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APPROPRIATENESS OF MNEMONIC TECHNIQUES ON FREE RECALL LEARNING OUTCOMES IN PUBLIC UPPER PRIMARY SCHOOLS IN MACHAKOS SUB-COUNTY, KENYA

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Abstract:
The purpose of this study was to investigate the appropriateness of mnemonic techniques on free recall learning outcomes in primary schools in Machakos Sub-County, Machakos County, Kenya. A 2x4 factorial design was used to test the appropriateness of three mnemonic techniques on free recall learning outcomes. Stratified sampling was to select one school from each of the three educational zones of Machakos Sub-County. Purposeful sampling was used to select four schools with mean grades between 279-281 marks in 2017 KCPE results. Random sampling was used to assign intact groups experimental and control groups. A sample size of 317 pupils was selected from standard seven pupils to participate in the study. The following research instruments were used: observation schedules for monitoring treatment process, Questionnaires for testing pupils' satisfaction level and test scores for measuring free recall learning outcomes. The validity and reliability of the instruments was established by piloting the research instruments in Kathiani Sub-County. The reliability of the research instrument was determined through the split-half correlation method. The treatment process involved exposing pupils to learning using three mnemonic instruction conditions. Two-way ANOVA was used to analyse the data. Post-hoc pair wise comparison (LSD) was done to test which groups had significant difference. The results were analyzed descriptively and inferentially. The study had the following findings: no significance differences ($F(3,318)= 2.26$, $P> 0.05$) were found in free recall

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learning outcomes between learners who were taught using the three mnemonic techniques hence none of the three mnemonic techniques was found to be more appropriate for free recall learning tasks. The study recommended that, teacher trainees need to be trained on how to teach using mnemonic techniques and similar study should be replicated with samples drawn from students in secondary schools, colleges and Universities.

Keywords: free call, verbal learning, pegword, keyword, learning outcomes, mnemonic techniques

1. Introduction

Learning involves connecting new information with existing concepts, knowledge and experience. Hence, new information is linked to existing knowledge by the learner to form new knowledge, and this process is known as constructivism. The links are stronger if they involve recent vivid, multisensory experiences, encountered in the learning process (Petty, 2009). Free recall learning is unstructured content one can recall words in any order they would like (Thomson 2005).

According to Lervag and Hulme (2010), free recall learning is an unstructured form of verbal learning, one can recall words in any order they would like. Although it is different from serial learning, free recall tasks will also show a serial position effect similar to that obtained with serial learning. In addition, a serial position effect similar to that obtained with serial learning. According to Chazin and Neuschatz (1990) free recall is facilitated by several factors viz; the more an item is rehearsed, the greater the likelihood that the item will be recalled. Organizing of information into some type of meaningful system also enhances recall ability. Some organizational heuristics include;

1) Associative clustering which involves putting presented stimuli together in a manner that utilizes preexisting associations.
2) Categorical clustering involves breaking a large number of specific words down into several smaller groups organized by conceptual similarity, such as schools, cities, etc.
3) Subjective organization involves using idiosyncratic associations that are relevant only to individuals.

Mnemonic techniques are systematic procedures for enhancing memory. They are used in developing better ways to encode information so that it will be much easier to retrieve, Brigham, Scruggs, and Mastropieri, (1995). Mnemonics techniques are memory devices that enable students to remember information more easily and effectively. Mnemonics perform this function by connecting the new, unfamiliar information that must be learned and remembered with information that is already known by the learner by the use of visual and auditory cues (Mastropieri, Sweda, & Scruggs, 2000).

Mnemonic techniques, such as acrostics and acronyms, have facilitated individuals to recall information by making new information more familiar, meaningful

and concrete (Bakken & Simpson, 2011). These devices are effective and are used by students to recall information on various subjects. Young adult learners have used mnemonics techniques to improve their vocabulary knowledge (Bakken & Simpson, 2011). Mnemonic techniques accelerate the rate of acquisition of new knowledge in Elementary accounting and help to enhance formal reasoning (Laing, 2010). Laing added that mnemonic techniques such as acronyms and acrostics, narratives and rhymes help to make abstract concepts more meaningful. An acronym that students learn to recall the colours of the rainbow is ROY G BIV. This helps them to remember the order of the colours correctly as red, orange, yellow, green, blue, indigo and violet (Bakken & Simpson, 2011).

Mnemonic techniques are also viewed as mnemonic systems which aid the memory in encoding, retaining and retrieval. The term may also refer more specifically to rather unusual, artificial memory techniques, the kinds recommended in popular memory-training books (e.g., stories, rhymes, acronyms, verbal mediators, visual imagery).

In education, mnemonics are often used at the initial stage of knowledge acquisition. They may act in this early stage as scaffolding for more permanent schematic knowledge that develops as education advances (Bellezza, 1996). Indeed, psychology courses (especially those taken early in the curriculum, such as introduction to psychology) require the mastery of an entirely new area before students can study more complex concepts (Balch, 2005; Carney & Levin, 1998). The types of elaborative strategies incorporated into mnemonics support this process.

Carney and Levin (1998) tested the use and impact of keyword mnemonics for study of brain structures and functions. For example, to remember the function of the *medulla*, one could use the keyword medal, and then imagine a runner winning a race, breathing heavily and with his heart pounding, then bending over to have a medal hung around his neck. After a 2-minute delay, both the keyword and the keyword-plus-image group which were similar in performance, they outperformed a control group using a rote repetition strategy, on definitional and applied test items. Because Carney and Levin's results did not suggest that instructor-provided imagery added to the keyword's helpfulness, they recommended that instructors teach the keyword method and provide the specific terms and relevant keywords for the to-be-learned material, so that learners can create interactive images on their own.

In a study by Shriberg, Levin, McCormick, and Pressley (1982), eighth grade students were presented with short passages describing the names and accomplishments of fictitious people. The keyword adaptation consisted of translating the "famous" person's surname into a concrete keyword, and then creating a pictorial relationship between the keyword and the person's accomplishment. Thus, to remember that Char- McKune was famous for owning a counting cat, *McKune* could be "keyworded" as *raccoon,* and one could then picture a cat counting raccoons jumping over a fence. In the Shriberg et al. study, students who were shown actual keyword illustrations of this kind recalled over three times more name-accomplishment information than did non-strategy control subjects. Moreover, subjects who were

instructed to generate their own keyword images recalled more than twice information as controls. In the current study teachers were supposed to use mnemonic techniques instruction strategies provided by the researcher other than their own strategies in order to ensure uniformity.

Carney and Levin (2008) investigated the short-term and long-term benefits of keyword mnemonics, using phobia words as stimuli. For example, to remember that *harpaxophobia which* refers to the fear of *robbers*, one could imagine *robbers* stealing a lovely *harp*. Three experiments showed significant advantages of the keyword mnemonic over a repetition condition, on immediate and 2-day-delayed tests of forward recall, inferential matching, categorization, and backward recall. Given that their results uniformly and strongly supported the advantages of the keyword mnemonic in a variety of immediate and delays recall contexts, the researchers cautioned instructors against avoiding mnemonics due to "*mnemonophobia*."

McCabe, Osha, Roche, (2013) extended the work of Carney and Levin (2008) by adding hand gestures to keyword mnemonics using similar phobia terms and keywords, he compared a gesture condition, in which an actor read aloud the imagery sentence while incorporating iconic hand gestures, to a non-gesture condition, in which the actor read the sentence aloud with no gestures. Gestures were advantageous on the 10-min-delayed test, although not at the 1-week-delayed test. He recommended further investigate on whether adding hand gestures to mnemonics is helpful for long-term memory, and whether it is beneficial for learners to do the hand gestures themselves, in addition to watching the gestures being performed.

McCabe, Craig et al. (2013), in a study to explore the use of mnemonic in studying introduction to psychology, extended Balch's work, and conducted a study that compared three conditions when learning brain terms in introduction to psychology: simply reading instructor provided examples and keyword mnemonics, self-generating examples, and self-generating keyword mnemonics. Results indicated a learning advantage on a structure-to-function matching test at both a 10-min delay and a 2-day delay for the generate-keyword condition, whereas the read-only and generate-example conditions were lower and similar to each other. Thus, for keyword mnemonics, as with acrostics, evidence suggests that self-creation is beneficial for learning.

A study, done by Chazin and Neuschatz (1990), investigate the effect of a music mnemonics on the recall of unfamiliar scientific information. The sample composed of 26 8-yr.-olds and 20 18- to 21-yr.-olds, who were divided into four different groups: older song group, older lecture group, younger song group, and younger lecture group. Both the lecture and the song presented to the subjects included minerals, colors, and other related information to be recalled. The researcher used 2×2 factorial design was used to test analysis showed information learned in a song increased recall rate over recall after lecture. Another study, Rainey and Larsen (2000), to determine the effect of familiar melodies on initial learning and long-term memory for unconnected text. In their two experiments they hypothesized that, music in the form of a familiar melody, can serve as an effective mnemonic technique. Participants learned a list of names that

they heard either spoken or sung to a familiar tune. In experiment 1, the melody was "Pop Goes the Weasel"; in experiment 2, the melody was "Yankee Doodle." They measured the number of trials to learn the list initially and the number of trials to relearn the list a week later. In both studies, there was no advantage in initial learning for those who learned the names to the musical accompaniment. However, in both studies, participants who heard the song version required fewer trials to relearn the list of names a week later than did participants who heard the spoken version.

Scruggs and Mastroprieri (2004) conducted a study on usefulness of mnemonic technique on high school students with learning disabilities. Over a six-week period students were taught the vocabulary words using either traditional instructional approach for control group where else experimental group were taught using pictorial mnemonic keyword technique. At the end of the instructional period, post test showed that there was significance difference between the two groups in favour of experiment group. Rummel, Levin and Woodward (2003), conducted experiment using college students to read a historical passage on aspects of human intelligence. Students were randomly assigned to two different instructional conditions, mnemonic techniques and traditional methods. Findings showed that mnemonic techniques are useful in improving students' memory for and application of central textual information.

Although literature existed on mnemonic enhancing and improving memory, this study did not report the appropriateness of the three mnemonic techniques on free recall learning outcomes, the researcher sought to fill this gap by investigating the appropriateness of the three mnemonic techniques on free recall learning outcomes, which were also tested for both immediate recall and delayed recall.

2. The Purpose of the Study

The main aim of this study was to establish the appropriateness of mnemonic techniques in of free recall outcomes.

2.2 Objectives of the Study

Objectives of the Study were to find out whether:
There are differences in free recall learning outcomes between learners using keyword, pegword and music mnemonic techniques public upper primary pupils.

2.3 Hypotheses of the Study

H_0: There are no significant differences in free recall learning outcomes between learners using keyword, pegword and music mnemonic techniques in public upper primary pupils.

3. Research Methodology

3.1 Research Design

The study adopted 2x4 factorial research design. A factorial-experimental setup consists of multiple factors and their separate and conjoined influence on the participants in the experiment Trochim (2004). Trochim continues to say that, a main effect in factorial - experimental design is an outcome that is a consistent difference between levels of a factor. An interaction effect exists when differences on one factor depend on the level you are on another factor. The purpose of factorial research design in this study was to study three independent variables: mnemonic instructions treatment conditions (pegword, keyword and music) simultaneous, and examine their effects on dependent variable (learning outcomes) at two levels (immediate and delayed recall learning outcomes).

3.2 Research Variables

According to Kothari (1985), if one variable depends upon or is a consequence of the other variable it is termed as dependent variable. The variable that does not depend on other variable is termed as independent variable.

In the current study, the independent variables were three mnemonic treatment conditions The dependent variable was learning outcomes which was measured at two levels: immediately and delayed recall.

3.3 Location of the Study

The study was carried out in Machakos Sub-County, Machakos County, Kenya. Machakos County had 998 primary schools, 346 secondary schools, one public university and over 30 post-secondary institutions. Machakos sub-county is divided into three educational zones: Muvuti zone which had 36 primary schools, Mumbuni zone which had31 primary schools and Mutituni zones which had 26 primary schools.

3.4 Target Population

The target population comprised of all public primary schools in Machakos sub-county. The accessible population was class seven pupils. According to statistics obtained from Machakos Sub-County Education office, in January 2018, there were a total of 92 primary schools in Machakos Sub-County with an estimated population of 25,966 pupils. There were 13,932 boys and 12,034 girls.

The ability level of pupils in the schools selected for the study show that schools had performed more or less the same in KCPE national exam with a mean grade range between 279-281; hence this would minimize variations due to ability level of the learners.

3.5 Sampling Techniques and Sample Size

According to Kombo and Tromp (2006) sampling is suitable in selecting a number of individuals from a population. The selected group contains elements which are representative of the characteristics found in the entire population. Stratified sampling technique was used to select at least one school from each zone of the three educational zones in Machakos Sub-County. Purposeful sampling technique was used to select primary schools with similar grade in KCPE 2019 national examination. Random sampling was used to assign the four schools three treatment groups and control group. A sample of 317 pupils was used for study.

3.6 Research Instruments

Four research instruments were used in this study: observation schedules, pupils satisfaction survey questionnaires and achievement tests.

3.7 Pilot Study

For the purpose of the pilot study, 32 pupils were used for pilot study which was an equivalent 10% of the total sample size. The pilot study was conducted in a primary school in neighbouring Kathiani Sub-County.

3.8 Validity

Validity refers to whether an instrument is really measuring what it is intended to measure (Orodho, 2004). Face validity is a subjective and cursory judgment of a concept, assessment of instrument, or any other conceptualization to ascertain whether or not its face appears valid (Belly, 1993). Pilot study was used to identify those items that could be misunderstood and such items were modified accordingly.

3.9 Reliability

Reliability refers to whether an instrument is measuring consistently in different situations but comparable occasions. There are several forms of reliability test: test retest, alternate form and split-half reliability (Kothari, 2011). Split-half reliability test was used to test reliability of the research instruments. The Spearman-Brown formula was used to calculate the correlation coefficients of the two sub-scales.

Table 1: Reliability Coefficients for Research Instruments

Instruments	**Pearson Correlation Coefficients**	**Corrected Coefficients**
Questionnaires	0.694	0.87
Observation schedule	0.706	0.89
Achievement tests (RAT)	0.709	0.92
Achievement tests (CAT)	0.710	0.93

All the research instruments gave reliable Correlation coefficient indexes of above 0.7. According to Gay (1992) any instrument with a split-half estimate of between 0.7 and 1.0 is readily acceptable as reliable enough.

3.10 Data Collection

Data collection refers to gathering specific information aimed at providing or refuting some facts (Kombo, 2006). The collection involved two stages: treatment stage and measuring stage.

3.10.1 Treatment Stage

The researcher started by first training teachers how to use the three mnemonic techniques instruction method in teaching. This training lasted for two sessions in each of the three schools which participated in intervention process.

Two main methods of instruction methods were used in this study: The mnemonic instruction methods for the three treatment groups and conventional method of instruction for control group. The mnemonic instruction involved intervention process where pupils in the three treatment conditions were taught using keyword, pegword and music mnemonics.

During this period observation schedule were used to monitor how teachers are teaching using mnemonics instruction method.

3.10.2 Measurement of Free Recall Learning Outcomes

Post-tests achievement tests for free recall learning tasks were administered after intervention process of mnemonic instruction methods to each of the treatment groups and one control group. Achievement tests were administered at two levels: immediately after the lesson and three weeks after continuous exposure to mnemonic treatment.

3.11 Data Analysis

The importance of data analysis is to assists the researcher to know the findings of the study so as to enable the researcher to identify the areas of gaps for further study (Komboand Tromp, 2011). Raw data was analysed descriptively and inferentially using 2X4 two-way ANOVA. Post-hoc Pairwise comparison by least square difference (LSD) was performed to establish where significance differences exited.

4. Findings

4.1 Appropriateness of Keyword, Pegword and Music Mnemonic Techniques on Free Recall Learning Outcomes

The researcher sought to investigate whether there were differences in free recall learning outcomes between learners using keyword, pegword and music mnemonic techniques. In order to obtain data, post-test scores were obtained after intervention process of the three mnemonic treatments groups and a control group. The data was then analysed and presented descriptively and inferentially.

4.2 Descriptive Analysis for Mnemonic Techniques Scores on Free Recall Learning Outcomes

The participants' free recall learning outcomes scores of learners taught using keyword, pegword and music mnemonic instructions conditions were analyzed to get the mean and standard deviation. The results are presented in Table 2.

Table 2: Descriptive analysis for keyword, pegword and Music Mnemonic techniques and control group on free recall learning outcomes

Mnemonic Device	Type of Assessment	N	Minimum	Maximum	Mean	Std. Deviation
Pegword	RAT	41	20.00	86.00	46.15	16.89
	CAT	41	22.00	67.00	52.40	10.19
Keyword	RAT	35	20.00	71.00	47.23	14.88
	CAT	35	25.00	73.00	53.43	12.39
Music	RAT	50	22.00	78.00	50.14	12.81
	CAT	50	34.00	83.00	55.54	10.37
Control Group	RAT	37	18.00	71.00	45.32	12.49
	CAT	37	17.00	83.00	50.11	16.88

Table 2 shows that there were mean difference between the three mnemonic technique treatment conditions and control group. Music had the highest mean score (50.14,55.54) and standard deviation of 12.81, 10.37, keyword was second with mean of 47.23,53.43and standard deviation of 14.88, 12.39, pegword was least with a mean of 46.15, 52.4 and standard deviation of 16.89, 10.19, finally control group recorded mean of 45.32,50.11 and standard deviation of 16.89, 10.19, for RATs and CATs respectively. Descriptive analysis also shows that there were mean difference between the factor B (two type of assessment). This is an indication that means scores of CAT (delayed recall) were higher than the mean scores for RAT (immediate recall) across all levels of factor A (mnemonic technique) treatment and control group.

4.3 Inferential Analysis for Mnemonic Techniques Scores on Free Recall Learning Outcomes

Regarding the null hypothesis (H_0:) There is no significant difference in free recall learning outcomes between learners taught using keyword, pegword and music mnemonic instruction methods. A two-way ANOVA analysis was done. This hypothesis was divided into two supplementary hypotheses: To test for significance differences between factor A (mnemonic technique) and free recall learning outcomes and to test for significance differences between in factor B(type of assessment) and free recall learning outcomes.

Table 3: Two-way ANOVA Test Analysis for Mnemonic Techniques Scores on Free Recall Learning Outcomes

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3849.601[a]	7	549.94	3.04	.004
Intercept	801315.664	1	801315.66	4434.27	.000
MnemD	1225.316	3	408.44	2.26	.081
ToA	2560.350	1	2560.35	14.17	.000
MnemD * ToA	27.965	3	9.32	.05	.985
Error	57465.737	318	180.71		
Total	884134.000	326			
Corrected Total	61315.337	325			

a. R Squared = .063 (Adjusted R Squared = .042)
Key: MnemD = Mnemonic techniques, TOA = Type of assessment

4.4 Supplementary Hypotheses

$H0_a$: There is no significant difference between main effect factor A (mnemonic technique instruction method) and observed scores.

The researcher sought to establish whether there were significant differences in free recall learning outcomes between learners exposed to learning through three Mnemonic instruction methods. There were no significant differences ($F(3,318)= 2.26$, $P> 0.05$) were found in free recall learning outcomes between learners exposed to learning using keyword, pegword, music mnemonic instruction methods and control group. Hence the null hypothesis was retained.

These findings imply that, whether learners were exposed to the three mnemonic instruction methods there were no learning advantage to mnemonics instruction methods over traditional method. This means that mnemonic techniques had no effects in enhancing free recall learning outcomes. These findings concurred with the studies done earlier by Melby, and Charles (2010), who found out that phoneme-awareness training improved serial recall substantially and improved free recall to a lesser extent. Their findings also showed that free recall and serial recall learning depends on common mechanisms, but free recall relies more on rehearsal. Based on the results the researcher suggested that significant differences were not found because time was inadequate for rehearsal since the period provided by may have not been sufficient as suggested by earlier findings done by Melby, and Charles (2010). More time was needed for rehearsal. In conclusion none of the three mnemonic techniques were found appropriate for free recall learning tasks.

However, these results are in contrast from some earlier ones done by Elliott and Gentile (1986): Carney and Levin (1998): Shriberg, Levin, McCormick, and Pressley (1982) and Carney and Levin (2008)who reported that significant difference of free recall learning task existed between keyword and control groups. The conflicting results of this study could have also been caused by cross-cultural differences. It is worth noting that all the previous studies cited were done in developed countries and no doubt the day to day schooling and school environment is very different from developing countries like Kenya where the current study was done.

H0$_b$: There is no significant differences between main effect of factor B(type of assessment) and the observed scores

The study sought to establish whether there were significant differences between main effect factor B (immediate recall and delayed recall). As shown in table 3 significant differences ($F(1,318)= 14.17$, $P< 0.05$)were found between main effect factor B and free recall learning outcomes, hence the null hypothesis was rejected.

The findings indicated that there were statistically significant differences between main effect factor B [immediate recall (RAT) and delayed recall (RAT)] and free recall learning outcomes.

Table 4: Pairwise Comparisons Analysis for Type of Assessment on Free Recall Learning Outcomes

(I) Type of Assessment	(J) Type of Assessment	Mean Difference (I-J)	Std. Error	Sig.[b]
RAT	CAT	-5.657*	1.503	.000
CAT	RAT	5.657*	1.503	.000

Key: CAT= Continuous assessment test, RAT= Radom assessment test

Further analysis using post-hoc pairwise comparison showed that, the mean of CAT scores is higher than the mean of RAT scores across all levels of factor A(mnemonic techniques). Learning outcomes of delayed recall (CAT) were higher than those of immediate recall (RAT) across all levels of mnemonic instruction methods. The learners scored much higher in delayed recall (CAT) when using mnemonic technique instruction method than in immediate recall (RAT).

These results agree with study done McCabe, Craig et al., (2013) in their study to explore the use of mnemonic techniques in studying introduction to psychology brain terms free recall type of learning, they compared three conditions: simply reading, instructor provided examples and keyword mnemonics, self-generating examples, and self-generating keyword mnemonics.

Results indicated a learning advantage on a structure-to-function matching test at both a 10-min delay recall and a two-day delay recall for the generate-keyword condition, whereas the read-only and generate-example conditions were lower and similar to each other. The findings also agree with studies done earlier by Carney and Levin (2008) and McCabe, Osha and Roche (2013) whose findings suggested that mnemonic techniques exposure group out performed control group for both delayed and immediate recall. Surprisingly, these results were contrary to the traditional belief that immediate recall is usually much higher than delayed recall according the famous Ebbinghaus forgetting curve (Ebbinghaus 1885, 1909, 2011).

The current study findings suggest that mnemonic techniques require time to learn and internalize them before the learners can use them to enhance retention.

5. Conclusions

5.1 Appropriateness of Keyword, Pegword and Music Mnemonic Techniques on Free Recall Learning Outcomes

These findings came up with two conclusions: first, based on the $H0_a$, there is no significant differences of main effect of factor A (mnemonic technique strategies) on free recall learning outcomes. No significant differences were found between learners taught using pegword, keyword, music mnemonic techniques and control group. Based on these findings a logical conclusion is that none of the three mnemonic instruction methods were found to be appropriate for free recall learning tasks. Second, regarding null hypothesis ($H0_b$): there is no significant differences of main effect of factor B (type of assessment) on free recall learning outcomes. Significance differences were found between the two type of assessment (immediate and delayed recall) across all levels of mnemonic technique treatment conditions. Further analysis indicated that the mean scores of CAT were higher than the mean scores of RAT across all levels of the three mnemonic technique treatment conditions. It is investigator's a logical conclusion that when using mnemonic techniques time is required first internalize the mnemonic techniques before the learners can use them to enhance memory, hence learners were getting higher mean scores in delayed recall than immediate recall.

5.2 Recommendations

Based on the findings of the study, the following recommendations for policy and further research were made.

5.2.1 Policy Recommendations

1. The teacher trainees need to be trained on how to teach using mnemonic techniques.
2. The head teachers should construct laboratories or storage facilities for storing mnemonic technique materials.

5.2.2 Recommendation for Further Research

The researcher suggests that further researches should be carried out on;

1. No significant mean differences were found in keyword, pegword and music mnemonic techniques. It was noted that the content used in this study was class 7 social studies term one syllabus. There is need to investigate relationship between free recall learning outcomes and keyword, pegword and music mnemonic techniques using content form different levels like class 6 and 8 to establish whether the results will show no significance differences.
2. The findings of this study were based on primary school pupils. In order to further contribute to the understanding of the relationship(s) between mnemonic techniques and learning outcomes a similar study should be replicated with samples drawn from students in secondary schools, colleges and universities.

References

Balch, W. R. (2005). Elaborations of introductory psychology terms: Effects on test performance and subjective ratings. *Teaching of Psychology, 32,* 29-34. http://dx.doi.org/10.1207/s15328023top3201-7

Bellezza, F. (1996). Mnemonic methods to enhance storage and retrieval. In E. L. Bjork, & R. A. Bjork (Eds.), *Memory: Handbook of perception and cognition* (pp. 345-380). San Diego, CA: Academic Press.

Kothari, C. R. (2011). *Research methodology and techniques* (2nded.) Delhi: New Age International Limited Publishers.

Kombo, D. K. & Tromp, L. A. (2011). *Proposal and theses writing*: Nairobi: Pauline Publication.

Laing, G. (2010). An empirical test of Mnemonic devices to improve learning in elementary accounting. *Journal of Education for Business, 85*(6), 349-3

Levin, J. R. (1993). *Mnemonic strategies and classroom learning: A twenty-year report card.* Elementary School Journal, 94(2), 235-244.

Levin, J. R., Shriberg L. K., & Berry J. K**,** (1983). *A Concrete Strategy for Remembering Abstract Prose:* American Educational Research journal.

Levin, Dretzke B. J, McCormick C. B., Scruggs, T .E., McGivern J. E., & Mastropieri M. A., (1983), Learning via Mnemonic Pictures: Analysis of the Presidential Process *Educational Communication and Technology Journal,* Vol. 31, No. 3, pp. 161-173

Levin, J. R., Shriberg, L. K., Miller, G. E., & McCormick, C. B., (1982). The keyword method in the classroom: How to remember the states and their capitals. *Elementary School Journal*, 1980, 80, 186-191.

Machakos County Government, (2017). Retrieved January 2019 from http://www.machakosgovernment.com.

Mastropieri, M., Sweda, J.& Scruggs, T. (2000). Putting Mnemonic strategies to work in an inclusive classroom. *Learning Disabilities Research & Practice (Lawrence Erlbaum), 15(2), 10/1/11-69-74.*

Mastropieri, M. A. & Scruggs, T. E. (1998). Constructing more meaningful relationships in the classroom: A review of research on Mnemonic techniques. *Remedial and Special Education, 6*, 20–35.

Mastropieri, M. A., Scruggs, T. E., & Levin, J. R. (1985). Maximizing what exceptional students can learn: A review of research on Mnemonic techniques. *Remedial and Special Education, 6*, 39–45.

McCabe, J. A., Osha K. L., Roche J. A., (2013),*Psychology Students' Knowledge and Use of Mnemonics***:** Goucher College in Baltimore, Maryland, sage journal

Melby-Lervåg, M. & Hulme C. (2010). *Serial and Free Recall in Children Can Be Improved by Training:* Evidence for the Importance of Phonological and Semantic Representations in Immediate Memory Tasks

Miller, G. A, Galanter E., & Pribram, K. H., (1960). *Plans and the structure of behavior*. New York: Henry Holt.

Orodho, A. (2009). *Elements of education and social science research methods*. Maseno, Kenya: Kanezja.

Petty, G. (2009). *Evidence Based Teaching* (2nd ed.). Nelson Thornes: Cheltenham.