Peer Instruction and Secondary School Students Problem Solving Ability in Mathematics; Bungoma County; Kenya.

Susan Awinouko
Faculty Of Education And Social Sciences, Masinde Muliro University Of Science And Technology
P. O. Box 190-50100, Kakamega, Kenya.
Corresponding Author: Susan Awinouko

Abstract Most Educators Agree That Mathematics Should Be Taught In A Way To Enable Learners Acquire Problem Solving Ability, Thus The Focus In Teaching Mathematics Should Be On Problem Solving Situations Rather Than On Routine Computations. This Implies Active Learner Participation As Brought About By Student Centered Instruction. This Study Was Concerned That The Conventional Methods Of Instruction Were Not Facilitating Acquisition Of Problem Solving Skills Resulting In Mass Failure Of Students In National Examinations. The Study Investigated The Role Of Peer Instruction In Learners’ Perception Of Their Problem Solving Ability In Mathematics. The Observation Learning Theory Was Used To Guide The Study. Previous Studies Indicated That Using Peer Instruction Enables Learners Acquire Skills Of Analysis, Synthesis And Evaluation That Facilitate Problem Solving. The Study Was Conducted In Bungoma County. Proportionate Sampling Was Used To Pick 300 Participants. The Study Used An Ex Post Facto Research Design. A Questionnaire Was Used To Collect Data. Both Descriptive And Inferential Statistics Were Used In Data Analysis. The Results Indicate That Majority Of Students Perceived Themselves Able To Solve Problems In Mathematics After Peer Instruction. The Study Therefore Recommends That Teachers Incorporate Peer Instruction In Their Teaching To Facilitate Learners Acquire Problem Solving Skills In Mathematics.

Key Words: Peer Instruction, Problem Solving Ability.

Date of Submission: 08-02-2018
Date of acceptance: 23-02-2018

I. INTRODUCTION

1.1 Background To The Study


A survey By Strengthening Mathematics And Science Education (SMASE), Indicates That The Teaching Of Mathematics In Secondary Schools Was Characterized By Lecturing And Giving Notes And That Learners’ Were Mostly Passive (SMASE, 2010). This Is Contrary To The Requirements Of The Syllabus Which Prescribes That Mathematics Lessons Should Mostly Be Student Centered And Characterized By Learning By Discovery (KICD, 2012). When Students Participate In Their Own Learning They Benefit From Intellectual Stimulation And Increased Understanding In The Field Of Study (Stones 1992). According To Wilson, Fernandez & Hadaway (2005), Successful Problem Solving, Involves Exploration, Pattern Finding And Organization Of Mathematics Knowledge. This May Be Brought About By Using Peer Instruction As It

DOI: 10.9790/0837-2302090104
Provides Learners With An Opportunity To Reflect On The Learning Activities In A Systematic And Constructive Way During The Learning Session.

1.2 Statement Of The Problem

Learning Problem Solving Is Central To Holistic Mathematics Education. This Is So Because Many Mathematics Applications Are Best Brought Out In Problem Solving. Educators Are Concerned That The Usual Methods Of Teaching Are Not Facilitating Learners Acquire Problem Solving Skills. Mass Failure Of Students In Mathematics In National Examinations Characterized By Inability To Solve Mathematics Problems Necessitated This Study.

1.3 Purpose Of The Study

This Study Investigated The Role Of Peer Instruction In Learners’ Problem Solving Ability In Mathematics. It Was Hypothesized That ‘There Is No Relationship Between The Use Of Peer Instruction And Learners Perception Of Their Ability To Solve Problems In Mathematics’.

1.4 Theoretical Framework


II. LITERATURE REVIEW

2.1 Peer Instruction Effectiveness


It Has Been Ascertained That Teachers With Teaching Problems Could Best Be Assisted By Their Peers Rather Than Their Supervisors (Waseem, 2015). This Study Supposes That, In A Classroom Learning Situation, Learners Could Assist Each Other Improve Their Problem Solving Ability. Owiti (2000), Says, Students Whose Friends (Peers) Work Hard In Mathematics Are Also Likely To Work Hard In Mathematics. This May Be So Because Children Tend To Adhere To The Peer Group Expectations If They Have To Fit In With Their Peers.

Rashcke, Dedrick&Statheet Al, (1988) Investigated The Outcomes Of Peer Tutoring, And Reports That, Learners’ Attitudes As Well As Motivation To Learn Mathematics Improved. This Results In Greater Achievement. Thus, Peer Instruction Provides The Best Training Ground For Problem Solving In Mathematics. Teachers Therefore, Should Encourage And Provide Learners With Opportunities To Relate To Each Other In Their Learning Experiences.

2.2 Peer Instruction And Problem Solving

Learners Acquire Facts And Skills And Also Leads To Analysis, Synthesis And Evaluation Of Concepts Resulting In Holistic Learning.

III. RESEARCH METHODS

3.1 Study Area
The Study Was Conducted In Bungoma county Of Western Kenya. In This County We Have Boys Schools, Girls Schools And Co-Educational Schools. Despite Producing Remarkable Results In National Examinations In Other Subjects, Performance In Mathematics Has Remained Poor.

3.2 The Study Sample
The Study Was Conducted Among Form Three Students. Proportionate Sampling Was Used To Select 30 Schools In The Ratio Boys: Girls: Co-Educational From Each Stratum. Participating Schools Were Selected By Random Sampling And The Process Resulted In 300 Subjects Of Whom 78 Were From Boys’ Schools, 81 From Girls’ Schools and 141 From Co-Educational Schools.

3.3 Research Design
The Study Used An Ex Post Facto Research Design. The Design Was Chosen Due To Its Suitability To The Study As The Variables Under Investigation Had Already Manifested In The Field. A Questionnaire Was Used To Collect Data From Students. The Questions Were Structured To Elicit Responses On The Relationship Between Peer Instruction And Problem Solving. The Questionnaire Used A Five Point Likert-Type Of Scale And Contained 20 Items. The Maximum Score A Learner Could Obtain Was 60.

Data Was Analyzed Using Descriptive And Inferential Statistics. A Table Of Frequencies Was Made. Grouped Responses Were Expressed As Percentages Of The Survey Sample. The Chi-Square Test Was Used To Accept Or Reject The Null Hypothesis. A Contingency Coefficient Was Used To Confirm The Magnitude Of Association Between The Variables.

IV. DATA ANALYSIS AND INTERPRETATION
The Study Investigated The Relationship Between Peer Instruction And Learners Problem Solving Ability In Mathematics. Percentages For Learners’ Perception Of Their Problem Solving Ability After Peer Instruction Were Calculated And The Results Presented In Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Using Peer Instruction</th>
<th>Using Conventional Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able To Solve</td>
<td>54%</td>
<td>22%</td>
</tr>
<tr>
<td>Not Able To Solve</td>
<td>11%</td>
<td>13%</td>
</tr>
</tbody>
</table>

The Results Indicate That The Majority Of Students (54%) Perceived That They Were Able To Solve Problems In Mathematics After Peer Instruction. To Investigate This Implication, The Chi Square Test Was Run. This Was To Ascertain If There Was Any Relationship Between Using Peer Instruction And Learners Perception Of Their Ability To Solve Problems. The Results Are Presented In Table 2.

<table>
<thead>
<tr>
<th></th>
<th>Using Peer Instruction</th>
<th>Using Conventional Instruction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able To Solve</td>
<td>161 (148)</td>
<td>67 (80)</td>
<td>228</td>
</tr>
<tr>
<td>Not Able To Solve</td>
<td>34 (47)</td>
<td>38 (25)</td>
<td>72</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
<td>105</td>
<td>300</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 13.609 \text{ At } \alpha = 0.05 \text{ Contingency Coefficient } 0.208 \]

Figures In Parenthesis Are Expected Frequencies
A Chi Square Value Of 13.609 Was Obtained At 0.05 Level Of Significance And 1 Degree Of Freedom. This Indicated That The Two Variables Were Not Independent Hence There Was A Relationship Between Peer Instruction And Problem Solving Ability. The Null Hypothesis ‘There Is No Relationship Between The Use Of Peer Instruction And Learners Perception Of Their Ability To Solve Problems In Mathematics’ Was Rejected.
4.2 Study Findings


This Study Therefore Concludes That Peer Instruction Is Instrumental In The Learners’ Problem Solving Ability In Mathematics. The Study Recommends That Teachers Incorporate Peer Instruction In Their Teaching Programs For Increased Problem Solving Ability By Learners In Mathematics.

REFERENCES

[7]. Hougan, L. (2002). Writing A Teaching Philosophy Statement. Iowa State University, Iowa.


DOI: 10.9790/0837-2302090104 www.iosrjournals.org 4 | Page