

## **Effect of Think-Pair-Share Strategy on student achievement and motivation in C.R.E**

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**Abstract:** The study sought to determine effects of TPS in students' motivation and achievement of C.R.E. Solomon four of non-equivalent control group research design under quasi-experimental research was used. Target population comprised Njoro-sub-county Secondary Schools in Nakuru County. Accessible population comprised form of two students in the Sub-County. A Simple random sampling technique was used to obtain a sample of four Sub-county divisions. 184 students from four schools participated in this study. A random assignment was used to place schools in experimental and control groups. TPS was used to teach CRE in experimental groups while control groups were taught using Conventional methods for four weeks. Teachers teaching experimental groups were inducted on TPS strategy before start of the treatment. CRE assessment test (CREAT) and Motivation Descriptive Questionnaire (MDQ) were instruments used to collect data. The instruments were verified by the supervisors and experts from Egerton University. A pilot-test was done in Rongai Sub County. Reliability of instruments was determined using Kuder-Richardson (K-R20) for CREAT and Cronbach's alpha for MDQ and PDQ. Both descriptive and inferential statistics was used in the analysis. Null hypotheses were rejected at a significance level of 0.05. The findings of the study revealed that TPS enhances achievement in CRE. The findings also revealed that student gender does not affect achievement. This study recommended that CRE teachers in secondary schools to make greater use of TPS strategy to enhance students' CRE performance.

**Keywords-** Achievement, Christian Religious Education, Gender, Teaching strategies, Think-Pair-Share

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### **I. INTRODUCTION**

The overall goal of teaching and learning is to bring about behavioral change to students at any age. According to Islam (2016), pedagogical practices that involve effective strategies are those that distinguish good teaching from poor teaching. Learner-centered methods are preferred for effective teaching and learning. According to Hatie (2015), effective teaching strategies lead to quality learning that increase students' academic achievement.

Poor performance by students is sometimes blamed to ineffective strategies as used by educators in teaching and learning (Adunola, 2011). According to Hightower (2010), quality teaching tends to be student-centered, although several factors contribute to quality teaching. TPS teaching strategy is collaborative discussion designed to provide a student time to think and formulate thoughts or ideas about a given topic or concept then join another to share their thinking (Lyman, 1981). Learning happens primarily through social interactions with others (Vygotsky, 1978). T.P.S fosters understanding and increase chances of students' application of diverse ideas, contexts and solutions to problems. T.P.S. foster autonomy to students' learning giving them control of their learning and skills to foster life-long learning (Hattie, 2009). It encourages increased student participation and high order thinking skills (Alfian, 2018).

TPS encompasses life approach to learning, role play and demonstration Kumar, (2012). The role-play model is a technique that enables students to explore real situations by interacting with other students to develop experience in a managed and supportive environment. Life Approach in C.R.E. as stipulated by KICD encourages student actual day-to-day experiences. It aims at guiding the learner to examine his/her experience in the light of God speaking to him/her (Wambui&Amukowa, 2013).

Religious education curriculum is expected to promote spiritual, moral, cultural, and equip students with life skills (Barnes, 2002). In Singapore, RE is referred to as Civic and Moral Education (C.M.E.). The

Ministry of Education established a comprehensive (C.M.E.) program that aims at equipping students with appropriate core skills and value systems to enable them navigate through the modern economy (Koh, 2012). In Nigeria (Ebonyi State), Christian Religious Studies (C.R.S.) in the school curriculum is for the purpose of helping young people to develop multiple perspectives of ideas and appreciate diversity as good citizens (Njoku&Njoku, 2015). Botswana adopted a multi-faith religious education curriculum to cater for the diverse belief system (Museka, 2019). In Uganda, Christian Religious Education is an examinable subject in the curriculum (Byaruhanga, 2018). The Bible, which emphasized the church's doctrines, was the primary text for teaching Religious Instruction (R.I.), as it was referred to then. After independence, the Kenya government set up the Ominde commission to look into how C.R.E and any other religious faiths were to be offered in a secular state (The Republic of Kenya, 1964).

In 2013 C.R.E percentage mean in Njoro was 24.10 compared to national % mean of 47.96. In 2014 % mean improved from 24.10 to 44.52 but was again lower than national mean. In 2015 it dropped to 41.50. However, in 2016 the % mean improved to 50.18, attaining an average mark of 50% In 2017 there was a significant from 50.18 to 39.44%, whereas national mean was 38.07.

### **1.2 Statement of the Problem**

C.R.E. curriculum in Kenya is compulsory, from early childhood education to form two in secondary schools. It is expected to contribute positively to transformation of self, society and acquire knowledge in various career fields. KNEC reports indicate that students' failure to master high order thinking skills questions may negatively impact importance of learning outcomes in C.R.E. Nationally performance has been declining for some years, as is the case in Njoro Sub-county. This decline in achievement may be closely related to motivation, perception of motivation, and teaching strategies. There is also a slight gender difference in C.R.E.'s achievement in favor of girls. There is a need to explore viability of less commonly used learner-centered strategies such as TPS to improve achievement. T.P.S may be useful in motivating and improving students' achievement, there is currently insufficient documented information on research conducted in Kenya and especially Njoro Sub-county, investigating effect of TPS on students' academic achievement in C.R.E., motivation to learn C.R.E., and perceptions of C.R.E. learning environment. This study may bridge the existing gap.

### **1.3 Hypotheses of the Study**

**H<sub>01</sub>** : There is no statistically significant difference in students' achievement in C.R.E. between students exposed to T.P.S. and those exposed to motivation.

**H<sub>02</sub>** There is no statistically significant difference in students' motivation to learn C.R.E. between students exposed to T.P.S. and those exposed to conventional methods

## **II. LITERATURE REVIEW**

### **2.1 Teaching Strategies and Academic Achievement**

Academic achievement of students in chemistry and other science subjects have been successfully carried out although most of these innovative instructional strategies proved to be significant when compared with conventional methods. The result of these studies is varying magnitude of effect of different teaching strategies on students' achievement (Marhaeni, 2013).

Teachers align their professional experiences with their teaching practices and pedagogies to benefit their students (Wahyuni&Jumaina, 2019). Today a teachers' significant role is to ensure that content delivered is achieving learning outcome which is considered a key challenge. Despite years of teaching experience there is always room for improvement and innovations (Kitaoka, 2011). There is demand from time to time forcing teachers to undergo professional and personal development to benefit students and themselves (Lightner&Tomaswick, 2017).

### **2.2 Think-Pair-Share Teaching Strategy**

Lyman (1981) created a three-step procedure called Think-Pair-Share (TPS) teaching strategy. A student is given some time to think independently about a question that has been posted so as to form ideas of his own. They then pair to share their thoughts. These steps allow them to articulate their ideas and to consider those of others and come to a consensus. Often students are more comfortable presenting ideas to a next person or a small group with support of a partner (Sesrita, 2017). Their ideas become more refined through this three-step process.

TPS promote active reasoning and articulation of ideas through active interaction of experiences. It develops reflective thinking and appreciates multiple perspectives (Syafii, 2018). The differences emerge in how a teacher executes the steps in a carefully planned sequence during a classroom instruction. There is insufficient

information in Njoro Sub County on how TPS can be used to improve desired learning outcomes in CRE. Hence this study seeks to fill the gap.

### **2.3 Effect of TPS Teaching Strategy on students' Academic Achievement**

Muhammad & Irwandi (2018) investigate how the Think-Pair-Share (TPS) technique can improve the students' reading skill at English Language Department, Muhammadiyah University of Mataram. The study revealed statistically significant differences in favor of experimental group taught using TPS strategy in achievement and retention. It enhanced attainment and made learning interesting. Salman (2015) investigated effectiveness of TPS strategies using role-play in grade five Arabic languages. He noted that it strengthened language abilities, self-confidence and increased performance. It was also found to arouse interest through its great emphasis on group activities and intense thinking. Khaleel & Hamdan (2017) conducted a study on the impact of (Think – Pair – Share) strategy on the achievement of third grade student in sciences in the educational district of Irbid. The results showed that TPS enhanced the average score of students compared to conventional methods

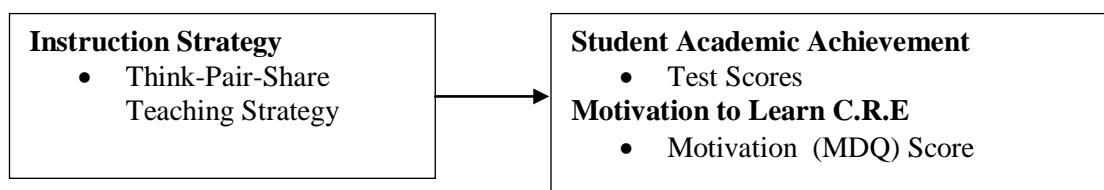
### **2.4 Effect of TPS Teaching Strategy on students' Motivation in Learning**

Teaching and learning process using right strategy can assist teachers to motivate and arouse students interests (Hatika& Farida, 2018). Skillful choices of teaching strategies that involve students through classroom activities are useful in acquisition of knowledge (Amrai 2011). TPS enhance student motivation, reduce stress, create a positive significant classroom climate and result in a more dynamic classroom interaction that promote and strengthen more learning.

### **2.5 Conceptual Framework**

#### **Independent Variable**

#### **Dependent Variable**



**Figure 1: Conceptual Framework**

Figure 1 shows independent variable as TPS instructional strategy presented to learners, conventional methods, and gender. Dependent variables were learners' achievement in C.R.E. motivation to learn C.R.E. and perception of C.R.E. learning environment. TPS strategy positively influenced learners' achievement in C.R.E compared to conventional methods. It motivated students to learn C.R.E. and improved their perceptions of learning environment. The extraneous variables which could influence outcome of study, was controlled through involving teachers who had an experience of at least one year and above. School characteristics were controlled using sub-county secondary schools because students in these schools had relatively similar entry behavior characteristics.

## **III. RESEARCH METHODOLOGY**

Solomon four non-equivalent control group designs under quasi-experimental research was used. It is considered appropriate for experimental studies (Gall, Gall & Borg, 2007). It fits this study because classrooms in schools exist as intact groups. It overcame external validity weaknesses by having two control groups (Campbell, 2002).

A random assignment of four groups was as shown in figure 2.

**Table 1: A representation of Solomon Four Non- Equivalent Control Group Design**

Group E1	O <sub>1</sub>	x	O <sub>2</sub>
Group C1	O <sub>3</sub>	-	O <sub>4</sub>
Group E2		x	O <sub>5</sub>
Group C2	-		O <sub>6</sub>

**Key:** E1 and E2- experimental groups.  
 C1 and C2: Control groups.  
 E1, C1 pre-tested and E2, C2 post-tested.

The study was conducted in Njoro- sub-county in Nakuru, Kenya. There are 51 secondary schools among them 3 in the category of extra-county (2 single-gender and 1 mixed) and 48 sub-county secondary schools. Njoro was chosen because of its dismal performance in C.R.E. Target population comprised Njoro secondary schools with a population of 14,292 students (Njoro Education Report, 2019). Accessible population comprised Form II students whose number was 4,745. Candidates performed poorly in questions that required evaluation, analysis, and synthesis (KNEC Report, 2017). Simple random technique was used to select four schools. A sample size of 184 student was used to meet a required minimum of at least 30 per group (Mugenda & Mugenda 1999). Teachers involved in teaching experimental group were inducted on how to use TPS module. Induction began after completion of pilot study and took one week. Teachers then began teaching using T.P.S strategy. Control groups were taught using conventional methods. Treatment exercise took four weeks

The study used Christian Religious Education Achievement Test (CREAT) and Motivational Descriptive Questionnaire (M.D.Q.) as data collection instruments. A Christian Religious Education Achievement Test (CREAT) developed by researchers was used for pre-test, later reorganized for a post-test. Fifteen test items open-ended with a maximum of 39 marks and a minimum of 0 marks. The test had different scores ranging from 1-8. They tested knowledge, application, synthesis, and evaluation. Test was validated by experts from Faculty of Education, Egerton University.

M.D.Q instrument was used to determine students' motivation to learn C.R.E. Researchers adapted a questionnaire developed by Tuan and Chin CShieh (2005). There were nine items in the questionnaire constructed using a five-point Likert scale. Positive items were scored from 1,2,3,4,5, while negative items scored from 5,4,3,2,1. P.D.Q instrument was used to determine students' perception of classroom environment. Questions were adapted and modified developed by Tuan and Chin CShieh, (2005). There were eight items in the questionnaire. Items were constructed using a five-point Likert scale. Positive items were scored from 1,2,3,4,5, while negative items scored from 5,4,3,2,1. Both M.D.Q. and P.D.Q. were combined for ease of administration to students.

Instrument's reliability was tested using Kuder-Richardson (K-R 20) for C.R.E. Achievement Test (CREAT) due to the method's suitability with binary variables and varying difficulty levels. Cronbach's alpha formula was used to determine reliability for Motivation and Perceptions Questionnaires (M.D.Q. and P.D.Q.). Cronbach's alpha was useful for instruments constructed using close-ended Likert type items. T.P.S. Module was prepared and availed in print form. Each teacher handling a treatment group was provided a copy of the module. Researchers used recommended books and syllabus from KICD to achieve stated objectives. T.P.S. module was used throughout treatment period among experimental groups and a post-test was administered for comparison.

An introductory letter from School of post graduate studies was used to obtain a permit from the National Commission for Science, Technology, and Innovation (NACOSTI) to gain access to schools. Heads of schools gave authorization. Teachers were inducted on how to use T.P.S. module for a week. Data was analyzed using descriptive statistics (mean, percentages, and standard deviation to summarize raw data) and inferential statistics. Quantitative data was generated and analyzed using Analysis of Variance (ANOVA) to determine whether the four groups differed significantly among themselves on studied variables. A t-test was used to determine whether mean of variables significantly differed between treatment and control groups, and male and female. All tests of significance were computed at 0.05 level of significance

#### IV. RESULTS AND DISCUSSION

Research data obtained is presented in descriptive, inferential statistics and findings presented in tables and graphs. One-Way ANOVA and t-test are used to test hypotheses of the study.

#### 4.1 Effects of TPS Teaching Strategy on Students' CRE Achievement

To determine the effect of TPS strategy on students' achievement in CRE Mean gain analysis and T-test was done. The mean gain analysis results for E<sub>1</sub> and C<sub>1</sub> are shown in Table 3

**Table 2: Mean Gain Analysis on Students CRE Achievements Test (CREAT) Scores**

CREAT scores	E <sub>1</sub>	E <sub>2</sub>	C <sub>1</sub>	C <sub>2</sub>
Pre-test mean	48.81	N/A	42.73	N/A
Post-test means	57.64	49.72	44.92	41.53
Mean gain	8.83	N/A	2.19	N/A

CREAT retest and post-test scores: - E<sub>1</sub> was 48.81 and 57.64, respectively while C<sub>1</sub> was 42.73 and 44.92, respectively. Post-test scores: - E<sub>2</sub> and C<sub>2</sub> were 49.72 and 41.53. . The results show that mean gain for E<sub>1</sub> CREAT post-test scores (8.83) is greater than that of C<sub>1</sub> (2.19). The increase might have been as a result of the treatment applied to E<sub>1</sub>. To determine whether there was a statistically significant difference in mean gains for E<sub>1</sub> and C<sub>1</sub>, independent samples T-test analysis was employed. Table 3 shows the descriptive statistics on academic achievement (CREAT) for E<sub>1</sub> and C<sub>1</sub>.

**Table 3: Summary Statistics for Academic Achievement (CREAT) Mean Gains between E1 and C1**

Parameters	Mean gain	N	SD
E <sub>1</sub> Mean scores gain	8.83	47	4.92
C <sub>1</sub> Mean scores gain	2.19	46	5.05

The mean gain for E<sub>1</sub> and C<sub>1</sub> was 8.83 and 2.19 respectively. Therefore, the difference in mean score gains between E<sub>1</sub> and C<sub>1</sub> was 6.64. Table 5 shows mean difference in mean score gains between E<sub>1</sub> and C<sub>1</sub>.

**Table 4: T-test Results for the Difference in Academic Achievement (CREAT) Mean Gains between E1 and C1**

Parameters	N	Mean	SD	Df	t-value	p-value
E <sub>1</sub> Mean scores gain	47	8.83	4.92	91	8.384	.000
C <sub>1</sub> Mean scores gain	46	2.19	5.05			

Mean difference = 6.64; Critical T-value = 1.99; Calculated T-value = 8.384

Mean difference = 6.64; Critical T-value = 1.99; Calculated T-value = 8.384

Table 5 show that the mean difference in mean score gains between E<sub>1</sub> and C<sub>1</sub> was statistically significant at 5% level (T-value = 8.384, P-value = 0.000). Students CRE Achievements Test (CREAT) mean scores gain for those exposed to TPS strategy (E<sub>1</sub>) 8.83 was higher than those not (C<sub>1</sub>). CREAT Scores for groups E<sub>1</sub>, E<sub>2</sub>, C<sub>1</sub> and C<sub>2</sub> are summarized in Table 5. Post-test means for E<sub>1</sub> and E<sub>2</sub> were 57.64 and 49.72 respectively. C<sub>1</sub> and C<sub>2</sub> was 44.92 and 41.53, respectively.

**Table 5: Summary Statistics for Academic Achievement Scores (CREAT) Among the Various Groups**

CREAT scores	N	Post-test means	SD
E <sub>1</sub>	47	57.64	7.72813
E <sub>2</sub>	45	49.72	5.54772
C <sub>1</sub>	46	44.92	6.42066
C <sub>2</sub>	46	41.53	6.27748

ANOVA was employed to establish whether there was a significant difference among various groups (E<sub>1</sub>, E<sub>2</sub>, C<sub>1</sub> and C<sub>2</sub>) so as to determine superiority of the two methods of teaching (conventional and TPS strategy) in the achievement (CREAT). The results are shown in Table 6.

**Table 6: One Way ANOVA Results to show Difference in Achievement Scores (CREAT) Among the Various Groups**

Source of Variation	Sum of Squares	df	Mean Square	F	P-value
Between Groups	1231.27	3	537.44	14.474	0.000
Within Groups	13.32	180	38.64		
Total	1244.59	183			

F-Critical (3, 180) = 2.655, P < 0.05, Calculated F-Value = 14.474

Post-test analysis for CREAT scores show that there was a statistical significant difference in achievement among the four groups. The calculated F-ratio (14.474) was higher than the critical value (2.655). The results indicated that experimental groups E1 and E2 (57.64, 49.72) achieved higher mean scores than the control groups C1 and C2 (44.92, 41.53) respectively. TPS strategy had positive effects on achievement due to its improvement of CREAT scores as compared to conventional methods.

A close analysis of Turkey post - hoc test results revealed that mean difference between E1, E2 groups (7.92) as well as, C1, C2 groups (3.39) was not statistically significant at 5% level. Mean difference between other groups (E1, C1; E1, C2; E2, C1; E2 and C2) were statistically significant at 5% level. These results are depicted in Table 8.

**Table 7: Turkey's Post-hoc Test Results for the Mean Difference in Post-Test Scores**

Variable (I)	Variable (J)	Mean Difference (I-J)	Sig.
E <sub>1</sub>	C <sub>1</sub>	12.72*	.000
E <sub>1</sub>	C <sub>2</sub>	16.11*	.000
E <sub>1</sub>	E <sub>2</sub>	7.92	.083
E <sub>2</sub>	C <sub>1</sub>	4.80*	.006
E <sub>2</sub>	C <sub>2</sub>	8.19*	.005
E <sub>2</sub>	E <sub>1</sub>	-7.92	.083
C <sub>1</sub>	C <sub>2</sub>	3.39	.105
C <sub>1</sub>	E <sub>1</sub>	-12.72*	.000
C <sub>1</sub>	E <sub>2</sub>	-4.80*	.006
C <sub>2</sub>	C <sub>1</sub>	-3.39	.105
C <sub>2</sub>	E <sub>1</sub>	-16.11*	.000
C <sub>2</sub>	E <sub>2</sub>	-8.19*	.005

\* means significant at 0.05 level

Table 8 show groups: E1 and C1, E1 and C2, E2 and C1 as well as E2 and C2. A statistical significant difference in post-test CREAT scores was noted. It indicated that there was a statistical significant difference among the four groups (C1, C2, E1 and E2). However, means between groups E1 and E2 and groups C1 and C2 was not statistically significant. Since the mean difference in post-test CREAT scores between experimental groups E1 and E2 and control groups C1 and C2 were statistically significant at 0.05, the study therefore, rejected the null hypothesis. The hypothesis stated that there was no statistically significant difference in achievement between students taught CRE through TPS strategy and those not. TPS strategy resulted in a higher achievement compared to conventional method. There was a significant difference in E1 and E2 as well as C1 and C2, probably due to teachers' low mastery of content in experimental group (E2) and control group (C2) thus leading to low student performance.

#### **Effects of TPS Teaching Strategy on Students' Motivation in Learning CRE**

To determine the effect of TPS strategy on students' motivation to learn CRE. Mean gain analysis and T-test was done. The mean gain analysis results for E<sub>1</sub> and C<sub>1</sub> are shown in Table 9

**Table 9: Summary Statistics for the Groups MDQ Scores**

Groups	N	Mean	SD
E <sub>1</sub>	47	3.69	.469
E <sub>2</sub>	45	3.41	.447
C <sub>1</sub>	46	2.84	.690
C <sub>2</sub>	46	2.62	.673

Note: Maximum score = 5.0

Table 9 shows the means of groups E1 and E2 as 3.69 and 3.41, respectively while the mean for groups C1 and C2 was 2.84 and 2.62, respectively. Table 10 show the mean difference in MDQ scores for the different groups in this study.

**Table 10: One-Way ANOVA Results for the Differences in MDQ Scores per Groups**

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>P-value</i>
Between Groups	3578.04	3	410.44	5.840	0.000
Within Groups	19.36	180	17.51		
Total	3597.40	183			

F-Critical <sub>(3, 180)</sub> = 2.655, P< 0.05, Calculated F-Value = 5.840

The results in Table 10 show that the mean difference in MDQ scores for the different groups in this study was significant at 5% level (Calculated F-Ratio (3, 180) of 5.840 was more significant than the critical value 2.655). It can be observed from the results that experimental groups E1 and E2 achieved higher MDQ mean (3.69 and 3.41) than control groups C1 and C2 (2.84 and 2.62) respectively. It means TPS strategy affected students' motivation. Experimental groups (E1 and E2) recorded superior academic performance in CRE compared to conventional methods.

**Table 11: Turkey's Post-hoc Test Results for Mean Difference in MDQ Scores**

Variable (I)	Variable (J)	Mean Difference (I-J)	Std. Error	Sig.
E1	C1	0.85	.359	.000
E1	C2	1.07	.047	.000
E1	E2	0.28	.272	.093
E2	C1	0.57	.192	.007
E2	C2	0.79	.272	.003
E2	E1	-0.28	.272	.093
C1	C2	0.22	.163	.104
C1	E1	-0.85	.359	.000
C1	E2	-0.57	.192	.007
C2	C1	-0.22	.163	.104
C2	E1	-1.07	.047	.000
C2	E2	-0.79	.272	.003

\* means significant at 0.05 level

MDQ Turkey's post-hoc test results show a significant difference in mean for MDQ scores among the various groups (except between E1 - E2 and C1 - C2). Results clearly show a statistical significant mean difference in MDQ between experimental groups (E1 and E2) and control groups (C1 and C2), that is, groups E1 versus C1, E1 versus C2, E2 versus C1 and E2 versus C2. Based on these results, this study rejected null hypothesis since there was a statistical significant difference in students' motivation to learn CRE between those exposed to TPS strategy and those not.

## V. DISCUSSION

The researchers found out that students taught using TPS strategy achieved significantly higher scores than those taught using conventional methods. According to Keter (2015), constructivist teaching strategies focus on meaning-making and knowledge construction and not mere memorization. Students learn by personally and uniquely developing an understanding which makes sense of information. Constructivist teaching strategy focuses on problem-solving, constructing and reconstructing ideas and methods (Etuk&Etuk 2011). According to Lom (2012), TPS teaching strategy promote student's academic achievement because it enhances content understanding and retention.

Muhammad & Irwandi (2018) investigate how the Think-Pair-Share (TPS) technique can improve the students' reading skill at English Language Department, Muhammadiyah University of Mataram. The study revealed a statistically significant difference in favor of experimental group that was taught using TPS strategy for subject achievement and retention. TPS enhances educational achievement by making its enjoyable to student.

Salman (2015) investigated the effectiveness of think-pair-share strategies of active learning (role-playing) among pupils in grade 5 taking Arabic grammar in the district of Irbid subject and noted that TPS strengthened the language abilities and self-confidence and hence increasing the performance of students. The method was found to arouse interest (motivation) through its great emphasis on group activities and intense

thinking. Al-Sultani (2015) studied the effect of TPS strategy among schoolgirls in the fifth grade and the level of ambitions in science generally. The results showed that TPS enhanced the average score for the students taught through TPS strategy as opposed to those taught using conventional methods in a science subject.

A critical difference between TPS teaching strategy and conventional group learning strategy is that the latter, students work in groups without attention to group functioning. In TPS teaching strategy, group work is carefully prepared, planned, and monitored (Suresh & Reddy, 2017) positive interactions do not occur naturally; hence social skills instruction must precede. Cooperative learning strategies tend to concur with this fact. Social skills entail communicating, building and maintaining trust, providing leadership, and managing conflicts. Onwuegbuzie (2001), documented positive educational benefits learning, and social benefits (good attitudes toward school, self-esteem, self-efficacy, motivation, good relationships and regular attendance) of cooperative learning, interdependence, individual accountability and physical interactions.

These results are consistent with Hetika and Farida (2018) as documented in their study on the application of TPS learning method in improving learning motivation and learning achievement in Introduction to Accounting I subject among accounting students in Polytechnics in Harapan Bersama College in Indonesia. Though the research used Class Action design and not Solomon-Four design as used in this study, the study found that TPS teaching strategy enhances students' motivation to solve problems.

## VI. CONCLUSION AND RECOMMENDATION

### 5.1 Conclusions

The study concluded that there is no statistically significant difference in academic achievement between students taught C.R.E. using T.P.S. teaching strategy and those who are not. The hypothesis was rejected at a 0.05 significant level. The Post-test CREAT scores (E1) - 48.81 and 57.64, respectively. In contrast, Pre- C1 was 42.73 and 44.92, respectively. Thus use of T.P.S. teaching strategy positively affected academic achievement due to its improvement of CREAT scores as compared to conventional methods. From the findings the study concluded that T.P.S. teaching strategy resulted in a higher academic achievement as compared to the conventional method of learning C.R.E. Use of T.P.S. teaching strategy resulted to higher academic achievement as compared to the conventional method of teaching C.R.E. Therefore, investing in better training of teachers on the delivery and evaluation of the teaching strategy is a useful policy instrument in improving students' C.R.E. achievement. However, complementary measures such as the availability of qualified teachers, teaching facilities and parental support must also be present.

### 5.2 Recommendations

From the conclusion the study recommended that recommended that C.R.E. teachers in secondary schools should pay greater attention in choosing teaching and learning strategies that may be of great benefit to the students, where students are offered an avenue to integrate skills learnt through collaboration and meaningful learning. T.P.S. can enhance students' motivation to learn C.R.E. and by extension, improves their academic performance in the subject.

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