

Cross Age Peer Tutoring as Pedagogical Strategy; a Remedy for Enhancing Academic Achievement in Secondary Schools

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Abstract: Education has moved to a level where everyone has an active role in the culture that is produced. Cross age peer tutoring is one of strategies that aims to promote and facilitate the students' development, into intellectual, emotional, personal and social dimensions. This study was based on the social constructivist theory and employed mixed method approach, concurrent triangulation design. The study was set to analyze the use of cross-age peer tutoring in enhancing academic achievement in secondary schools. The study was conducted in Kisumu West Sub County because of a dropping performance in national examination. 34 principals, 366 teachers and 12,299 students made up the study population of 12,699. Simple random sampling was used to sample 1 schools and purposive sampling sample teachers and students. Purposive sampling was used to get form two class to take part in the study. This study used learners' standardized achievement tests, questionnaires and interviews guides to collect data. Piloting, test retest method was employed to enhance the reliability of instruments for data collection. The qualitative data was analyzed by organizing content into themes and sub themes. Quantitative data derived from questionnaire items was analyzed by use of descriptive statistics then presented in tables. Students were pretested through a standardized achievement test. On the basis of pre test results and the willingness of the students, a number of students were assigned to the experimental group treated through cross age peer tutoring and the rest were assigned to the control group. Moreover, 30 peer tutors were purposively selected in school in form three on the basis of their academic achievement in chemistry results in their immediate internal exam and their willingness to serve as peer tutors. To determine the significance of the tutoring intervention through comparison of pre and post-test achievement of experimental and control groups, descriptive statistics of mean, median, standard deviation, coefficient of variation, and inferential statistics of t-test and analysis of covariance were used. The study results indicated that the experimental group showed greater improvement in their chemistry academic achievement as a result of their exposure to peer teaching. Cross age peer tutoring had thus a visible effect on the posttest performance of the experiment group when tested at .05 level of significance. The study also found that cross age peer tutoring had not been embraced by teachers in schools. Principals interviewed were aware that cross age peer tutoring was not one of the favorite strategies used by teachers. The study recommended that cross age cross age peer tutoring was useful to complement routine methods and should be embraced by teachers among other recommendations.

Keywords: cross age peer tutoring, pedagogy, strategy, academic achievement and hypothesis.

1. INTRODUCTION

1.1 Introduction

Cross age peer tutoring is an action that allows students' integration and adaptation, guiding and boosting students' relations with the different services by ensuring appropriate use of the different resources that the institution provides (Carrasco and Pérez, 2005). They learn to use tutoring materials, take turns as the tutor and the tutee, ask the questions appropriately, and deliver feedback in a positive manner. In peer tutoring, students practice content information in tutoring pairs rather than whole class learning (Scruggs, Mastropieri, and Marshak, 2012).

An action research conducted in more than one hundred schools in United Kingdom over a period of ten years observed that cross age peer tutoring-engage negative students in secondary schools. The study demonstrated that cross age peer tutoring has the power to transform the behaviors, attitudes and performance of students with serious behavioral and academic problems (Morrison 2004; Morrison, Burton and O'Toole, 2006).

A study in the United Kingdom on the impact of cross age peer tutoring showed that peer learners had higher test scores than students who studied alone, either, there was an increase in positive attitudes to their learning and that a completion rates stood at 64% higher in comparison to traditionally taught students (Falchikov, 2001). The research concluded that teenagers learn more effectively from their peers, particularly older peers, than from traditional teacher - centered instruction and peer learning situations effectively supported student learning (O'Donnell and King, 2009).

In Guinea, Gyanani and Pahuja (2008) reported the results of a geography peer-teaching programme with Junior High School students. A study contained 214 experimental and 201 control students ranging in age from 11-16. Experimental students were organized into cross age peer tutoring groups while the controls continued to be taught by the teacher as one large group. Students were then tested on the material learned during both the one-group teacher instruction sessions and the tutoring sets. The results of the study indicated that the experimental group achieved significantly higher gains in terms of the mean scores for the group than the control groups. In geography, cross age peer tutoring improved a mean score in Guinea.

Nakabugo, Opolot-Okurut, Ssebbunga, Ngobi, Maani, Gumusiriza, Mbagu, Alupo, Byamugisha, Tukesiga, Bisikwa, Ndawula and Bbosa, (2007) conducted a baseline study of primary teachers' instructional strategies in large classes in Uganda. They used a sample of 35 teachers in twenty schools using interviews, observation and documentary analysis. They found that teachers used group work, cross age peer tutoring and attention attracting methods to handle large classes among learners themselves. Teachers advocated for the teaching of large classes through peer-teaching. Teachers used peer tutoring which placed responsibility of teaching in the hands of the able, knowledgeable and well prepared students whom the teacher had trained. Nakabugo, et al. (2007) observed that teachers in Uganda employed group work, a cross age peer tutoring strategy, in teaching of classes of classes with more than 70 students used this teaching strategy in classroom management.

In Kenya, the researcher found a limited documented evidence of cross age cross age peer tutoring as a strategy in enhancing academic achievement in secondary schools. This was despite the fact that learner centered strategies were encouraged. As noted by the Ministry of Education in its National Report on the Development of Education in Kenya and presented at the International Conference on Education in September 2001, teaching approaches adopted by teachers were to be learner-centered (Ministry of Education, 2001).

In the universities, for instance, University of Eldoret encouraged group work. Student teachers were expected to: allow students perform tasks in groups, help students to assist fellow students, encourage students to rely on fellow students and on groups, encourage students to organize themselves socially for better efficiency (Teaching Practice Guide, 2017).

The previous studies showed that cross age peer tutoring was important in making learners take responsibility in their own learning, identifying and addressing their knowledge gaps (Thomas, 2013). By taking full responsibility for their learning, learners avoided stress and uncertainty which led to ineffective learning strategies. Poor results, class repetition, poor retention rate, truancy, learners' disillusionment and school dropout were major challenges that needed urgent intervention (Republic of Kenya, 2011).

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Despite a surge in school enrolment as a result of the introduction of free education in 2003, Kenya had not adequately increased the number of teachers since 1999 in tandem with the rising number of learners enrolled each year (Oyaro, 2008). Kenya had a deficit of 46,000 teachers at the primary and 13,000 at secondary school level (Sinyolo, 2007; Oyaro, 2008) a challenging situation in providing individualized learning environments to learners in schools. High student ratio implied that a teacher were not able to handle many students at ago. This made teachers to employ teaching methods which were deductive, rendering students passive (Michelowa, 2003; Dembele and Miaro, 2003).

In Kisumu West Sub County, low Curriculum Based Establishment (CBE) was one of the many factors that were responsible for the current performance but cross age peer tutoring was an intervention. The Curriculum Based Establishment (CBE) showed that the sub county had 366 teachers out of 600 needed in secondary schools. This gave Kisumu West Sub County a shortfall of 234 teachers (Table 1.1). This shortfall brought out the need for an intervention hence, a need for cross age peer tutoring as one of the mitigating strategies.

Table 1.1: Teaching staff in Kisumu West Sub County

| CBE (Teachers Needed) | Teachers on Duty | Shortfall |
|-----------------------|------------------|-----------|
| 600 | 366 | 234 |

Source: Kisumu West Sub County Education Report 2017

Inadequate number of teachers led to congested classrooms that affected classroom interaction and resulted to poor academic results. This made teachers to encounter difficulties in giving learners personalized attention needed for academic success (Arnold, Gaddy and Dean, 2004).

Dropping performance in national examination was a concern to many stakeholders. In 2017, Kisumu West Sub County Commissioner reminded the stakeholders about a need for better results "... those who did not perform that... there is always a next time. I therefore call upon all the stakeholders for cooperation and a peaceful co-existence for better result" (KSWST, 2017: Pg2).

The call by Kisumu West Sub County Commissioner of Education was prompted by a dropping performance in Kisumu West Sub County. Kisumu West Sub-County performance was less that Muhoroni and Kisumu Central Sub Counties with 4.791 and 5.139 respectively. The performance had been below average for the last six years continuously (Table 1.3).

Table 1.2: KCSE Performance from 2010 to 2017

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | *2017 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Mean | 5.962 | 5.829 | 5.625 | 5.543 | 5.496 | 5.408 | 4.713 | 4.228 |

*KCSE 2017 results were outside the research scope but included during for update of performance.

Source: Kisumu West Sub County Education KCSE Reports 2010-2017.

The dropping performance in Kenya Certificate Secondary Education in Kisumu West Sub County and the need to ascertain the role of cross age peer tutoring in enhancing academic achievement in secondary schools necessitated the current study. Cross Age Cross age peer tutoring could be a timely corrective intervention. The need for an intervention strategy to the dropping performance in KCSE and a possibility that cross age peer tutoring was a remedy prompted the researcher to interrogate effects of cross age peer tutoring in enhancing academic achievement in secondary schools.

1.2 Statement of the problem

Despite the desire by the Ministry of Education, Teachers Service Commission and universities that learner centered approach be adopted to enhance academic performance, there was limited evidence of cross age peer tutoring strategy in Kenyan secondary schools. The need for more documented literature on cross age peer tutoring and a desire to improve academic performance in secondary schools prompted the researcher to interrogate Cross age peer tutoring as Pedagogical Strategy; a remedy for enhancing academic achievement in secondary schools.

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1.3 Objectives of the Study

To analyze the use of cross-age peer tutoring in enhancing academic achievement in secondary schools.

1.4 Research Hypotheses:

H₀ Cross age peer tutoring strategy does not enhance academic achievement in secondary schools.

H₁ Cross age peer tutoring strategies does enhance academic achievement in secondary schools.

2. RESEARCH METHODOLOGY

This study employed mixed methods research approach, concurrent triangulation design, which used both quantitative and qualitative methods as components of research. In mixed methods research, quantitative and qualitative methods were combined in the context of one study (Caruth, 2013). Most of the literature on mixed methods research were considered generic which means that the discussion were centered on research designs with little or no relation to any particular disciplinary context (Creswell, 2009). The researcher used mixed method concurrent triangulation design because more than one method was used to confirm, cross-validate and verify findings within a study to overcome a weakness of one method with the strengths of another. This design was based on either or both perspectives. Moreso, researcher's problems were hypotheses based on prior literature and sample sizes were also varied based on methods used. Data collection involved techniques that were available to the researcher. Interpretation was continual and influenced various stages in the research process (Creswell, 2003).

2.1 The Area of Study

The study was conducted in Kisumu West Sub-county. The sub county is located in Nyanza region in the Western Kenya. The Sub - County in located near Winam gulf of Lake Victoria that lies within longitude 33, 20 east and latitude 0, 20 north(longitude and latitude both given in degrees). The researcher identified Kisumu West Sub County because of a dropping performance from 2010 to 2016 compared to Muhoroni and Kisumu central that had means of 4.791 and 5.139 respectively in 2016 from the data availed to the researcher showed in the background of the study (Table 1.3).

2.2 Study Population

According to the Kisumu West Sub County Sub Deputy Director of Education report (2016), the sub county had a total 34 principals, 366 teachers and 12,299 students that made up the study population of 12,699 (Table 1.4). There were 34 public secondary schools and 5 private schools.

2.3 Sample Size and Sampling Techniques

Purposive sampling sample Form Two class. Form Two was sampled because Form Four class were not sampled because they were busy preparing for KCSE and were already doing revision and could not take time for the study. The Form One was relatively new from primary schools and needed time for orientation and a substantial coverage of the syllabus. The researcher did not sample Form Three class because they were anxious their movement to the national examination class (Kothari, 2014).

3. DISCUSSION

3.1 Cross age peer tutoring in Schools

In school Y, the researcher analyzed the use of cross-age peer tutoring in enhancing academic achievement in secondary schools. In this objective, older students were matched with younger students to deliver instruction. Tutors were typically at least one year older than the tutees at a higher class. There was no large difference in skill levels between the tutors and tutees. 30 students from Form Three were purposively selected because of their age and academic performance in chemistry based on their end team 2016 exams. A frequency distribution table of the pretest scores of the control group and experimental group was formed. The pretest scores of control group and experimental group. The table indicated that the highest number of experimental group (22) scored between 15-19 marks in pretest chemistry subject, and also in the control group the highest number (12) scored between 15-19 marks. The pretest raw scores for both groups were given in the appendix H. Table 4.7 marks distributions for both for distribution of marks.

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Table 2.2: Frequency Table School Y

| Class Interval Marks | Frequencies Control Group | Frequencies Experimental Group |
|---------------------------------|--------------------------------------|---|
| 05-09 | 4 | 1 |
| 10-14 | 8 | 1 |
| 15-19 | 12 | 22 |
| 20-24 | 11 | 16 |
| 25-29 | 5 | 0 |
| TOTAL | 40 | 40 |

The distribution of the scores in table 4.7, the mean was 17.05 and a standard deviation of 6.013 marks for control group. This scores were later compared with the post test score after to determine the effect of peer teaching.

The distribution of the scores in table 4.7 the mean was 19.45 and a standard deviation of 4.646 marks for control group. This score were later compared with the post test score to determine the effect of peer teaching.

Table 4.8 showed a comparison of the control and experimental groups on the pretest scores in school Y. Scores had minimums, 14%, 1st quartile, median and mean.

Table 2.3: Comparison Table School Y

| | Control Group | Experimental Group |
|--------------------------|----------------------|---------------------------|
| Minimum | 5 | 8 |
| 14% | 7 | 15 |
| 1 st Quartile | 11 | 17 |
| Median | 16.50 | 18 |
| Mean | 17.05 | 19.45 |
| Standard Deviation | 6.01 | 4.65 |
| Coefficient of Variation | 35.25 | 23.90 |
| 3 rd Quartile | 21.25 | 23.25 |
| 86% | 23 | 24 |
| Maximum | 27 | 29 |

Mean of the experimental group was 2.4 marks higher than that of the control group in the pre test scores. The median for the experimental group was also 2.50 marks higher than that of control group. The middle 50 percent of the pretest scores of the experimental group ranged from about 17 to 23.25 while that of the control group ranged from about 11 to 21.25, and the middle 72 percent of the pretest scores of the experimental group ranged from about 15 to 24 while that of the control group ranged from about 7 to 23. The experimental group was superior in their pretest scores as compared to control group (Table 4.8).

The control group contained more variability among the individual in pretest scores shown by the coefficient of variation of 35.25 as compared as to the experimental group with a coefficient of variation of 23.90. This showed that the experimental group had less variation among individual pretest scores.

3.2 Posttest (Administration and Interpretation) for school Y

After grouping the students into these two distinct groups named as control and experimental groups, the control group was taught through the traditional method while the experimental group was taught through cross age cross age peer tutoring whereby one peer tutor handled two to three learners. 30 Form Three students who were older than the sampled form two students were selected as peer tutors based on their academic superiority and their willingness to be tutors. This was conducted by pairing the selected academic favored Form Three students with the sampled form two students. The Form Three students acted as tutors while the Form Two students were the tutees. Both groups were taught for ten weeks and after the experiment they were post tested. Table 4.9 showed a frequency distribution of the posttest scores of the control group and experimental group for school Y. 20 experimental group scored post test chemistry subject between 20-24 marks and 10 control group also scored between 20-24 marks (Table 4.9). The post test raw scores for both the groups are given in the appendix H.

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Table 2.4: School Y Distribution Table

| Class Interval Marks | Frequencies Control Group | Frequencies Experimental Group |
|-----------------------------|----------------------------------|---------------------------------------|
| 05-09 | 7 | 1 |
| 10-14 | 8 | 0 |
| 15-19 | 11 | 2 |
| 20-24 | 10 | 20 |
| 25-29 | 4 | 17 |
| TOTAL | 40 | 40 |

The post test scores distribution were the mean of the test was 16.28 marks while standard deviation was 6.25 mark. The result had a normal curve showing a normal distribution of marks. The score in control group differed in that in pre test scores the mean was 17.05 compared to post test score of 16.28 marks this showed a drop 1.22. This showed that cross age peer tutoring was better than conventional teaching, post test scores of control group was 16.28 and a standard deviation of 6.25 marks.

This showed that learners performed better in experimental group than in control group. There was a remarkable difference in the means scores in both pre test and post test scores in the students results. The mean mark in pre test was 17.05 marks. In post test the mean was 23.8 which was an improvement from 19.45.

A comparison between control and experimental groups on the post test scores (Table 4.10). The mean post tests score of the experimental group was 7.53 higher than that of the control group. The variability among the individual score in the control group was much higher as indicated by the coefficient of variation of 38.41 as compared to that of the experimental group with 15.29 as the coefficient of variation. This indicated that experimental group contained less individual variation in the post test scores in chemistry subject as compared to the control group. The mean scores of the pre test and post test tests were also different. The mean of school Y in pretest exam dropped from 17.05 marks to 16.27 marks in the control group while mean of experimental group improved from 19.45 marks to 23.08 marks. This improvement showed that cross age peer tutoring improved the performance of chemistry (Table 4.10).

Table 2.5: Comparison between Control and Experimental Groups

| | Control Group | Experimental Group |
|--------------------------|----------------------|---------------------------|
| Minimum | 5 | 9 |
| 14% | 8.46 | 22 |
| 1 st Quartile | 11.75 | 23 |
| Median | 16 | 24 |
| Mean | 16.27 | 23.8 |
| Standard Deviation | 6.25 | 3.64 |
| Coefficient of Variation | 38.41 | 15.29 |
| 3 rd Quartile | 22 | 26 |
| 86% | 23 | 27 |
| Maximum | 27 | 29 |

The researcher found out whether there was significant difference between the mean marks of post test scores of control group and experimental. In this case the researcher tested the following hypothesis

H₀: Cross age peer tutoring strategy does not enhance academic achievement in secondary schools.

H₁: Cross age peer tutoring strategies enhances academic achievement in secondary schools

The researcher tested the statistical significance of this difference through analysis of covariance. In table 4.11 indicated that main effect of grouping (Control and Experimental) was highly statistically significant. This was because the observed F value, $F(1, 77) = 88.798 > F_{0.05}(1, 77) = 3.97$ (appendix T). The researcher therefore rejected the null hypothesis that cross age peer tutoring strategy does not enhance academic achievement in chemistry in secondary schools and concluded that there was sufficient evidence that cross age cross age peer tutoring does enhance academic achievement in chemistry in secondary schools. The experimental group showed a larger improvement of 4.35 marks in

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their post test mean as compared their pretest chemistry subject. This improvement was as a result of their exposure to cross age peer tutoring.

Table 2.6: Tests of Between-Subjects Effects

| Dependent Variable: posttest | | | | | | |
|------------------------------|-------------------------|----|-------------|---------|------|---------------------|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
| Corrected Model | 2665.664 ^a | 2 | 1332.832 | 202.333 | .000 | .840 |
| Intercept | 154.526 | 1 | 154.526 | 23.458 | .000 | .234 |
| pretest | 1533.151 | 1 | 1533.151 | 232.743 | .000 | .751 |
| Group | 584.941 | 1 | 584.941 | 88.798 | .000 | .536 |
| Error | 507.224 | 77 | 6.587 | | | |
| Total | 35293.000 | 80 | | | | |
| Corrected Total | 3172.887 | 79 | | | | |

a. R Squared = .866 (Adjusted R Squared = .863)

The study through questionnaires sought the opinion from teachers how often teachers paired students from different classes in their subjects to enhance academic performance. 60% of the respondents said they never did cross age cross age peer tutoring strategy while 17% respondents responded that they rarely did cross age cross age peer tutoring strategy. In the study 10% of teachers sometimes paired learners from other classes while 6% and 7% of teachers always paired students while 6% of teachers frequently paired students. In the responses, teachers did not s any show deliberate effort to use cross age peer tutoring technique in schools. This went against the desire by the universities, Teachers Service Commission, Ministry of Education and universities that cross age peer tutoring should be used in teaching and learning as a strategy. One teacher observed that there was a problem of discipline in schools that made it impossible to employ cross age peer tutoring strategy. The teacher observed:

The issue of discipline among learners is a major drawback in our school. (TQY1)

In the interview, all the four principals agreed that cross age peer tutoring was not being practised in their respective schools. They acknowledged that it was a fact that such a strategy improved academic performance if they were well implemented but also observed that teachers were too busy to supervise students. The principal (P1) added that cross age peer tutoring strategies only took place during weekends for the reason that there were no regular classes. The principal (P1) noted:

I know such a strategy could improve academic performance in schools, the implementation remains to be a major challenge. Teachers are too busy to supervise such group discussions. We used to do this during weekends but not now. It was important in fasihi and literature areas. (P1)

Another principal (P3) was pessimistic about the use of cross age peer tutoring strategy in schools, hence, need attitude change about cross age peer tutoring in secondary schools. It was the researcher's opinion that cross age peer tutoring could improve academic performance in schools and the reason behind a variation in standard deviation in the achievement tests of 6.25 marks in control group and 3.64 marks in experimental group. Principal (P3) observed that cross age peer tutoring may not be feasible in secondary school. It was observed by the principal (P3) that:

Enforcing such a teaching strategy in almost impossible because of the time fact involved. (P3)

The results from the treatment showed that cross age peer tutoring had a positive academic impact to learners. These results concurred with a study by Tšepo et al. (2013) in Lesotho, who explored cross age peer tutoring in the context of outdoor learning in primary school. The study concluded that both the tutor and the tutees responded positively the outdoor learning activities. The positive response to outdoor activities was a positive effect of cross age peer tutoring likewise there a positive effect on academic achievement. The current study showed a positive effect on grouping that was of a high statistical significance. This was because the observed F value, $F(1, 77) = 88.798 > F(1, 77)_{0.05} = 3.97$.

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The current study from the treatment showed that cross age peer tutoring was superior to other strategies as supported by Robinson; Schofield, and Steers-Wentzell (2005). Cross-age tutoring was the most common form of tutoring. However, Topping (2005) argued that tutors who were in the same age/grade level as the tutees, were becoming more common since the type of tutoring arrangement was more advantageous for both tutors and tutees. Cross- age tutoring enhanced academic achievement in chemistry as shown by the means of 16.27 and 23.8 for control and experimental groups respectively. Coefficient of variance was 38.41 and 15.29 in control and experimental groups respectively showing an effect of cross age peer tutoring strategy.

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The study analyzed the use of cross age cross age peer tutoring in enhancing academic achievement in secondary schools. The study was to measure the achievement of the students in the subject of chemistry before the experiment, to obtain the willingness of the students to participate in the experiment, to provide the experience of peer teachings treatment to the experimental group, explore the difference in the achievement of students participating in cross age peer tutoring and students who did not participate in cross age peer tutoring but were taught as usual through conditional teaching. It was hypothesized that there would be no significant difference between mean achievement scores of the students taught through cross age peer tutoring in the light of social constructivist theory and those taught through traditional teaching.

Finding revealed that 20 experimental group learners scores in post test chemistry subject was between 20-24 marks and 10 control group also scored between 20-24 marks. The mean post tests score of the experimental group was 7.53 higher than that of the control group. The variability among the individual score in the control group was much higher by the coefficient of variation of 38.41 as compared to that of the experimental group with 15.29 as the coefficient of variation. This means that the experimental group contained less individual variation in the post test scores in chemistry subject as compared to the control group.

In this schools, students taught through cross age peer tutoring based on social constructivism theory performed better than the students taught through conventional method and, when both the experimental group and control group were statistically equated on their academic achievement before the experiment. The conclusion drawn was that, cross age peer tutoring based on constructivism teaching was a superior method to teaching through conventional method.

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