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Effect of metacognitive learning strategies on English language performance among students in Kenya

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Abstract: The study investigated the effect of metacognitive learning strategies on academic performance in English language among students in public secondary schools in Kenya. The study adopted Solomon four-group experimental design. The participants comprised 283 Grade 11 students from four public secondary schools. The study utilised a modified standardised metacognitive learning strategy questionnaire (MLSQ) to measure the use of metacognitive learning strategies by students in English language. Cronbach's alpha (α) was computed to investigate the internal consistency of the questionnaire and the overall reliability coefficient of $\alpha = 0.827$ was reported. The findings is that there is significant difference between experimental group posttest scores (Group-3) and control group posttest scores (Group-4), $t(53) = -8.095$ ($p < .05$). The conclusion is that metacognitive learning strategies are effective in enhancing student's academic performance in English language. Teachers of English language should therefore utilise metacognitive learning strategy during instruction in schools.

Keywords: effect; metacognitive learning strategies; academic performance; English language; students; Kenya.

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1 Introduction

Metacognitive strategies refer to techniques or actions that involve thinking about the learning process, planning for learning, monitoring the learning task and evaluating how well the task has been learnt (Madrid, 2000; Woolfolk, 2014). Metacognitive strategies involve individualised thinking in learning from the learner's perspective. Metacognitive learning strategies were derived from metacognition which involves systematic procedures of individual's 'thinking about thinking' (Flavell, 1979). Metacognition constitutes a higher level of cognitive process that an individual applies to consciously control his/her thoughts and actions towards a complex matter that demands to be solved in a given situation (Flavell, 1979). According to Woolfolk (2014), metacognition constitutes regulation of cognition and cognition of knowledge. In regard to cognition of knowledge, an individual becomes aware of oneself, a learning task and the strategies to use in order to achieve what one intends to do. Metacognition knowledge is also concerned with declarative knowledge which involves being aware of oneself and what one intends to do and how it done. It also describes the procedural knowledge on how something and conditional knowledge which deals with how to use specific strategies to achieve what one plans to attain. Finally, it involves individual's tendency to self-regulate their actions, emotions and behaviour and experiences which allow them to be responsible (Woolfolk, 2014).

According to Ormrod (2011), there are four metacognitive learning strategies: self-planning, self-regulation, self-monitoring and self-evaluation. Self-planning learning strategies consists of: planning, self-goal setting, organisation, self-directed learning and selective attention. Self-monitoring learning strategy involves constant checking, verifying and clarifying of the learning process. On the other hand, self-evaluation learning strategies involve self-assessment, making summary of what has been learnt and how well it has been achieved and applying new knowledge in different contexts (Oxford and Griffiths, 2014). Metacognitive learning strategies emphasises the role of learners where active participation of learners is essential in the teaching learning process. This strategy enables students to think about the learning process, plan about their learning in what, when and how to learn, regulate and control their own learning process and also evaluate the entire learning process and check whether they have attained the desired outcome (Oxford and Griffiths, 2014).

In Kenya, the academic achievement in English language is measured through the Kenya Certificate of Secondary Examinations (KCSE) under the authority of the Kenya National Examinations Council (KNEC) which is mandated to conduct examinations at primary, secondary and tertiary levels of learning. The academic achievement is also determined through teacher formulated assignments and tests based on a given criterion. The performance of students in English in the KCSE is expected to be at mean grade of

C+ (mean of 7.00) which is the minimum requirement for entry to the degree programs at the universities. In the present study, teacher made pretest and posttest were utilised to measure the academic achievement. In Kenya, English language is a compulsory subject and a prequisite in education, training and development. However, the low academic achievement is a key concern to the nation based on annual reports from the Kenya National Council Examinations over the last two decades. This is because the results have been below the expected standards both in spoken and written levels. Current studies on English performance have focused on causes like attitude, teaching styles and motivation among others. However, the low results in English subject seem discouraging, hence the need for the current study on metacognitive learning strategies and how it affects learning of the subject among public secondary schools in Kenya. In the present study, all aspects of metacognition were combined in the study. The components consisted of metacognitive knowledge, regulation and experiences (self-planning learning strategy, self-monitoring learning strategy, self-regulated learning strategy and self-evaluation learning strategy).

1.1 Theoretical framework

The study adopted the information processing model. The model provides theoretical ideas that are considered critical in the information processing framework and cognitive psychology (Miller et al., 1960). The first tenet of the theory is the idea that human memory has the capacity of short-term memory whereby chunking takes place. The principle developed by Miller et al. (1960) was the idea of information processing using a computer model of human learning. The theory describes how human memory takes in information from the environment, performs operations on it to change its form and content, stores and locates it and generates responses to it, all functions which are similar to the way digital computers input and process (Miller et al., 1960).

The model is centred on the processing of information that entails the gathering and representing information, or encoding; holding information or retention; and getting at the information when needed, or retrieval. The theory assumes that human memory performs cognitive tasks which constitute several mental representation and structures which are perceived and organised in a specific way depending on how they are interpreted by the memory (Ormrod, 2011). This theory's principles inform that cognitive development of an individual has internal self-modification which controls the functions of the memory. The information processing model was applicable in this study because it determines the amount of information learnt from the environment and how it is organised, stored and retrieved. In the present study on metacognitive learning strategies as predictors of academic performance in English language was considered appropriate and relevant because students were exposed to a lot of information materials that require to be processed.

2 Literature review

Literature on metacognition strategy and academic enhancement exists albeit with varied findings. An experimental design that targeted students between 6th and 8th grades in a middle school were employed by Gonzalez (2016) concluded that metacognition and motivation were positively correlated with academic performance. Similarly, Avhustiuk

et al. (2018) indicated that students who employed monitoring improved in gaining knowledge, confidence levels and correctness in learning activities in contrast to their counterparts who were less confidence, with high levels of inaccuracy and low performance in learning activities. In Malaysia University, Kosnin (2007) results show that metacognitive self-regulated learning is a significant predictor of Malaysian undergraduates' academic achievement. A causal comparative design by Fouche (2013) in the USA found that through the use of metacognitive and self-regulatory strategy instruction, students in the overall and algebra-ready treatment groups performed significantly better than their control group peers. In Italy, De Stasio and Di Chiacchio (2015) established insufficiency application of metacognitive learning and academic attainment among weaker students. Oruc and Arslan (2016) indicated that self-regulated learning significantly increased the reading comprehension and metacognitive thinking skills of the students in the experimental group.

An experimental design study by Karaođlan et al. (2017) also revealed that students from the experimental group indicated a statistically significant superior level of metacognitive support compared to the control group. In South Africa, Van Aswegen et al. (2019) indicated that most learners seemed to have improved in terms of metacognition and strategy knowledge on most data collection instruments. It was concluded that the story-based intervention could be a feasible and effective learning tool to develop metacognition. In another study in South Africa, Tachie and Molepo (2019) showed that there was evidence of teachers applying metacognitive skills unconsciously in assisting their learners in problem-solving in class. In another South African study, Butterfield (2012) indicated that the employed metacognitive orientated teaching procedures enhanced my Grade 9 natural sciences learners' metacognition. Their metacognitive awareness and reflection abilities improved, as well as their knowledge and regulation of cognition. Similarly, Cetin (2017) revealed that metacognitive self-regulated learning correlated with the performance scores of students. In another survey design by McCabe (2011), it was revealed that an independent measure of metacognitive self-regulation was positively correlated with performance.

A study conducted in South East Texas by Young and Fry (2008), reported a positive correlation between metacognitive awareness inventory and cumulative general performance average (GPA) and end of course grades. A study conducted by Tok et al. (2010) reported that metacognitive awareness and learning strategies played a significant role in students' academic success in an online English course. Another study by Doganay and Demir (2011) among students at universities found that there was a significant difference between high achieving and low achieving prospective classroom teachers in using metacognitive strategies. In China, at Guinzou University, a study by Zhang and Seepho (2013) reported that there was a significant positive correlation between metacognitive strategy use and reading in English. In Kenya, Mwaniki (2015) findings supported that there was a significant relationship between metacognition and reading comprehension performance.

In contrary, some studies have reported different findings. In Balikesir University, Hakan (2016) reported that there was a weak and negative significant correlation between metacognitive skills and academic achievement. In other studies have also argued that meta-cognitive learning techniques have no effect on the academic performance of students who are on online learning mode. Some of the reviewed literature targeted participants who were pursuing studies through online and distance learning in which they could not express the emotions and feelings. However, in the present study, the

participants had a chance to interact and share their perceptions and experiences in regard to metacognitive learning strategies through face to face learning classroom environment. The reviewed literature revealed that most of the studies linked to metacognitive learning strategies have been conducted in universities and tertiary institutions and some in high schools and elementary schools. However, most of the reviewed studies have given little attention on metacognitive learning strategies among form three students in a high school level especially in Africa and specifically in Kenya and their effect on learning and academic performance of English language. Therefore, it was necessary to conduct the present study on metacognitive learning strategies as predictors of academic performance in English language among students in public secondary schools in order to determine its applicability and add insight to the existing literature. The null hypothesis was stated as follows:

H₀ There is no statistically significant effect of metacognitive learning strategies on academic performance in English language among students in public secondary schools.

3 Methods

3.1 Research design

The study adopted Solomon four-group experimental design, where the participants are randomly assigned into the two experimental and two control groups with pretest and posttest. One of the experimental groups (EXGP 2) receives a pretest and the other does not. Then, an intervention is administered to both the experimental groups. In the control group, one of the groups is pretested while the other is not pretested. The control groups use routine learning strategies through the learning period. However, all the groups are post-tested according Braver and Braver (1988) and Bless et al. (2006). The Solomon four-group experimental design as indicated in Table 1.

Table 1 Solomon four-group experimental design

<i>Group</i>			
EXGP 1 (R)	Pretest (O)	Treatment (X)	Posttest (O)
CGP 1 (R)	Pretest (O)	No treatment	Posttest (O)
EXGP 2 (R)	No pretest	Treatment (X)	Posttest (O)
CGP 2 (R)	No pretest	No treatment	Posttest (O)

Note: R = randomisation, O = observation of the group and X = treatment.

Source: Modified from Claire et al. (2006)

Table 1 shows the Solomon four-group experimental design in which the groups were divided into an experimental and control groups, respectively. The Experiment group-1 (EXGP1), was pretested, treated and then post-tested while the next group was considered as control group one (CGP 1). This control group (CGP 1) was pretested and then post-tested only. The next experimental group (EXGP 2) was not pretested. However, it received an intervention and then a posttest was administered. The second control group (CGP 2) did not undergo pretesting and no intervention was provided to it. However, a posttest was administered. Solomon four-group design was preferred to other

designs because it is a rigorous design that reduces the effects of internal and external threats in a study. It is also preferred in a study where a researcher intends to deal with bias in an outcome which may be attributed to the exposure of a pretest.

3.2 *Participants*

The study participants comprised 283 Grade 11 students from four public secondary schools in Marani Sub-county in Kenya. The study utilised four selected schools which were treated as study groups from which random assignment was used to divide the schools into two experimental and two control groups regardless of the number of students. The entire Grade 11 students from the four selected schools remained intact as experimental and control groups during the entire study period. According to Creswell (2014), intact groups might be used in research contexts in which the participants are available or have accepted to be involved in the research and also when the situation does not allow one to form artificial groups. Therefore, Grade 11 intact classes were used as groups because the study could not create artificial groups for the experimental and control group in the same classroom because this might have interfered with routine learning. Moreover, intact groups were used to minimise the effects of external and internal effects in the study if the two groups were drawn from the same classroom because they would interact, hence affect the quality and accuracy of the findings. The sample size is presented in Table 2.

Table 2 Study sample size

<i>Category of school</i>	<i>Group</i>	<i>Sample size</i>
Sub-county	Experimental group-1	79
Sub-county	Control group-1	69
Sub-county	Experimental group-2	77
Sub-county	Control group-2	58
<i>Total</i>	<i>4</i>	<i>283</i>

Source: Survey data (2018)

Table 2 indicates the summary of the four groups involved in the study, with a study sample size of 283 students and 12 teachers of English language.

3.3 *Research tools*

The study adopted questionnaires to collect data. The present study utilised a modified standardised metacognitive learning strategy questionnaire (MLSQ) to measure the use of metacognitive learning strategies by students in English language in order to suit the study contexts. The metacognitive learning questionnaire consisted of 80 items that were based on metacognitive learning strategies scales: self-planning learning strategy (22), self-monitoring learning strategy (21), self-regulated learning strategy (18) and self-evaluation learning (19), respectively. The MLSQ questionnaire employed a

five-point Likert scale to rate application of metacognitive learning strategy. Cronbach's alpha (α) was computed to investigate the internal consistency of the questionnaire, as a way of ascertaining the reliability of the MLSQ questionnaire. All the items of the subscales of the MLSQ were worthy of retention as the overall reliability coefficient was $\alpha = 0.827$.

3.4 Data collection procedures

Ethical clearance was first obtained from the National Council for Science and Technology and Innovation (NACOSTI) of Kenya. Thereafter, the researcher made the first visit to the selected secondary schools to seek for permission, familiarise with the school authorities, teachers and students, and make the required introduction. The second visit was meant to train the teachers of English language and teachers of guidance and counselling on the application of metacognitive learning strategies in learning English language.

In the first phase, there was a training session which was meant to introduce, train and guide on how to implement and monitor the use of metacognitive learning strategies among the students. The teachers of English were gathered in one school where the training on metacognitive learning strategy was done for one day. Since the researcher had already divided the four groups into experimental and control groups, the study administered a pretest to two groups: Experimental group-1 (EXGP 1) and Control group-1 (CGP 1). This was done to establish the baseline of student's mastery and performance in English language.

In the second phase, the two experimental groups (EXGP 1) and (EXGP 2) were induced to metacognitive learning strategies. The teachers of English language who were trained on metacognitive learning strategies were used to provide the intervention to the students with the supervision and guidance of the researcher. The training was done at the onset of second term. The two experimental groups received direct instruction on metacognitive learning strategies in addition to traditional learning strategies from the already treated teachers of English. Since the study was using Solomon four-group design, it necessitated the first experimental (EXGP 1) to be administered with the metacognitive learning questionnaires and later a posttest. The second experimental group (EXGP 2) was not pretested, although it received a treatment followed by the same group filling in a metacognitive learning questionnaire and a posttest at the end of the term.

Both experimental groups received an intervention on metacognitive learning strategies twice a week and each training session took 40 minutes. The entire period of training, monitoring, implementing and collecting data from the participants on the application of metacognitive learning strategy was 12 weeks.

In the first control group (CGP 1), a pretest was given at the start of the term, although an intervention was withheld from the group. The same group completed a metacognitive learning questionnaire and then a posttest was given. The next control group (CGP 2) did not receive both pretest and treatment. However, the same group also filled in a questionnaire on metacognitive learning strategies which was followed by a posttest on English language. All the control groups used conventional learning strategies in the entire period of 12 weeks.

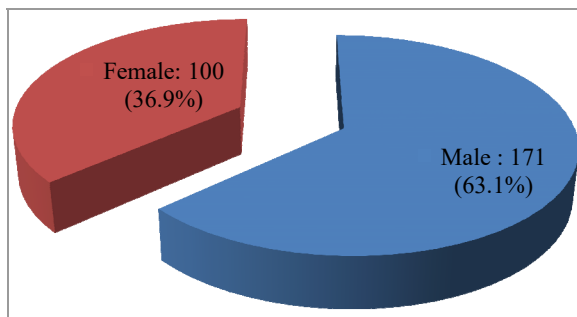
The use of metacognitive learning questionnaires was to gather data on the trend and compare the application of study strategies in learning of the subject. After the intervention period, the MLSQ questionnaires were filled by the students. At the end of the term, all the participants from both the experimental and control groups were exposed to a posttest which was an equivalent in the level of difficulty with the pretest already administered. Thus, the students sat for an English examination after the intervention where the posttest performance scores in English were obtained.

4 Results

4.1 Demographic information

The study sought to investigate the demographic information of the students' respondents on the basis of gender which is shown as indicated in Figure 1.

Figure 1 Gender distribution of the students (see online version for colours)



Source: Survey data (2018)

From Figure 1, it is evident that a significant majority 171 (63.1%) of the respondents were boys, and 36.9% female. This was not surprising because one of the schools that took part in the study was purely boys' school and the other three schools were mixed. None of the schools that took part in the study was purely girls' only school. However, it is noted that gender was considered in the study and therefore the findings were representative of the total population.

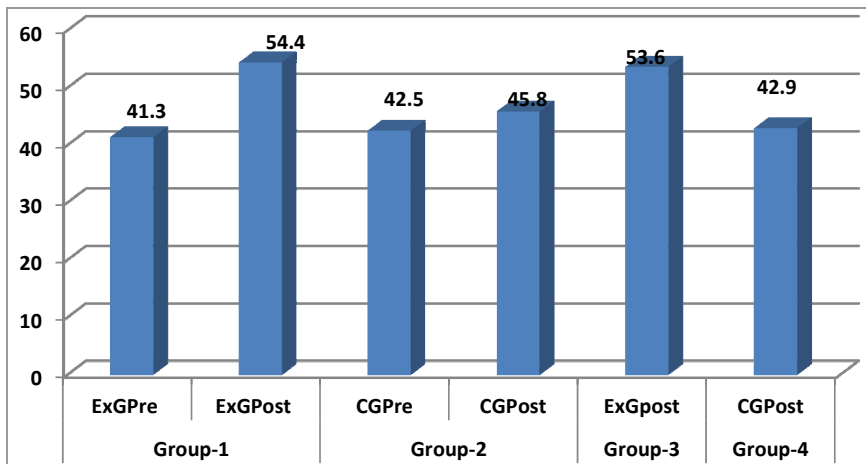
4.2 Mean average scores in performance in English language

The pre and posttest scores for the Grade 11 students in English language in the four groups were determined using the mean and standard deviation and the results are presented in Table 3.

Table 3 Mean scores of the four groups

<i>Group</i>	<i>Notation</i>	<i>Explanation</i>	<i>Mean</i>	<i>SD</i>
EXGP 1 (n = 77)	Experimental GPretest	Pretest scores of Group-1 before they received treatment on metacognitive learning strategy	41.3	9.4
	Experimental G Posttest	Posttest scores of Group-1 after they received treatment on metacognitive learning strategy	54.4	12.0
Control group-1 (n = 65)	Control GPretest	Pretest scores of Group-2, they did not receive treatment on metacognitive learning strategy	42.5	9.5
	Control GPosttest	Posttest scores of Group-2, they did not receive treatment on metacognitive learning strategy	45.8	13.8
EXGP 2 (n = 75)	Experimental GPPosttest	Posttest scores of Group-3 after they received treatment on metacognitive learning strategy but without pretest	53.6	9.9
Control group-2 (n = 54)	Control GPosttest	Posttest scores of Group-4 without receiving treatment on metacognitive learning strategy and no pretest	42.9	9.1

Figure 2 Mean average scores in performance in English language (see online version for colours)



From findings presented in Table 3, it is evident that the highest mean score recorded in English language was 54.4 (SD = 12.0) in posttest examination results by Group-1 students who received treatment of metacognitive learning strategies after a pretesting. It was followed closely with the mean score of Group-3 students, who received treatment but post-tested without pretesting, at 53.6 (SD = 9.9) in a posttest examination. The least score recorded was pretest results for Group-1 students, those who received treatment on metacognitive learning strategy. Figure 2 further shows the relative difference in mean scores of the various groups.

From Figure 2, the results indicate the groups that received treatment reported relatively higher performance in English language than their counterparts who did not receive treatment. Most of the teachers from the experimental group reported that there was a considerable correlation between metacognitive learning strategy and academic performance in the subject. This indicates a difference in performance between those

students who use metacognitive learning strategy and those who use convectional learning strategies to learn.

4.3 *Correlational results between metacognitive learning strategies and performance of English language*

To establish the statistical significance of the metacognitive learning strategies and academic performance in English language from posttest scores, parametric test such as Pearson product moment correlation, was used. The results are presented in Table 4.

Table 4 Correlation results: metacognitive learning strategies and performance of English language

<i>Metacognitive learning strategies</i>		<i>Performance of English language (posttest score)</i>
Self-planning learning strategy	Pearson correlation	0.149
	Sig. (2-tailed)	.014
	N	270
Self-monitoring learning strategy	Pearson correlation	0.241
	Sig. (2-tailed)	.000
	N	270
Student benevolent interest	Pearson correlation	0.161
	Sig. (2-tailed)	.001
	N	270
Self-evaluation learning strategy	Pearson correlation	0.231
	Sig. (2-tailed)	.000
	N	270

The results in Table 4 indicates that the effect of self-planning learning strategy was positive and significant ($r = .149$, $n = 270$, $p = .014$), the effect of self-monitoring learning strategy was positive and significant ($r = .241$, $n = 271$, $p < .05$), self-regulated learning strategy was positive and significant correlated ($r = .161$, $n = 270$, $p = 0.05$), and finally, there exist a positive and statistically significant relationship between self-evaluation learning strategy and academic performance in English language ($r = .231$, $n = 270$, $p < .05$). The study further sought to investigate the overall effect of metacognitive learning strategies on performance in English language among students.

4.4 *Findings on the overall effect of metacognitive learning strategies on performance in English language*

The study sought to investigate the overall effect of metacognitive learning strategies on performance in English language among students in public secondary schools, and a multiple regression analysis was used to achieve this. The null hypothesis was stated as follows:

- H₀ There is no statistically significant effect of metacognitive learning strategies on academic performance in English language among students in public secondary schools.

The results of multiple regression analysis are presented in Table 5.

Table 5 Multiple regression results: metacognitive learning strategies on academic performance in English language

<i>Model</i>	<i>R</i>	<i>R square</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>	<i>Sig.</i>
Self-planning learning strategy	.177	.031	.021	12.386	.000
Self-monitoring learning strategy	2.62	0.68	0.58	12.147	.000
Self-regulated learning strategy	.190	.036	.025	12.355	.000
Self-evaluation learning strategy	.253	.064	.054	12.174	.000

Notes: a Dependent variable: posttest score in English language.

b Predictors: (constant-metacognitive learning strategies), self-planning learning strategy, self-monitoring learning strategy, self-regulated learning strategy and self-evaluation learning strategy.

The results presented in Table 5, indicates the effect of metacognitive learning strategies (self-planning learning strategy, self-regulated learning strategy, self-evaluation learning strategy) on academic performance in English language among students. The model explains 3.1% ($R^2 = .031$) of the variance in academic performance in English language among students in public secondary schools is accounted for self-planning learning strategy. In the model, 6.8% ($R^2 = .068$) of variance in academic performance in English language among students in public secondary schools is explained by self-monitoring learning strategy. In addition, from the model in Table 5, 3.6% ($R^2 = .036$) of the variance in academic performance in English language is explained by self-regulated learning strategy. The results in Table 5, shows that 6.4% ($R^2 = .064$) of the variance in English language among students in public secondary schools is explained by self-evaluation learning strategies. The model explains that each of the variables made a significant prediction of the academic performance in English language. The overall results on the effect of metacognitive learning strategy were shown in Table 6.

Table 6 Model summary: metacognitive learning strategy, treatment and pretest on performance of English language as a subject

<i>Model</i>	<i>R</i>	<i>R square</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>	<i>Sig.</i>
1	.068 ^a	.076	.897	.137	.000

Notes: ^aDependent variable: posttest score.

Predictors: (constant), metacognitive learning strategies.

From the coefficients in Table 6, it is evident from Model 1, that when the students increase in application of metacognitive learning strategy, there is a statistically significant influence in academic performance in English language as a subject. In overall, in Model 1, 7.6% ($R^2 = 7.6\%$) explains the overall variance in academic performance in English language is attributed to metacognitive learning strategies. Hence, there exists a statistically significant effect of metacognitive learning strategy on academic performance in the subject.

4.5 Comparisons of the posttest scores in English language performance among the four groups

To establish whether there is any statistical influence of metacognitive learning strategies on performance in English language among students in public secondary, three different designs were applied and findings were compared with respect to their effectiveness. First, a comparison was made between the posttest scores attained by Group-3 and Group-4 students, as shown in Table 7.

Table 7 Paired samples test – solution with the posttest only design with non-equivalent control groups

		Paired differences			<i>T</i>	<i>Df</i>	<i>Sig.</i>
		<i>Mean</i>	<i>Std. deviation</i>	<i>Std. error mean</i>			
Pair 1	CG posttest (Group-3) ExGPosttest (Group-4)	−8.833	8.018	1.091	−8.095	53	.000

Table 7 shows paired sample t-test investigating solution with the posttest only design with non-equivalent control groups. From the results, it can be concluded that there is significant difference between ExGPosttest (Group-3) and CGPosttest (Group-4), $t(53) = -8.095$ ($p < .05$). Since the difference is statistically significant at 5% level, it can be concluded that students who employed metacognitive learning strategies outperformed their counterparts in regard to the performance in English language.

The study further explored solution with the two group control group design, as refinement over the finding, as shown in Table 8.

Table 8 Paired samples test: solution with the two group control group design

		Paired differences			<i>T</i>	<i>Df</i>	<i>Sig.</i> (2-tailed)
		<i>Mean</i>	<i>Std. deviation</i>	<i>Std. error mean</i>			
Pair 1	ExGPretest (Group-1) ExGPosttest (Group-1)	−13.026	8.788	1.002	−13.006**	76	.000
Pair 2	CGPretest (Group-2) – CGPosttest (Group-2)	−3.120	11.020	1.272	−2.452	64	.117
Pair 3	ExGPretest (Group-1) – CGPretest (Group-2)	−1.213	6.603	.762	−1.591	74	.116
Pair 4	ExGPosttest (Group-1) – CGPosttest (Group-4)	3.037	5.677	.773	3.931**	53	.000

Notes: **Significant at 1% level.

From Table 8, a paired sample t-test on pair 2 (CGPretest – Group-2) and (CGPosttest – Group-2) suggests that no difference was established between before and after values in control group – $t(74) = 2.452$, $p = .117$ (ns), but a test on pair 1 reveals that there is significant difference between pretest and posttest score of experiment group which means a significant impact of treatment (training on the use of metacognitive learning strategies) was established on the experiment group, $t(76) = -13.006$, $p < .05$.

Equally, test 4 further confirms that there is significant difference (mean difference = 3.037) at 1% significant level between ExGPosttest (Group-1) and CGPosttest

(Group-4), $t(53) = 3.931$, $p < .01$. In addition, test 3 suggests that the randomisation process was effectively applied to get samples under ExGPretest (Group-1) and CGPretest (Group-2) because no significant difference was established, $t(74) = -1.591$, $p = .116$ (ns). Hence, it can be concluded that metacognitive learning strategies are effective in enhancing student's academic performance in English language.

Although from Table 8, it is indicated that the use of metacognitive learning strategies is effective in enhancing student performance in English language. However, there may be some sort of influence of pretest on scores because the mean difference has been increased from -13.026 to 3.037 from test 1 to test 4. Hence, this further required confirmation using solution with the Solomon four-group control group design, whose results is shown in Table 9.

Table 9 Paired samples test – solution with the Solomon four-group control group design

		<i>Paired differences</i>			<i>T</i>	<i>Df</i>	<i>Sig.</i> (2-tailed)
		<i>Mean</i>	<i>Std. deviation</i>	<i>Std. error mean</i>			
Pair 1	ExGPretest (Group-1) – ExGPosttest (Group-1)	-13.026	8.788	1.002	-13.006	76	.000
Pair 2	CGPretest (Group-2) – CGPosttest (Group-2)	-3.120	11.020	1.272	-2.452	64	.117
Pair 3	CGPretest (Group-2) – ExGPretest (Group-1)	1.213	6.603	.762	1.591	74	.116
Pair 4	CGPosttest (Group-2) – ExGPosttest (Group-1)	-8.240	9.144	1.056	-7.804	74	.000
Pair 5	CGPosttest (Group-3) – ExGPosttest (Group-4)	-8.833	8.018	1.091	-8.095	74	.000
Pair 6	CGPretest (Group-2) – ExGPosttest (Group-4)	-7.704	10.559	1.437	-5.361	74	.000
Pair 7	ExGPosttest (Group-1) ExGPosttest (Group-4)	3.037	5.677	.773	3.931	53	.000
Pair 8	CGPosttest (Group-2) – CGPosttest (Group-3)	4.723	12.295	1.525	3.097	64	.063

From Table 9, a paired sample test for pair 2 suggests that there was no statistical significant difference in English language mean score found between before and after values in control group, CGPretest (Group-2) and CGPosttest (Group-2), $t(74) = -2.452$, $p = .117$ which is not statistically significant. However, test results for pair 1 reveals that there is statistical significant difference at 1% significance level between pretest and posttest scores of the experiment group, $t(76) = -13.006$, $p < .01$, which means that a significant impact was found in the use of metacognitive learning strategies in enhancing student performance in English language. Further, test on pair 3 concludes that the randomisation process was effectively applied to get samples for the experiment and control groups because no significant difference was found between CGPretest and ExGPretest, $t(74) = 1.591$, $p = .117$ (ns).

In contrast, test in pair 4 confirms that there is significant difference between CGPosttest and ExGPosttest, $t(74) = -7.804$, $p < .05$. Therefore, the current study concluded that the use of metacognitive learning strategies in learning English language is effective in enhancing student performance in the subject. There was a possibility of

influence of pretest procedure on the scores. However, test on pair 5 proves that there is significant difference between CGPosttest and ExGPosttest (without pretest) at 1% level, hence it can be inferred that the statistical significant difference in mean scores noted was largely attributed to treatment effect.

Moreover, test in pair 4 and pair 5 suggests that there is significant impact of metacognitive learning strategies in learning English language and the mean difference of test in pair 5 is not significantly higher than that of pair 4 which implies that pretest procedure the students were exposed to in the current study did not significantly influence the results of the survey. This meant that although some students who had done pretest examinations might have inquired about metacognitive strategies in learning English language and enriched themselves with some sort of information due to pretest, making them advantaged over other groups who had not been pretested, this influence was negligible.

Nonetheless, the result of test in pair 6 suggests that external factors had been included unknowingly in this study. Equally, the results of pair 7 reveals that pretest had some effect upon the performance in posttest English scores and test in pair 8 may imply that pretest had some influence on posttest results. The study has established that there is statically significant overall effect of metacognitive learning strategies on English language performance among students in public secondary schools.

5 Discussion

The regression model explains that each of the variables made a significant prediction of the academic performance in English language. Thus, when students increase in their application of metacognitive learning strategy, there is a statistically significant influence in academic performance in English language as a subject. The t-test results also indicated that there is significant difference between pretest and posttest score of experiment group which means a significant impact of treatment (training on the use of metacognitive learning strategies) was established on the experiment group. The study has established that there is statically significant overall effect of metacognitive learning strategies on English language performance among students in public secondary schools. This finding correlates with Gonzalez (2016) who concluded that metacognition and motivation were positively correlated with ACADEMIC performance. Similarly, Kosnin (2007), Fouche (2013) and Oruc and Arslan (2016) all showed that metacognitive self-regulated learning is a significant predictor of academic achievement. Van Aswegen et al. (2019) also indicated that most learners seemed to have improved in terms of metacognition. Tachie and Molepo (2019) also indicated that there is evidence of teachers applying metacognitive skills unconsciously in assisting their learners in problem-solving in class. In addition, Zhang and Seepho (2013) reported that there was a significant positive correlation between metacognitive strategy use and reading in English. Mwaniki (2015) also supported that there was a significant relationship between metacognition and reading comprehension performance. However, the findings differ from Hakan (2016) who reported that there was a weak and negative significant correlation between metacognitive skills and academic achievement. Similarly, other studies have also argued that meta-cognitive learning techniques have no effect on the academic performance of students who are on online learning mode. The implication of these study findings is that it is important for teachers to embrace metacognitive learning

strategies since they help motivate students' cognitive processes in order to have sustainable patterns of learning without entire dependency on the teachers.

6 Conclusions and recommendation

The findings indicate a significant difference between pretest and posttest score of experiment group which means a significant impact of training on the use of metacognitive learning strategies. It can be concluded that students who employed metacognitive learning strategies outperformed their counterparts in regard to the performance in English language. Therefore, when the students increase in application of metacognitive learning strategy, there is a statistically significant influence in academic performance in English language as a subject. The results affirmed that metacognitive learning strategies have a positive effect on academic performance in English language among students in public secondary schools. Hence, the metacognitive learning strategy is essential in enhancing learning and can be adopted in theory and practice thus adding valuable information in literature to the existing one. The Kenya Institute of Curriculum Development (KICD) should develop relevant materials, which should infuse metacognitive learning strategies in the curriculum of English language. Teachers of English language should utilise metacognitive learning strategy during instruction in schools. From the study findings and recommendation, further research is suggested on contextual factors that influence individual preferences on metacognitive learning strategies use in English language.

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