Impact of Career-Related Instruction on Mathematics Achievement of Rural and Urban Students in Benue State, Nigeria

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Abstract: The study was carried out to find if there were any differences in the effect of career-related instruction on mathematics achievement of urban and rural students. The design of the study was the non-randomized pretest-posttest quasi-experimental type since intact classes were used in the sampled schools. Three hundred and eighty-eight Senior Secondary Two (SS2) students from two urban schools and two rural schools randomly selected from Benue State were involved in the study. The main instrument used for data collection was the Mathematics Achievement Test (MAT) developed by the researchers. A two-way Analysis of Covariance (ANCOVA) was used to analyze the data collected. The findings of the study showed that urban students performed significantly better than their rural counterparts when taught mathematics using career-related instruction. The study concluded that this result might be due to greater awareness of career implications of mathematics topics by urban students involved in the study.

Keywords: Achievement, applications, career, instruction, mathematics, relationship, rural, urban

INTRODUCTION

Mathematics plays a key role in the development of any modern society. As Sidhu (2002) points out, any individual who earns and spends money uses mathematics. Thus the service needs of man are fulfilled through the use of mathematics. In support of this, Eraikhuemen (2003) posits that a disciplined and ordered pattern of life can be achieved generally through the culture of mathematics. Right from the kitchen in our homes to the industries and the most advanced technologies, mathematics is needed. Unfortunately, the achievement of students in this all important subject in Nigeria have not been encouraged over the years. This is why Abakporo (2005) reports that achievement in mathematics has left much to be desired.

As recent as 2009 the West African Examination Council (WAEC, 2009) and the National Examination Council (NECO, 2009) Senior School Certificate Examination (SSCE) results were reported to have recorded very low percentage passes in mathematics at credit level. In trying to find out the reasons for this unfortunate situation in mathematics education in Nigeria, Amoo (2002) blames students’ poor learning interest and teachers’ failure to use appropriate and stimulating teaching methods. To Sidhu (2002), the situation may be due to lack of motivation of students.

These problems seem to be independent of location as students in urban and rural schools tend to perform in a similar manner in mathematics at the secondary school level. This is supported by some research findings (Jahun and Momoh, 2001; Uka, 2006). However, from a similar study to find out the effect of location on students’ mathematics achievements O’Kwu and Aligba (2004) report that there was significant difference between urban and rural students in mathematics achievement. The findings showed that the urban students performed better.

The foregoing findings were based on teaching strategies normally used by mathematics teachers (conventional methods). The present study is focused on the effect of location when students are taught using career-related instruction. Career-related instruction is the teaching of mathematics such that while teaching the teacher illustrates and exposes the career applications of each topic to the students. Jahun and Momoh (2001) conclude from that there is no fixed pattern with regards to urban-rural factor in mathematics achievement. Would this conclusion be also applicable to students’ mathematics achievement if they are taught using career instruction? Thus the objective of this study is find out if there is significant difference in mathematics achievement of rural and urban students after being taught mathematics using career-related instruction.

MATERIALS AND METHODS

The study was conducted between April and May, 2008 in the following schools:

Urban schools: Gaadi Comprehensive College, Makurdi, Makurdi Local Government, Benue State, Nigeria; and Wesley High School, Otukpo, Otukpo Local Government Area, Benue State, Nigeria.

The design of the study was the randomized pretest-posttest control group type of quasi-experimental design. This design was chosen because intact classes were used in the sampled schools to avoid disorganizing school programmes.

The target population comprised 4,655 Senior Secondary Two (SS2) students from twenty seven co-educational secondary schools with double arts and science classes in Benue State.

The study involved four secondary schools randomly selected from the twenty seven schools with the target population. These schools were separated into urban and rural schools. Two schools with 199 SS2 students were randomly selected from the urban schools while two schools with 189 SS2 students were similarly selected from the rural schools. Thus the sample size for the study comprised a total of 388 SS2 students.

A Mathematics Achievement Test (MAT) constructed by the researchers was used for the data collection. MAT was validated by one lecturer in tests and measurement and two lecturers in mathematics education form Benue State University, Makurdi. The instrument had 27 multiple choice items and was scored out of 27 marks. These items which were used for the pretest were reshuffled and administered as posttest after eight weeks of teaching using career related instruction in mathematics. One lesson plan based on SS2 mathematics curriculum, developed by the researchers was used for the teaching. Using Kuder-Richardson formal 20, the reliability coefficient of MAT was found to be 0.98.

The standard deviations of urban and rural students in the Mathematics Achievement Test (posttest MAT) were used to answer the research question. Analysis of Covariance (ANCOVA) was used to test the stated hypothesis at 0.05 level of significance.

RESULTS

Table 1 shows the means and standard deviations of urban and rural students in the Mathematics Achievement Test (MAT).

Research question: How does the use of career-related instruction affect the mean achievement scores in mathematics among urban and rural students?

Table 1: Mean achievement scores and standard deviations per group per test

<table>
<thead>
<tr>
<th>Group</th>
<th>Type of test</th>
<th>Number</th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>pretest</td>
<td>199</td>
<td>7.29</td>
<td>2.63</td>
</tr>
<tr>
<td></td>
<td>posttest</td>
<td>199</td>
<td>11.93</td>
<td>3.69</td>
</tr>
<tr>
<td>Rural</td>
<td>pretest</td>
<td>189</td>
<td>6.83</td>
<td>2.59</td>
</tr>
<tr>
<td></td>
<td>posttest</td>
<td>189</td>
<td>9.72</td>
<td>3.84</td>
</tr>
</tbody>
</table>

Table 2: Results of the two-way analysis of covariance of the effect of career-related instruction on students’ mathematics achievement by group and location

<table>
<thead>
<tr>
<th>Sources of variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F-ratio</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected model</td>
<td>5063.603</td>
<td>4</td>
<td>1265.901</td>
<td>166.554</td>
<td>0.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>2078.173</td>
<td>1</td>
<td>2078.392</td>
<td>273.424</td>
<td>0.000</td>
</tr>
<tr>
<td>Pretest</td>
<td>2804.392</td>
<td>1</td>
<td>1957.662</td>
<td>368.972</td>
<td>0.000</td>
</tr>
<tr>
<td>Posttest</td>
<td>1957.662</td>
<td>1</td>
<td>93.775</td>
<td>257.568</td>
<td>0.000</td>
</tr>
<tr>
<td>Location</td>
<td>93.775</td>
<td>1</td>
<td>21.478</td>
<td>12.335</td>
<td>0.000</td>
</tr>
<tr>
<td>Error</td>
<td>5844.827</td>
<td>769</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>88729.000</td>
<td>774</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected total</td>
<td>10908.430</td>
<td>773</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 shows that the mean achievement score of urban students in the posttest was 11.93 with a standard deviation of 3.69 while that of the rural students was 9.72 with a standard deviation of 3.84. This leaves a gain difference of 2.21 between the mean achievement scores of the two groups. This shows that the urban students achieved higher in the posttest compared to their rural counterparts. This answered the research question.

Research hypothesis $H_{01}$: There is no significant difference between the mean achievement scores of urban and rural students taught mathematics using career-related instruction.

Table 2 shows that the F-ratio for location was $F (1, 384) = 12.335$. This result is significant at 0.005 alpha level. The null hypothesis is therefore rejected. This means that the urban students achieved higher in the posttest than their rural counterparts.

DISCUSSION

It has been found from the study that urban students perform better than their rural counterparts when students are taught mathematics using career-related instruction. This finding is in line with that of Jahun (1989) in Kaduna, Kano and Katsina States, O’Kwu and Aligba (2004) in Benue State. The findings however contrast that of Jahun and Momoh (2001) in Kwara State and that of Uka (2006) in Abia State who found no significant differences between the mean achievement scores of urban and rural students.

A reason for the findings of this study might be that urban students are more enlightened about career preferences and their mathematics implications. This view
is supported by Okereke (2006) who found from a study that prior knowledge of career implications of mathematics topics facilitated the interest and achievement of students in mathematics.

CONCLUSION

The study has shown that urban students perform better than rural students in mathematics when they are taught mathematics using career-related instruction. The implication of this is that both urban and rural students need to be exposed to career-related learning to motivate them to improve their achievement in mathematics. Career-related learning should be emphasized in the Nigerian mathematics curriculum in order to improve achievement of students in the discipline.

REFERENCES


