

Field Dependent-Independent Cognitive Styles as Correlates of Reading Comprehension Performance among Form Two Students in Kiambu County, Kenya

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Abstract: The problem addressed by this study was that secondary school teachers in Kenya have largely ignored the cognitive learning styles of students in their pedagogical strategies. The teachers have been mostly using talk-chalk method, which may be attributed to dismal performance in reading comprehension in English especially in sub county secondary schools. Scholarly efforts to address this issue have majorly focused on non-cognitive factors. The study was anchored on the field dependence-independence theory of cognitive styles. This study used correlational research design. The sample size was 20 public day schools representing 11% and 860 form two students representing 10.6%. The study used a modified Group Embedded Figures Test and English comprehension test. The pilot study was carried out in two schools with a sample of 30 students to establish the reliability and validity of the research tools. Data analysis involved the use of Pearson correlation and t-test to test the research hypotheses with the aid of SPSS program version 23. The findings revealed that there was a significant relationship between field independent cognitive learning style and reading comprehension performance, $r(452) = .32, P = .01$. The results also indicated that there was a positive significant correlation between field dependent cognitive learning style and reading comprehension score, $r(404) = .48, P = .00$. The findings revealed that the mean score difference in reading comprehension performance of respondents with FI and FD cognitive learning styles was statistically significant, $t(854) = -2.13, p = .03$. The study recommends that curriculum designers and the developers of learning content should include cognitive learning styles in learning books to educate secondary school students on the importance of these styles in educational achievement. Teachers should use diverse teaching methods that cater for the different cognitive learning styles to improve reading comprehension performance.

Key Words: Field Dependent Cognitive Styles; Field Independent Cognitive Styles; Reading Comprehension Performance

I. BACKGROUND TO THE STUDY

English language majorly exists in two forms; written language and spoken language. For people to understand, make use of and communicate using written language, reading comprehension plays a significant role in these processes. In school achievement, reading comprehension is fundamental to enhanced learning and strategic information processing (Lianne, Barnes, Fletcher, Dennis & Raghubar, 2010). For

learners to effectively respond to academic needs, they need to read and understand instructional materials in the course of teaching and learning. Learning progress is greatly shaped by the students' ability to comprehend what they are reading. Even during assessment, reading comprehension is very critical if the learners are to score quality grades. Inability to read and understand will make it impossible for the students to participate productively in this competitive 21st century. Therefore, the importance of reading comprehension in educational settings cannot be overemphasized.

There is abundant evidence of the significant role that reading comprehension plays in school achievement but its performance still remains a challenge across many countries in the world (Al-Jarrah & Ismail, 2018). In the USA, Spenser, Quinn and Wagner (2014) pointed out that about 10%-15% of school going children experience below average achievement in reading comprehension. Lee, Grigg and Donahue (2007) reported that fourth grade learners in the USA were struggling with difficulties in reading comprehension because they were not able to attain the basic levels of reading comprehension performance. Unsatisfactory performance in reading comprehension among the said learners implies that they may not excel in subsequent grades of learning. The gloomy picture of dwindling performance in reading comprehension was brought out by Strauss (2017). It was reported that reading comprehension performance among children in fourth grade has been on the decline since 2001. The country lagged behind in reading comprehension scores in international reading exam rankings. In Thailand, Chawwang (2008) examined reading comprehension performance and found that most of the sampled students experienced difficulties in English reading comprehension. This problem was associated with inadequate vocabulary.

In Nigeria, Awe (2014) reported that learners in secondary schools demonstrated poor performance in reading comprehension. The researcher established that only 61.5% of the sampled students performed well in reading comprehension, 60%, 38% and 66% performed well in creative, evaluative and inferential reading respectively. Ambatchew (2011) lamented over the dwindling quality of education in Ethiopia which was attributed to the inability of

students to benefit from lessons due to insufficient reading comprehension. Despite the efforts that have been made by the government and nongovernmental organizations, poor performance in reading comprehension still remains one of the major stumbling block to quality education. For more than a decade, there has been no significant improvement in the students' reading comprehension because the students mostly do not use English language for communication on regular basis.

In Kiambu County, the problem of reading comprehension performance in secondary schools is real as demonstrated by empirical evidence. A study by Karanja (2015) that explored the influence of reading difficulties on school performance revealed that 90% of the teachers of English had challenges in teaching reading comprehension. It was also found that majority of the students performed below average in a cloze test. Gitonga (2014) reported that inadequate learning resources negatively affected language competence skills of learners in public day secondary schools in Kiambu County. Most of the day secondary schools were found to be consistently performing below average in Kenya Certificate of Secondary Education (KCSE), a state the researcher attributed to poor language skills such as reading comprehension. The KCSE mean scores in English in the year 2016, 2017 and 2018 were 3.9, 4.3 and 4.6 respectively. As indicated in Table 1 majority of the students scored grade D+ and below in the three years.

Table 1: Kiambu County KCSE grades in English from the year 2016 to 2018

Year	Grades								
	A	A-	B+	B	B-	C+	C	C-	D+ and below
2016	10	86	457	1011	1732	2143	2731	2614	18431
2017	11	96	449	980	1817	2297	2605	2820	17723
2018	35	$\frac{16}{2}$	651	1243	2214	2960	2842	3181	16747

Owing to the high premium that is attached to learning outcomes, reading comprehension performance in Kiambu County is a matter that cannot be left to chance. Educational scholars have linked poor performance in reading comprehension in English to teacher factors, lack of teaching and learning resources, student's attitude towards reading and cognitive factors (Runo, Karugu & Mugo, 2010; Mugo, 2011; Mwaniki, 2015).

The cognitive factors that have been reported to have a significant predictive index on reading comprehension performance include attitude, metacognition, goal orientation, memory ability and learning cognitive styles. For instance, Mwaniki (2015) established that reading comprehension performance was significantly related to metacognitive knowledge and strategies. Earlier, Cromley and Azevedo (2011) established that reading comprehension performance was significantly related to metacognitive strategies. However, the studies used samples of children drawn from primary schools.

In the context of reading comprehension, the proponent of FD and FI cognitive learning styles was interested in the degree to which a learner can overcome the effects of irrelevant extraneous environmental factors while consciously focusing on the learning material or activity that involves reading. Collins, White and O'Brien (1992) state that FD learners experience difficulties in focusing on the learning task or activity and overcoming the effects of irrelevant environmental factors while FI students can readily focus on the learning activity or task and are able to overcome the effects of environmental factors.

In terms of perception and information processing during reading, FI learners are analytical thinkers. They organize and process information critically and exhibit a higher tendency to comprehend and retain information. This type of learner employ problem solving and structuring techniques, organization and analysis in reading comprehension situations. FD learners are often referred to as global learners. They use a global approach and are more holistic to learning (Coll ins, White & O'Brien, 1992). Much of the reading comprehension experiences are based on social frames of reference.

Research findings have revealed a positive relationship between FD and FI cognitive styles and reading comprehension performance (Nozari & Siamian, 2015) and academic performance Onyekuru (2015). Regarding the differences in performance between FI and FD students, studies have reported mixed findings. One body of research has demonstrated that FI students perform better in English language than FD students (Hickson & Baltimore, 1996: Oludipe, 2014) while another body of research has established that FD students perform better than FI students (Sheykhi & Mohamadi, 2017; Sellah, Jacinta & Helen, 2018).

The findings that FI students performed better than FD students may be due to the fact FI students are hardworking and are persistent to find answers. FI students are said to be more reflective and prefer working alone, a characteristic that may be attributed to acquisition of more knowledge on reading comprehension. Onyekuru (2015) reported that FI cognitive style was pronounced among male students while FD cognitive style was pronounced among female secondary school students in Nigeria. Rezai and Noori (2013) established that there was a gender difference in FI-FD cognitive learning styles with males being FD while females being FI. These mixed and contradictory findings necessitated the need for more research in this area especially in reading comprehension which is the foundation for school learning.

Significance of the Study

The results of this study may provide useful information to the school administrators on the importance of cognitive styles and goal orientation on reading comprehension performance and support the teachers in their endeavors to enhance learning. The results may also be used by practicing teachers of English to categorize the students on the basis of their cognitive learning styles and goal orientation in order to

employ instructional strategies that best works for each category of students. This may go a long way in improving learning and performance in English. Curriculum developers may find the results relevant in developing learning materials that suit the cognitive learning styles of students in order to improve learning outcomes. The research findings are also intended to add to literature on the cognitive domains as correlates of reading comprehension performance and inspire further and future research in this area.

II. REVIEW OF RELATED LITERATURE

The relationship between FI and FD cognitive learning styles and reading comprehension performance has not received much scholarly attention. Nozari and Siamian (2015) designed a study to examine the link between FD and FI cognitive learning styles and reading comprehension performance among secondary school students. The study used multistage selection technique to randomly sample 305 students consisting of both boys and girls. The selected students completed to the GEFT and English test. Data were analyzed using regression analysis and the results showed that FD and FI cognitive learning styles were related to the changes in reading performance scores. The reported value for FD cognitive style was 8.8% while that of FI cognitive style was 9.2%. From the results obtained, it was concluded that the higher the FI, the higher the scores in reading comprehension scores but the extent to which FI cognitive learning style was related to reading comprehension performance was not clear, a gap the current study sought to fill.

Relatedly, Masoud and Mehrnoush (2015) examined the difference between FI and FD cognitive learning styles concerning the quality of translation. The study used a quantitative research methodology with a sample of 297 university students. The respondents were both male and female senior students who were enrolled in a translation course. Language proficiency test, cognitive styles inventory, rating rubric and text to translate were used to obtain information from the students. The statistical analysis results revealed that learners with FI cognitive styles performed better than students with FD cognitive styles. The study did not examine the link between FD and FI cognitive learning styles and reading comprehension performance, which was the main objective of the current study.

Other scholars have focused on the effect of cognitive styles on writing performance. One such study was conducted by Nazanin and Afghari (2007) to examine the effect of FD and FI on writing scores among university students. The researchers involved 89 students (75 females and 14 males) who were majoring in English. The standard Group Embedded Figures test was used to categorize the students into FD and FI groups. Then the students were asked to write essays on the modes of argumentation and narration. The collected data was subjected to t-test, MANOVA and Scheffe statistical procedures. The results revealed a significant difference between the two FD and FI groups in writing performance. FI students outperformed FD students in the

domains tested. However, the study did not examine the relationship between the cognitive styles and learning outcomes, a concern the present study addressed.

A study conducted in Iran by Rezaee, Ebrahimi, Bakhshizadeh and Rahimi (2019) investigated the association between FI-FD cognitive learning styles and reading comprehension performance. The sample consisted of 180 university students who were aged between 16 to 20 years. The researchers used GEFT to categorize the students into FI and FD. Then the respondents took reading comprehension test which contained both global and local reading comprehension test. To establish the nature of the relationship between the variables, the researchers subjected the data to Pearson correlation analysis. The results showed that there was a significant relationship between FD cognitive learning style and performance in reading comprehension performance. The results also revealed that FI cognitive learning style and reading comprehension performance were significantly related.

Another research by Addinna, Ovilia and Asfina (2019) investigated the effect of learning cognitive strategies on performance in visualization among university students. GEFT was used to categorize the students into FI and FD. The study used quasi experimental research design since it was not possible to randomly assign the respondents into either FI or FD. A total of 54 students participated in the study. Cluster sampling was used to group the participants into control group and experimental group each with 28 and 26 students respectively. The results showed that FI students scored better than FD students in reading comprehension. Setyosari, Degeng, and Sulton (2019) studied the influence of cognitive learning styles on academic performance of students who were taking geography. The subjects of the study were 128 students. The students were categorized into either FI or FD using GEFT. The results showed that there were differences in performance of students with FI and FD cognitive learning styles.

In Nigeria, Onyekuru (2015) explored the link between FD-FI cognitive learning styles and academic performance among students sampled from secondary schools in Rivers State. The researcher used cluster sampling to select 16 secondary schools from which a sample of 320 students. GEFT test was administered to the sampled students and then the scores were used to categorize the learners as either field independent, field dependent or ambiverts. The results revealed that 28.13% of the sampled male students were field dependent while 21.25% of the respondents were field independent. It was also revealed that FD students had a higher achievement mean score in sciences while FI students had a superior score in arts than FD students. The study focused on the association between FD and FI cognitive learning styles and performance in arts and sciences and therefore, there was need to focus on reading comprehension performance to compare the findings.

Locally, the correlation between FD and FI cognitive learning styles and reading comprehension performance has not been

directly investigated. In a related study, Musya (2015) investigated the correlation between cognitive learning styles and academic achievement in chemistry among secondary schools students. A sample of two hundred form three students responded to questionnaires. The students were taken from public secondary schools located in Kitui County in Mwingi north constituency. Half of the students were selected from high achieving secondary schools and the rest from average and low achieving schools. Data were collected and analysis done using SPSS (Statistical Package for Social Sciences). The results revealed that a bigger percentage of males showed a FI cognitive style and performed better in Chemistry as compared to their counterparts; a higher percentage of females employed a FD cognitive style and performed dismally as compared to their counterparts. Since the study focused on achievement in chemistry as the outcome variable, the current study focused on reading comprehension performance to support or discredit the findings.

III. METHODOLOGY

A. Research Design

The researcher used correlational research design. This design is employed when the independent variables cannot be manipulated (Kothari & Garg, 2014). Correlational research design is a quantitative technique of research in which two or more variables from the same subjects are studied to determine if there is covariance or relationship (Kothari & Garg, 2014). Using this design, the researcher sought to establish the relationship between FD-FI cognitive learning styles, learning goal orientations and reading comprehension performance. This method was suitable for this study because FD and FI cognitive learning styles and goal orientation cannot be manipulated due to ethical issues such as isolating the students on the basis of their cognitive learning styles and limited expertise on the part of the researcher to successfully conduct an experimental study. Correlational research design has been successfully used to study the factors that influence academic performance among secondary schools in Kiambu County. Mwangi (2015) used this design to examine the relationship between resilience and academic achievement and the results were consistent with the findings of most studies conducted earlier. In another research, Ngunu (2019) used that same design to study selected correlates of academic achievement and the researcher was able to verify the study hypotheses.

B. Locale of the Study

The locale of this study was Kiambu County. Most public sub county day secondary schools in the county were reported to be struggling with dwindling academic achievement (Mwangi, 2015). The county was suitable for this study because academic performance in most public sub county day secondary schools was found to be below average (Nganga, 2018). According to KNEC statistics (2018) the County was ranked position 36 and 38 in KCSE in the years 2017 and 2018 respectively. Furthermore, most of the last 200 public day secondary schools in KCSE in the year 2016, 2017 and

2018 were from Kiambu County. A study by Chege (2012) found that reading comprehension had a significant positive correlation with academic performance. Therefore, dismal academic performance in public day secondary schools in Kiambu County may be attributed to poor reading comprehension, hence the need for this study to address the problem. Even though some scholars had tried to address this problem, no attempt was made to find out the relationship between FI-FD cognitive learning styles, learning goal orientation and reading comprehension performance.

C. Sampling Techniques

The public day secondary schools were selected using purposive sampling because statistics obtained from the Kiambu County Education Office indicated that the schools have been consistently performing below average in national examinations. Out of 176 public day secondary schools, 20 of them were selected using simple random sampling. The schools were given codes from 1 to 174 and then the research assistants were instructed to write the numbers on small pieces of paper. Two schools were excluded from the study because they were involved in the piloting of the research instruments. They were then folded and put in a bowl for reshuffling. To select the twenty schools, twenty pieces of paper were randomly selected from the bowl. For schools that had more than one stream, simple random sampling was used to select one stream. The students were selected using proportionate stratified sampling to ensure that both boys and girls are given equal chances of participating in the study.

D. Research Instruments

The study employed two research instruments namely; The modified Group Embedded Figures Test (GEFT) and the English comprehension test.

i. Modified Group Embedded Figures Test (GEFT)

The researcher used Field Independence/Dependence Questionnaire by Robert Wyss (2002) adapted from the Group Embedded Figures Test (GEFT) to categorize the students. Due to the complexity of GEFT scale, the constructs of the scale were simplified in order to categorize the respondents into either FI or FD. Guided by the adapted GEFT used by Musya (2015) in a study that investigated the relationship between cognitive styles and academic achievement, the researcher developed an 18 item scale. The scale was categorized into FI and FD cognitive learning styles, each with nine items. The researcher used test-retest technique to establish the reliability of the research instrument. The results are presented in Table 2.

Table 2: Reliability Coefficient for FI-FD Scale

		Test 1	Test 2
Test 1	Pearson Correlation	1	.77
	Sig. (2-tailed)		
	N	30	30
Test 2	Pearson Correlation	.77	1
	Sig. (2-tailed)		
	N	30	30

As indicated in Table 2, the correlation between the test and re-test scores was .77. The correlation coefficient was within the recommended range of 0.7 and above (Kothari & Garg, 2014). Masoud and Mehrnoush (2015) used a modified GEFT and reported a reliability coefficient of .61.

Before the pilot study, the FI/FD statements were measured on a five point Likert scale (A-E) starting from 3, 2, 1, 2 to 3. The respondents were provided with the following instructions;

“Check one box in each item that best describes you. Boxes A and E would indicate that the Statement is very much like you. Boxes B and D would indicate that the sentence is more or less like you. Box C would indicate that you have no particular inclination one way or the other.”

However, when the respondents were given the questionnaire to fill, some of them indicated that they used both FI/FD cognitive learning styles at the same time. To avoid this confusion during the actual study, the instructions were reviewed to read as follows;

“Read all the statements in part I and II and then decide which side best describes you. You are required to respond to questions in one side only. Check one box in each item that best describes you. Box A would indicate that the statement is very much like you. Box B indicates that the sentence is more like you while Box C indicates that the sentence is less like you.”

The students were also asked to indicate statements which were ambiguous. After the corrections were done, the questionnaire was administered to a different group of students selected from the same schools.

The pilot study was carried out in two public day secondary schools in Kiambu County. The sample size consisted of 30 students (16 girls and 14 boys). The questionnaire consisted of 18 items concerning field dependent and field independent. It places a person on a scale between field dependent and field independent. The expected highest score for FD/FI was 27. Based on the category with the highest score, the students were classified as FI or FD. The reliability coefficient of the test was 0.77.

ii. English Comprehension Test

The researcher adapted the English Comprehension test from Pavement form two English examination term III 2016. The passage is about peer pressure and has eight paragraphs. To measure the reading comprehension of the respondents, they were required to answer six multiple choice questions. Originally the test consisted of open-ended questions but the researcher developed four multiple choices for each question. This was done to ensure that scoring was objective and also make it possible to generate quantitative data that would be used to test the research hypotheses. In the original reading comprehension test, question one read “Why did the author start smoking?” However, when the test was pretested it was established that it had a low discrimination index and low

item difficulty index. To achieve acceptable item discrimination and difficulty indices, the item was revised to read as “Why did the author start smoking bhang?” The results of the pilot study showed that item discrimination and difficulty indices were within the acceptable range. The other five items met the criteria for inclusion and therefore, they were not altered. To establish the reliability of the test, the test-retest technique was used, and the results obtained are presented in Table 3.

Table 3: Test Re-test Reliability Coefficient for Reading Comprehension Test

		Test 1	Test 2
Test 1	Pearson Correlation	1	.713
	Sig. (2-tailed)		
	N	30	30
Test 2	Pearson Correlation	.713	1
	Sig. (2-tailed)		
	N	30	30

The results indicate that the correlation coefficient of the test and retest scores was greater than .70 as recommended by Biemer, Christ and Wiesen (2009).

E. Data Collection

The sampled schools were listed down and then given codes for easy identification of the questionnaires during data coding. In some of the schools, the researcher delivered the data collection instruments in person accompanied by the research assistants. Upon getting permission from the school principal, simple random sampling was used to select the respondents. It took about 15 minutes to take the sampled students through the instructions and once they indicated they understood what they were expected to do, they were allowed to fill the research instruments. In some schools, the researcher requested the class teachers for assistance to collect data. The teachers were taken through the instructions on what the students were expected to do. In such schools, the research instruments were delivered and then the teachers were allowed to collect data at their own convenient time. The filled research instruments were collected on a later date. This technique of data collection was the most appropriate for this study because it was cost effective and enabled the researcher to reach more respondents compared to other techniques.

F. Data Analysis

All the questionnaires were checked for completeness and out of 860 questionnaires that were administered, five of them were discarded because they had more than four items that were not filled. The remaining questionnaires were coded into a data book and then entered into SPSS computer program Version 23. Preliminary treatment of the data involved checking for any missing data and outliers. Missing values were replaced and outliers deleted before analysis. Descriptive data were analyzed using frequencies, percentages, means and standard deviations. Assumptions for the statistical tests were tested using scatter plots, histograms, kurtosis and skewness.

The results were presented using tables. Inferential statistics; Pearson correlation and independent samples t-test were used to test the following hypotheses;

- H₀₁ There is no significant relationship between FD and FI and reading Comprehension performance among secondary school students in Kiambu County: Statistical test; Pearson product moment correlation.
- H₀₂ There is no significant relationship between mastery and performance goal orientations and reading comprehension performance among secondary school students in Kiambu County. Statistical test; Pearson product moment correlation.
- H₀₃ There are no significant differences in reading comprehension performance of students with FD and FI cognitive styles in Kiambu County. Statistical test; t-test for independent samples.
- H₀₄ There are no significant differences in reading comprehension performance of students with mastery and performance goal orientations in Kiambu County. Statistical test t-test for independent samples.
- H₀₅ There are no significant gender differences in FD and FI cognitive styles and goal orientation towards reading among secondary school students in Kiambu County. Statistical test t-test for independent samples.

IV. FINDINGS

A. Demographic Data of the Respondents

The demographic data of the respondents collected were gender and age. Table 4 shows the gender of the respondents.

Table 4: Gender of the Respondents

Gender	Frequency	Percent
Male	419	48.9
Female	437	51.1
Total	856	100.0

Table 4 shows that 419 respondents representing 48.9% were boys while 437 respondents representing 51.1% were girls. The results indicate that the number of girls involved in the study was slightly higher than that of boys. This difference is attributed to the fact that in public secondary schools in Kiambu County, the number of girls enrolled is slightly higher than that of boys.

The researcher then examined gender distribution across the age categories and the results are presented in Table 5.

Table 5: Respondents' Gender and Age cross tabulation

		Age			Total
		16-18	19-20	21 and above	
Gender	Male	366(42.8%)	45(5.2%)	8(0.9%)	419
	Female	415(48.5%)	20(2.3%)	2(0.2%)	437
Total		781	65	10	856

As shown in Table 5, majority of the respondents for both boys and girls were between 16 and 18 years. A total of 415 girls representing 48.5% and 366 boys equivalent to 42.8% were aged between 16 and 18 years. Those aged between 19 and 20 years were 45 boys (5.2%) and 20 girls (2.3%). Only 8 boys (0.9%) and 2 girls (0.2%) were in the age category of 21 years and above. The findings indicate that majority of the respondents were in the recommended age bracket (16-17 years) for form two students. The few students who were 19 years and above might have delayed in schooling due to several factors such as sickness, financial challenges and truancy. Majority of the boys were older than the girls in the age category of 19 years and above. This disparity may be attributed to the less attention the boys are getting on matters of education. Probably some of them are not consistent in school attendance which makes them to repeat classes. Others may be dropping out of school and then come back or get suspended because of indiscipline which delay them in proceeding to the next class. Regarding the issue this study sought to address, the findings indicate that all the respondents were in the right age in cognitive development and therefore, they were expected to perform well in reading comprehension.

To understand the distribution of the respondents' cognitive learning style on the basis of gender, the data were cross tabulated and the results are presented in Table 6.

Table 6: Respondents' Gender and Cognitive Learning Style Cross Tabulation

		FI and FD				Total	
		FI		FD		F	%
Gender	Male	214	25	205	23.9	419	48.9
	Female	238	27.9	199	23.2	437	51.1
Total		452	52.9	404	47.1	856	100

Note. FI – Field Independent; FD – Field Dependent; F- Frequency; % - Percentage

Table 6 shows that 452 respondents (52.9%) had field independent cognitive learning style while 404 respondents (47.1%) had field dependent cognitive learning style. Concerning cognitive learning style and gender, 214 boys (25%) had field independent learning orientation while 205 (23.9%) had field dependent learning orientation. For the girls, 238 (27.9%) of them had field independent cognitive learning style while 199 (23.2%) girls had field dependent cognitive learning style. The results indicate that the number of respondents with FI and FD cognitive learning styles was almost equal.

The distribution of the respondents across the categories of age was analyzed and the findings are presented in Table 7.

Table 7: Age Categories of the Respondents

Age category (years)	Frequency	Percent
16-18	781	91.2
19-20	65	7.6
21 and above	10	1.2
Total	856	100.0

Table 4.5 shows that 781 respondents representing 91.2% were aged 16-18 years. Only 10 respondents (1.2%) were aged 21 years and above while 65 respondents (7.6%) were aged between 19 and 20 years. The findings indicate that majority of the respondents were within the required age of Form Two students of 16-18 years. A substantial number of respondents were much older than is expected due to some of the factors discussed under Table 3.

The researcher also analyzed the distribution of the respondents with FI and FD cognitive learning styles across the age categories and the results are presented in Table 7.

Table 7: Respondents' Cognitive Learning Styles across the age categories

		FI and FD				Total	
		FI		FD		F	%
		F	%	F	%		
Age	16-18	410	47.9	371	43.3	781	91.2
	19-20	36	4.2	29	3.4	65	7.6
	21 and above	6	0.7	4	0.5	10	1.2
Total		452	52.8	404	47.2	856	100

Note. FI – Field Independent; FD – Field Dependent; %- Percentage; F-Frequency

Regarding the distribution of respondents based on cognitive learning styles across the age categories, Table 7 shows that 410 respondents representing 47.9% and 371 respondents (43.3%) with FI and FD learning orientations respectively were aged between 16 and 18 years. The respondents aged between 19 and 20 years with FI and FD learning orientations were 36 (4.2%) and 29 (3.4%) respectively. The respondents with FI and FD learning goal orientations that were aged 21 years and above were 6(0.7%) and 4 (0.5%) respectively. The results indicate that there was a slightly higher number of respondents with FI learning orientation than those with FD learning orientation in the age category of 16-18 years. The same trend was observed in all the age categories. These findings contradict the results of Zhang (2010) who found that cognitive learning styles change with age. However, the age differences noted in this study were not significant to affect the cognitive learning styles of the respondents.

B. Hypothesis Testing

The researcher sought to find out if FD-FI cognitive learning styles were significantly related to reading comprehension performance or not. To achieve this, the researcher tested the following null hypotheses;

H₀₁ There is no significant relationship between FD cognitive learning style and reading comprehension performance.

H₀₂ There is no significant relationship between FI cognitive learning style and reading comprehension performance.

The hypotheses were tested using Pearson product moment correlation analysis and the results are presented in Table 8.

Table 8: Correlation between FD-FI Cognitive Learning Styles and Reading Comprehension Score

		Reading comprehension score
FI score	Pearson Correlation	.32*
	Sig. (2-tailed)	.01
	N	452
FD score	Pearson Correlation	.48*
	Sig. (2-tailed)	.00
	N	404
Reading Comprehension score	Pearson Correlation	1
	Sig. (2-tailed)	
	N	856

Note. FI - Field independent; FD - Field Dependent

The correlation of cognitive learning styles was done at two levels; field independent and field dependent. The findings revealed that there was a significant relationship between field independent cognitive learning style and reading comprehension performance ($r(452) = .32, P = .01$). Therefore, the null hypothesis was rejected. The results also indicated that there was a positive significant correlation between field dependent cognitive learning style and reading comprehension score, $r(404) = .48, P = .00$. The researcher hypothesized that there is no significant relationship between field dependent cognitive learning style and reading comprehension performance. Since the correlation is significant, the null hypothesis was rejected and the alternative one adopted. Therefore, an increase in field dependent scores leads to an increase in reading comprehension scores and vice versa.

V. DISCUSSION OF THE RESULTS

The findings of this study support the results of other studies conducted in the area but contradict the findings of other researchers with regard to the relative contribution of FI and FD cognitive learning styles to academic performance. Nisiforou and Parmaxi (2016) conducted a study in Greece among university students to examine the effect of cognitive learning styles on performance in computer assisted language learning. The results showed that students with FD cognitive learning orientation performed better than students with FI cognitive learning orientation. The findings are consistent with the results of the present study and therefore this indicates that regardless of the level of learning and culture, cognitive learning styles influence academic performance of the students.

The current study established that majority of the respondents used FI cognitive learning style. Analysis of the levels of reading comprehension scores showed that majority of the respondents had average scores. The reading comprehension mean score of students with FD cognitive learning orientation was higher compared to the mean score of students with FI cognitive learning orientation. Clearly, the results demonstrate

that cognitive learning styles affect reading comprehension performance. FD cognitive learning style was found to enhance reading comprehension performance better than FI cognitive learning style.

In another study, Sheykhi and Mohamadi (2017) established that there was a positive significant relationship between cognitive learning style and reading comprehension performance. The study also found that FD students performed better in reading comprehension compared to FI students. The findings imply that the degree to which a learner is able to overcome the effects of environmental distractors, is related to academic performance. For instance, FD learners find it difficult to focus on the learning task in a learning environment with distractors. Therefore, for this category of learners to perform well in reading comprehension, the learning environment should be free from irrelevant extraneous environmental factors. On the other hand, FI are able to focus on the learning task amid environmental distractors. FD learners use global approach to learning while FI learners are analytical thinkers and tend to process information critically. The differences in reading comprehension performance among learners with FD and FI cognitive learning styles may be attributed to the fact that FD use wholist approach to learning which makes them to understand the learning content better than FI students.

Based on these findings, the below average performance in English language in most day secondary schools in Kiambu County may be attributed to FI cognitive learning orientation which gives the students little opportunity to understand the content. Reading comprehension requires the learners to employ a global and holistic approach which is a characteristic of learners with FI cognitive learning style. In this approach, the immediate environment plays a significant role in learning and reading comprehension in particular. Therefore, since learners with FI cognitive learning style are not able to overcome the effects of environmental factors, they end up learning very little leading to dismal performance in English that is experienced in Kiambu County.

Another group of researchers has demonstrated that FI students perform better in academics than FD students. Oludipe (2014) reported that there was a significant relationship between cognitive learning styles and performance in physics. The study that was carried out among secondary school students also revealed that FI students performed better in physics than FD students. The contradictory findings may be attributed to the different subjects that were studied. Most concepts in physics are abstract and therefore require reflective learning approach which is a characteristic of FI students. On the other hand, learning English language requires global learning approach which is a characteristic of FD students. Therefore, FD students perform better than FI students in reading comprehension while FI students perform better than FD students in physics. The differences in performance among students with different learning styles can be attributed to the

fact that different subjects require different cognitive learning styles.

VI. CONCLUSIONS

The results showed that there was a significant relationship between FD-FI cognitive learning styles and reading comprehension performance. The correlation coefficient was higher for students with FD cognitive learning style. The results imply that students with FD cognitive learning style performed better in reading comprehension than students with FI cognitive learning style. Since FD students learn more depending on how enriching the learning context is, its important that parents, teachers and school administrators provide an external learning context that stimulates learning to enhance reading comprehension performance. The students also need to support one another because they are part of the social context that is important to the learning of students with FD cognitive learning style. Such efforts may improve reading comprehension performance and the overall quality of education in secondary schools.

VII. RECOMMENDATIONS

The study established that there was a significant relationship between FD-FI cognitive learning styles and reading comprehension performance. Based on the results, its recommended that curriculum designers and the developers of learning content should include cognitive learning styles in course content to educate secondary school students on the importance of FD cognitive learning style in reading comprehension performance and how to develop it.

The study found that there was a significant difference in reading comprehension performance of students with different cognitive learning styles. The study recommends that teachers should use diverse teaching methods that cater for the different cognitive learning styles to improve reading comprehension performance.

Policy Recommendations

The study established that there was a significant relationship between cognitive learning styles and reading comprehension performance. However, the study did not investigate the variables that influence cognitive learning styles. Therefore, future research should investigate the factors that can be manipulated to influence cognitive learning styles for better reading comprehension performance.

The study found that there was a significant difference in reading comprehension performance of students with different cognitive learning styles. The study recommends that teachers should use diverse teaching methods that cater for the different cognitive learning styles to improve reading comprehension performance.

Recommendations for Further Research

i. The study established that there was a significant relationship between cognitive learning styles and reading comprehension performance. However, the study did not

investigate the variables that influence cognitive learning styles. Therefore, future research should investigate the factors that can be manipulated to influence cognitive learning styles for better reading comprehension performance.

ii. The findings of this study revealed that there was a statistically significant difference in reading comprehension performance between students with FD and FI cognitive learning styles and those with mastery and performance goal orientation. The researcher used ex post facto research approach and therefore future research should adopt experimental design to create more knowledge in this area.

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