To establish the effect of Teacher pupil Ratio on learners' performance in Kenya Certificate of primary Education in Kenya

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ABSTRACT
Education is widely seen as one of the most promising paths for individual to realize better, more productive lives and as one of the primary drivers of national economic development. According to the Ministry of Education's Management Information System (EMIS), the number of public and private primary schools increased from 6,058 in 1963 to 27,489 in 2010. The purpose of the present study was to investigate the influence of teacher pupil ratio on learners’ performance in public primary schools in Mau Division of Narok County. This study used descriptive survey design which is appropriate because it facilitates data gathering by administering questionnaires from a sample of individuals. The study adopted purposive sampling technique since the head teachers, class teachers and zonal Pupils are believed to be having reliable information relevant for this study. Documents from the education offices were also analyzed. The study used two instruments namely Questionnaires and observation schedule. The researcher analyzed the data by use of the Statistical Package for Social Science (SPSS). The study used quantitative techniques (measures of central tendency) and qualitative techniques which are basically descriptive. The study therefore concludes that most of the schools had huge classes for the teachers to effectively deliver. The research also concludes that those schools with inadequate staffing recorded low mean score but those schools which were adequately staffed reported higher
performance. The researcher recommends that to bridge this gap school management should look for more donors to pay teachers hired by the schools. The teachers' service commission should employ the large number of trained teachers who are jobless to improve the schools performance. This should also be done with caution as numerous researches show that small classes do not always translate to high performance. The head teachers should be more accountable in their supervisory role. They should ensure that teachers who absent themselves from schools are disciplined by the Teachers Service Commission.

Key Terms: Teacher staffing, Teacher Pupil Ratio, Learners’ performance

Introduction

The PTR in most developing countries is in a worrying state due to increased advocacy for improving education access for the World’s children (UNESCO, 2005 & MOEST, 2004). UNESCO (2006) estimated that over 84 per cent of classrooms had over 40 pupils per teacher. Majority of the countries that have PTR exceeding 40:1 are in Sub-Saharan Africa and Asia. Sub-Saharan Africa has the largest PTR with Congo having a PTR of 54:1, Mali 55:1, Mozambique 67:1, Rwanda 65:1, Ethiopia and Malawi hovering around 70:1, South Asian countries such as Afghanistan with 83:1, Cambodia 50:1, and Bangladesh 50:1. (UNESCO, Institute of statistics, 2008). The high PTR in many developing countries is as a result of large enrolments following the quest for universal primary education and the increasing teacher shortages. With such enrolments and reduced number of teachers, the available teachers face serious obstacles in an attempt to deal with over-crowded classes. These high enrolments have caused low efficiency in the schools which is one of the main reasons for the poor quality of education offered in many primary schools in the developing countries (UNESCO, 2006).

In order to fulfill the international mandate, more and more developing countries in Sub-Saharan Africa, South and East Asia and Latin America regions are utilizing the services of less qualified teachers. In Cambodia these teachers are given fancy names like ‘Bare foot teachers’, contract and Para-teachers and provide ‘first aid’ services into the education system (King and Schielman, 2004). Countries such as Niger, Mali, Togo, India and China have been recruiting contract teachers in order to
cope with teacher shortages and high PTR (UNESCO, 2006).

**Teacher-Pupil Ratio and Learners’ Performance: A Critical Analysis**

In Europe and North America contexts there is agreement that small classes benefits occur due to a number of factors, including increased teacher-pupil contact, differentiated instruction, improved classroom management, and improved teacher morale (Vander Ark, 2003, Nye et al, 2001a & b, Fidler, 2001). Researchers have also noted that the academic gain seen in young children from smaller classes tends to persist into higher grades when small classes are introduced in lower grades. However, there are examples of very large classrooms in Asia with excellent student learning outcomes. South Korea, who placed second on the 1996 Third International Mathematics and Science Study (TIMSS), has an average of 56.9 students per class in mathematics and 48.8 in science. Similar conditions have been observed in both Japan and Singapore, where students are also excelling in larger classes. Numerous analysis of classroom data many of which are documented have been unsuccessful in making definitive statements about the effect of large classrooms on learning outcomes. Some have argued that, intuitively smaller classes have a positive impact on student achievement, while others conclude that there is no significant impact (Vander, 2003).

Where research on large classrooms in developing countries does exist it is equally inconclusive. Hanushek (1995) reviewed 96 studies that attempted to link various educational inputs to student performance in developing countries. Nearly a third of the reviewed studies (n=31) specifically investigated the effect of pupil-teacher ratio. Of these, only eight studies found reductions in class size significantly explain improved academic achievement. In another study Hanushek (1999) noted that smaller class size i.e. low pupil-teacher ratio had a stronger positive effect in secondary schools as compared to elementary schools. Of the 277 estimates attempting to capture the effects of pupil-teacher ratio on student performance, only 15% of the estimates were significant and positive. Virtually the same percent, 13% were negative and significant suggesting that lowering the pupil-teacher ratio resulted in poorer student performance.
Iowa (2001) carried out studies in five Franco Sub-Saharan African countries (Cameroon, Cote d’vore, Burkina Faso, Madagascar and Senegal). From her analysis she concluded that there was an inverse relationship between class size and learning outcome. She further noted that 62 students per teacher was a threshold number. The study therefore found that academic achievement was increasingly high in smaller class size (lower student-teacher ratio) in regular classes.

Finn (2003) reviewed studies that examined the link between student engagement and class size. He conceptualized student engagement into two forms: social engagement and academic engagement. He concluded that when students are placed in smaller classes they become more engaged, both academically and socially. With strong social and academic engagement, he argued that academic achievement increased. Pupil attention is an area of particular concern that affects academic engagement. Researchers have shown that students tend to spend less time on class assignments when in large classes (Blatchford & Mortimore, 1994 & Cahen, 1989). It has also been shown that students in smaller classes tend to participate more (Cahen, 1989).

In South African, Case & Deaton (1999) sidestepped this problem by conducting their analysis shortly before the end of apartheid. At that time, pupil-teacher ratios were on average much higher in black schools than in white schools, and also substantially more variable. The authors found that the pupil-teacher ratio had a significant negative relationship with educational attainment for black students, while there were no similar findings for whites.

South Africa Consortium for Monitoring Education Quality (SACMEQ) research noted that schools in South Africa transformed inputs into outputs with a large degree of variation, and that some low socio-economic status schools perform well above their predicted levels in spite of being at a resource disadvantage (Crouch & Mabogoane, 1998). This suggests that managing the available resources well rather than the benefiting from a greater stock of resources may be the most critical school-level determinant of student performance. This therefore refuted the studies linking small class sizes and students performance. This is cognizance with a study in Kenya by Duflo, Dupas & Kremer (2008) which revealed that at the sample mean, in lower grades, reducing class size from 80 to 40 without any change does not lead to a
significant increase in test scores. A similar finding was reported by Banerjee et al (2007) in India where no impact of the reduction in class size was achieved through the hiring of remedial education teachers for students who remained with a regular teacher. In addition, a study done in Ethiopia, Verwimp (1999) argued that there is a negative correlation between the quality of teaching and the Pupil-teacher ratio. However, the Ethiopian study was quick to acknowledge that class-size is not a relevant variable in the quality debate. A study covering 11 of the 19 countries in the World Economic Indicators (WEI) programmes reported a lower Pupil-teacher ratio for the participating countries.

Most WEI- countries (India, Philippines, Malaysia, Sri lanka Tunisia, Peru, Argentina, Brazil, Chile, Paraguay & Uruguay) had in average a Pupil-teacher ratio in the range of 20 to 30. India had the highest number (59) especially in the villages while Malaysia had the lowest number, with a Pupil-teacher ratio of 18. In the WEI-Countries Zhang, et al (2008) revealed that there was slight difference in students’ achievements across the countries despite variations in Pupil-teacher ratio. Some researchers (e.g., West &Woessmann, 2003) believe that school districts would do better to hire fewer teachers with better credentials than to hire more teachers without regard to the level of credentials and experience. They argue that the quality of the teacher, rather than the size of the class, drives student achievement.

In short, the stakes are high when undertaking these initiatives since debates continue about the ability of reduced class size to fuel student achievement, making it critical to approach the issue armed with credible research that helps inform decision-making.

Impact of Large Classrooms after Implementation of FPE in Kenya

A study on the effect of class size on classroom interaction after the implementation of FPE in Kenya revealed that increased enrolments in schools created increased class sizes and high Pupil-teacher ratio, factors that hindered Teacher-pupil interaction and negatively affected performance in national examinations (Majanga, et al 2010). Schools with high number of pupils per teacher were found to have discipline problems. It was also revealed that minimal pupil-teacher interaction negatively influenced teaching and learning of core subjects like mathematics which require frequent teacher interaction. On average, the PTR for the sampled
schools was 80:1 for lower classes and 50:1 for the upper classes (Majanga et al. 2010). In another study Boy (2006) noted that over enrolment caused poor performance in public schools. This was evident from the comparison of the Kenya national examination results for 2006 and 2007. Performance of primary school pupils in public schools in K.C.PE declined compared to those in private primary schools (Too, 2005).
Arnold (2000) revealed that large schools experience wider gaps in achievement. He noted that because they result in less communication, interaction, and coordination throughout the school this contributes to lower student achievement.
In a study on school sizes in Nairobi area of Korogocho, Viwandani, Jericho and Harambee on “Quality of primary education children are receiving in urban schools” Ngware, et al (2008) noted that the teaching load in schools varied by school ownership and location. They revealed that teachers in public schools had huge workload compared to their counterparts in private this resulted to poor performance in public schools.
Waita(2012) in his research on Pupil-teacher ratio and its impact on academic performance in public primary schools in central division, Machakos County found out that PTR significantly influenced performance of pupils in national examinations although 10.4% of the performance was due to PTR while the remaining 89.6 % was due to other intervening factors or error in the independent variable.

**Statement of the problem**

In Kenya, since 1990’s the country has been facing a daunting challenge of increasing PTR due to escalating teacher shortages. The situation grew worse with the introduction of FPE in 2003. The implementation of FPE programme witnessed a 10% increase in enrolment in primary schools nationally (MOEST, 2004). A record of 1.3 million children registered in various schools across the country, raising the enrolment from 5.9 million in 2002 to 7.2 million in 2003 (MOEST, 2004). This sharp increase in enrolment rejuvenated into challenges of FPE in the country (Wamukuru, Kamau and Ocholla., 2006). For instance, the number of pupils exceeded the available human and physical facilities in the country. The PTR steadily increased from the recommended 40:1 to between 60:1 and 90:1 (MOEST, 2004). The situation is grimmer in arid and semi-arid areas as well as in the slums of urban areas where
the ratio is over 100 pupils per teacher (UNICEF, 2005). Earlier studies have shown that that smaller class population can help improve achievement where others have shown it does not depending with the mechanism of implementing it. For Japanese they prefer larger classes for socialization purpose. For this reason the researcher wants to establish the influence of pupil teacher ratio on pupils’ performance in Kenya Certificate of primary education in Narok County.

**Purpose of the study**

The purpose was to investigate the influence of pupil teacher ratio on learners’ performance of public primary schools in Mau Division of Narok County.

**Objective of the study**

The objective of this study was to establish the effect of pupil teacher ratio on learners' performance in Kenya Certificate of Primary Education in Narok County.

**Research Question**

What is the influence of pupil teacher ratio on school performance in Kenya Certificate of Primary Education in Narok County?

**Research Design**

This study used descriptive survey design which is appropriate because it facilitates data gathering by administering questionnaires from a sample of individuals (Orodho & Kosibo, 2002).

**Target Population and Sample Size**

The target population in this study consisted of forty five (45) public primary schools in Mau Division of Narok North District with a population of 16,058 which includes teachers, pupils and Head teacher (DEO’s Office – Mau Division, 2013). A sample is a smaller group of the population selected for study. Researchers suggest that for descriptive research and correlation studies, 30 percent of cases (population) are the minimum (Mulusa, 1988). According to Krejcie and Morgan (1970) this study used a sample of 375 out of the total population of 16,058 people. This gave 95 percent confidence level with 5.0 margin of error. Accordingly, this sample is appropriate because it is above 30 percent criteria as recommended by Mulusa (1988).

**Research Instruments**

The study used two instruments namely Questionnaires and observation schedule. The questionnaires were both structured
and closed to guide responses and also give room for more information.

Observation schedule - This instrument was used in collecting information by way of own investigation, observation without interviewing respondents (Orodho, 2008). In this study, observation schedule was used to collect information about physical infrastructure.

Validity of the Instruments

Validity is the degree to which the empirical measure or several measures of the concept, accurately measure the concept (Orodho, 2008). For this study, the questionnaires and observation schedules were presented to independent experts for examination and approval. The recommendations were incorporated in the final instruments.

Reliability of the Instruments

For this study, the developed instruments (questionnaire) were given to two standard eight class teachers and twenty pupils (not the ones to be included in the main study). The answered questionnaires were scored manually. The same questionnaires were administered to the same group after period of two weeks. The questionnaire responses were once more scored manually. A comparison of responses obtained in the two tests was made using Pearson's Product Moment formula;

\[ Rho = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2)(N\sum Y^2 - (\sum Y)^2)}} \]

Where

- \( N \) is number of respondents
- \( x \) is test 1
- \( y \) is test 2
- \( \sum \) is sum of

For the test retest to compute correlation co-efficient to establish the extent to which the contents of the questionnaire are consistent in eliciting the same responses every time the instrument is administered. A correlation coefficient of between 0.75-0.85 be considered high enough to authenticate the instruments' reliability for the study (Orodho, 2008).
Data Collection Procedures

The researcher sought clearance from Narok North District Education Office. The ethical standard was adhered to requiring, the purpose of study to be explained to respondents and the respondents consent sought. The research instruments were administered in person.

Data analysis techniques

The researcher analyzed the data by use of the Statistical Package for SocialScience (SPSS). The study used quantitative techniques (measures of central tendency) and qualitative techniques which are basically descriptive. The qualitative data was first coded using 3 likert scale; 1, 2, 3 and then analyzed.

Data Analysis, Discussion and interpretation

The quantitative data obtained was presented using descriptive statistics such as percentages, frequency distribution tables and using inferential statistics. Contentanalysis was used to present the qualitative data which was later presented in prose form.

Table 42: Schools Performance in 2013 KCPE

<table>
<thead>
<tr>
<th>Performance</th>
<th>Below 250 marks</th>
<th>251-300 marks</th>
<th>301-400 marks</th>
<th>Above 400 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of schools</td>
<td>26</td>
<td>19</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Percentage</td>
<td>57.78</td>
<td>42.22</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

SOURCE: AEO's office, MAU division

The table 4.3 shows the ratio of pupil to teacher and the results are as follows Table 4.3: Pupil Teacher

<table>
<thead>
<tr>
<th>Ratio</th>
<th>20:1</th>
<th>30:1</th>
<th>40:1</th>
<th>50:1</th>
<th>Above 50:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of schools</td>
<td>nil</td>
<td>nil</td>
<td>4</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td>Percentage</td>
<td>0</td>
<td>0</td>
<td>8.89</td>
<td>28.89</td>
<td>62.22</td>
</tr>
</tbody>
</table>

Source: AEO's office, MAU division
The table 4.4 below shows schools' performance in the year 2013. KCPE results and the teacher pupil ratio in MAU division. The correlation between KCPE performance and teacher pupil ratio is calculated using spearman's rank order correlation coefficient to determine how pupil teacher ratio influences KCPE performance.

**Table 4.4: Spearman's rank correlation coefficients**

<table>
<thead>
<tr>
<th>School</th>
<th>Performance</th>
<th>Pupil teacher ratio</th>
<th>Rank 1</th>
<th>Rank 2</th>
<th>Deviation (D)</th>
<th>$D^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>261.3</td>
<td>38:1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>240.6</td>
<td>45:1</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>252.8</td>
<td>47:1</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>231.9</td>
<td>56:1</td>
<td>12</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>228.1</td>
<td>54:1</td>
<td>11</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>273.4</td>
<td>46:1</td>
<td>5</td>
<td>4</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>239.4</td>
<td>52:1</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>244.4</td>
<td>61:1</td>
<td>14</td>
<td>7</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>254.7</td>
<td>37:1</td>
<td>12</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>233.6</td>
<td>48:1</td>
<td>7</td>
<td>5</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>248.2</td>
<td>57:1</td>
<td>13</td>
<td>7</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>237.3</td>
<td>53:1</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>255.4</td>
<td>44:1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>236.2</td>
<td>51:1</td>
<td>8</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>184</strong></td>
<td></td>
</tr>
</tbody>
</table>

$$P = 1 - \frac{6\sum D^2}{N(N^2-1)}$$

$P$=performance

$I$=is critical value

$N$= Number of school

$\sum$= is summation of standard deviation
The correlation coefficient of 0.5956 shows significant relationship between performance in KCPE and pupil teacher ratio. The lower the pupil teacher ratio the higher the performance in KCPE in MAU division. This resonates with the studies done by Nye et al (2001a & b), Fidler (2001) and Waita(2012). However, some researchers have not found a connection between smaller classes and higher student achievement as opined by Vander, 2003; Hanushek, 1999), but most of the research shows that when class size reduction programs are well-designed and implemented in the primary grades (K-3), student achievement rises as class size drops.

**School Intervention Plan to bridge the gap of shortage of teachers**

The table below illustrates the steps taken by the schools in case the numbers of teachers are inadequate;

<table>
<thead>
<tr>
<th>Adequacy of Trained Teachers</th>
<th>frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PTA Teachers</td>
<td>11</td>
<td>79</td>
</tr>
<tr>
<td>Sponsors</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Volunteers</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>100</td>
</tr>
</tbody>
</table>

It was established that table 4; 10; 2 majority of the respondents indicated that theirs schools employed teachers through their parents teachers association as shown by 79 percent, 21 percent indicated that they look for sponsors who helps them in payingsalaries for the extra teachers employed and neither of the respondents indicated that they took no action nor looked for volunteers. This shows that teachers and parents have the schools interest at heart and that’s the reason they contribute some amount from their pockets to
hire extra teachers for the benefits of their children performance. On the school performance in KCPE in relation to the teachers staffing, the research established that those schools with inadequate staffing recorded a performance of less than 250 in the KCPE but those schools which were adequately staffed reported a performance of between 259.4 and 267.3; This shows that adequate a small teachers pupil ratio will lead to improved performance in KCPE.

Summary and Suggestions

From the research it was established of the schools in Mau Division had large classes and for the teachers to effectively deliver had to move an extra time either by creating more time to fully interact with the students who needed special attention. This had contributed to the poor performance in KCPE examination because young learners need a lot of guidance from the teacher and if they lack it they get distracted. The Teacher Service Commission should make effort to employ more qualified teachers who are jobless in these schools. Even though the parent teacher Associations in public schools makes an effort to hire their own teachers to compensate for the shortage they may only employ the untrained teachers because they cannot afford the money to pay the trained teachers and the implication is more scarce resources from the parents will be used which does not translate to better performance but only the presence of a teacher in class. This also beat the policy of free primary education. Pupils will still miss classes because their parents cannot afford to pay the hidden fees. And the question arises when will the EFA goals be achieved in developing countries with these challenges? The reduction of classes should be done with caution because as pupil teacher ratio accounts for about 14% of pupil performance (Waita, 2012).

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