*, which we call *speech genres*." (BAKHTIN, 2003, p. 262 – emphasis added). The texts that originate in different spheres of social life have, therefore, common characteristics, resulting from the relative stability of the statements that originate in these spheres. Due to these common characteristics, the textual genre can be identified. A personal letter, for example, has different characteristics compared to a short story.

Undoubtedly, the notion of textual genre is relevant to guide the progression of reading teaching practices, as it is possible to think that teaching should start from genres that circulate in spheres closer to the daily lives of students, therefore less complex, and move towards genres that circulate in more specialized spheres, therefore, more complex. Large-scale assessments have also used this notion, both for the construction of the tests and for the dissemination of their results. However, the genre category is not enough to reveal, in greater detail, how students interact with texts, since such interaction process involves different skills that are mobilized by the reader not only in function of the textual genre with which they interact, but also in terms of the structure of the texts and the type of reading task required of the reader.

This article intends, based on the results obtained in a research carried out by the Center of Assessment and Public Policies for Education (CAEd) of the Federal University of Juiz de Fora, to present a classification of the complexity of texts into levels, defined from some categories, based on an incursion into a wide range of texts used as items support that assess reading, applied to students from the 5th to the 12th grades of basic education, in different states and municipalities of the federation and also in national assessments, in Brazil.

Initially, some considerations will be presented on how the theme of text complexity has been addressed in the dissemination of the results of the Programme for International Student Assessment (PISA), 2018 report, and in the SAEB/Prova Brasil report, through the Portuguese Language proficiency scale.

Then, it is presented the methodology and the *corpus* of the research on which this article is based, as well as the classification of the levels of complexity of the text in the light of the data of the research carried out.

Finally, some considerations are taken into account on the relevance of having greater clarity about the level of complexity of the text for the processes of elaboration of tests that assess reading, as well as for the communication of assessment results to schools and teachers.

II. The Complexity of Texts in Communicating International and National Assessment Results

The Basic Education Assessment System report (SAEB) (BRASIL, 2019) presents the results of the Portuguese Language and Mathematics assessments carried out in 2017, within the scope of the Prova Brasil, throughout the national territory. In this report, students performance in both curricular components is presented using a proficiency scale.[2] . Based on the proficiency

[2] Proficiency scale: Set of ordered numbers obtained by Item Response Theory (IRT) that represents the measure of proficiency in a given area of knowledge. In the SAEB, in each area of knowledge, there is a single proficiency scale for all school years (grades) and all editions of the assessment (Ex.: the Portuguese language proficiency scale in the 2017 edition is the same as in previous editions and aggregates the proficiencies of students who participated in the tests of the 5th and 9th grade of elementary school and the 3rd grade of high school). Each scale ranges from 0 to 500 points, with a mean of 250 and a standard deviation of 50. Available at http://portal.inep.gov.br/documents/186968/484421/Relat%C3%B3rio+Saeb+2017/e683ba93-d9ac-4c2c-8f36-10493e99f9b7?version=1.0 Access on Dec. 10th 2019.

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scale, these performances are interpreted and described, in the Portuguese Language assessment, reading, in 9 (nine) levels. This form of presentation and dissemination of results is the one that has been used by INEP throughout the different editions of Prova Brasil.

Table 1 presents the descriptions of the first three performance levels of the Portuguese Language proficiency scale, as described in the SAEB report (BRASIL, 2019).

Table 1: Levels of Performance in Portuguese Language according to the SAEB proficiency scale (fragment).

LEVEL	Level Description
Level 1 Performance greater than or equal to 125 and less than 150	Students are likely to be able to: Locate explicit information in short narrative, informative texts and advertisements. Identify the theme of a text. Find elements such as the main character. Establish relationship between parts of the text: character and action; action and time; action and place.
Level 2 Performance greater than or equal to 150 and less than 175	In addition to the aforementioned skills, students are likely to be able to: Locate explicit information in short stories. Identify the main subject and the main character in a report and in fables. Recognize the purpose of recipes, manuals and regulations. Infer character characteristics in fables. Interpret verbal and non-verbal language in strips.
Level 3 Performance greater than or equal to 175 and less than 200	In addition to the aforementioned skills, students are likely to be able to: Locate explicit information in stories and reports and in advertisements with or without the support of graphic resources. Recognize the relationship of cause and consequence in poems, short stories and comic strips. Infer the sense of the word, the sense of expression or the subject in letters, short stories, comic strips and comic books, with the support of verbal and non-verbal language.

Source: SAEB 2017 Report.

The description of the other levels of the scale follows the same pattern as the description of the first three ones, brought here by way of illustration. Based on this example, it is observed that the description of the students's reading performance occurs in an articulation between the assessed reading ability (for example, locating explicit information, inferring, recognizing the purpose of the text) and the textual genre used as support to items that assess skill (report, poems, short stories, fable). The progression between the different levels is given by the addition of skills to those indicated in the previous level, however, in the research we have been developing, we found that in this way it is not possible to understand how the complexity of the reading task changes or what makes a genre more complex than the other, from the point of view of the reader's interaction with the text. For instance, at the most elementary level, the description that the students, probably, *"are able to: locate explicit information in short narrative, informative texts and advertisements."* At level 2, in which students would have a greater proficiency than those at level 1, it is read that students are probably able to, besides performing the reading tasks of the previous level *"find explicit information in short stories".* Short stories can be short narrative texts. Furthermore, there is no clue about the position of the information to be located nor how it should be retrieved by the reader, based on the type of problem situation constructed in the item. Thus, regarding the ability to locate information, it is not possible to figure out what distinguishes a student with proficiency compatible with level 1 from those with proficiency compatible with level 2. This same problem is repeated in relation to other descriptors and in the passage between other levels.

It is concluded, from the above, that narratives, such as short stories, for example, can materialize in texts with different levels of complexity, consequence of the type of syntax, the lexicon, the topic addressed, among other possibilities. In addition, in the case of the ability to locate explicit information, the position of the requested information and also the existence of a greater or lesser amount of information in the text are also factors to consider, in addition to the way in which the information is retrieved in the proposed problem situation by the item: whether through a repetition, an almost repetition, or a simple paraphrase, for example. Thus, the description of reading skills as presented in the SAEB report is not very clear about the nature of reading skills developed by students at different levels of the proficiency scale.

In the PISA report, student performance in reading is also presented through 6 (six) levels. In the board two, the first three levels of the PISA proficiency scale are presented (OECD, 2019).

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Table 2: Performance levels in *reading literacy proficiency* of PISA (fragment).

Level 1 B	Readers at level 1b can locate a single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, such as a narrative or a simple list. Texts in level 1b tasks typically provide support to the reader, such as repetitions of information, pictures or familiar symbols. There is minimal competing information. Level 1b readers can interpret texts by making simple connections between adjacent pieces of information.
Level 1B	Readers at Level 1a can locate one or more independent pieces of explicitly stated information; they can recognize the main theme or author's purpose in a text about a familiar topic, or make a simple connection between information in the text and common, everyday knowledge. Typically, the required information in the text is prominent and there is little, if any, competing information. The student is explicitly directed to consider relevant factors in the task and in the text.
Level 2	Readers at Level 2 can locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. They can recognize the main idea in a text, understand relationships, or construct meaning within a limited part of the text when the information is not prominent and the reader must make low level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical tasks at this level require readers to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.

Source: Assessment and Analytical Framework, PISA (OECD, 2019, s/p).

In the PISA report, it is possible to find more detail on the reading tasks that students at different levels of proficiency are likely to perform. For example, the ability to locate information is described as a skill that can be more or less complex if the text presents a lot of information that competes with that requested by the item, if the requested information is more or less prominent in the text. There are no references to the textual genre, but to general characteristics of the text, such as the fact that it addresses a more or less familiar theme. In this case, there is a more detailed analysis of the reading task, but such detailing is done without a more precise definition of the nature of the text, its characteristics and microstructure, which can make these reading tasks more or less complex. However, there is an advance in relation to the SAEB report, in the sense of making more evident the reading tasks that students at different levels are likely to perform successfully.

The studies carried out within the scope of the research dealt with in this article have shown that the reading skills developed by students are strongly related to the structure of the text and the type of signaling it offers so that students can perform the required reading task, showing the development of certain skills. A poem, for example, may present a language close to that used in everyday life, which will require a relatively lower reading proficiency for its understanding by the reader; or it can use a metaphorical language, which will demand a high reading proficiency to be understood by the reader.

III. The Definition of Text Complexity Levels in the CAEd Assessment Research, Portuguese Language Area

Within the scope of evaluation research, in the Portuguese Language area, four descriptors that make up the CAEd Evaluation Reference Matrix were analyzed over the years 2017 and 2018, namely: D06 - Find explicit information; D07 - Recognize the subject of a text; D08 - Inferring the meaning of a word or expression; D09 - Inferring information in a verbal text. In all these descriptors, different genres are used as support for the construction of the problem situation of the text items. The corpus of the research consisted of 763 texts, which supported items that evaluated these descriptors.

The analyzes undertaken within the scope of the research aimed to identify the progression of the difficulty that each of the skills presents along the SAEB proficiency scale. To understand this progression, the complexity of the texts used to support the elaboration of items that assess each of the skills proved to be a decisive element. This happened because reading presupposes an interaction between reader and text that are relevant factors to the nature of the text and to the reader's experience. The text, the central object of the investigation, is configured as a set of signals that "guide" the reader so that he/she can produce meanings for what he/she reads, and the reader as someone who acts in this process from a range of knowledge - about the world, on specific themes of the world, on texts, on language.

For the analysis of the descriptors of the Reference Matrix for Assessment in Portuguese Language, an explanation of the linguistic nature of the descriptor was initially carried out based on the theories

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of the text, especially the cognitive-based theories (SMITH 1991; KLEIMAN 1989; KOCH 1998) and in text linguistics (KOCH, 1989; KOCH & TRAVAGLIA 1989).

The IRT – Item Response Theory – and the three-parameter model were those that supported the analysis of the evaluation results. To identify the levels of complexity of the texts that supported the items, the following were eliminated: items with parameter A less than 0.01, since these items have a weak discriminating power between students who developed the skills assessed and those who did not develop them and also items with a C parameter greater than 0.025, since these items have a strong probability of hitting them by chance. The analysis considered the anchor point of the items in the SAEB reading proficiency scale and the distribution of these items in 25 point intervals.

The second step consisted of an incursion into the items that assess each of the descriptors, seeking to identify the degree of complexity with which these skills are manifested along the scale, which offered evidence of the students' reading proficiency in the different stages of schooling. Such identification was made by comparing texts that supported items that anchored in points close to the proficiency scale, seeking to identify common aspects between these texts. The definitions of the skills assessed, elaborated in the first stage of the research, were also fundamental for the analysis of the texts that supported the items.

The analysis of the tasks proposed by the items considered both the complexity of the text and the nature of the signals it offered to carry out the task. Examples of signs supporting reading are: the presence, in the text, of synonyms that help the task of inferring the meaning of a word; the presence of topical marking that facilitates the reader's task of recognizing the subject of a text; a paraphrastic statement that allows access to information, among other possibilities. On the other hand, the level of complexity of a text – defined from criteria such as syntax, lexicon, theme, extension – also has an impact on the complexity of the task.

The classification resulting from the criteria defined in the scope of the research considers four levels of complexity of the texts, in whose definition the syntax presents itself as a very defining element of complexity, when considering the first two levels and the lexicon and the theme are presented as very determinants on levels three and four. Based on the criteria of size, syntax, lexicon and theme, the following levels of complexity for the texts below were defined.

Texts of level 1: The texts are not long (up to 15 lines). The *syntax* is simple, in which short periods and coordinated structures predominate, or even topics; cohesive processes are simple, such as those involving retakes with a close referent – by referencing through subject pronouns or reiteration, by repetition or synonymy; the structure of the texts is conventional and the sentences presented in canonical order. The *lexicon* is closer to colloquial and suitable for the preferred interlocutor of the text, usually children. The *themes* are more of daily use, as less familiar themes require treatment that "make it easier" to read the text. The most common texts at this level are of canonical structure, with narratives and expository texts being present: on the former, we can highlight "nursery rhymes", legends, narratives from children's literature, and also poems with narrative structure; among the latter are "scientific curiosities" or "scientific notes", as defined by the BNCC.

Level 2 Texts: The texts are not very long (up to 15 lines). The *syntax* is a little more complex than what is observed in level 1 texts, with small changes in the canonical syntactic structure – reduced relative clauses at the beginning of periods and brief intercalations, for example; there is a predominance of slightly longer periods, with two lines on average; cohesive processes are more complex, such as those involving retakes by ellipse, object pronouns and more usual relative pronouns. There are texts that present more usual *lexicon* or those whose lexicon is typical of formal speech, but with speech facilitation strategies, as appositive after an unusual word or a scientific or technical term. The *themes* are related to everyday life and, when less familiar, the text offers clues to identify their content. The most common texts are narratives with a canonical structure and brief arguments with simple structure.

Level 3 Texts: The texts are presented in any *size,* that is, there are both short and very long texts among those classified at this level. The *syntax* is complex and typical of the formal use of the language, with dependent clauses, longer intercalations or impersonalizations, for example. Periods are longer, approximately three lines; cohesive processes are more complex, such as those involving retakes by ellipse, objective pronouns and less usual relative pronouns, as well as retakes from more distant referents. The *lexicon* is characteristic of formal speech, presented in different texts, with a less canonical structure. The *themes* are unfamiliar and the supports are more varied, aimed at different interlocutors. The narratives that appear at this level are short stories, chronicles, fragments of novels – texts from Brazilian literature. At this level, longer expository or argumentative texts are found, such as news, reports and poems with metaphorical elaboration.

Level 4 Texts: Just like the previous level, level 4 texts are displayed in any *size.* The *syntax* is complex and typical of the formal use of language, with subordinate structures, longer intercalations and impersonalizations. Periods are longer, with three lines on average; cohesive processes are more complex, such as those involving retakes by ellipse, objective pronouns and less usual

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relative pronouns, as well as retakes from more distant referents. The *lexicon* is characteristic of formal, specialized and literate speech, presented in different texts, with a less canonical structure. The predominance is of texts with more elaborate literary treatment, affecting its structure and resources, and those that deal with specialized *themes,* mainly in the field of science and life in society. As an example of narrative texts, classic texts stand out: tales, chronicles and fragments of novels, narratives less focused on action and with more complex strategies, such as free indirect speech, descriptions that capture the character's stream of consciousness. At this level, there are also reviews, news and reports, opinion texts with various arguments and poems with a more elaborate literary treatment, with the presence of metaphors, allegories and poetic images.

Based on the four levels of complexity of the texts presented here, the items referring to the descriptors mentioned above were analyzed and applied in assessments carried out by CAEd to students from 5th to 12th grade. Tables 3, 4, 5 and 6 below show the distribution of the analyzed items, related to each descriptor, by 25-point intervals of the proficiency scale.

Table 3: Distribution of items that assess the ability to locate explicit information in texts by levels of complexity.

D06- TEXT COMPLEXITY QUANTITATIVE BY INTERVAL								
Breaks	LEVEL 1		LEVEL 2		LEVEL 3		LEVEL 4	
	Qty	%	Qty	%	Qty	%	Qty	%
100-125	1	0.31						
126-150	3	0,95	5	1.58				
151-175	16	5.07	29	9,20			1	0.31
176-200	6	1.90	38	12.06	5	1.58		
201-225	3	0,95	51	16.19	17	5,39	2	0.63
226-250			33	10.47	18	5,71	5	1.58
251-275			22	6,98	13	4.12	4	1.26
276-300			9	2,85	3	0,95	7	2.22
301-325			3	0,95	2	0.63	7	2.22
326-350			1	0.31	2	0.63	4	1.26
351-375							3	0,95
376-400								
Above 401					1	0.31	1	0.31
Total	29	9,18	191	60,59	61	19.32	34	10.74
General Total	315 texts							

Source: CAEd Evaluation Survey 2016-2019.

Table 4: Distribution of items that assess the ability to recognize the subject of a text by levels of complexity.

D07- TEXT COMPLEXITY QUANTITATIVE BY INTERVAL								
Breaks	LEVEL 1		LEVEL 2		LEVEL 3		LEVEL 4	
	Qty	%	Qty	%	Qty	%	Qty	%
125-150	3	1,33	1	0,54				
151-175	4	1.78	16	7,10	1	0,54		
176-200	3	1,33	17	7.58	11	4,91		
201-225			20	8,92	21	9.37		
226-250			14	6.25	35	15.62	3	1,33
251-275			5	2.23	14	6.25	16	7,10
276-300			6	2.67	9	4,01	2	0,89
301-325			1	0,54	2	0,89	3	1,33
326-350					7	3.12	6	2.67
351-375					1	0,54	2	0,89
376-400								

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Above 401					1	0.44		
Total	10	4.44	80	35.83	102	45.25	32	14.21
General Total	224 texts							

Source: CAEd Evaluation Survey 2016-2019.

Table 5: Distribution of items that assess the ability to infer the meaning of a word or expression by levels of complexity.

D08- TEXT COMPLEXITY QUANTITATIVE BY INTERVAL								
Breaks	LEVEL 1		LEVEL 2		LEVEL 3		LEVEL 4	
	Qty	%	Qty	%	Qty	%	Qty	%
125-150	1	0,65						
151-175	4	2.80	2	1.40				
176-200	7	4,89	12	8.39				
201-225	3	2.09	20	13.98	3	2.09		
226-250	8	5.59	19	13.29	1	0,65		
251-275	1	0,65	19	13.29	8	5.59		
276-300			3	2.09	13	9.09		
301-325			1	0,65	11	7.69		
326-350			2	1.40	2	1.40		
351-375					1	0,65		
376-400			1	0,65	1	0,65		
Above 401								
Totals	24	16,67	79	55.14	40	27.81		
General Total	143 texts							

Source: CAEd Evaluation Survey 2016-2019.

Table 6: Distribution of items that assess the ability to infer information in a verbal text by levels of complexity.

D09- TEXT COMPLEXITY QUANTITATIVE BY INTERVAL								
Breaks	LEVEL 1		LEVEL 2		LEVEL 3		LEVEL 4	
	Qty	%	Qty	%	Qty	%	Qty	%
125-150	1	1.23	1	1.23				
151-175	2	2.46	1	1.23				
176-200	3	3,70	11	13.58				
201-225			5	6.17	2	2.46	1	1.23
226-250	1	1.23	7	8.64	7	8.64	2	2.46
251-275			2	2.46	6	7,40	3	3,70
276-300			1	1.23	12	14,81	3	3,70
301-325					1	1.23	2	2.46
326-350					3	3,70	2	2.46
351-375					1	1.23	1	1.23
376-400								
Above 401								
Total	7	8.62	28	34.54	32	39,47	14	17.24
General Total	81							

Source: CAEd Evaluation Survey 2016-2019.

As can be seen from the analysis of tables 3, 4, 5 and 6, level 1 texts are those predominant in items that anchor between 125 and 200 points on the SAEB reading proficiency scale. Level 2 texts predominate as support for items that anchor between 151 and 275 points on the proficiency scale. Level 3 texts appear

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predominantly in support of items that anchor between 176 and 300 points of the scale. Finally, level 4 texts appear as support for items that anchor above 226 points of the scale, with greater concentration among items that anchor above 250 points of the scale. The comparison between the distribution of texts, according to their level of complexity, among the different descriptors of the reference matrix, indicates a certain regularity of this distribution. Such regularity is indicative of performance standards in reading presented by students who did the tests and who are at different stages of basic education. It is possible to affirm, for example, based on the description of the levels of complexity of the text, that students with proficiency between 125 and 200 points read short texts (up to 15 lines), which present simple syntax, in which short periods and coordinating structures predominate, or in topics, with simple cohesive processes, such as those involving retakes with a close referent, by referencing through subject pronouns or reiteration, by repetition or synonymy. The structure of the texts these students read is conventional, with sentences presented in canonical order (subject, verb, object), the lexicon is closer to the colloquial and the most everyday themes. Nursery rhymes, legends, narratives from children's literature, poems with narrative structure, "scientific curiosities" or "scientific notes", as defined by the BNCC, are the genres that students with this proficiency read.

According to the analysis carried out, what distinguishes Level 1 texts from Level 2 texts is fundamentally the syntax. Small changes in the canonical syntactic structure (such as intercalations and anticipations), as well as the extension of sentences can make a text more complex for beginning readers who do not have the strength to read. What is observed is that the length of sentences is a more determining factor for the complexity of the text than, properly, the length of the text. On the other hand, level 1 and 2 texts are characterized by having a more familiar lexicon, close to the colloquial use of language.

The lexicon was presented, in this investigation, as a defining element of the complexity of level 3 and 4 texts. Level 3 texts usually have a lexicon proper to formal speech, implying a more constant inferential activity. Level 4 texts have a specialized lexicon, present in texts whose theme is also specialized, that is, texts that address issues in specific areas of knowledge: science and technology, life in society, etc.

However, the consideration of these features of the lexicon (whether more or less close to formal speech) should not be strict. In some texts, for example, formal uses of the language are followed by "speech facilitation" resources that allow working with an unknown lexicon. Texts that deal with specialized themes and that are aimed at the child or adolescent reader usually display several strategies to facilitate their reception (such as explanatory expressions, synonyms, examples, etc.). Lexicon and theme are therefore important criteria for classifying texts at levels 3 and 4.

The investigation carried out so far allows us to propose that reading competence is strongly determined, initially, by the domain of the syntax of the language. Beginner readers are, little by little, appropriating the syntax of the language, of its formal use, from the contact with texts that are increasingly complex from the syntactical point of view. The maturation of this reader is consolidated as he expands his/her reading repertoire and, consequently, his/her lexical repertoire, becoming familiar with texts from various fields of knowledge, mastering their structure, approaching more and more specialized topics. This competence is further expanded when one understands the expressive potential of language recreated literarily.

IV. Final Considerations

The results of the research presented here indicate that the complexity of texts is an important criterion to be considered when describing performance standards in reading, defined on the basis of large-scale assessments. Considering the levels of complexity of the texts that support those used in these assessments, allows us to go beyond the description of the reading tasks proposed by these items and glimpse broader reading skills, possibly developed by students who are in certain proficiency intervals.

The research results also point out that, in defining the levels of complexity that a text can present, it is necessary to consider a set of characteristics, which combine to make a text more or less challenging for the reader and that, throughout the reader formation process, these factors play a different role. For readers with low proficiency, text syntax is a very defining factor in text complexity. For the more experienced ones, the theme plays a more determining role for a text to be considered more or less complex. It can be deduced, from the above, that the genre category and the length of the text are not sufficient for a more consistent description of the reading skills developed by students. For example, a poem, despite its length, can be presented as more or less complex to read, depending on its structure: if it is a narrative poem that uses colloquial language, with simple structured lines, it will be easier to read than presenting a metaphorical language and verses with a less canonical structure.

Given the above, it is concluded that the description of performance standards in reading should consider a more careful analysis of the supports used in the construction of problem situations proposed by the items, in addition to considering the type of skill assessed. In this sense, it is important that, when describing the ability, for example, to locate explicit information in a text, consider the type of text and the

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support offered by it so that the reader can carry out the task proposed. If we consider -+reading as a process of interaction between reader and text, it is necessary to figure out how the text leads the reader in this interaction, besides considering what the reader brings to it.

Another important consideration based on the survey data is that greater clarity regarding the characteristics of the texts, obtained by defining clear criteria for classifying their levels of difficulty, favors the production of items that more closely match satisfactory, the reading assessment of students who are in specific stages of schooling, considering what is provided for in the curriculum. Thus, the next stage of the research will consist of comparing the classification of the difficulty levels of the texts, produced based on the incursion into items already used in large-scale assessments, to establish a relationship between these levels and the different stages of basic education.

It is also noteworthy the fact that greater clarity regarding the level of difficulty of the texts is relevant knowledge to support the production of items that assess other areas of knowledge, such as natural sciences and human sciences, since in these areas are also used verbal texts that support the elaboration of the items that assess them.

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On the Subject Complement and its Basic Types in Chinese

By Yingjie Zhang & Huifen Tong

Abstract- Chinese subject complement has a very long history of existence since the West Han Dynasty. But as a grammatical term in Chinese, it is an unknown or unfamiliar concept. In fact, it always appears at the lower level of the predicate component and forms the subject-predicate relationship with the subject as a logical category of stating and being stated. For example, the sentence ″我们 | 打 || 赢了球″ can be converted to: ″我们打球，我们赢了″ (The winner is the subject ″我们″)(1) It goes without saying that the component of the original sentence ″赢了球″ is a subject complement. Because it is at the lower level of the predicate ″打″, and its logical relationship is directed to the sentence subject ″我们″ Compared to the components of subject complement, such as “完” in this sentence “我们 | 打完了 || 球” (same as (1)) , it's very different that its logical relationship just points to the ″打″ which is used as a predicate verb. Therefore, the sentence cannot be converted in the above-mentioned manner; otherwise “我们打球，我们完了”.— It is funny, or really confusing for “完” in the sentence that means the end of life or the entry into a critical situation.

Keywords: subject complement; object complement ; pivotal structure; complement; predicate complement.

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On the Subject Complement and its Basic Types in Chinese

Yingjie Zhang [α] & Huifen Tong [σ]

Abstract- Chinese subject complement has a very long history of existence since the West Han Dynasty. But as a grammatical term in Chinese, it is an unknown or unfamiliar concept. In fact, it always appears at the lower level of the predicate component and forms the subject-predicate relationship with the subject as a logical category of stating and being stated. For example, the sentence "我们|打‖赢了球" can be converted to: "我们打球，我们赢了" (The winner is the subject "我们")(1)It goes without saying that the component of the original sentence "赢了球" is a subject complement. Because it is at the lower level of the predicate "打", and its logical relationship is directed to the sentence subject "我们" Compared to the components of subject complement, such as "完" in this sentence "我们|打完了‖球"（same as (1)，it's very different that its logical relationship just points to the "打" which is used as a predicate verb. Therefore, the sentence cannot be converted in the above-mentioned manner; otherwise "我们打球，我们完了".— It is funny, or really confusing for "完" in the sentence that means the end of life or the entry into a critical situation.

Consequently, for the judgment of subject complement, this paper demonstrates from the two aspects of both hierarchical attributes and logical relationship between structures. And it uses the language examples from both historical document and contemporary literary works as the basis to prove the objective existence of subject complement and its basic types of composition.

The simplest way to affirm the objective existence of subject complement is that the typical sentence of "医生劝他戒烟" recognized as "兼语句" by the Chinese academic circle can be converted objectively to a passive sentence "他被医生劝戒烟". "他" in the active sentence acts as "兼语": while in the passive one, "他" served as the subject, no doubt. And then, what is the sentence component of "戒烟" in the passive sentence? Is it converted to a "predicate" of the subject? — Of course not. It is an impeccable subject complement actually.

Keywords: subject complement; object complement；pivotal structure; complement; predicate complement.

I. Instruction

What is the subject complement in Chinese? This is the most primary question of theoretical inquiry. In fact, the language phenomenon of subject complement in Chinese had matured as early as the Western Han Dynasty. Therefore, let's take a look at some traditional examples, such as "破秦军" and "伤楚共王目" in the sentences of"李牧|击‖破秦军"（史记•廉颇蔺相如列传）and "晋|射‖伤楚共王目"（史记•郑世家）.Compared with the examples in modern Chinese, such as the above mentioned "赢了球" in the sentence "我们|打‖赢了球", it is rather clear that the very language phenomenon of ancient and modern times reveals exactly the same. However, due to the lack of structural and morphological changes in Chinese syntax, and the hierarchical attributes remain under cover, therefore the language structure of Chinese will inevitably be misjudged or misunderstood. A very typical example is the sentence "我们｜打‖赢了球" mentioned in the *Abstract* above. Since the logical relationship of "赢" points to "我们" as a subject of the sentence and the sentence is from the book whose editors-in-chief are both famous professors. They made it clear that "The winner is the subject '我们'" as mentioned above. In other words, "我们" and "赢" constitute the subject-predicate relationship of logical category, which means that "赢" is clearly the component of the subject complement.

But It is very regrettable that since the word "赢" in the sentence has confirmed that "the winner is the subject '我们'" and is a statement to the subject rather than a supplement to the predicate '打', that is to say, "赢" is the subject

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complement that conforms to the grammatical rules. The conclusion of actual judgment, however, is classified as the "result complement" of the predicate. Therefore, the very language phenomenon of Chinese subject complement is wrongly judged and then the opportunity to find the subject complement is missed by the Chinese academic circle.

It is because the paper "汉语的“兼语式”并非兼语" (2) that demonstrates with detailed factual evidence the grammatical identity of object complement proposed by the older generation in the academic circles in the 1920s and then we can see the objective existence of Chinese subject complement phenomenon. For example, the verb "饮" in the sentence "羽因留沛公饮" (*汉书•高帝纪*), leads to the banquet scene of the host and guest drinking together. The original word "饮" as the object complement, that is, it is traditionally referred to as the predicate of "兼语". However, it is obvious that the logical relationship of the object complement also points to the subject "羽", which constitutes the subject-predicate relationship of the logical category as well. The following language examples are more explicit and typical:

① 经济学家韩志国批评证监会，刘士余｜邀其‖共进午餐。（中华网•经济频道）
② 师傅｜邀芒儿‖一起去。（陈忠实•*白鹿原*）
③ 齐德学校刘洪斌校长在学校餐厅邀请“幸运学生”‖一起共进午餐。（山东校园联盟•新闻）
④ 鹿子霖忙给白嘉轩让坐位，他｜早晨曾请他‖和自己一起主持这个集会。（陈忠实•*白鹿原*）

The adverbials "共" and "一起" in the above example sentences, as grammatical evidence, more directly and definitely display that the predicate verbs are plural. For example, sentences ① and ③ show that both the subject and object "共进午餐". In other words, "进午餐" not only acts as the "谓语" traditionally known as "兼语式", that is, the object complement described in this paper, but also acts as the subject complement reasonably and in accordance with the rules of grammar. Because the subject and "进午餐" also have a significant and objective subject-predicate relationship in the logical category. In the sentence example ④, the subject of the whole sentence "他" (鹿子霖) "早晨曾请他（白嘉轩）和自己一起主持这个集会", that is to say, the syntactic expression of the subject and object jointly "主持这个集会", can no longer be clear.

Even in the sentences as so-called "兼语句", there is no participation of words such as "共, 共同, 一起, 一同, 一道", etc., in which the predicate verb “吃” as below is also plural:

他请我吃饭。He asked me to dine with him. （”远东英汉大辞典”）

There is no doubt that "他" of the above subject also participated in "吃饭" customarily, as evidenced by the accurate bilingual examples of experts.

It is precisely because the grammatical identity of the object complement has been verified, the emergence of the subject complement has become an inevitable result. In other words, if we convert the sentence containing object complement, that is, the "兼语句" affirmed by traditional Chinese scholars, into a passive sentence, then the subject complement will stand in it. For example,

我请你来，就是为这个人的事。（老舍•*四世同堂*） If you change it to a passive sentence, you have the following one:

你被我请**来**，就是为这个人的事。

It is obvious that the verb "**来**", which was originally used as the object complement---but traditionally referred to as a pivot ‘兼语’, turns into the sentence component of the subject complement. And another example:

大太太扯着天津腔，叫他**去挑水**。（老舍•*骆驼祥子*） Its passive sentence is,
他被大太太扯着天津腔，叫**去挑水**。

Therefore, the original object complement, that is, the predicate "挑水" of the traditional "兼语", has become the subject complement definitely. In addition,

他本想一言不发，可是酒力催着他**开开口**。（老舍•*四世同堂*） Its passive sentence is as below,
他本想一言不发，可是他被酒力催着**开开口。**

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Obviously, "开开口" turns from the object complement to the subject complement. And,

中国人教会了你们**作旧诗**。（ditto） After changing it to a passive sentence,
你们被中国人教会了**作旧诗。**

Similarly, "作旧诗" has turned into an impeccable subject complement. The passive transformation of the sentence pattern of "兼语" reveals the reality of the subject complement; And it also proves that the identification of "兼语" structure is obviously unreasonable: the "兼语" originally used as the object has now reached the position of the subject, can it still be called "兼语"? And what is the real grammatical meaning of "兼语" ?

In fact, even in the so called "兼语句" without artificial passive conversion, the natural language form of the subject complement exists objectively as shown in the following bold words:

每个人被逼着**发出最后的吼声**。（田汉•*义勇军进行曲*）
金狗也是被邀请**列席的**。（贾平凹•*浮躁*）
客人就直接请**进屋里**。（霍达•*穆斯林的葬礼*）
我也被命令**面壁而立**。(季羡林 • *牛棚杂忆*)

As for the method of argument, we might as well adopt the "exclusive method" of option argument, that is, to exclude the real existence of subject complement in Chinese and face various possibilities of other options. The author here is intended to be careful to verify, so as not to be subjective and arbitrary. But in fact, there is no reasonable option that can be used as the object of argument, or as a reference for argument.

Therefore, it is needless to say that the language phenomenon of subject complement in Chinese, like object complement, is undoubtedly the objective existence of Chinese sentence components.

II. Syntactic Characteristics of the Chinese Subject Complement

Since the language phenomenon of subject complement exists objectively, it is necessary to show the structural characteristics of its sentence in order to better understand and reveal its objective syntactic connotation.

Subject complement, as the name suggests, is a sentence component used to supplement and explain the subject. In fact, it is always at the lower level of the predicate verb, and constitutes the logical relationship of subject-predicate with the subject. However, before clarifying the structural connotation of subject complement and facing the existing definition of subject-predicate relationship in Chinese, it is necessary to involve it here. The purpose is to clarify the traditional definition with grammatical defect. Since this definition relates to the basic structure of Chinese sentences i.e., the theoretical basis of analysis and judgment including subject complement.

In the traditional definition of subject-predicate relationship in Chinese grammar category, most of the existing college textbooks have similar expressions: " It consists of two parts, the former being stated, followed by the stating part, and the relationship between the two parts is the relationship of being stated and stating, i.e. the subject-predicate relationship." **[3]** We notice that in this definition of "subject-predicate relationship", the basis of the judgment is just only "the relationship between the two parts is the relationship of being stated and stating". That is to say, there is only one single logical relationship, but no grammatical rule to judge the "subject-predicate relationship" of the grammatical category at all. Therefore, the essence of the above definition of "subject-predicate relationship" with grammatical defect is only the subject-predicate relationship of a logical category, for it does not include any grammatical rules. This conclusion is determined by the causal relationship of thinking logic, i.e., so-called "plant melons and you get melons, sow beans and you get beans". If the very definition of "subject-predicate relationship" is used as the basis for the analyzing and judgment of grammatical categories, it is bound to bring misjudgment and misleading. For example, objectively, it has led to the emergence and spread of the false concept "兼语式". In the article “On the Grammatical Position of Chinese Hierarchical Attributes in Syntactic Analysis” **[4]**, the author has clarified the definition of subject-predicate relationship in Chinese grammatical category, that is, the two parts preceding and subsequent of the same hierarchical attributes and between the

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two, there is a logical relationship of being stated and stating. Such conceptual attributes are based on the objective grammatical components of Chinese, that is, hierarchical attributes. This is equally crucial and indispensable to the scientific definition of the subject complement.

a) Definition of the Subject Complement

In the above of this article, the author has listed some common examples of the subject complement. The subject complement always appears at the lower level of the predicate verb, which is used to supplement the attribute of the subject or changes, results affected by the expression of the predicate verb. For example, in the sentence "藤枝｜刺眼‖新" *(杜甫•奉陪郑驸马韦曲二首)*, the word "新" at the lower level of the predicate verb, is expressing a completely new outlook of "藤枝" under the bright spring sunshine, so glittering that "藤枝" are looking "刺眼". Obviously, the verb "新" indicating the change here, is used to state "藤枝" as its logical subject at the lower level of the predicate verb, which constitutes the logical relationship of stating and being stated with the subject. And so it acts as the component of subject complement in the sentence. Moreover, because the concept of the verb "刺" does not have any objective connotation of "新" at all, the word "新" cannot modify the predicate verb "刺" and form the result supplement of the predicate verb. Other examples, such as:

这首诗｜写得‖真不错！（胡裕树•*现代汉语*）

"真不错" in this sentence states its logical subject "这首诗" at the lower level of the predicate verb "写". Obviously, "真不错" is not used to modify the action or behavior of "写", while its logical object it states directly points to the subject "这首诗". But the subject is not at the same level as "真不错", which is the core syntax elements of the subject complement.

Now we can define the subject complement, that is, *the subject complement is located at the lower level of the predicate verb, and to supplement the subject's nature, change or result affected by the expression of the predicate verb. And the subject and the subject complement constitute the subject-predicate relationship of logical category.* It can be seen from the definition above that the subject complement and the subject as sentence components are not at the same subject-predicate level, which is the objective hierarchical attribute of the subject complement, i.e., the grammatical component. And the second is that the subject and the subject complement constitute the logical relationship being stated and stating, which is the logical characteristic of the subject complement. It is because the subject and subject complement are not at the same hierarchical attribute; otherwise, according to the traditional definition of subject-predicate relationship, it will certainly become the grammatical category of the subject-predicate relationship. For the subject and subject complement just have the relationship of logical relationship. In this way, the subject-predicate relationship between grammatical categories and logical categories in Chinese will be confused, and syntactic analysis will lose the criterion in confirmation.

b) The Decisive Elements of Subject complement

According to the definition above, the judgment of the subject complement needs to be made according to the core connotation of its definition, and the first thing is the grammatical elements.

i. The Syntactic Level of the Subject Complement

According to the definition of subject complement, "the subject complement is located at the lower level of the predicate verb, to supplement the subject's nature, change or result affected by the expression of the predicate verb." That is to say, if we want to determine the composition of the subject complement, we just need to analyze and focus on the language content after the predicate verb, i.e., whether there is a sentence component to supplement the subject after the symbol "‖":

① 他洗了很多衣服，（他）|洗得‖满头大汗。（胡裕树•*现代汉语*）

② 他|洗得‖满地是水。（ditto）

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③ 我们|打‖赢了球。（黄伯荣 廖旭东•*现代汉语*）
④ 我们|打‖完了球。（ditto）
⑤ 头发|抹得‖光滑透亮。（余华•*活着*）
⑥ 苏小姐|慌得‖松了手。（钱钟书•*围城*）
⑦ 两只眼|瞪得‖溜溜圆。（莫言•*蛙*）
⑧ 大奶奶|老得‖像那些传说中的“老娘婆”一样了。（ditto）

Obviously, the predicate verbs in the sentences ① and ② above are all "洗", but in the structure of ① after "洗", the logical pointing of the expression of "满头大汗" is "他" as the subject, so it fully meets the requirements of the definition and constitutes the sentence component of the subject complement in the sentence. But the logical direction of "满地是水" after the symbol "‖" in example ② is obviously the verb "洗", which is the result of supplementary explanation of "洗", that is, the traditional predicate complement.

In the examples ③ and (4) above, the structural composition after the verb "打" is completely different. The logical pointing of "赢了球" in ③ is clearly the subject "我们", so it is the subject complement. While the logical direction of "完" after the symbol "‖" in example ④ is the action of "打" and "完" means the action of "打"has been completed. And so "完" is the traditional predicate complement.

The component "光滑透亮" after the predicate verb in the example ⑤ indicates the characteristics of "头发" affected by the expression of the verb "抹", which is obviously used to supplement the sentence component of the subject. Therefore, "光滑透亮" meets the requirements of the definition and is the subject complement rather than the predicate complement.

The logical pointing of "松了手" in example ⑥ is undoubtedly the subject "苏小姐", to supplement the fact that "苏小姐"--- "松了手" because of the change affected by the verb "慌" of the predicate. Therefore, the cause and effect are clear, it is "苏小姐" who "松了手", not "慌" which "松了手". So clearly, "松了手" is the subject complement.

The description of "溜溜圆" after the symbol "‖" in example ⑦ is fully in line with the definition, that is," to supplement the subject's nature, change or result affected by the expression of the predicate verb. And the subject and the subject complement constitute the subject-predicate relationship of the logical category". Obviously,"溜溜圆" is a supplementary description affected by the expression of the predicate verb "瞪", and therefore is a subject complement.

The sentence component in the comparative structure of "像那些传说中的‘老娘婆’一样了" in example ⑧ is obviously a supplement at the lower level of the predicate to show that the subject "大奶奶" is influenced by the expression "老" and presents the historical background indicated in the above comparative structure, so it is the subject complement. Moreover, the lexical meaning of the word "老" does not have the epoch information contained in the comparative structure "像那些传说中的". And so the logical pointing of the description can only be the subject "大奶奶".

ii. *The Logical Pointing of Subject Complement*

The syntactic elements of the subject complement in the previous subsection may also be controversial. For example, "溜溜圆" in the sentence "两只眼 | 瞪得 ‖ 溜溜圆" in example ⑦ above, some people will certainly think that the traditional judgment as a predicate complement is more appropriate, since "溜溜圆" is a direct result of the predicate verb "瞪". It seems quite convincing. However, we believe that the determination of sentence components cannot be limited to a certain point, but should be the result of the comprehensive analysis and judgment of various elements, that is, the so-called "holographic positioning".

So we might as well analyze the above "溜溜圆" from the perspective of its objective logical pointing: is it the result of modifying "瞪"? So what is the result of "瞪"？—— Clearly, it is "两只眼"---"溜溜圆". This fully proves that "溜溜圆" describes the subject "两只眼", which is objective and direct. It goes without saying that there is an obvious logical relationship between "溜溜圆" and the subject "两只眼". In other words, the above-mentioned hierarchical attribute of subject complement, combined with the perspective of the logical pointing in this section, adequately shows

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that "溜溜圆" fully meets the definition requirements of subject complement. As other examples, the following sentences contain their subject complement:

① 万口，这名字 | 起得 ‖ 真好！（莫言 •*蛙*）
② 我 | 活得 ‖ 依然沉静如初。（陈忠实 •*白鹿原*）
③ （金鱼） | 养得 ‖ 肥大撩人。（安妮宝贝 •*素年锦时*）
④ 嘉轩和母亲 | 全都急 ‖ 傻了。（陈忠实 •*白鹿原*）
⑤ 那些男学生 | 看得 ‖ 心头起火。（钱钟书 •*围城*）
⑥ 荷叶 | 已经蔓延得 ‖ 遮蔽了半个池塘。（季羡林 •*我的人生感悟*）
⑦ 你肥得*像头猪*，你老板肥得像口大炖锅。（王晓方 •*白道*）

In the above example ①, the apposition "万口, 这名字" acts as the subject, and the logical pointing of the later "真好" is obviously the subject, not the verb "起". However, some people may also think that it points to "起". So we can't help asking, what's the basis of praise "真好", or more accurately, what's the prerequisite for getting praise? Objectively speaking, the answer should be the quality level of the subject "万口, 这名字". Otherwise, if a common name is not impressive, it surely loses the premise of being praised, and so the praise "真好" will no longer exist. In other words, the target of praising "真好" is directed at the subject "万口, 这名字".

In the above example ②, the object stated by "依然沉静如初" after the predicate points definitely to the subject "I" rather than "活得".

In example ③ above, "肥大撩人" shows the fat and lovely appearance of the subject "金鱼", and is used to express the result of the subject "金鱼" affected by the predicate verb "养". That is to say, the object described as"肥大撩人" is "金鱼" that serves as the subject, not the predicate verb "养". And therefore "肥大撩人" is the subject complement in the sentence.

The logical pointing of "傻" In example ④ above, is the result of the subject "嘉轩和母亲", due to the negative impact of the predicate "急". Therefore, the subject "嘉轩和母亲" and "傻" constitute the subject-predicate relationship of the logical category. Obviously, "傻" is the subject complement.

Needless to say, in sentences (5), (6) and (7), the logical pointing of the sentence components after the predicate is also the subject, which is the logical feature of the subject complement.

Similarly, one of the elements determining the subject complement in English is also its logical pointing, such as the components in bold in the following sentences:

Your idea sounds great.

The flowers smell sweet.

They married *young.*

The logical pointing of the adjectives *great, sweet,* and *young* in the above example sentence are all their subjects rather than predicates; and since adjectives cannot modify predicate verbs, they are universally accepted as subject complements.

It goes without saying that the logical relationship of subject complement directly points to the subject of the sentence, which just shows that the subject is the logical subject of subject complement, that is, they have the subject-predicate relationship of logical category.

iii. *The Structural Auxiliary Word "得" of Subject Complement*

As we all know, Chinese scholars believe that the structural auxiliary "得" is the symbol of "complement", that is, the symbol of the traditional predicate complement, because this is the only complement recognized by the academic circles at that time. But in fact, the auxiliary word "得" is also the grammatical sign of subject complement, such are as follows:

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我｜歇得‖来精神了。（余华•*活着*）
我｜听了以后惊得‖目瞪口呆。（王晓方•*白道*）
我｜在城里闹腾得‖实在有些过分。（余华•*活着*）
提起这些“老娘婆”，姑姑｜就恨得‖咬牙切齿。（莫言•*蛙*）
她｜高兴得‖屁颠屁颠地爬上一辆红色小车。（ditto）
香灰｜积累得‖*很厚*。（安妮宝贝•*素年锦时*）
而冬天夜晚的大雪｜总是来得‖没有声息。（安妮宝贝•*素年锦时*）
这个口号｜提得‖正确，提得‖及时，提得‖响亮，提得‖明白。（季羡林•*我的人生感悟*）

Since the auxiliary word "得" is not only the sign of predicate complement, but also the sign of subject complement, and how to distinguish these two different categories?

In fact, as complements, they are behind the central word and supplement the central word in front. As long as to find out the different logical relationship between the two: the relationship between the subject and the subject complement is to be stated and to state; the relationship between the predicate and the predicate complement is to be modified and to modify. And then it is not difficult to distinguish between the two. Such as the following：

① 人家终身大事｜，比赌钱**要紧**得‖**多**呢。（钱钟书•*围城*）
② **诗人**｜听了，欢喜得‖**圆如太极的肥脸上泛出黄油**。（ditto）
③ 身边认识的人｜，……**少得离奇**。（安妮宝贝•*素年锦时*）
④ 看完后**我**｜激动得‖**彻夜难眠**。（ditto）
⑤ 焦躁的画眉｜**碰撞**得**鸟笼子嘭嘭响**。（莫言•*红蝗*）
⑥ **你**｜那会儿还不急得‖**猴子摘桃一样**。（陈忠实•*白鹿原*）

The logical pointing of the complement "**多**" after "得" in the above example ① is obviously the predicate "**要紧**" rather than the subject "人家终身大事". And so “**多**” here as an adverb is the predicate complement to modify the adjective "**要紧**".

The complement of example ② "**圆如太极的肥脸上泛出黄油**" and the subject "**诗人**" constitute the logical relationship of stating and being stated. And so the auxiliary word "得" in this sentence is the sign of the subject complement.

The complement "**离奇**" after "得" in example ③ is obviously a modifier of the predicate "**少**". So "**离奇**" is the predicate complement.

The complement in example④, "**彻夜难眠**" evidently states its logical subject "我", so it is a subject complement. In example ⑤, the complement "**鸟笼子嘭嘭响**" after "得" in the sentence certainly cannot form a subject- predicate relationship in the logical category with the subject "焦躁的画眉", so the complement here is only the modifier of the predicate "**碰撞**", that is, the predicate complement.

In example ⑥, the component "**猴子摘桃一样**" after "得" has a logical relationship to state and to being stated with the subject "**你**", so this comparative structure "**猴子摘桃一样**" is the subject complement

Obviously, whether the complement after the structural auxiliary word "得" is a predicate complement or a subject complement depends on the direction of the logical relationship: the predicate complement points to the predicate and the subject complement points to the subject.

III. Basic Types of the Subject Complement

The subject complement of the Chinese language has a diversity of constituent types. This article analyzes the basic types of subject complements based on the interrelationship between the subject and predicate of the sentence, and between the subject and object. From the perspective of subject and predicate of a sentence, Chinese subject complement can be divided into agent subject complement, patient subject complement and subject-object common complement.

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But no matter in the active or passive voice, the logical relationship of subject complement always points to the subject of the sentence, not the predicate. However, when the predicate verb of the sentence is acted by causative verbs, the subject complement of Chinese can show the unique structural form of the Chinese language, such as the subject complement "入市" in the sentence "公子引车入市" (*史记•魏公子列传*). Distinctly, since "引车入市" is guided by the agent "公子", its logical relationship naturally points to the "公子" as the subject. However, the traditional view of Chinese scholars holds that "入市" is just the predicate of "车"acted as "兼语". Therefore, the logical relationship of "入市" here is bound to point to "车" as "兼语". In fact, we have no objection that the logical relationship of "入市" points to "车" as "兼语", but think that "入市" is only an object complement (same as [2]). In other words, "入市" here undoubtedly achieves the sentence component of a new term as "subject-object common complement" unique to Chinese structure, that is, it is both subject complement and object complement.

a) Active and Passive Voice of Subject Complement

i. *Agent Subject Complement*

An agent subject complement is a sentence component that expresses the purpose of the predicate verb dominated by the subject in the active voice. And its logical relationship directly points to the subject of the sentence. As follows, the words shown in bold are agent subject complements:

① 李牧|击‖**破秦军**,南距韩、魏。（*史记•廉颇蔺相如列传*）
② （李牧）|大破‖**杀匈奴十馀万骑**。（ditto）
③ 成王|自绞‖**杀**。（*史记•楚世家*）（"自" in the sentence is a reflexive pronoun. "杀" here means death）
④ 晋|射‖**伤楚共王目**。（*史记•郑世家*）
⑤ （靳歙）|击‖**绝楚饷道**。（*史记•傅靳蒯成列传*）（*"绝"即"断绝"之意*）
⑥ 他|学得‖**兴动** *了*，那里闭得口住？（*西周生•醒世姻缘传*）
⑦ 两只眼睛|哭得‖**红肿肿** *的*。（李宝嘉•*官＂＂形＂*）
⑧ 白嘉轩｜办得‖**很认真**。（陈忠实•*白鹿原*）

"**破秦军**" in the above example ① is used to supplement and explain the results after the implementing of "击" by the subject. Therefore, the subject "李牧" and "**破秦军**" constitute the subject-predicate relationship of the logical category, and so "**破秦军**" is the agent subject complement.

Example ② is the military operation by the subject "李牧" ---"大破"**匈奴**, and has achieved the brilliant results of "杀匈奴十馀万骑". Therefore, "杀匈奴十馀万骑" constitutes a subject-predicate relationship with the subject in the logical category, and it acts as an agent subject complement

The word "杀" in the sentence of example ③ is to complement the result of "成王自绞", and also constitutes the agent subject complement.

In Example ④, "晋" attacked with "射", and the result was "伤楚共王目". Therefore, the subject "晋" and the "伤楚共王目" constitute a subject-predicate relationship in the logical category, and obviously the latter is the agent subject complement.

For example, sentence ⑤ is that "靳歙" launched an attack and reached the stage goal of "**绝楚饷道**". Therefore, "**绝楚饷道**" is the agent subject complement used to state the subject "靳歙"

The words "**兴动**", "**红肿肿**" and "**很认真**" in sentences (6), (7) and (8) are obviously the agent subject complement.

ii. *Patient Subject Complement*

Patient subject complement refers to a sentence component that expresses the change or result affected by the predicate verb in a passive sentence. And this component forms a logical relationship with the subject. The sentence components shown in bold text are as follows:

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① 国|削‖**弱至于亡**。（*史记•魏世家*）
② 屈原|,楚贤臣也,被谗‖**放逐**,作《离骚》赋。（贾谊•*吊屈原赋*）
③ 舞榭歌台，风流|总被雨打风吹‖**去**。（辛弃疾•*京口北固亭怀古*）
④ 经书什物|皆被焚‖**荡**。（释慧皎•*高僧传*）
⑤ 多少好汉|被蒙汗酒麻‖**翻**了。（施耐庵•*水浒传*）
⑥ 几家瓦厦|，忽剌剌被巡军都曳‖**塌**。（张国宾•*公孙汗衫记*）
⑦ 全部|被冲刷得‖**干干净净**。（安妮宝贝•*素年锦时*）
⑧ 我|被他们盯得‖**几乎听到了心脏的地狱般的怦怦声**。（王晓方•*白道*）

In sentence example ①, the result of "国" dominated by "削" must be "**弱至于亡**". Obviously, "**弱至于亡**" states the crisis of the subject "国" at the lower level of the predicate. In other words, "**弱至于亡**" is the patient subject complement.

In sentence example ②, "屈原" is dominated by the predicate verb "谗", and its consequence is "**放逐**". Therefore, there is a clear logical relationship of subject-predicate between "屈原" and "**放逐**". It goes without saying that "**放逐**" is the patient subject complement.

In Example ③, "风流" is always "被雨打风吹", so it will eventually disappear and "**去**". --- "**去**" states the subject of the sentence "风流" at the end, so "**去**" acts as a patient subject complement.

In Example ④, the subject "经书什物" are governed by the predicate verb "焚", and the result is bound to "**荡**" without existing. Therefore, the sentence component "**荡**" refers to the object of "焚", that is, the subject of the sentence ---"经书什物". It goes without saying that "**荡**" is the patient subject complement, because the subject and 荡 constitute a subject-predicate relationship of logical category.

In sentence example ⑤, the sentence component "翻" states the subject "多少好汉" who are numbed (麻) by蒙汗酒 (a kind of narcotic wine). In other words, the subject and "翻" have formed the subject-predicate relationship of the logical category, so "翻" is the patient subject complement.

The components "**塌**", "**干干净净**" and "**几乎听到了心脏的地狱般的怦怦声**" in sentence examples (6), (7) and (8) all state the patient subjects dominated by several predicate verbs, so they are patient subject complements, because the patient subject and they have formed the subject-predicate relationship of the logical category.

b) Subject-Object Common Complement

The subject-object common complement, that is, the same complement is shared by both subject and object. This is because the subject of the sentence dominates the predicate of the imperative verb and causes its object to participate in the same activity or behavior, thus forming the same structure expressing the same activity or behavior. In other words, the same structural component acts as subject complement and object complement respectively. As the word "偕" in the following example ① means that the host and guest "go together", similarly, "去" in example ② and "入市" in example ③, etc. It is because the activities or acts in which the subject and the object participate together are embodied in the same words, which in turn act as subject complements and object complements respectively. This is the origin of the common complement between subject and object. And examples are as follows:

①（平原君）|约与食客门下有勇力文武备具者二十人‖**偕**。（*史记•平原君虞卿列传*）
② 左右|或欲引相如‖**去**。（*史记•廉颇蔺相如列传*）
③ 公子|引车‖**入市**。（*史记•魏公子列传*）
④（余）|携幼‖**入室**，有酒盈樽。（陶渊明•*归去来兮辞*）
⑤ 庞公|任本性，携子‖**卧苍苔**。（杜甫•*昔游*）
⑥ 杖藜|扶我‖**过桥东**。（志南•*古木阴中系短篷*）
⑦ 场期到了，（辛光禄）|遂忙忙约会了辛解愠‖**同入场去**。（步月主人•*两交婚*）

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⑧ 再娶者|，皆引狼‖**入室**耳。（蒲松龄•*黎氏*）
⑨ 我|带了你‖**同进去**。（钱钟书•*围城*）
⑩ 凤霞|时常陪我**坐在一起**。（余华• *活着*）

The adverbial "同" in the above examples ⑦ and ⑨ and the adverbial "一起" in example ⑩ are clearly grammatical evidence that the subject and object participate in the same activity to form a common complement.

IV. Conclusion

In summary, this paper explores the structural characteristics of the subject complement from the two levels of syntactic level and logical relationship in Chinese. And this paper takes the selected linguistic examples of the historical text as the basis for elaboration, and strives to analyze and demonstrate it necessarily and fully, so as to prove the objective existence of the subject complement in the structure of Chinese syntax and its basic structure types.

In fact, in the paper mentioned above, the author has set forth the reasons for the false concept of "pivotal structure" and its flawed objective facts, so as to demonstrate the grammatical identity of the object complement proposed by the scholars in the Chinese academic circle, so the emergence of the subject complement has become an inevitable result. The simplest way for the subject complement to appear is that if we convert the sentence containing the object complement, which is traditionally called "pivotal structure", into the passive voice, the subject complement will stand in it. For example, if the sentence ″本来高松年请他去当政治系主任”（钱钟书•*围城*）is converted into a passive sentence, there is ″本来他被高松年请去当政治系主任″. Obviously, it was originally used as an object complement, but now it is regarded as the predicate of "pivotal structure ″去当政治系主任″, turning around becomes the structural component of the subject complement of the impeccable subject ″他″. In fact, there is no need for artificial passive transformation, and the subject complement of original ecological still exists objectively, such as:

每个人被逼着**发出最后的吼声**。（田汉 • *义勇军进行曲歌词*）
我也被命令**面壁而立**。（季羡林 • *牛棚杂忆*）

Consequently It goes without saying that in the Chinese language system, the objective existence of subject complement is beyond doubt.

According to the definition of subject complement given above: *"The subject complement is located at the lower level of the predicate verb, and to supplement the subject's nature, change or result affected by the expression of the predicate verb. And the subject and the subject complement constitute the subject-predicate relationship of logical category."* Therefore, the basic types of subject complement restricted by the relationship between subject and predicate can be divided into two categories: agent subject complement and patient subject complement. The objective existence of subject-object common complement is that there are no structural elements in Chinese to distinguish the case of nouns and pronouns, while the real predicate verbs are of singular and plural isomorphism and there are no structural changes of tense and voice neither. For example, ″凤霞时常陪我坐在一起″（余华• 活着）. This is the concrete embodiment of the grammatical characteristics of the Chinese language.

Traditional Chinese scholars believe that the structural auxiliary ″得″ is the sign of complement (in fact, it is the sign of predicate complement, the author's note), but it also covers the structural components of subject complement objectively. So, how to distinguish subject complement from predicate complement?

First of all, it should be discriminated from the hierarchical attribute as a grammatical component. Relative to the subject of the sentence, the subject complement is at the lower level of the predicate, For example, ″我｜被他们盯得‖**几乎听到了心脏的地狱般的怦怦声**″（王晓方•*白道*），it is obvious that the subject ″我″ and the subject complement in bold in the same sentence belongs to two distinct structural levels. However, it should be emphasized here that subject and subject complement are not at the subject-predicate level of grammatical category, although they have the logical relationship to be stated and to state. The predicate complement is at the same level as the

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predicate, For example, "哆嗦得更厉害了" in the sentence "祥子的手哆嗦得更厉害了" (老舍•*骆驼祥子*), it is a complement structure at the same predicate level. Secondly, from the logical connection between complement and central word: subject complement and subject constitute the relationship to state and to be stated; while predicate complement and predicate constitute the relationship to modify and to be modified. For example, "更厉害了" in the above sentence, its logical direction is obviously the predicate "哆嗦", rather than the subject "祥子的手".

It goes without saying that Chinese subject complement, like object complement and predicate complement, is an objective constituent unit in Chinese complement's family members.

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Yorùbá Orature: The Fundamental Basis for Teaching Yorùbá Numeral

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Abstract- Without mincing words, there is a gradual loss of long-aged tradition, a method of equipping young ones for life. In Yorùbá traditional setting, the teaching of Yorùbá numerals remains an authentic means of transmitting culture from one generation to another. This paper attempts to examine that Yorùbá traditional education is deeply rooted in Yorùbá orature. Equally, it shows that the education system had been part and parcel of the society and it is not the training given in modern education but education which the indigenous black people of Africa offered. Additionally, the paper establishes that Yorùbá orature serves both recreational as well as educational purposes to prove that the use of Yorùbá orature is a fundamental basis for teaching the young ones the Yorùbá numerals as embedded in the culture and tradition of the people. Apart from this immediate and apparent function of teaching the young ones, the teaching of Yorùbá numerals initiates child(ren) into the various phases of life. This research work adopted both primary and secondary research methods.

Keywords: yorùbá orature, yorùbá numerals, traditional education, western-education, society, theory, culture, children.

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Àránsí Ayọ̀ọ́lá Ọládùnńkẹ́

Abstract- Without mincing words, there is a gradual loss of long-aged tradition, a method of equipping young ones for life. In Yorùbá traditional setting, the teaching of Yorùbá numerals remains an authentic means of transmitting culture from one generation to another. This paper attempts to examine that Yorùbá traditional education is deeply rooted in Yorùbá orature. Equally, it shows that the education system had been part and parcel of the society and it is not the training given in modern education but education which the indigenous black people of Africa offered. Additionally, the paper establishes that Yorùbá orature serves both recreational as well as educational purposes to prove that the use of Yorùbá orature is a fundamental basis for teaching the young ones the Yorùbá numerals as embedded in the culture and tradition of the people. Apart from this immediate and apparent function of teaching the young ones, the teaching of Yorùbá numerals initiates child(ren) into the various phases of life. This research work adopted both primary and secondary research methods. The methodology involved fieldwork where we interviewed older adults through tape recording. Moreover, the researcher consulted journals, books and magazines related to the subject matter. This paper concludes that Yorùbá orature deeply comprises the fundamental basis for teaching Yorùbá numerals and that, Yorùbá traditional society has a lot to offer the educational system, while the learners will attain a higher degree of education.

Keywords: yorùbá orature, yorùbá numerals, traditional education, western-education, society, theory, culture, children.

I. Introduction

This paper examines how Yorùbá traditional education is deeply-rooted in Yorùbá orature. According to a Yorùbá proverb which says, "Àkùrọ̀ ti lómi tẹ́lẹ̀ kí òjò tó rọ̀ si" (A marshy land already contains water before the rain falls). Before the advent of Western education in the mid-nineteenth century, Yorùbá had a fundamental means of educating their children. Therefore, when the Europeans came and introduced their system of formal education in the society, it was not new because it was regarded as an additional and perhaps a modern way of seemingly developing the intelligence of the people. The traditional educational system had been part and parcel of the society before experiencing the school pudding. This Yorùbá traditional education system is in line with Awoniyi (1975: 357) when he says:

> No education system stands apart from the society which establishes it, and education has purposes which it must achieve if that society is to continue in the right direction. Education, therefore, draws inspiration and nourishment from society and contributes in turn to social opportunities for growth and renewal.

In essence, Yorùbá educated elites should appreciate that education has to do with people's culture and tradition. Lester (1957: 9) rightly observes this when he defines education as:

> The culture which each generation purposely gives is to those who are to be its successors, to qualify them for at least keeping up, and if possible for raising the level of improvement which it has attained.

The obvious implication is that it seems impossible to educate the child properly or effectively outside his cultural environment. Long More (1959: 7) justifies this when he says:

> If a man does away with his traditional way of living and throws away his good customs, he had better be certain he has something worth more invaluable to replace them.

It is pertinent that scholars have not intensified much research effort on how a Yorùbá child can be taught Yorùbá numerals effectively through Yorùbá orature. Also, one should realise that the Yorùbá traditional society has something to proffer educational theory and practice, which is brought out lucidly in its educational pattern through a combination of precepts and orature. By orature we mean, rich corporal of texts as are derivable from folklore, proverbs, chants, recitations, songs, riddles, folktales, and incantations, presented in oral form for the aim of animating and influencing the behavior of each other in a speech society.

Yorùbá orature is used amongst the Yorùbá to express a thought in vivid metaphor, to describe a person or thing in more obscure metaphor, to provide a form of amusement and it has an instructive value. In essence, Yorùbá orature combines recreational and educational features. Some scholars have researched the study of Yorùbá traditional method of education; for example, Ajàyí 1990, examines riddles and the Yorùbá child: while Callaway (1975) explains indigenous education in Yorùbá society. Fáfúnwá (1975) concerns himself on education in the mother tongue among the Yorùbá people of Nigeria. Fájánà (1966) attempts to appreciate some aspects of Yorùbá traditional education and education policy in Nigeria traditional society in (1972) respectively. Also, Obidi (1997) writes on Yorùbá indigenous education in while Ọlájubù (1978)

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dealt with the use of Yorùbá folktales as a means of moral education.

This paper has attempted a micro-study of Yorùbá orature as a means of teaching Yorùbá numerals. That is, the preceding writers have not examined the reading of numerals in the Yorùbá thought system.

II. Analysis

In Yorùbá society, song serves as a means of communication. The Yorùbá people sing on all occasions. Such occasions include a time of joy and sorrow. In essence, one could conclude that songs permeate Yorùbá life. Consequently, songs serve as one of the means through which the Yorùbá teach numerals, as discussed below.

Orin (Songs)

Lílé:	Ení bí ení	Solo:	One like one
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Èjì bí èjì	Solo:	Two like two
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Ẹ̀ta ń tagbá	Solo:	Three is sure
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Ẹ̀rin wọ̀rọ̀kọ̀	Solo:	Four is doubtful
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Àrún ìgbódó	Solo:	Five is prompt
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Ẹ̀fà tièlè	Solo:	Six is slippery
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Aro n báro	Solo:	Aro is aro
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Mód'Ẹ̀rẹ̀kẹ̀sán	Solo:	I arrive Ẹ̀rẹ̀kẹ̀sán
Ègbè:	Họ ẹ	Chorus:	Yes
Lílé:	Gbangba lẹ̀wá	Solo:	Ten is certain
Ègbè:	Họ ẹ	Chorus:	Yes
	Gbàngbà eré wa dayọ̀ láyé		Undoubtedly, our game has become successful.
	Èèrò wá wò wá o o		People should come and watch us.

From the preceding example, it is observed that numbers one to ten are sung in a sonorous voice to teach the young ones the Yorùbá numerals. As the Yorùbá children are lovers of songs, it is very stress-free to teach them how to count one to ten. By rendering this song repeatedly, the act of counting becomes part and parcel of their knowledge.

Ìwúre

Ìwúre is the prayerful aspect of the oral medium of communication between man and gods in Yorùbá culture. Like songs, ìwúre also permeates Yorùbá life. In essence, the Yorùbá pray on every occasion either in joy or sorrow. Therefore, it will not be a surprise if the Yorùbá uses ìwúre as one of the means of teaching their children numerals, as it is analysed below:

Ení:	Ànímọ́ owó, ànímọ́ ọmọ	One:	You will have more money; you will have more children.
	Ànímọ́ àìkú tíí ṣe baálẹ̀ ọrọ̀, Àṣẹ!		You will have long life which supersedes everything. Amen

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Èjì:	Òjíjí kìí wọdò kómi ó gbóná	Two	When òjíjí (fish) enters the river, the river does not become hot.
	Oó máa jí rówó. Oó máa jí rọ́mọ. O ó máa jí rí ire gbogbo. Àṣẹ!		You shall always have money; you shall always have children. You shall always have fortunes. Amen
Ẹ̀ta:	Agbọ́n ayé kò ní ta ọ́	Three:	Agbọ́n (widely) will not sting you
	Oyin ayé kò ní ta ọ́,		Oyin (honey bee) will not sting you.
	Àkéekèe ayé kò ní ta ọ́		Akéekèe (scorpion) will bot sting you. Amen.
Ẹ̀rín:	Ẹ̀rín lọmọdé ń rín kawó,	Four:	It is with happiness that kids count money
	Ẹ̀rín làgbàlagbà ń rín pobì		It is with joy that adults pieces cola nut
	Ẹ̀rín làgbàrá ń rín pàdé odò lọ́nà		It is with happiness that erosion meets with the river,
	Tẹ̀rín, tẹ̀yẹ ni ọ̀rọ̀ rẹ yóò máa jásí. Àṣẹ!		Your ways will result in fortune and happiness. Amen
Àrún:	Àrùn ò ní sọ ẹ́ lójò kalẹ. Àṣẹ!	Five:	A prolonged disease will not attack you. Amen.
Ẹ̀fà:	Ẹ̀fale fako ni tèrúkọ́	Six:	Hoes bring forth booties everywhere;
	Gbogbo ohun tí ó bá fọwọ́ fà		whatever you struggle for,
	Yóò máa jásí rere		will come into being
	Ìfà yóò máa wọlé tọ̀ ẹ́ wá. Àṣẹ!		Booties will come on your way. Amen
Èje:	Bí Olúgbọ́n ṣorò yóò kìje	Seven:	Olúgbọ́n's festival lasts seven days.
	Bí Arẹ̀sà ṣorò yóò kìje		Arẹ̀sà's festival lasts seven days,
	Àṣeyọrí yóò máa jé tire. Àṣẹ!		Success will be yours. Amen.
Ẹ̀jọ:	Jọ̀jọ̀ agbò níí mágbò níyì	Eight:	Àgbò's (ox) overgrown hair gives it respect
	Ilé rẹ a jọ		Your home will be orderly.
	Ọ̀nà rẹ a jọ. Àṣẹ!		Your ways will be good. Amen.
Ẹ̀sán:	Ilé ayé 'a san ẹ sówó	Nine:	Life will favour you with money
	Á san ẹ́ sọ́mọ		Life will favor you with children.
	Á san ẹ́ sí ire gbogbo		Life will favor you with good things.
	Alẹ́ yóò san ẹ́ ju òwúrọ̀ lọ. Àṣẹ!		Your future will be better than the present. Amen.
Ẹ̀wá:	Wíwá ni a ń wá mọ́ tọwọ́ ẹni	Ten:	One searches more for whatever he has.
	Owó yóò máa wá ẹ wálé		Money will search for you.
	Ọmọ yóò máa wá ẹ wálé		Children will search for you
	Ire ayé yóò máa wá ẹ wálé. Àṣẹ!		Good fortunes will search for you. Amen

From the above excerpt, one realizes that the Yorùbá can teach their children numerals accurately through supplicatory devices (ìwúre).

Ewì Eré Òsùpá (Moonlight Poetry)

It is important to note that in Yorùbá culture, children often go out during the moonlight time to socialize together. During this occasion, they chant various children's poems to display their intellectual wit. Also, such chanting serves as the means of training their tongue or enhancing speech ability. In essence, moonlight poetry serves as means of education and even as a serious test of mental capacity. Here is an example:

Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dení	That is one
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot

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Ó dèjì	That is two
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dẹ̀ta	That is three
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dẹ̀rin	That is four
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dàrún	That is five
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dẹ̀fà	That is six
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dèje	That is seven
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dẹ̀jọ	That is eight
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dẹ̀sán	That is nine
Kámú gba lámù ká fi kámú	Let's pick calabash from the pot and put it on top of the pot
Ó dẹ̀wá	That is ten

The above example is not only used to enhance children's smooth speech ability but mainly to teach them to count numerals from one to ten. When this is done repeatedly during the moonlight game, obviously, children become experts in counting. In totality, such moonlight poetry is an indirect way of teaching numerals in Yorùbá culture.

Ẹsẹ Ifá (Ifá Corpus)

Ifá corpus is not only used by the diviners to predict the future but also serves as a way of teaching young ones how to count numbers. This basic knowledge enriches children's prowls. The excerpt below is taken from Ọ̀yẹ̀kú Méjì, thus:

Ọ̀kan ṣoṣo póró lóbìnrin dùn mọ́ lọ́wọ́ ọkọ	One woman is the best for a husband
Bí wọ́n bá di méjì	If they are two
Wọn a dòjòwú	They become rivals
Bí wọ́n bá di mẹ́ta	If they are three
Wọn a dẹ̀ta ǹ túlé	They become three to scatter the house
Bí wọ́n bá di mẹ́rin	If they are four
Wọn dìwọ ló rín mi ni mo rín ọ	They become you laugh at me; I laugh at you
Bí wọ́n bá di márùn-ún	If they are five
Wọn a di lágbájá lo ti run okọ wa tán	They become someone that ruins our husband's fortunes.
Lóhun ṣuṣuuṣu	If they are six
Bí wọ́n bá di mẹ́fà	They become wicked
Wọn a dìkà	If they are seven
Bí wọ́n bá di méje	They become witches
Wọn a dàjẹ́	If they are eight
Bí wọ́n bá di mẹ́jọ	They become big-headed women

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Wọn a dìyá alátàrí bàmbà	That brings nonsense to our husband
Ló ti kó irú èyí ṣẹ ọkọ wa lọ́wọ́	If they are nine
Bí wọ́n bá di mẹ́sàn-án	They become a jobless or the jobless mother
Wọn a dìyá wa kò níṣẹ́ kan,	That has no specific work
Kò lábọ̀ kan	If they are ten
Bó bá ti jí	They become our husband sits at home
Aṣọ ọkọ wa níí má sán ń kiri	That they come to look for him
Bí wọ́n bá di mẹ́wàá	One woman is the best for a husband
Wọn a d'ilé lọkọ wa jókòó	If they are two
Ni wọ́n ń wá ọkọ wa wá	They become rivals

From the preceding, the researcher observed that the Ifá corpus teaches children the act of counting numerals. This system roots seriously in Yorùbá's traditional society.

Ewì Ọmọdé (Children's Poetry)

In Yorùbá culture, some poems connect to children's games. Such poems are known as "Ewì Ọmọdé" (children poetry). Children render these types of poems during the moonlight game to open or commence the day's activities. The children usually render them one after the other to determine whether a child makes a mistake or a free performance. In essence, such poems serve to develop children's mental skills. For example:

Ení bí ení lọmọdé ń kawó	One by one, children count money
Èjì bí èjì làgbà ń tayò	Two by two, adults play ayò game
Ẹ̀ta bí ẹ̀ta ẹ jẹ́ kí a tara wa lọ́rẹ	Three by three, let us exchange gifts
Ẹ̀rin bí ẹ̀rin, ẹni rín ni làá rín	Four by four, you laugh at me I laugh at you
Àrún bí àrún, baba má ṣe wá l'árungún	Five by five, father, don't make us a jobless people
Ẹ̀fà bí ẹ̀fà, ẹ jé ká fara wa mọ́ra	Six by six, let us be cordial
Èje bí èje, olúgbọ́n ṣorò ó kìje	Seven by seven , olúgbọ́n's festival lasts seven days
Ẹ̀jọ bí ẹ̀jọ, ẹni bíni làá jọ	Eight by eight, one resembles his parents
Ẹ̀sán bí ẹ̀sán, ilé mi á san ọ̀nà mi á san	Nine by nine, my home will be well, my way will be okay
Ẹ̀wá bí ẹ̀wá, wíwá ni a ń wá mọ́ tọwọ́ ẹni	Ten by ten, let us look more for what we have

It is realized from the above excerpt that "Ewì Ọmọdé" is a device not only to teach children numerals but also to refresh their memory.

Àlọ́ Àpagbè (Folktales)

Folktales serve as a device not only to teach children good morals but also to teach them numerals in Yorùbá culture. A good example is a folktale titled, "Lákíti àti Ará Ọ̀ run" (Lákíti and Men of the heaven). In the distant past, there was a quarrel between Lákíti and the men of the underworld, which invariably led to physical combat. The men of the underworld numbered ten confronted Lákíti in turns in a fight to finish the combat. The combat began with the one-headed man who came forward to slug it out with Lákíti in the presence of a large audience. Shortly after the combat started, the drummers commenced saying thus,

Lílé:	Lákíti kò lè jà (2ce)	Solo:	Lákíti cannot fight (2ce)
Ègbè:	Ǹjẹ́ ó lè jà? (2ce)	Chorus:	Can he fight? (2ce)
Lílé:	Kó gbé e párá kó fi dá	Solo:	He lifts promptly to win
Ègbè:	Ǹjẹ́ ó lè jà?	Chorus:	Can he fight?
Lílé:	Kó yàn bọ̀n-ùn bí ìbọn	Solo:	He sounds like a gun
Ègbè:	Ǹjẹ́ ó lè jà? Abbl.	Chorus:	Can he fight? (etc.)

Instantly, Lákíti and the one-headed man started the fight, but it took Lákíti a few minutes to win by killing the challenger. The audience in attendance hailed Lákíti for defeating the one-headed man.

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The two-headed man came out fully determined to challenge Lákíti in a fight. As soon as the contest begins, drummers continue to sing thus:

Lílé:	Lákíti kò lè jà (bbl)	Solo:	Lákíti cannot fight (etc)
Ègbè:	Nj̀é ó lè jà? (abbl)	Chorus:	Can he fight? (etc)

Within a twinkle of eyes, Lákíti defeated the two-headed man by killing him. All the people hailed him for his victory.

The three-headed man came out desperately to fight Lákíti. This time it was a tug of war. The drummers commenced their usual song thus:

Lílé:	Lákíti kò lè jà (abbl)	Solo:	Lákíti cannot fight (etc.)
Ègbè:	Nj̀é ó lè jà? (bbl)	Chorus:	Can he fight? (etc.)

It took Lákíti no time to win the dwell by killing his challenger. The shout of joy over Lákíti's victory spread all over the places.

The four-headed man came out, and Lákíti defeated him in the same grand style. The five-headed man took his turn, and it was the same story of victory for Lákíti.

The six-headed man challenged Lákíti to the fight to finish the war. But luck was in Lákíti's favor.

The seven-headed man came out, aiming to defeat Lákíti. But, the whole thing was just like a dream because Lákíti recorded a victory over his victim.

The eight-headed man promised to give Lákíti a tough fight but all in vain. Lákíti claimed victory over his challenger.

The nine-headed man came out with full force to silence Lákíti just with a few blows. But Lákíti escaped defeat. This victory earned Lákíti instant popularity before the audience.

The ten-headed man came out so determined to avenge all the death blow that Lákíti had rained on his fellow men. As soon as the fight began, both the drummers and the signers went into action, thus:

Lílé:	Lákíti kò lè jà (bbl)	Solo:	Lákíti cannot fight (etc.)
Ègbè:	Nj̀é ó lè jà? (bbl)	Chorus:	Can he fight? (etc.)

The ten-headed man took the advantage that Lákíti was already tired of his previous fights. He unleased dead blows on Lákíti, and he dropped down dead. This event saddened the audience, and they went home disappointed and unceremoniously. The ten-headed man performed a miracle by resuscitating his fellow men, numbering nine, and all of them, including the ten-headed man, went home alive in happiness and elaborate jubilations. Surprisingly, Lákíti's son, who was the only one left behind, came out from his hide-out after all the ten men of the underworld had left to rescue his father. Both Lákíti and his son went home in joy too.

It is worth noting that one of the numerous devices adopted by the Yorùbá to teach the young ones numerals in society often uses the above folktale. Also, in the above folktale, Lákíti's challengers were numbered ten. He defeated the first nine, that is, one-headed man, two-headed man, three-headed man, four-headed man, five-headed man, six-headed man, seven-headed man, eight-headed man, and nine-headed man. But unfortunately, the ten-headed man defeated Lákíti as a result of his tiredness.

III. Conclusion

It is apparent to stress in this paper that the use of Yorùbá orature as a fundamental basis for teaching young ones the Yorùbá numerals ensues the culture and tradition of the people. Also, teaching numerals effectively through Yorùbá orature has started in the distant past before the advent of westernization of Yorùbá education.

The various ways of imparting Yorùbá numerals into the knowledge of Yorùbá children are through song, ìwúre, moonlight poetry, folktales, children poetry, and Ifá literary corpus. These various ways permeate the Yorùbá life because the system is deep-rooted in Yorùbá culture and tradition. The method should be encouraged to ensure that the children's upbringing is a continuing partnership between the school and Yorùbá society.

Finally, it is shown in this paper that the Yorùbá traditional society has something to offer for education theory and practice. Indeed, this fact, which sustains the teaching of Yorùbá numerals, is a reason why orature still continues as fundamental means by which we teach Yorùbá numerals to children despite the challenge of western education.

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Using Field Trips and Worksheets to Assist JHS 1 Learners of a Basic School in Assin Atonsu Address their Refusal to Accept the Concept of Malaria Taught in School

By Charles Appiah, Ruby Jecty, Comfort Arthur & Linda Kwofie

Abstract- The committee's commitments to visit basic school in the Assin community to strengthen good health led to the discovery of JHS 1 pupils' misconceptions about the concept of malaria. Mr. Charles Nuamah, the WASH committee chairman and Miss Ruby Jecty, the secretary, both of Foso College of Education, observed Miss Linda Kwofie, a student teacher on establishing teaching, go through a hectic time facilitating the causes and prevention of malaria. Despite the striking information on Malaria discussed with the learners , these JHS 1 learners did not make the attempt to understand the concept of malaria taught in the school because of some superstitious beliefs about the disease held religiously in the community. As malaria threatens human health and WASH has health component as its focus, the authors saw it as a responsibility to research on Malaria and collate the information into a learner friendly package accompanied by appropriate strategies to challenge these misconceptions. Action research design which concerns itself with investigating challenges faced by a group of people and finding immediate resultant strategies to remedy them informed the use of purposive sampling and census techniques to involve all twenty eight JHS 1 learners.

Keywords: *malaria, misconception, community walk, worksheets.*

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Abstract- The committee's commitments to visit basic school in the Assin community to strengthen good health led to the discovery of JHS 1 pupils' misconceptions about the concept of malaria. Mr. Charles Nuamah, the WASH committee chairman and Miss Ruby Jecty, the secretary, both of Foso College of Education, observed Miss Linda Kwofie, a student teacher on establishing teaching, go through a hectic time facilitating the causes and prevention of malaria. Despite the striking information on Malaria discussed with the learners, these JHS 1 learners did not make the attempt to understand the concept of malaria taught in the school because of some superstitious beliefs about the disease held religiously in the community. As malaria threatens human health and WASH has health component as its focus, the authors saw it as a responsibility to research on Malaria and collate the information into a learner friendly package accompanied by appropriate strategies to challenge these misconceptions. Action research design which concerns itself with investigating challenges faced by a group of people and finding immediate resultant strategies to remedy them informed the use of purposive sampling and census techniques to involve all twenty eight JHS 1 learners. Observation and test were the research instruments which went through the processes of pre-intervention, intervention and post-intervention stages. The main findings were categorized into the causes of learners' refusal to accept the concept of malaria taught in school, the strategies that could be used to remedy it and how effectively community walks and worksheets helped in challenging these misconceptions about the concept of malaria in the Atonsu community. The intervention strategies were inspired by information retrieved from WHO documents. It was recommended that health personnel and educationists should educate the people in Atonsu community periodically so that the misconceptions and superstitious beliefs attached to malaria transmission will be eradicated at a tender stage.

Keywords: malaria, misconception, community walk, worksheets.

I. Introduction

One of the major challenges facing our educational sector today is the infiltration of traditional beliefs into the schools system resulting in internal cognitive conflicts especially when the educational concepts violate traditional beliefs. Observations made during the supervision revealed that JHS 1 learners of a school in Assin Atonsu, a town that shares boundaries with Foso College of Education, show unacceptability of the concept of malaria taught in class because they have had proving pieces of evidence that people infected by malaria are healed by prayers and observing directives from herbal doctors so no amount of conviction with scientific evidence could make them agree to the causes and prevention of malaria. The purpose of this study was therefore to find out the causes and effects of learners' refusal to accept the concept of malaria taught in class and find appropriate strategies to investigate this misconception and right it.

In order to solve the problem of learners' gross exhibition of refusal to accept the concept of malaria taught in class, the study was guided by the following questions:

- What are the causes of JHS 1 learners' refusal to accept the concept of malaria taught in class?
- What are the possible strategies that could challenge this refusal among JHS 1 learners?
- To what extent can community walks and worksheets prove appropriate in eradicating this refusal among JHS 1 learners?

It is the hope of the authors that the findings and recommendations in this study will equip basic school teachers with possibilities of outlining the misconceptions about academic concepts and ways of challenging them for their resultant academic progress to learners. It is obvious that any research work is bound to suffer hindrances and this research was no exception. Some of the difficulties encountered were; The subject for the study has minimum flirtations by authors and so coming by information for the study was a big blow. The study was also limited to action research which presented only pedagogic solutions. The findings of this research were also limited to descriptive analysis by the use of means, frequencies, tables and percentages.

II. History of Malaria

Malaria, literally meaning "bad air" and formerly called ague or marsh fever due to its association with

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swamps and marshland, originates from the Mediaeval Italian word mala aria. Although the parasite responsible for malaria has been in existence for 50,000–100,000 years, until remarkable advances in agriculture and the development of human settlements, there was no increase in the population size of the parasite. (1). The "Roman fever" that was so pervasive in several regions in ancient Rome such as southern Italy, the island of Sardinia, the Pontine Marshes, the lower regions of coastal Etruria and the city of Rome along the Tiber (2) and causing the decline of the Roman Empire because of the favorable presence of stagnant water caused from Irrigated gardens, swamp-like grounds, run-off from agriculture, and drainage problems from road construction, preferred by mosquitoes for breeding grounds was later traced to be Malaria. (3) In Mediaeval West Africa, the people of Djenné successfully identified the mosquito as the vector and cause of malaria. (4)

Around 1640, a drug, which happened to be the first effective treatment for malaria, was introduced in Europe by the Jesuits. This drug was extracted from the bark of cinchona tree, which grows on the slopes of the Andes, mainly in Peru whose indigenes made a tincture of cinchona to control fever and later found effective against malaria. By 1677, it was included in the London Pharmacopoeia as an antimalarial treatment. (5) It was in the 1820s that the active ingredient in the drug extracted from the bark, was isolated and named by the French chemists Pierre Joseph Pelletier and Joseph Bienaimé Caventou as quinine. (6) Quinine was the predominant malarial medication until the 1940s, when chloroquine replaced quinine as the treatment of both uncomplicated and severe malaria until resistance supervened, first in Southeast Asia and South America in the 1950s and then globally in the 1980s.

III. Misconception about Malaria

According to (7) the general misconceptions about malaria include the following:

1. "I did not hear any mosquitoes so I won't be bitten.": The female anopheles mosquito is small and noiseless. She often doesn't leave a mark either. Many people believe that they don't get bitten by mosquitoes, especially if they don't hear them buzzing.
2. "I have had malaria, so I am immune.": The misconception regarding immunity and malaria puts many people travelling to malaria areas at risk. There are those who believe that once they have had malaria, they will be immune (similar to the measles situation) but this is not the case.
3. "Malaria isn't fatal.": Malaria can be fatal. Not every case of malaria is fatal of course, in fact, the majority are not if treated in time, but it can kill.
4. "There is a vaccine for malaria.": Currently, there is no malaria vaccine available in the market. We have to wait for a safe and effective vaccine.
5. "I am travelling in the dry season so mosquitoes won't bite me or be around.": In tropical regions that have a wet and dry season there is a slight fluctuation in mosquito activity but that doesn't mean they aren't still active year-round and that doesn't mean you are immune from being bitten in one season over another. Although mosquitoes are more active in the wet season, you are still at risk of being bitten.
6. "I am staying in nice hotels with air-con, that will protect me from mosquitoes and malaria.": Aircon rooms do reduce the risk of being bitten at night because there is a much lower chance of mosquitoes getting in the room, you will still need other mosquito protection and you will still need antimalarials if you are in a high-risk area.
7. "I'm only in the high-risk area for one day/a short stopover, so it isn't worth getting antimalarials.": A high-risk area is a high-risk area regardless of the length of time spent in it. True, the chances of you getting bitten by an infected mosquito rise the longer you spend in that region, as does the need for you to take antimalarials. It only takes one bite from one infected mosquito to contract malaria. Seek professional advice on what medication and length of course you need for where you are going.
8. "Everyone says they suffered awful side effects of antimalarials and I shouldn't take them.": Every drug has side effects, and every drug will affect different individuals differently. That is why it is essential to speak to a professional in enough time before your trip and see exactly which medication is right for you. That way you can minimise the negative side effects and still protect yourself.
9. "Once I get malaria, it will stay in my body for years or even life-long.": Nowadays, we have very effective medication for the treatment of all species of malaria. All malaria can be cured. Although, some species of malaria namely P. ovalae and P. vivax could stay in your liver for a long time, we could eradicate them.
10. "If you take an antimalarial tablet, you can be sure that you will not get malaria.": No antimalarial medication is 100% effective when used to prevent malaria. Most of them are around 80-95% effective, that means you could get malaria while you're taking antimalarial medication. And in this situation, it may be difficult to find malaria in your blood, or your symptoms might not be obvious which may lead to unawareness of malaria. So you should inform the doctor that you visited malaria risk area and had been taking antimalarial medication.

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Also, (8) documents the following misconceptions about malaria.

1) Gin and tonic will stop me from getting malaria. As a matter of fact, it once did. The British consumed tonic water to prevent malaria during colonial days, and due to the bitterness of its quinine content they added gin (surprise, here comes the alcohol). These days tonic water hardly contains quinine, and you'd have to drink some 150 litres per day – even if you'd manage this, I suggest you do not mix it with gin.
2) I keep mosquitoes at bay with ultrasonic devices. This nonsense persists simply because from time to time industry tries to fool us into buying such gadgets. They supposedly produce high-frequency male mosquito sounds that would keep the female away from you. Not so. In fact, selling such gadgets ought to be viewed as unethical.
3) I eat lots of garlic and drink my beer. Numerous stories about food sources that reduce your attractiveness to mosquitoes persist. Fact is that there is hardly any evidence that garlic and Vitamin B affects the number of bites you'll receive. Although it is indeed likely that consumption of garlic alters your body odour profile and thus the smells female mosquitoes use to track you down at night, the causal link between eating garlic and attractiveness to mosquitoes remains very weak. And for the Brits, no, Marmite won't help you either.
4) I'll only be there for a few days. The length of your stay doesn't matter – all it takes is one bite, one single bite from an infected mosquito. Between 1987-2006, in the UK alone, some 39,300 travellers returned home with malaria. So better be safe than sorry and take preventive measures.
5) I stay in luxurious hygienic places. Hungry female mosquitoes ignore the price you've paid for your accommodation. Although luxurious places often do better in terms of keeping mosquitoes out (screening, bednets), once you sit on your veranda at night you'll be on the mosquito menu.
6) There is no malaria-risk in urban centres. Even this doesn't hold. Many large urban centres that you will spend a night or two in before and after your safari have malaria. Though most cities were free of malaria during colonial days because of laws banning intra-urban agricultural practices, such activities have returned and are providing superb breeding sites for mosquitoes.
7) My partner always gets bitten so I don't need to worry. It is indeed true that, given a choice, female malaria mosquitoes will preferentially select one of you. If you're the lucky one, don't count yourself rich – if your partner is not around you will still be bitten and run the risk of contracting disease.

Sleeping under impregnated bednets protects againts the anopheles bites during the night. The mosquitos have changed biting habits, their feeding time starts at dusk and ends at dawn, it is not correct as said at midnight.

Drug prophylaxis has it sides effects yes, but the side effect of not taking it may be ending up at the grave yard. They do not give 100% protection, but they give us medical doctors time to give you effective treatment before the parasite kills you.

Stop spreading those lies, young unexperienced people may listen to you and end up seriuosly ill, life long handicapped with brain damage after cerebral malaria or die.

a) What are Field Trips?

Field trips, also known as instructional trips, school excursions, school journeys, are student experiences outside of the classroom at interactive locations designed for educational purposes through displaying and exhibiting to gain an experiential connection to the ideas, concepts, and subject matter. (9) (10)

b) Purposes of Field Trips

Field trips help to provide firsthand experience and stimulate interest and motivation in science by strengthening observation and perception skills (11). Also, learners have the opportunity to be taken to locations that are unique and cannot be modeled in the classroom but the connection between the field trip venue and the classroom links the field trip's experiential learning with prior experiences and learning from the classroom (12). apart from giving opportunity to encounter a multidimensional activity to learners in which all their senses are fully involved (13), they are also experiential, authentic social events that create a new way of knowing an object, concept, or operation (14). Quality experiences lead to deeper learning and interest development (13).

c) Kinds of Field Trips

Formal field trips consist of planned, well-orchestrated experiences where students follow a documented format. Teachers find such programs comfortable because the students are bound to a choreographed agenda. However, there are minimal opportunities for students to personally interact and connect to the experience (15).

Informal field trips on the other hand are less structured and offer students some control and choice concerning their activities or environment. Teachers are often amazed by how much students know and which students possess the most knowledge (15). Together, these qualities create an intrinsically motivated student (15) that encourages students to examine their connection to the local and national communities, as well as their connection to the local and global ecosystems (9).

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d) Barriers to Effective field Trips

(11) identified seven barriers to successful field trips: 1. transportation; 2. teacher training and experience; 3. time issues such as school schedule and teacher's ability to prepare; 4. lack of school administrator support for field trips; 5. curriculum inflexibility; 6. poor student behavior and attitudes; and 7. lack of venue options.

Finding time for the trip and making arrangements for students who cannot make the trip adds tasks to an already busy teacher schedule (15, 13). Teachers need to determine the logistics to transport students. Large introductory classes present unique challenges due to the need of larger transportation facilities, safety issues, more student logistical planning, and time lost trying to organize the large group (16). It is imperative that the teacher prepares the students for the field trip in order to maintain a level of control that will allow for learning to occur when the class arrives at the venue (18). (19) suggested that often, a teacher's biggest fear is losing control of the students once at the field trip location. Upon arrival at a field trip venue, students are often disoriented resulting in excited, explorative, and unrestrained behavior (20). The teacher should be prepared to focus the students' mental and physical energy towards participation at the venue (12).

e) The Role of the Teacher in Organizing Field Trips

Despite the educational benefits of field trips to learners, teachers are directly involved and participate in all the preparation and field trip activities to connect the school's science curriculum to the venue and its focus because the field trip should not be a stand-alone experience (24). The teacher visits the venue prior to the field trip to learn the layout and determine whether the venue is suitable for all the learners (22; 15). To satisfy the three variables that prepare students for field trips identified by (23) as understanding the venue layout, the focus of the activities, and being prepared to be in a "novelty space," the teacher should connect the students' experiences on the trip with concepts and lessons taught in the classroom. As the field trip begins, the teacher plays a role to make learners comfortable in the new environment by first communicating the venue's expectations to any unfocused or confused students (25). During the field trip, students experience learning in an authentic, informal, natural setting. Each student's prior knowledge, gained both from the classroom and from their personal out-of-school experiences, is used to make connections to the field trip experience (26). The teacher should keep the students engaged. Teachers often utilize worksheets to help students focus on exploring and learning the targeted concepts. Worksheets are quite effective when one worksheet is given to a small group, in which the students are better observers, interact more frequently, discuss the concepts, and ultimately develop more connections between the concepts and the experience (24; 15). Simple fill-in-the-blank task completion worksheets are not effective, when every student is responsible for his or her own data, where the focus is solely to fill in the data and not to explore or participate in activities (24). Finally, the teacher's actions after the field trip to reinforce learners accumulated experiences through discussion, activities, reading, a television show or movie should not be overlooked. (28; 24; 29; 30; 21). Students need to solidify their new ideas and observations which have not yet made connections. Reflection will help build those connections, as well as reinforce the successful connections already made on the trip. Students generate greater understanding as teachers develop potential connections through reflection (24). Students should discuss their observations and experiences, and in the case of elementary grades, create presentations to share with their classmates. During the remainder of the school year, the teacher should connect new classroom concepts to the students' field trip experiences (25). In Tal & Steiner's (21) examination of teacher's roles during field trips to museums, neither elementary nor secondary grade level teachers carried out quality post-visit activities. Teachers must recognize the importance of post field trip reflection and debriefing to maximize student interest and learning.

IV. Methodology

The research design used for this study was an action research design. Action research design was chosen because the study focused on a specific problem in a particular setting, that is a JHS in Atonsu and because action research design helps the classroom teacher to establish conditions in the classroom which will enable him/her achieve a particular result. The purposive sampling and census techniques were used to involve all twenty-eight JHS 1 pupils both boys and girls. These sampling techniques were used because they provided the opportunity for all the pupils to be engaged in the intervention processes since all of them showed gross refusal to accept the concept of malaria taught in class. The research instruments used were test items and observation. Observation was carried out during the teaching of malaria in class. It was observed that as the student-teacher was explaining the causes of malaria, the pupils continually shook their heads in disagreement because they had already been saturated in the traditional beliefs of malaria transmission.

The authors used test items for the pre and post intervention analysis. These were recorded and used to establish the fact that these were real problems at the pre-intervention stage and to see the effectiveness or

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otherwise of the intervention put in place at the post-intervention stage.

a) Pre-Intervention Data Collection

Immediately the student-teacher finished facilitating a lesson on the causes and prevention of malaria, the authors conducted pre-intervention test to find out the pupils' understanding on the topic. The test was made up of eight supply type questions on worksheets, adapted from a WHO document. After the marking, it was observed that the performance was not encouraging.

Pupil Name: _____

Instructions: Answer all the questions in this assignment. When you complete them all mail the assignment or bring it in person to AMREF.

1. Outline the importance of Malaria

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2. Outline the impact of malaria

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3. List down the external characteristics of an adult mosquito

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4. List down the features used in differentiating between the life stages of the anopheline and culicine mosquitoes

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5. Outline the mode of transmission of Malaria.

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6. Describe the life cycle of the malaria parasite.

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7. In your opinion, why do you think malaria has become a disease of significance in the your country?

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8. What factors influence malaria transmission in your environment?

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b) Intervention Process

The authors met the head teacher to get him informed about the need to take pupils on a community walk to enhance their understanding on the concept of malaria. Then the authors discussed with them that they were about embarking on a community walk to the College of Education, the two Nursing and Midwifery Colleges, the Hospital, the river banks and part of Atonsu town behind the river. The head teacher in turn stamped the letters to the principals of the various institutions assembly man and chief of Atonsu. The essence of the community walk to these places was to allow the learners have a feel of a new environment outside the classroom for learning in a relax atmosphere and to observe how health and teacher trainees were seriously taken through the concept of malaria and how a complete ward is reserved for malaria patients to receive intensive care.

c) Intervention Design and Implementation

Week 1 day 1:

Objectives:

By the end of the session, every pupil should be able to

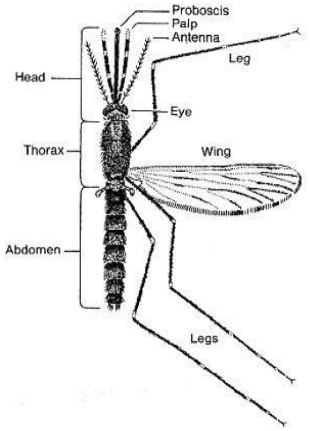
1. Examine the female anopheles mosquito and discuss its parts
2. Discuss the breeding grounds for mosquitoes

Procedure:

A picture of a labeled female anopheles mosquito was projected for the pupils to observe and discuss what they thought the various parts were used

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for. Students talked about using the wings to fly, the eye to see. The nose to smell, the proboscis to suck etc. a detailed discussion about the mosquito was done and after the pupils were prepared for the excursion.



Activity 2

The authors went with her pupils to Assinman Nursing and Midwifery Training College where one student nurse guided on the tour. The authors and her pupils discovered that there was a choked gutter just in front of the entrance of the gate which could serve as a breeding ground for mosquitoes. Pupils were given a magnified lens to view the larvae of mosquitoes. At the back the college is a swampy area which could also serve as a breeding ground. The second place visited was the Foso College of Education. They were led by a Science tutor who served as a resource person for the tour. The resource person took the pupils around and showed them their drainage system. It was noticed that all their water passes through covered gutters and for that matter it cannot serve as a breeding grounds for mosquitoes. The resource person however took them to a swampy area on campus. This was a place where the soil texture had a capacity to retain water for a long time so as it rained, the water became stagnant there, as he made a sweep with his hand over the stagnant water, the pupils could see mosquitoes flying about. Again at the entrance opposite the supermarket is a refuse dump where mosquitoes were also seen in empty open cans and other containers that could hold water. The pupils had the opportunity to visit the outskirts of the ladies' dormitories where buckets of water were kept. It was noticed that some mosquitoes had already found these as safe places to breed. The tutor brought us back to campus and showed us the numerous garbage bins with tight lids placed at vantage points on campus. These and the covered gutters, he said were measures of preventing mosquitoes from breeding.

When we returned to school, a recap of the visit was done with pupils and the following worksheets were given them in groups to fill and present.

List down the external characteristics of an adult mosquito.

External characteristics of an adult mosquito.

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List 3 possible breeding grounds for mosquitoes.

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Discuss three ways of preventing mosquitoes from breeding.

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It was a healthy discussion. The authors established the following core points and that was it for day 1

Well done! Your list included the following features which help us to identify adult mosquitoes. These are Long and segmented antennae;

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A long proboscis (the adapted mouth parts), which projects forward and which the female uses to pierce the skin when taking a blood meal;

A body and wings covered with scales; and

Wings with veins which show a definite pattern

There are over 2,600 known species of mosquitoes in the world. However, in Africa we are mainly concerned with two species namely, the An gambiae sl and An funestus. The life cycle of a mosquito has four distinct stages of development, egg, larvae, pupa and adult. The eggs, larvae and pupae stages are aquatic but the emerging adults are free-flying insects. Mating usually takes place immediately after the adults emerge from the pupa before females seek a blood meal. Both females and males suck nectar and other plant juices as energy sources; but females require a blood meal for maturation of eggs. Mosquitoes rest either indoor or outdoor during the day in cool humid locations to minimize moisture loss. Their biting activities take place from dusk, throughout the night until just before dawn, feeding either indoor or outdoor. Mosquitoes have preference for various hosts (Human & animal) for their blood meal; however, efficient malaria vectors have preference for human blood.

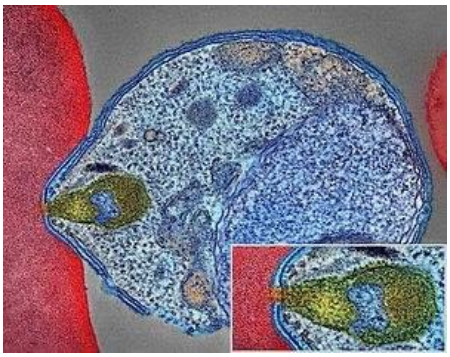
Week 1 day 2

Objectives

By the end of this unit you should be able to:

Define malaria

Write down the importance of malaria



Malaria parasite

Again worksheets were given to pupils in groups to answer and present.

Write down the importance of malaria

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List the public health impact of malaria

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Examine the malaria parasite.

Procedure

The authors, with the help of a community voice had a whole class discussion on malaria with the pupils. The community voice took the pupils through the following *As we begin our discussion, it is important for us to know what Malaria is and its importance Malaria is a febrile disease caused by the blood parasite called Plasmodium transmitted by the bite of an infected female anopheles mosquito. Malaria is the most common disease in Africa. It is also the number one cause of death among young children and a significant cause of miscarriages among pregnant mothers. About 95% of children brought to health facilities with fever suffer from Malaria. A significant amount of suffering, complications and death due to malaria can be prevented through prompt and correct treatment and prevention measures.*

After, the authors had a discussion on the importance and impact of malaria on the society with the pupils. Then a picture of the malaria parasite was projected for the learners to see.

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Describe the life cycle of the malaria parasite

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Now compare your answers with the following discussion.

- The public health importance of malaria

One-fifth of the world's population is at risk of malaria. According to WHO there are between 300 – 400 million cases of malaria illness annually (WHO1).

The greatest burden and most deaths occur among African children and are on the increase.
It endangers the health of women and newborns.

Malaria epidemics cause high morbidity and mortality in areas where they are prone particularly in the highland areas.

There has been progressive spread of malaria into areas which had been free of the disease in the recent past.

Malaria is therefore, an important disease requiring special attention.

- The public health impact of malaria

1. The disease causes widespread premature death and suffering
2. Imposes financial hardship on poor households,
3. Holds back economic growth and improvements in living standards.
4. Acute febrile illness, chronic debilitation, complication of pregnancy, and impairment of the physical development and learning ability of children.
5. Time lost and physical inability to engage in productive work and contribution to economic welfare translates directly into economic loss and impacts negatively in the quality of life of individuals, their dependence and or caretakers incase of children.
6. Costs to individuals and their families include: purchase of drugs for treating malaria at home; expenses for travel to, and from health clinics; lost days of work; absence from school; expenses for preventive measures; expenses for burial in case of death and other incidental expenditures.
7. Costs to governments include: maintenance of health facilities; purchase of drugs and supplies; public health interventions against malaria, such as insecticide-treated nets; lost days of work with resulting loss of earning; and lost opportunities for joint economic ventures. Such costs can add substantially to the economic burden of malaria particularly in endemic countries and strongly impedes their economic growth.

Week 1 day 3

Objectives

By the end of the lesson, every learner should be able to

Differentiate an Anopheles mosquito from the other mosquitoes

Describe the life cycle of both the anopheles mosquito and the culicine mosquito.

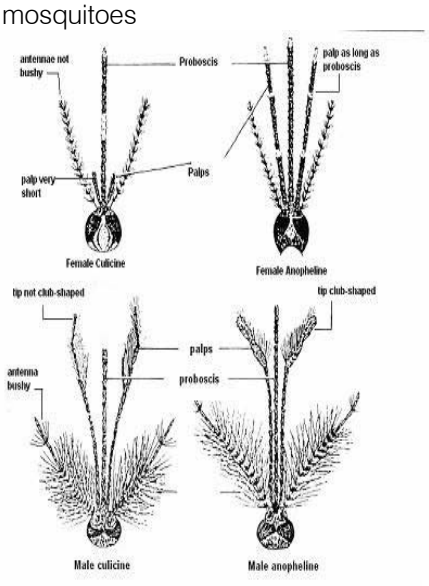
Procedure

Because of the prior arrangement made with management of the college of education for the visit, this day walk was an enjoyable one. The time was 7:00 a.m. We arrived there to join the science students in their study of the differences between the anopheles mosquito and others and their life cycles. Before the start of the session, all of us were made to go round the premises and identify mosquito prone areas. Equipment was given us to attract as many mosquitoes as we could. When we came back, lenses were given us to observe the types of mosquitoes caught. The images of both mosquitoes were projected for pupils to observe.

After the lesson, the facilitator met us for questions and clarifications. When the leaqrners admitted that they had understood everything, we were granted leave and came back to school. Each learner was given a worksheet to fill out the differences observed between the anopheles and other mosquitoes.

Then a whole class discussion was held.

Some distinguishing features of Anopheline and Culicine mosquitoes



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How well can you differentiate an Anopheles mosquito from other Mosquitoes?

i. Female anopheline……
ii. Culicine ……
iii. Male anopheline……
iv. Culicine ……

One way that anopheline mosquitoes can be distinguished from culicines is by the length and shape of the palps.

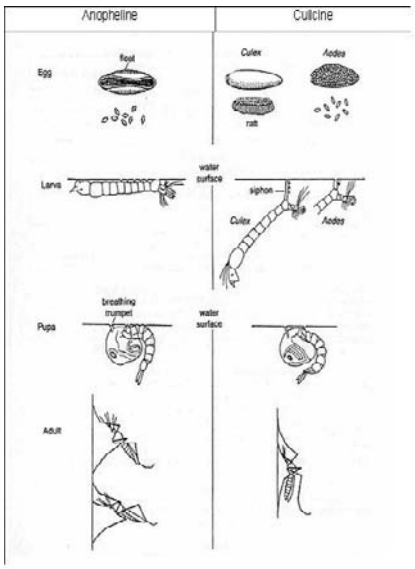
Female anophelines have palps as long as the proboscis

Female culicines have palps which are much shorter than the proboscis

Males Anophelines have palps longer than proboscis and are club-shaped at tip

Culicine have palps longer than proboscis, with tapered tips.

Then the life cycle of the two mosquitoes were projected and discussed as follows



Life cycle of anopheline and culicine mosquitoes

Another way of distinguishing anopheline and culicine mosquitoes is by observing the following:

Culex eggs clump together forming a "raft".

Aedes eggs float singly, Anopheles eggs have floats.

The anopheles larvae rest parallel to the water surface, breathing with specialized hair at last segment.

This is in contrast with culicine larvae which rest at an angle to the water surface and has a long siphon for breathing.

The pupae for both species are active and do not feed.

The adult anopheles rests at an angle while culicine rests parallel to the resting surface respectively.

Week 2 Day 1

This day's excursion was done at Nursing School 1. Because the purpose of the visit was already known to the authorities, the principal of the school invited us to the lecture theatre where the students were all set for lectures. The topic was the specie of the plasmodium. The learners observed how seriously the nursing students had taken the lesson. This was a way of challenging their misconception that if malaria was indeed a spiritual disease, why would both teacher and nursing training institutions spend time studying it in formal educational set ups.

Back at school, the authors modified what the nursing students studied in simple language with the help of the following WHO document.

Plate 1 Appearance of Plasmodium falciparum stages in Giemsa stained thin and thick blood films

Plate 2 Appearance of plasmodium malariae stages in Giemsa stained thin and thick blood films

Plate 3 Appearance of plasmodium ovale stages in Giemsa stained thin and thick blood films.

The four species of Plasmodium which are known to cause disease in man are:

Plasmodium vivax (Tertian).

It is the most common species in the World. It is the largest of the malaria parasites found in humans. The length of its asexual cycle is 48 hours. Relapses are common in vivax malaria due to emergence of new blood forms from maturing secondary liver schizonts. In tropical areas, relapses may arise within three to four months of primary attack, while in subtropical areas relapses occur only after nine months or more.

Plasmodium ovale, (Tertian)

It is a relatively a rare species with a frequency of less than 5%. It may sometimes be confused with P. vivax. The length of its asexual cycle is 48 hours. Relapses occur as in P. vivax but the disease tends to be more chronic.

Plasmodium malariae. (Quartan)

It is a less common species whose length of its asexual cycle is 72 hours. P. malariae is associated with quartan malaria.

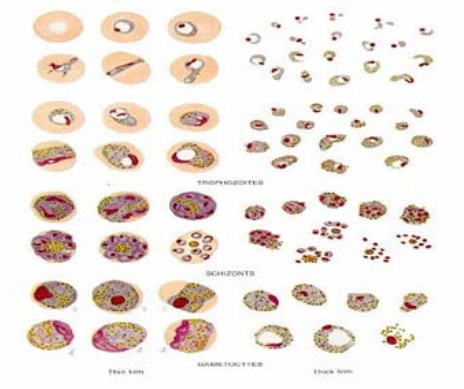
Plasmodium falciparum, (Sub-Tertian)

It is the commonest species in Africa and it accounts for 95 - 98% of all malaria infections. It is responsible for severe illness cerebral malaria and other complications and may cause death. The length of asexual cycle is about 48 hours. Fever is produced when the schizonts are mature i.e. at 48 hours interval. Sub-tertian means that diurnal periodicity is common. The liver stage of development take about 14 days.

In our environment, you may have noticed that many malaria laboratory tests report the presence of P.

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falciparum. This is because it is the most common cause of malaria in our environment. Indeed in Africa, Plasmodium falciparum is the most common type of malaria parasite transmitted in Africa, south of the Sahara, accounting in large part for the extremely high mortality in this region.



Back to school the worksheets were given the pupils to work on as assignments.

List down the four (4) species of Plasmodium

i) .....
ii) .....
iii) .....
iv) .....

Outline one characteristics of each species

i) .....
ii) .....
iii) .....
iv) .....

Week 2 Day 2

Objectives

By the end of the lesson, every learner should be able to discuss the life cycle of a mosquito.

This day's facilitation was done in the learners' own class for the purposes of addressing any future misconceptions that issues about malaria were to be studied in higher institutions. The facilitation was designed as a progression of what the two institutions had studied.

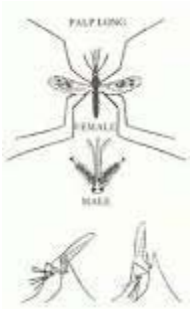
The different biting styles of mosquitoes were projected for pupils to observe.



Then the following discussion proceeded.

As we mentioned earlier, malaria is transmitted by the female Anopheles mosquito which requires blood for the development of its eggs. These eggs are laid on stagnant water or slow flowing water where they stay for 2-3 days before they hatch to release mosquito larvae. The larvae grow beneath the water surface and become pupa. After a few days the pupa develops into adult mosquitoes and flies away. The development of mosquitoes from egg to larvae to adults takes 7-14 days at a temperature of 31oC or 20 days at 20oC. If the adult mosquito is female, it looks for a blood meal to facilitate egg development, thereby starting the development cycle all over again. If the adult mosquito is male it feeds on plant juices. When a mosquito sucks the blood of a person who has malaria parasites in his or her blood, the mosquito picks male and female gametocytes where they undergo a series of changes to become sporozoites. The sporozoites are the infective stages of malaria parasites in the mosquito. This process called sporogonic cycle takes about 10 -14 days depending on environmental temperature. When a mosquito carrying sporozoites bites a person, it passes the parasites into the blood of that person, thereby infecting that person with malaria.

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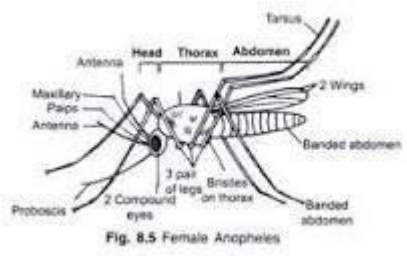
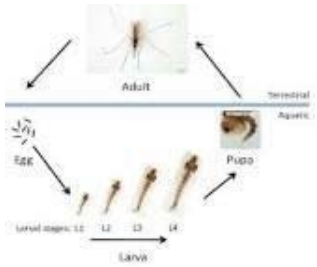


Fig. 8.5 Female Anopheles



DESCRIBE THE LIFE CYCLE OF A MOSQUITO.

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Week 2 day 3

The Malaria Life Cycle

By the end of the lesson, every learner should be able to mention three vectors involved in malaria transmission.

Procedure

On this day, because it was assumed that the pupils knew something about malaria transmission, the worksheets were given to them before the start of the lectures.

Mode of Transmission of Malaria:

Before you read on, here is an activity to enhance your learning process, take about 10 minutes to think about it and write out your answer.

How is Malaria transmitted? Name the vector involved in the transmission.

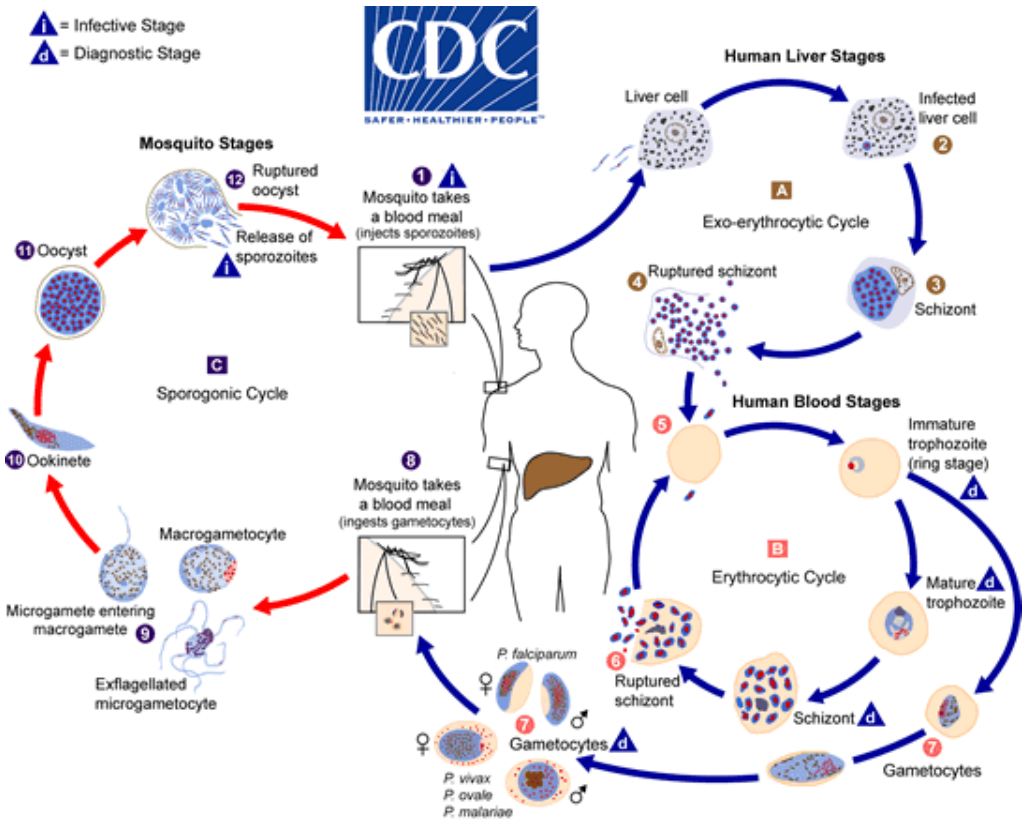
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Then the following note was projected on the screen for pupils to read at random. As pupils read paragraph by paragraph, the facilitator describes the process on the projected diagram. The Malaria parasite lifecycle begins when an infected adult female Anopheles mosquito bites a human being to feed on his or her blood. As it feeds on this blood, it releases malaria sporozoites (parasites) into the blood stream of the host (human being). This is the infective bite. Once the parasites enter the human blood stream they move quickly to the liver cells where they develop and multiply (schizogony). The infected liver cells rapture and release numerous merozoites into the blood, which invade red blood cells (RBCs). This stage takes 9-14 days. Within the RBCs the parasites develop from “rings” into blood schizonts. The schizonts then rupture the RBCs releasing numerous merozoites which invade new RBCs. When the infected red blood cells rapture, this process initiates the chills and fever which are characteristic of Malaria. Indeed, the peaks of fever experienced during malaria coincide with the release into blood circulation of malaria parasites (merozoites) from raptured RBCs.

The period between the infective bite and the onset of symptoms (i.e fever, chills etc,) is called the incubation period of malaria. As we mentioned earlier, the incubation period is usually 7-14 days but may be shorter as in P. falciparum or longer in the case of P. vivax and P. malariae. See figure 5 for an illustration of the cycle of malaria.

There was a discussion on the transmission. As the facilitator explained, he points to the stages on the diagram projected alongside.

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In the space provided below and in your own words; describe the life cycle of the Malaria parasite.

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Week 3 Day 1

On week three day 1 the learners were asked to give two reasons why we should promptly treat malaria at each of these stages. After the whole class discussion, the following points were established on the two stages of malaria.

Uncomplicated Malaria: It presents with fever, chills, nausea, vomiting, headache, joint pains, general malaise, and profuse sweating. It is important to promptly diagnose and treat uncomplicated malaria for two reasons:

To avoid the disease progressing to a severe and complicated situation

To reduce the number of parasite carriers within the community and hence interrupt further transmission

Severe Malaria:

This is a form of life threatening malaria that can affect many systems of the body as shown in the following table.

Malaria complications are life threatening so we should stop the clinical stage from progressing by early diagnosis and administration of the correct treatment. After the short discussion that served as an introduction to malaria, the visit to the hospital was a perfect compliment. The official in wait for us welcomed us and led us to the conference room where the medical practitioners were having a PDS. The doctors discussed the signs and symptoms of malaria and prepared to visit the malaria ward to see how the patients showed different signs and symptoms. There were some receiving infusions, others given transfusion, nurses administering drugs to others and some throwing up. Some temperatures read 38^{0} and other patients shivering with cold. We were made to observe the conditions of those with uncomplicated malaria and those with severe malaria. The differences were obvious. Those with mild attacks could speak, move around and eat but almost all with severe malaria were either on infusion or transfusion because of extreme weakness and blood shortage respectively and others being managed at critical points. This visit had a positive effect on the learners because as the facilitator explained, if it were a spiritual disease, the various tests run on them would not have shown the presence of the parasite and patients would not have responded to treatment. He also addressed that no matter how insignificant the plasmodium parasite may look, once they attack the blood of their host and the blood circulates, it carries the parasites along and very soon the whole blood is

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infected that is why malaria remains the fastest killer disease if not diagnosed and treated early.

Week 3 day 2

By the end of the lesson, every pupil will be able to

1. List three activities of indigenes that promote malaria infection
2. Educate the indigenes of ways of preventing malaria infections.
3. Initiate communal labour to clear all weedy places in and around the school premises.

Beside these educational visits, there was a visit to the Atonsu River. People around the river have poor drainage system. It was noticed that they poured dirty water anywhere and anyhow because they believe that it will drain to the river. These dirty water thrown around anyhow served as breeding grounds for mosquitoes since some are stagnant.

From there, the authors with the pupils went to the river banks and realized that there were dense forest canopy around each side of banks and hence serve as a hiding place and breeding ground for mosquitoes.

The next activity was to educate the people around the bank of the river. Pupils were put in pairs to visit households and educate them on the causes and symptoms of malaria as well as its prevention. The pupils were prepared for this through the discussion of problem solving and cultural identification skills.

The learners were poised for action. The time for communal labour which was fixed at 4:30 p.m was scheduled with the people. It was a successful campaign.

At exactly 4:00 p.m. the learners had started gathering with their weeding tools. At 4:30 p.m. we marched to the areas earmarked for the activity: in and around the school premises, the banks of the river and the community center. It was surprising how members of the community joined hands to complete this malaria eradication activity.

Week 3 day 3: Post – Intervention

By the end of the lesson, every learner should be able to demonstrate independent learning skill by answering the following questions.

You have now come to the end the intervention session. For the past three weeks, we have managed to define malaria, discussed its causative organism, its life cycle and mode of transmission. If you have are satisfied that we have achieved the learning outcomes, do the attached assignments for marking. If you have any problems in understanding any of the sections, do not hesitate to consult me about it.

Pupil Name: _____

Instructions: Answer all the questions in this assignment. When you complete them all mail the assignment or bring it in person to AMREF.

1. Outline the importance of Malaria

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2. Outline the impact of malaria

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3. List down the external characteristics of an adult mosquito

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4. List down the features used in differentiating between the life stages of the anopheline and culicine mosquitoes

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5. Outline the mode of transmission of Malaria.

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6. Describe the life cycle of the malaria parasite.

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7. In your opinion, why do you think malaria has become a disease of significance in the your country?

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8. What factors influence malaria transmission in your environment?

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V. Results, Findings and Discussions

This section covers the data presentation and analysis, the description of the data obtained from the various instruments used, findings and general outcome of the intervention and what further research should address.

a) Data Presentation and Analysis

i. *The Causes of Pupils' Refusal to Accept the Concept of Malaria Taught in Class*

Table 1 discusses the causes of pupils' refusal to accept the concept of malaria. A poll was taken for pupils to write down why they did not accept the concept of malaria taught in class. It could be seen that out of the 28 pupils, 4 representing 14% said that they had not experienced the disease before so they couldn't imagine what the teacher was talking about. They said they had never contracted it nor seen anybody have it so the concept was abstract to them. 15 pupils representing 54% chose traditional beliefs. They said ever since childhood, they have been made to believe that Malaria is only contracted if demons make one their target and infect them with it. According to them, it is only a strong and powerful man of god who can, through prayers and pacifications heal an infected person of the disease. Unscientific healing procedure was also chosen by 3 pupils who said per their own experience, it took the drinking of concoctions and other traditional processes like subjecting one in a very hot water temperature and batheing with salty water. No other methods would prove efficacious apart from what they had really trusted. Lastly, teachers' poor method of teaching attracted 6 pupils constituting 21% because the pupils said the teachers only talk without illustrations and any touch to practicality.

Table 1: Causes of Refusal to Accept the Concept of Malaria Taught in Class

Causes	Frequency	Percentage
Never experiencing the disease	4	14
Traditional beliefs	15	54
Unscientific healing procedures,	3	11
Teachers' poor teaching	6	21
Total	28	100

Because majority of the learners admitted that because of their traditional beliefs about the spread of malaria, it was difficult accepting what the teacher was saying, the authors probed further to know the which beliefs militated against the scientifically proven information about malaria taught in class. The learners were told to list two of the beliefs they know about the causes and prevention of malaria. From table 2, it can be concluded that 24 of the learners, forming 86% said that malaria is a spiritual disease. They never understood why a tiny creature like mosquito can cause malaria. They questioned, 'how huge and strong is the mosquito to contain such a parasite which can kill humans?' Again 16 learners felt that only spiritual men could cure malaria by pacifying the spirit beings responsible for its transmission. They believed that being prayed for and given spiritual directives will keep these spirit beings away to complicate the disease so that the concoctions prepared for you could heal you.

26 other learners constituting 93% posited that all the orthodox medicines available were manufactured from herbs so if there is the need to full potency of a drug, the herbal product should be more preferable to the orthodox ones which had gone through some artificial processes to reduce its efficacy.

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Misconception	Frequency	Percentage
Malaria is a spiritual disease	24	86
Spiritual men can cure malaria	16	57
Herbal drugs and concoction can Heal malaria patients	26	93
Malaria is transmitted when A supernatural being is offended	20	71

The strategies to challenge the misconceptions pupils have malaria was discussed with pupils. The items were explained and the pupils were tasked to choose one. Work sheets was chosen by 6 pupils representing 21%. They said since that will give them some practical touch to the lesson, they would very much want to work with it. Video shows pulled down 7 pupils representing 25%. They posited that something they could not imagine will best be close to real when shown on videos. All their senses would be activated to feel, hear, see, what it means to be infected by malaria. A resource person's visit was equally attracted to 5 pupils representing 18%. They felt that perhaps if an expert in the field handled the concept, it would be more interesting, more information packed and more activity based. However, community walk swept away 10 pupils representing 36%. They said they wanted to visit places where they could a feel of the real situation. Getting to know places where mosquitoes breed, the causes of malaria, symptoms and prevention and seeing people who are receiving treatment other than what they have been exposed to, will go a long way to satisfy their curiosity for a better understanding of the concept.

Table 2: Strategies to Challenge Pupils' Misconception

Strategies	Frequency	Percentage
Work Sheets	6	21
Video Show	7	25
Resource Person's Visit,	5	18
Community Walk	10	36
Total	28	100

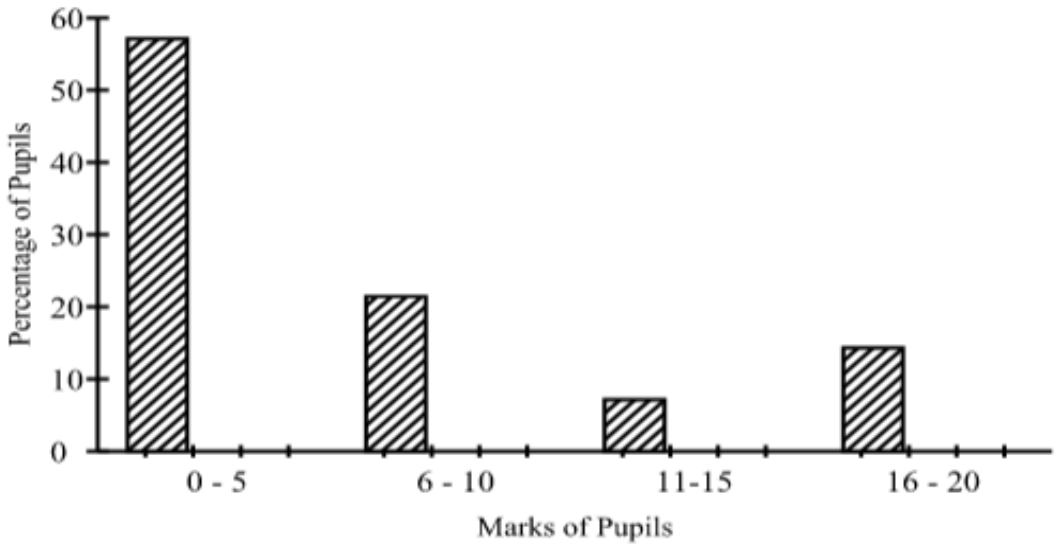
From table 3, it could be realized that the pre-intervention test results was nothing good to write home about as compared to the post- intervention test results while 16 pupils representing 58% scored between 0-5 in the pre-intervention test, only 3 pupils representing 11% scored it during the post intervention. A percentage drop of 47% is a remarkable achievement to note. Again score 6-10 attracted 6 learners representing 21% at the pre-intervention but at the post intervention 2 pupils representing 7% scored it. Here too a 14% decrease was realized. This showed that the range from fail to average recorded a 61% drop signifying an improvement in performance was realized with a conclusion that the concept was now becoming understandable to pupils. Score range of 11-15 attracted 2 pupils constituting 7% while at the post-intervention test, 7 pupils representing 25% scored it. In the same achievement trend, score 16-20 attracted 4 pupils representing 14% at the pre-intervention test while a huge number of 16 pupils representing 57% scored it at the post-intervention test. A percentage rise of 61 % was acknowledging enough to call for a celebration.

Table 3: Pre-Test Results in Raw Scores and Percentages

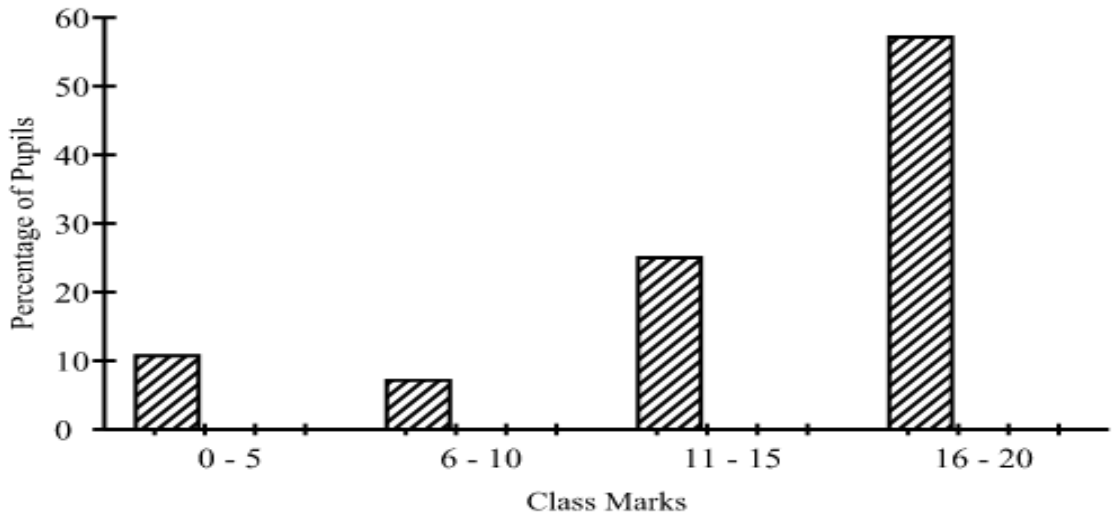
Class Marks	Pre-test	(%)	Post test	(%)
0-5	16	58	3	11
6-10	6	21	2	7
11-15	2	7	7	25
16-20	4	14	16	57
Total	28	100	28	100

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Pre-Test Results in Bar Graph



Post – Test Results in Bar Graph



VI. Summary of the Study

The main objective of the study was to examine the causes of pupils refusal to accept the concept of malaria among JHS 1 learners of Census and purposive sampling procedure were used to select all twenty-eight pupils for the study. The sample is made up of 16 boys representing 12 girls representing. The data were presented using descriptive statistics.

The study identified the following as major findings.

1. Causes of refusal to accept the concept of malaria among JHS1 pupils comprise never experiencing the disease, traditional beliefs, unscientific healing procedures, teachers' poor teaching methods.
2. Strategies to overcome the refusal to accept the concept of malaria among JHS1 learners include community walk, work sheets, video shows, and resource person's visits.
3. Compared to work sheets, video shows, resource person's visit, community walk, was considered to be the most important strategy to reduce poor reading skills.

VII. Conclusion

The findings showed that never experiencing the disease, traditional beliefs, unscientific healing procedures, teachers' poor teaching methods are the causes of the inability of pupils to understand the concept of malaria among JHS 1 learners as shown in the literature review.

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The views of the pupils led to the conclusion that work sheets, video shows, resource person's visit, community walk, was considered to be the most important strategy to reduce inability of pupils to understand the concept of malaria among JHS 1 learners.

VIII. Recommendations

Based on the findings and conclusions of the study, the following recommendations are made.

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Impact of using Simulink in Matlab on Students` Academic Achievement and Gender in Elctronics Works Trade in Technical Colleges of Adamawa State, Nigeria

By Dr. Hassan, Abdulkarim Abdulhakim

Abstract- This study explored the impact of using Simulink in MATLAB on Students` Academic Achievement and Gender in Electronics Works Trade in Technical Colleges of Adamawa State, Nigeria. The study adopted quasi-experimental design. Two research questions and two hypotheses guided the study. The population of the study was made up of all NTC students offering Electronics works Trades course in Adamawa state Technical Colleges. Purposive sampling was used to select 52 NTC II students offering Electrical Works Trade from Yola South and Numan Technical colleges. The instrument for data collection named Electronics Works Trade Achievement Test (EWTAT); was constructed, validated and used for the study. The reliability of EWTAT was determined using Pearson Product Moment Correlation Statistic (PPMCS) and it yielded 0.70. Mean statistics was used to answer the two research questions and t-test statistic techniques was used for testing the null hypotheses at 0.05 level of significance. findings of the study revealed that using Simulink in MATLAB was more effective for teaching Rectifier circuits in Electronics Works Trade than when Lecture Method was used.

Keywords: MATLAB, simulink, simulation, academic achievement and electronic technology.

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IMPACTOFUSINGSIMULINKINMATLABONSTUDENTSACADEMICACHIEVEMENTANDGENDERINELCTRONICSWORKSTRADEINTECHNICALCOLLEGESOFADAMAWASTATENIGERIA

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Keywords: MATLAB, simulink, simulation, academic achievement and electronic technology.

I. Introduction

Rapid Technology advancement in the modern society cannot be separated from the advancement in electronic technology. The world has turned into an age where modern industry finds application of electronics technology very essentials. Most firms rely on Electronics technology for designing, constructing and maintaining industrial machines (Ogbuanya and Owodunni, 2015). Application of Electronic technology helps Companies to reduces cost and increases productivity, the application of the Electronics technology requires experts to implement and monitor the automation and analysis of manufacturing process. Growth and development in the field of electronic industries have created a strong demand for employees who are well trained, experienced and up to date in knowledge (Ogundokun, 2010). This job area requires graduates with good problem-solving skills, critical thinking abilities, and computer skills, among others. Electronic Technology technicians/craftsmen are trained at various levels of education system, both formal and informal, these include: Technical colleges, Colleges of education, Polytechnics, and Universities. Others are Government and Nongovernmental skills acquisition centers (Okoro, 2006). According to Federal Republic of Nigeria (FRN), (2013) the Course of study offered at Technical colleges that prepare its recipient to become Electronics Technology Technician/Craftsmen is Electronics Works trade.

Electronics works trade in one the courses in engineering trades offered in Nigerian`s Technical colleges in which at the completion of three years or one year advanced programme, the graduates are awarded National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) for the craft level and advanced level respectively FRN, (2013). The programme of Electronics work trade is designed to produce competent craftsmen and technician, who could be employed, be self-reliant and also, able to proceed to higher education. According to National Board for Technical Education (NBTE), (2010), graduates of electronics works trade are expected to be able to test, diagnose, services and repair any fault relating to electronics unit and system based on manufactures` specification. The syllabus of Electronic works trade at NTC level according to NBTE, (2015) was based on the following modules; Electrical/Electronic drawing, General metal work 1, Electronics devices and circuits, Radio communication, Radio and audio frequency amplifier, Satellite transmission and reception and Television. The modules were further broken to sup-topics such as: Diodes, bi polar junction transistors (BJT)/Field effect transistors (FET), and common circuit configurations including clippers, clamps, amplifiers, active filters, regulators, power amplifiers, differential amplifiers and operational amplifiers and Rectifier circuit, among others. The Rectifier circuits was considered and selected as the topic for the experimental. The modules and the topics are designed as a guide toward the attainment of the objectives of Electronic works trade at Technical college level.

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The realization of the objectives of Electronic works trade in Technical colleges, which include production of qualified craftsmen and technicians that can carry out repairs and maintenance of faulty electronics appliances and also further their education, depends on a number of factors. These include; the availability of equipment, tools and materials, an adequate supply of qualified technical education teachers and the method of teaching employed in delivering the teaching and learning. At present, in Adamawa state`s Technical colleges, the Electronics works students were taught with the traditional teaching method, which is mostly the lecture and demonstration methods (Oyebolu & Lemu, 2013).

Teaching and learning are very important element in Technical Education, the teacher uses different methods and materials to teach their students. There are various strategies for teaching electronics works trade which range from the use of lecture, discovery, inquiring, demonstration and problem solving among others (Usman, 2010). Mostly, teachers uses lecture method for teaching.

The lecture method is a teacher centered method where by, the teacher does most of the talking (Usman, 2010). This lecture method used by teachers to teach in technical colleges reduces the ability of the students to grasp relevant concepts rather than when they are exposed to lessons involving hand-on experience. Ishaku, (2019) observed that students are not interested in technical courses because of the apparent non-motivational methods and approach used by some of the teachers. Moreover, Nuruddeen (2013) opined that, the learning of electronics technology should be based on teaching materials, variety of teaching methods and dynamic approach. Students learn through observation and doing, which signifies hands on and minds on theories, learners could be introduced to the phenomena of nature which surround them through the use of fascinating learning materials that will make them to be exploratory in nature.

The development of technology from day to day is providing better alternatives to the ways and means by which teaching and learning was previously carried out. Traditionally, in electronic technology, forming large models of systems have been via a mathematical model derived from related circuit theory, which attempts to find analytical solutions to problems and thereby enable the prediction of the behavior of the system from a set of parameters and initial conditions. It is important to note that with new technologies such as the use of computer aided designs and software packages. learning nowadays can be facilitated through different computer Aided Instruction (Software) other than the traditional teaching and learning method (Hassan and Musa, 2020).

Software-supported educational products are some of the innovative technologies designed to be used in the computer-based and computer supported teaching practices. Such technologies can be used as complementary materials for doing calculations, and preparing simple models and simulations (Traynor, 2003) It can also be used as a teaching material in the teaching of a part of a subject or the whole subject. Teaching software is capable of reducing the problems encountered in education (Ahmet and Ahmet, 2008). Science and technical programmes, students need to be encouraged to learn not only through their ears, but should be able to use their eyes and hands to watch and manipulate tools/equipment (Traynor, 2003). The use of Simulink in MATLAB could be a way out of the problem of lack of instructional materials for effective teaching of electronics works trade.

MATrix LABoratory (MATLAB) is a software that can be used to analyze, synthesize, organize, and evaluate contents and gathered data in schools and industries. Marcov, (2009) observed that the use of circuit simulation software such as MATLAB provides change in teacher's role from that of giver of information and adviser to that of facilitator and modeler. This provides technology-rich environment to motivate interest and enhance achievement of electronic learners. Xenophontos (1999) noted that MATLAB is a high-level computer language and interactive environment for numerical computation, technical data analysis, programming, simulation and visualization. He further stressed that it can be a valuable tool for teaching courses in technology. With MATLAB, data can be analyzed, algorithms developed, and models and applications created. It has a language, tools and in-built mathematical functions which can enable the exploration of multiple approaches to reach solutions faster than with spreadsheets or traditional programming languages. According to Jarumi (2016) MATLAB can be used for a range of applications, including signal processing, communications, image and video processing, control systems, test and measurement computations among others through the use of simulation.

A simulation is a situation in which a particular set of condition is created artificially in order to study or experience something that could exist. In electrical technology, circuit simulation is a technique that can be used to predict the behavior of a real circuit using a computer program. Simulation is a computer program that predict the behaviour of a real circuit. It replaces real components with idealized electrical models which allows measurements of internal currents, voltages and power that in many cases are virtually impossible to do any other way (Jarumi, 2016). Simulation processes are done in a Simulink, which is a software incorporated in to MATLAB (Ogundokun, 2010).

Simulink is a software imbedded in MATLAB, it provides a block diagram tool for modeling and simulating dynamical systems, including signal

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processing, controls, communications, and other complex systems. The products of Simulink are used in a broad range of industries, including automotive, space technology, electronics, environmental, telecommunication, computer peripherals, finance and medical (Ogundokun, 2010). Simulink also has a large collection of tool boxes for variety of applications. A tool box consists of functions that can be used to perform some computations in the toolbox domain. It can therefore be an invaluable tool for improving students' achievement in electronic technology courses (Jarumi, 2016). Instrument of lesson delivery is of great importance in achievement as observed by Nuruddeen (2013) who stated that the methods and tools employed by a teacher to teach the lesson could influence students' learning interest as well as academic achievement.

Academic achievement denotes knowledge and skills attained by students in school or institution. According to Usman (2010) academic achievement is always denoted by a score which represent the amount of learning acquired, knowledge gained or skills and competencies in the subjects. Hassan and Musa (2020) viewed Academic achievement as a measure of the student's academic standing in relation to those of other students of his age. Academic achievement is the exhibition of knowledge attain or skills developed by learners in a course of study. It is the measure of results test scores administered to learners (Jarumi, 2016).

Students' academic achievement can be influenced by their gender. There are gender differences in learning in Science, Math, Engineering and Technology. Jarumi (2016) conducted a study on using MATLAB Simulation, she found that, there is no much differences in the mean achievement of male and female students. Ogwo (1996) conducted a study on the effects of meta-learning instructional strategies on students' achievement in metal work technology and reported that male students had slightly higher mean scores than the females, which was not considered significant. The inconclusive nature of research findings on gender and achievement in technology makes it imperative to find out the impact of the software Simulink in MATLAB. It is hoped that the use of Simulink in MATLAB may help ease some of the difficulties students of electronics faced due to the abstract nature of the subject and, complex mathematical models involved and also bridge the gender gap. The package can be used in creating a virtual lab or workshop to help students appreciate practical operations of phenomena they otherwise would have imagined. Various studies (Hassan and Musa, 2020; Jarumi, 2016) have associated improved learning performance with the use of computer assisted instruction, and their claims that, the quality of learning can be significantly enhanced when ICT is integrated with teaching motivated the need to embark on this study.

II. Statement of the Problem

Graduates of technical colleges in Adamawa state according Ishaku, (2019) were unable to establish themselves by taking up a carrier from their trades of specialization, neither proceed to higher institutions, they end up as Keke Napep riders, Taxi driver, Political tugs and other diverse social vices like Shila boys. Lack of courage by graduates of technical colleges to set up a business in their area of discipline could be attributed to lack of acquisition of required skills during training. This shows that efforts of Government, Teachers and resources invested is a waist (Hassan, 2016). Checkmating the underperformance of Technical college graduates according to Ogbuanya and Owodunni (2015) require the assessment of the teachers` quality, teaching methods and required training facilities. The prevalence uses of Lecture method my contribute to the ineffective teaching and learning (Abdul-Aziz, 2013). According to him the lecture method of teaching is the "Talk and chalk" approach. The method is teacher centered and the student remain passive. Consequently, the students are not able to obtain and apply their learning to new situation and this makes them apathetic and repulsive to learning. This method may as well may impede the acquisition of requisite skills.

Similarly, NABTEB, 2010 Chief examiner says that the students` low academic performance was particularly due inappropriate methods and techniques used by teachers, lack of qualified and competent teachers, lack of available and up to date standard facilities and material and lack of commitment on the side of the students. It is due to the continuous decline in the performance of students of technical colleges in Adamawa state the researcher aimed to assess the Impact of Simulink in MATLAB on Students` Academic achievement and Gender in Electronics Works Trade in Technical Colleges of Adamawa State, Nigeria.

a) *Purpose of the Study*

The general purpose of this study was to investigate the Impact of Using Simulink in MATLAB on Students` Academic Achievement in Electronic works Trade in Technical Colleges of Adamawa state, Nigeria. Specifically, the study sought to:

1. Compare the mean achievement scores of students taught using Simulink in MATLAB and those taught with lecture method.
2. Determine the influence of gender on achievement of students when taught using Simulink in MATLAB.

b) *Research Questions*

The following research questions were answered in the study:

1. What is the difference between the mean posttest scores of students taught Rectifier circuit using

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Simulink in MATLAB and those taught with lecture method?

2. What is the influence of gender on achievement of students when taught using Simulink in MATLAB?

c) Hypotheses

The following hypotheses were formulated to guide the study and were tested at 0.05 level of significance:

$H0_1$: There is no significant difference in the achievement scores of students taught using Simulink in MATLAB and those taught with the lecture method.

$H0_2$: There is no significant difference in the achievement of male and female students taught using Simulink in MATLAB.

III. Methodology

The research design employed for this study was Quasi-experimental design, with emphasis on post-test non-equivalent control group. The study involved the use of experimental and control groups. The population of the study consisted of all NTC students offering Electronics works trade at state State Government owned Technical colleges in Adamawa state. Purposive sampling was used to select NTC II student from Yola south and Numan LGAs. The sampled students were made off Fifty-two (52) students (Male=39, Female=13). Thirty (30) students were assigned to experimental group while twenty-two (22) students were assigned to control group. One instrument was developed by the researcher to generate data for this study. The instrument was named Electronics works trade Achievement Test (EWTAT), it has forty (40) items, adapted from NABTEB pass questions of (2015-2019). The students were freely allowed to select the correct answers and each correct answer was assigned a mark while the overall mark was forty (40) marks. The EWTAT drafted was validated by two experts in field of Electronics Technology Education at Modibbo Adama University Yola. The EWTAT was pilot-tested on a sampled student having same characteristic with the groups in different schools in Gombe State. The split half method (odd-even) was used to test the reliability of scores on thirty (30) students. Pearson Product Moment Correlation Statistic (PPMCS) was used to determine the reliability of the EWTAT, and the instrument yielded a reliability co-efficient (r) of 0.70. For the purpose of data collection, the following sequential steps were used. The students were subjected to the treatment using the planned Lesson plan, then followed by post-test by the researcher through the use of EWTAT to obtain information from the students. The data were collected after marking the students` answer scripts. The scores were computed into experimental and control groups. Thereon, the scores collected from tests were recorded, calculated and subjected to data analyses respectively. The data collected were analyzed at two different levels, via descriptive and inferential levels. At the descriptive level, the descriptive statistics of mean and standard deviation were used to respond to research questions. While at the inferential level, the t-test analysis was used to test the null hypotheses at the significance level of $\alpha = 0.05$. The inferential statistics level formed the basis to permit decision making on whether to reject or retain the null hypotheses after being tested.

IV. Results

Research Question One: What is the difference between the mean posttest scores of students taught using Simulink in MATLAB and those taught with Lecture method?

Table 1: Mean and Mean Difference of Electronics works Trade Achievement Scores for the Experimental and Control Groups

Group	N	MEAN	SD	Mean Difference
Experimental Group	30	23.27	7.09	9.36
Control Group	22	13.91	5.02	

The result from Table 1 shows that, from the mean of experimental group 23.27 and that of control group 13.91, there is a mean difference of 9.36 between the mean academic achievement scores of students taught Rectifier circuit using Simulink in MATLAB and those taught using Lecture Method. This proves that, the experimental group had mean score greater than that of the control group. This establishes the evidence that, the treatment had improved students 'Achievement in Rectifier circuit positively.

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Research Question Two: What is the influence of gender on achievement of students when taught using Simulink in MATLAB?

Table 2: Comparison of Mean Scores of Male and Female Students in Experimental

Variable/Group		N	Mean	SD	Mean Difference
Experimental Group	Male	22	19.98	9.34	0.95
	Female	8	19.03	7.81	

Result from Table 2 calibrates that, based on the mean of male group 19.98 and that of female group 19.03, there is mean difference in male and female students of 0.95. This establishes that, the treatment had promoted the performance of both male and female students in Rectifier Circuit significantly.

V. Hypotheses

Hypothesis One: There is no significant difference in the achievement scores of students taught using Simulink in MATLAB and those taught using Lecture method.

Table 3: T-test Analysis on Academic Achievement of Students for Experimental and Control Groups

Group	N	Mean	SD	df	t	p	Remark
Experimental Group	30	41.3	10.7	50	28.6	0.01	Significant
Control Group	22	32.1	7.3				

Table 3 indicates a significant difference between the mean academic performance scores of students taught Rectifier Circuits using Simulink in MATLAB and those taught with Lecture Method; $t\ (98) = 28.6$, $P = 0.01$. With $P < 0.05$ the result suggests a difference in students` achievement after being exposed to Simulink in MATLAB and Lecture method. Therefore, hypothesis one is rejected.

Hypothesis Two: There is no significant difference in the achievement of male and female students taught using Simulink in MATLAB.

Table 4: T-test Comparison on Academic Performance of Male and Female Students in Experimental Group

Group	N	Mean	SD	df	t	p	Remark
Male	22	29.26	4.3	28	1.96	0.06	No Significant
Female	8	28.25	4.1				

The result from Table 4 revealed that there is no significant difference between the mean performance scores of male and female students taught Rectifier circuit using Simulink in MATLAB; $t\ (48) = 1.96$, $P = 0.06$. With $P > 0.05$ the difference between the mean performance scores of male and female students exposed to treatment is not significant. Hence, the hypothesis is accepted.

VI. Discussion

The result from research question one showed that, there is significant difference between the mean academic achievement scores of students taught Rectifier circuits using Simulink in MATLAB and those taught using Lecture Method. The experimental group therefore, achieved significantly greater than the control group. The hypothesis one was rejected which revealed that there is significant difference in the mean scores of both experimental group and control group therefore, the finding was in accordance with the finding of Hassan and Musa (2020) which indicated that Computer Assisted Instruction significantly influenced the performance Electronics works students in Resistor color coding. This is also agreed with the findings of Ogbuanya and Owodunni (2015) who found that the Reflective Inquiry Instructional Techniques is more effective than the Traditional method. The result from the research question two indicated that, there is no much difference between the mean academic achievement scores of male and female students taught Rectifier Circuit using Simulink in MATLAB. In addition, male and female students exposed to Simulink in MATLAB did not differ significantly. While the second hypothesis was upheld, this revealed that there is no significant difference in mean scores of male and female when taught with Simulink in Matlab. It was generalized that

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Simulink in MATLAB was found to be gender friendly which is in accordance with the findings of Jarumi (2016) which showed that, the use of MATLAB Simulation in teaching Electronic Technology proved to be effective in enhancing the performance of male and female students, he further stated the the approach is gender friendly.

VII. Conclusion

Analysis of the result portrayed that; the experimental group achieved statistically better as a result of the exposure to treatment that is using Simulink in MATLAB. It is evidence that, Simulink in MATLAB is effective in enhancing learners` academic achievement, it also indicated that, teacher-centered method of delivery instructions may be the reason for low performance and failure of students to response NABTEB questions effectively in Electronics Works Trade. This also showed that, the lecture method commonly used by teachers in secondary schools is not quite suitable for effective teaching and meaningful learning of Electronics works trade concepts and Rectifier circuit in particular, because the lecture method is not a student-centered approach. The exposure of male and female students to the treatment implied that, the two subjects gained actively from the treatment. This indicates that, the treatment is suitable for both male and female students meaning that, is gender friendly and not bias.

VIII. Recommendations

Based on the findings of this study, the researcher recommended that:

1. Annals of Technology Education Practitioners Association of Nigeria (ATEPAN), Technical Teachers, NBTE and research centers like Nigerian Educational and Research Development Council (NERDC) and National Teachers` Institute (NTI) should incorporate the use of Simulink in MATLAB approach in science and Technology curricula as well as delivery instructions at technical colleges.
2. Seminars, workshops and conferences should be organized by Technical education board, NBTE, ETF and NERDC in order to train Technical teachers on effective implementation of the use of MATLAB` Simulation approach in teaching Technical subjects such as Electronics works trade.
3. Stakeholders in education, Non-governmental Organizations (NGOs), Parent Teachers` Association (PTA) and State Universal Basic Education Commission (SUBEC) should be encouraged and fascinated to provide sufficient funds so as to facilitate the tour on Simulink in MATLAB for delivery instructions in science and Technical subjects at Technical college level.

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Influence of the Principal's Communication Skills on Students' Discipline in Public Day Secondary Schools in West Pokot Sub County, Kenya

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Abstract- Ethical instructional leadership demonstrates that the success of any teaching and learning process and the level of students' discipline is dependent on effective communication skills. Learning and the success of student discipline are among the most primary goals of a principal's instructional leadership. This study therefore, investigated the influence of the principal's communication skills on student discipline in secondary schools in West Pokot Sub County in Kenya. The study was anchored on deontological ethical and teleological ethical theories which typically judge rightness or wrongness of an individual's actions in his or her line of duty and if the actions are fair to the followers. The target population of the study was 3450 respondents. This comprised of 497 teachers and 2953 students from the public day secondary schools in the study area. Simple random and purposive sampling techniques were used to arrive at a sample of 593 respondents. Questionnaires, interview and document analysis were used as the primary tools of data collection. The study used a descriptive survey research design in data analysis using SPSS version 26 to obtain mean values and standard deviation.

Keywords: principal's communication skills, students' discipline, public day secondary schools.

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Influence of the Principal's Communication Skills on Students' Discipline in Public Day Secondary Schools in West Pokot Sub County, Kenya

Obiero Francis Gisore [α], Pacho Ogalo Titus [σ] & Benard O Nyatuka [ρ]

Abstract- Ethical instructional leadership demonstrates that the success of any teaching and learning process and the level of students' discipline is dependent on effective communication skills. Learning and the success of student discipline are among the most primary goals of a principal's instructional leadership. This study therefore, investigated the influence of the principal's communication skills on student discipline in secondary schools in West Pokot Sub County in Kenya. The study was anchored on deontological ethical and teleological ethical theories which typically judge rightness or wrongness of an individual's actions in his or her line of duty and if the actions are fair to the followers. The target population of the study was 3450 respondents. This comprised of 497 teachers and 2953 students from the public day secondary schools in the study area. Simple random and purposive sampling techniques were used to arrive at a sample of 593 respondents. Questionnaires, interview and document analysis were used as the primary tools of data collection. The study used a descriptive survey research design in data analysis using SPSS version 26 to obtain mean values and standard deviation. Encouraging open door policy was at a low level (2.32, std .96), encouraging students to bring new creative ideas on discipline was also at a low level (2.73, std 1.10). Allowing the students to determine the dress code (2.33, std 1.13) and setting aside specific days for meetings with students on discipline matters (2.39, std 1.33). Findings from correlation analysis showed that there is a significant relationship between principal's communication skills and student discipline. The study findings indicate that the principals' communication skills can be considered below average. People do not live their lives in moral isolation but grow up within particular set moral standards. Therefore the study recommends that teaching being a moral enterprise the school principals should be regularly trained through in-service courses on their communication skills since communication is an integral skill in shaping student.

Keywords: principal's communication skills, students' discipline, public day secondary schools.

I. Introduction

Leaders are characterized by different values, norms, attitudes, beliefs, procedures, conduct, behaviours and practices and which are to a certain extent dependent upon the organizational, professional or institutional culture (Mihelic, Lipicnik, & Tekavcic, 2010). The responsibility of school principals is to provide instructional leadership direction in the management of the school (Diliberti *et al*., 2019). The principal develops curricula standards to assess teaching methods and monitor student achievement. The school principal has to supervise the daily operation of the institution and facilitate establishment of academic goals through duty allocation to teachers (Horng & Loeb, 2010).

Studies indicate that discipline is fundamental in human conduct and if it lacks among the members of an institution, then the institution cannot perform towards its ideal targets (Ouma, Simatwa, & Serem, 2013). With regards to educational systems, disciplined students are those whose practices, actions and inactions adjust to the set standards and guidelines within the school, (Ali, Dada, Isiaka, and Salmon, 2014).

Discipline ideally implies more than adhering to the set guidelines and standards and involves the student's ability to differentiate right from wrong based on the societal expectations (Gitome, Katola, & Nyabwari, 2013). Discipline is a basic requirement for a successful school system and therefore a matter of interest for all school heads (Eshetu, 2014). He further argues that discipline is a parameter of someone's successful life and it is reflected through the accumulation one's daily activities and behaviours in terms of morals, values and ethics which are always connected and interrelated to the society and attached to societal culture. Indiscipline is argued to be a demonstration of unaccepted conduct in a social network set up or in the general public (Omote, Thinguri, & Moenga, 2015). In the school environment, Ali *et al. (*2014) argue that indiscipline is any kind of misconduct which learners exhibit in their actions. Currently school principals are faced with enormous challenges in addressing the rising cases of students' indiscipline. Therefore the role of school principals can be said to be perhaps the most dynamic and influential function in the education sector. The duties of school principals have evolved drastically and have been dominated by discourse around principals' responsibility in school achievement, effectiveness and students' moral growth. This requires school principals to embrace ethics in their communication by being truthful and unbiased. Exercising sound communication ethics requires competent communication skills which involve studying,

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understanding and applying them. It also entails knowing when to follow guidelines, using discernment and judgment of particular situations, environments, and audiences, and articulating sound and just reasons for a decision (Tompkins, 2011)

Bechuke and Debeila (2012) argue that with the ban of corporal punishment as a disciplinary measure, majority of the teachers have experienced difficulties to adopt the recommended alternatives in maintaining discipline in schools. As a result teachers tend to set very strict rules to guide students conduct in schools instead of considering the prevailing circumstances. They further argue that teachers are less knowledgeable on the methods that could enhance learners' self-reliance. Therefore this study sought to establish the influence of principals' communication skills on students' discipline.

II. Principal's Communication Skills and Students Discipline

Yalokwu, (2002) defines communication as the effective transmission of a common understanding among people through speaking, writing or the other methods. He asserts that unless there is a perfect understanding resulting from transmission of verbal or non-verbal symbols, communication will not be said have taken place. That is communication should result in what the communicator wants. It should generate the desired effect and maintain the effect.

(Littlejohn & Foss, 2010) opines that communication as a process encompasses the level of observation or abstractness, intentionality, and normative judgment. The level of observation or abstractness depends on how broad communication is done. There are different reasons for which people communicate. Some communicate to share ideas, express emotions and pass on information to others through a certain media or technology. Giambra (2014) agrees to this by stating that some people just communicate to meet their social needs.

Globally communication is a tool of relaying information of whichever kind, be it school regulations, government policies, rules and laws among others. According to Nakkazi (2012), communication should produce the desired effect.

In educational institutions communication is a vital tool used in the progress of the set programmes and with regard to handling student discipline. A communicative leadership is essential for any school or organizations with values that are non-negotiable (Zulch, 2014). He further argues that the desired end goal of a school is dependent on the manner in which communication takes place. Unavailability of communication and poor communication by teachers are the major factors that have led students to abandon their study objectives and begin to engage in deviant behaviours at a certain level (Dinu, 2015). The wholesome success of students is directly related to the effective communication of the teachers (Khan, et al 2017). Effective communication skills stimulate moral imaginations that are key the formation of ethical behaviour by the learners. The role of the principal, as an instructional leader, can only be realized by having comprehensive communication skills. Good communication skills help to develop better understanding and beliefs among people, inspire them to follow the principles and values which their leader wants to inculcate in them (Zulch, 2014). School principals as the lead ethical instructional leaders of educational institutions should build among students an understanding that education is embedded on promoting values and character formation which relies on the epistemic status of moral reflection and moral agency (Carr, 2014). Mendels (2012) believes that today's principals need to be focused on instruction and demonstrate effective communication skills so as to manage students moral development who have become more exposed to the world of technology.

A study by Kraft and Shaun (2013) on the effects of teacher- family communication on student engagement in Boston, Massachusetts revealed a positive relationship between teachers and parents communication on students engagement in U.S.A public schools. They further argued that effective teachers and students communication improves their sense of competence and behavioral change.

Myers (2011) opines in his study that the school head's communication is reflective of his or her leadership style. If the leader communicates well, the climate for learning is cultivated well to ensure effective learning. This expansive idea has not been actualized in our schools' reality. Nobody of us may intend to be a failure in his/her activity. Therefore, school heads for the present schools have at the top of the priority list that the brains and the contemplations of teachers and students that they manage are not the same as they were previously, the present individuals will never acknowledge to be treated as slaves or typical specialists who indiscriminately comply with the supervisor's orders.

According to Onyeiwu (2010), in his study in Nigeria, the realization of the goals of a secondary school as an educational organization hinges on effective communication among the various operating personnel. Communication acts as system binder that binds the parts of the system together and binds the system to its environment. In other words, no goal can be achieved if people do not communicate effectively with each other.

Different types of a principal's communication skills have a great effect on the learners' discipline. For a school to maintain a positive image in terms of

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discipline there ought to be effective communication between and among the education stakeholders (Bursalıoğlu, 2013). He further argues that effective communication has to yield the initiated behavior on the part of the sender which conveys desired message to the receiver and causes desired response in behavior from the receiver. Leaders who communicate effectively encourage and stimulate their followers towards the intended goals. They ensure discipline, and a sense of responsibility among team members. Poor communication skills may lead to the failure of a school to yield the desired results as a social agent of change. The source of many personal, organizational and social problems can be found in the lack of effective communication. Ensuring that there is an effective communication system without any misunderstandings and communication misinterpretations should be main tasks of any principal who strives to create a dynamic and targeted relationship among all the organization's followers (Angelika Anderson, 2018). School principals while communicating must ensure that there would be no chance of any kind of miscommunication or misunderstandings. Therefore, the institutional head has to possess effective communication skills both verbal and written to ensure that no miscommunication takes place (Şişman, 2012). According to Mbiti, (1974), communication is essentially a bridge of understanding between people in any institution. Communication leads to good management which aids achievement of organizational goals.

Muriithi (2013) did a study to examine the influence of teachers' communication strategies on students' discipline in public secondary schools in Mukurweini district. Four objectives were formulated that sought to; establish the use of teachers' oral communication on students' discipline in public secondary schools in Mukurweini district; to establish the use of written communication by teachers on students' discipline in Mukurweini district; establish the use of non-verbal communication by teachers on student discipline in the same discipline and to determine the prevailing conditions that hinder effective communication towards student discipline. The study employed descriptive research design which is suitable in collecting both qualitative and quantitative data. The sample included 45 teachers and 540 students. Data was collected by the use of questionnaires. The findings indicated that holding of classroom meetings, use of school prefects, communication during assembly, use of guidance and counseling, use of rewards and incentives, holding of open forums, encouraging members to pass information among themselves are some of the communication strategies commonly used by teachers' in Mukurweini District that have positively impacted on student's discipline.

According to Kiprop (2012), most principals adopt a master-servant or superior-inferior attitude in dealing with students. Believing that students have nothing to offer; principals rarely listen to students. This creates tension, misunderstanding and stress eventually leading to frustrations and violence as manifested in strikes.

Mulwa (2014) conducted a study to investigate the effects of principals' alternative disciplinary methods on students' discipline in public secondary schools in Kitui County, Kenya. His main goal was to establish the use of class meetings with students for collaborative decision making on students' discipline. He based his study on the Systems theory. The findings showed that class meeting enhance decision making since the learners were fully involved during the class meeting. This kind of platform provided a window for the principal and the learners to interact in real time hence, bringing about effective communication.

The manner in which the principal communicates portrays his or her ability to cause change in a school. Hester and Killian (2011) argues that the school heads in their communication ought to consider the principles of ethics if it they have to achieve the desired goal. They further argue that for the principals to be the forces of change, they must be virtuous in their own moral standing. Upholding ethical communication skills for example honesty has profound effects in teaching morality and character formation (Sanderse, 2012). They should strive to be agents of change by being the servants of the people they serve. This implies that principals as ethical instructional leaders should in their communication be clear, brief and should value the thoughts, ideas and feeling of others.

According to Katolo (2016), school heads are critical in shaping an effective school administration where learners' discipline is catapulted by the burning desire for continuous improvement in their scholarly work. The most powerful predictor of a child's behaviour is the perception of control. Students who feel that their school head is not supportive to them mostly tend to display negative behaviours (Rimm-Kaufman & Sandilos, 2012).

Organisational leaders are both implicitly and explicitly charged with being ethical and moral in their communication (Shapiro & Stefkovich, 2011). Instructional leaders have a clear focus on student learning by having a vision, clear learning goals, and high expectations for learning for all students; interactions and cordial relationships with relevant stakeholders and interaction, emotional and interpersonal support, visibility and accessibility. The actualization of these values requires effective communication from the school principals. Oboegbulem and Onwura (2011) assert that effective communication occurs when the sender and receiver of a message deduce the same understanding of the content of the message. The success of secondary school functions

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depend on the effectiveness of communication from the school leadership to the followers.

From the literature review, it was observed that several studies have been done around the variable, principal communication but there is a research gap on the influence of effective communication skills on student discipline especially in West Pokot Sub- County. For instance, Myers assumes in his research that the principal is considered as the most powerful person to affect the work atmosphere in a school even with the understanding on the cultural change of the students handled today which has resulted from globalization and trends in information dissemination among the adolescents. However, no studies have been noted to have investigated any impact or influence of the principal's communication skills on students' discipline. This study sought therefore to fill the gap of the influence of the principal's communication skills on student discipline in public day secondary schools in West Pokot Sub-County, West Pokot County in Kenya.

III. Materials and Methods

The study used a descriptive survey research design. The target population of the study was 3450 respondents. This comprised of 497 teachers and 2953 students from the public day secondary schools in the study area. Simple random and purposive sampling designs were used to arrive at a sample of 593 respondents. The study used research questionnaires, interview and document analysis guides to collect data. A pilot study was conducted in one school from Pokot South Sub County to establish reliability of the research instruments. The collected data was entered, edited, and analyzed by SPSS -26. Descriptive statistics, frequencies and means were used and the results presented by tables and graphs. Qualitative data was analyzed thematically according to the respective specific themes in the objective.

IV. Key Findings

a) Descriptive results for ethical communication skills and student's discipline

The study sought to find out the influence of the principals' communication and students' discipline. The respondents were required to use the scale which had a key of: 5=Strongly Disagree 4=Disagree 3=Not sure 2=Agree 1=Strongly Agree. The findings were recorded in table 1 communication strategies and student discipline.

Table 1: Communication strategies and student discipline

Communication statements	Mean	SD
Encourages open door policy where students are free to see the head of the institution to explain their problems.	2.32	.96
Encourages students to bring new creative ideas on discipline.	2.73	1.10
Allowing students to have a say in determining the dress code of the school.	2.33	1.13
Setting aside specific day(s) in a week for meetings between the Principals and the students to discuss matters pertaining to student discipline.	2.39	1.33

From the results in table 1, it was observed that, the principals encourage open door policy where students are free to see the head of the institution to explain their problems had a mean of 2.32 (Std .96) which was below average, encourages students to bring new creative ideas on discipline with a mean of 2.73 (Std 1.10) indicating an average effort from the principals, Allowing students to have a say in determining the dress code of the school had a mean of 2.33 (Std 1.13) and Setting aside specific day(s) in a week for meetings between the principals and the students to discuss matters pertaining to student discipline had a mean of 2.39 (Std. 1.33) indicating average participation. From the study findings it is observed therefore that the principals' ability to communicate can be considered average.

The teachers were asked to state the extent to which they believed that the principals' communication influenced the quality of student discipline in their schools. Their responses were as shown in figure 1.

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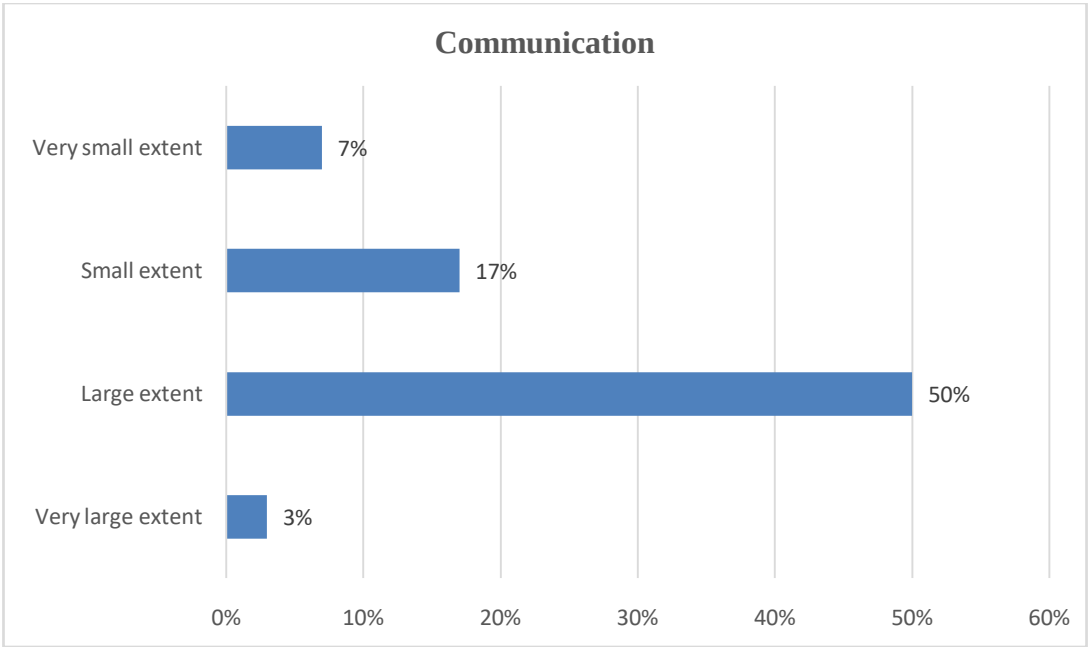


Figure 1: Principal's Communication

The results from the teacher's responses indicate that the teachers believed to a large extent 50% that if the principals communicate effectively on the expected ethical standards, discipline will be enhanced. However, 17% believed to a small extent that communication led to enhanced discipline among students, 7% to a very small extent and 3% to a very extent. This is validation from the students who also believed that with faultless communication on management of student discipline there will be improved student moral behaviour in schools. The findings conform to a study conducted by Sng Bee, (2012) which found out that good communication skills are not only important for teacher but also important for students for their educational success.

Principals were exposed to similar questions on communication in their daily endeavors in school and all of them were in agreement that teachers meet the threshold of teacher conduct and regulation to a larger extent. They said that this has remained a positive precursor in encouraging students to copy positive behaviour from the regulated code of conduct.

On which channels of communication, they use in their respective schools, announcements during assemblies played out as the common medium of communication, notice boards come out as the second most used method. For instance, one principal said: *"…in my school I embrace many media as forms of relaying messages to both teachers and students. Key among them is announcements done during school assemblies and notices placed at different noticeboards in the school…"* This conformed to Muriithi's study which found out that teachers' communication on students' discipline was done largely during assemblies. Majority of the principals believed that to a larger extent good commination can lead to better school discipline.

On how effective the communication strategy leads to effective discipline among the students' in secondary schools, one principal said, *"…….. A principal may communicate as perfectly as possible but, the key question lies on the students being communicated to. Do the students appreciate the messages that are being put across? What if the principals and those involved in administration are doing the right thing in communicating and yet the consumer does to the contrary?* Another principal quipped, *"…….. There is a gap between the communicator and the student being communicated to. Different people take the information given to them at the same time differently. If a for instance the question is absenteeism where the message is, seek for permission before getting out of school, there are those who in the same day of the message has been given will be absent without any official permission. Will it matter therefore how the communication was done or it more on the consumer of the information?*

On the challenges that result from channels of communications in the schools, majority of the principals felt that that the major problems are not in the medium of communication but in the students' who are being communicated to. The communication channels are sufficient and pretty.

The deputy principals were also asked similar questions as the principals on channels of communication adopted in their respective schools. Like the principals, the deputy principals indicated that assembly announcements, noticeboards and fixed message posters were the most used media of

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communication in schools. It also came out from the deputy principals that principals communicated on matters of discipline from time to time. On the reaction of the students towards the messages, the deputy principals indicated that normally the students will behave like they have understood the information given but just like in any society; there are some who will behave to the contrary of what had been communicated.

The findings that effective communication skills enhance student discipline agree with theory and other studies on ethical researches. For instance, Nejati, and Shafaei (2018). Schools discipline thrives when the leadership communicates ethically and teachers feel valued for their expertise. Devine and Alger, (2011) argue that ethical communication creates transformational school environment that has far reaching positive effects in a school. Students in transformational schools develop positive attitude towards the school and are inspired to work towards positive outcomes (Veeriah, Chua & Siaw, 2017). Teachers and students develop trust in the leadership and they collaboratively strive towards maintaining high levels of discipline as long as the principals are perceived as trustworthy, honest, and admired (Oyer, 2015). School Principals in West Pokot can advance the overall mission of continuous improvement of good morals among students by developing superior ethical communication skills within their schools. The illusive student discipline among secondary school students in Kenya can then be addressed and properly managed.

V. Correlation Results

In correlation analysis, the aim is to investigate the strength and nature of relationship between variables; especially, between independent variable and the dependent variable (Helwig, 2019).

Communication skills of the school principals were positively and significantly associated with the students' level of discipline ($\rho = .235$, $p < .001$) an indication that ethical instructional leaders have to possess effective communication skills which are highly associated with good students' discipline. This emphasizes the critical role effective ethical communication skills play in achieving the desired students' discipline in secondary schools.

VI. Conclusions

The study concludes that there is a significant relationship between principals' ethical communication skills and students' discipline in secondary schools. It is argued that possession of ethical communication skills by the school leadership underpins positive behaviours among students. The study also concludes that the perception of teachers, students regarding principal's communication skills is average or below average among principals in West Pokot Sub County. Focusing on building students' discipline is to build noble and positive characters among the students and strengthening modern human resources. The Poor perception of teachers and students can impact negatively on levels of student discipline.

VII. Recommendations

Effective communication skills are critical today in transforming a society through education. Having leaders who are conscious of the role played by ethical communication skills in schools is a mandatory option. This can be achieved through an elaborate plan of continuous in-service training of current principals and other teachers with an aim of addressing student discipline.

On perceptions change, the current principals in West Pokot Sub County need to work towards understanding the reasons of their ethical rating with a view to strengthen their strong points and improve where they are not strong so has to build a positive attitude from their followers.

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Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Social Science Research Paper

Techniques for writing a good quality homan social science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.
Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

19. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

20. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

21. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

22. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."



Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

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Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

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Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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