

HEADTEACHERS' AND TEACHERS' PERCEPTIONS TOWARDS SMASE PROGRAMME AND PRIMARY SCHOOL PUPILS' MATHEMATICS AND SCIENCE ACHIEVEMENT IN MURANG'A COUNTY, KENYA

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Abstract

With support from Japan, the Government of Kenya embarked on implementation of Strengthening *Mathematics and Science Education (SMASE) in-service programme in all primary schools in 2009* with the aim of improving pupils' achievement in the two subjects. However, headteachers' and teachers' perceptions towards this programme and the effects of those perceptions on pupils' achievement have not been established. This study therefore sought to determine headteachers' and teachers' perceptions towards the SMASE-programme and primary school pupils' achievement in Mathematics and Science in primary schools in Murang'a County, Kenya. This study adopted descriptive survey research design. Data were collected through validated headteachers' and teachers' questionnaires and pupils' achievement tests in Mathematics and Science. Chi Square (χ^2) tests and Pearson correlation coefficient were used to test the null hypotheses ($\alpha = .05$). In the study, only headteachers' perceptions towards SMASE in-service programme had a significant relationship with pupils' achievement in Mathematics, albeit a negative one.

Key words:

Perceptions, SMASE, SPRED, SbTD, in-service, Mathematics, Science, achievement

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1.1 Introduction

In a school set-up, there are many stakeholders who determine the success of educational programmes. According to Fullan (1993), educational stakeholders have perceptions which may form barriers to the successful implementation of educational programmes. One of the major stakeholders who determine the success of educational policies and programmes in a school set-up is the headteacher (Craig, 1989; UNESCO, 2005).

According to Craig (1989), it is invariably the headteachers' actions, not what he or she says which carry the message whether a change is to be taken seriously or not.

On the other hand, Kimani, Kara and Njagi, (2013) identify the teacher as a major input in any educational endeavour. According to Chhinh and Tabata (2003), educational planners, policy makers and administrators all over the world have come to realize that many meaningful improvements in the quality of education are highly dependent on the quality of teachers. Chhinh and Tabata noted that teachers' influence on the success of educational programmes was especially notable in developing countries where teachers are usually the only adults who transact educational inputs to the pupils. Consequently, headteachers' and teachers' perceptions are likely to have far-reaching implications on the success of educational policies and programme.

The Government of Kenya has in the recent past embarked on implementation of a number of teacher-based educational programmes aimed at improving pupils' achievement in Mathematics and Science in primary schools. Examples of such interventions include; first, Strengthening of Primary Education (*SPRED*) programme; secondly, the School-based Teacher Development (*SbTD*) programme; and lately, the Strengthening of Mathematics and Science Education (*SMASE*) programme (Republic of Kenya, 2008). According to Republic of Kenya (2008), the implementation of *SMASE* programme in primary schools in Kenya was a five year bilateral commitment between Japan and Kenya running from December, 2009 to December, 2013. During this period, it was envisaged that 60,000 standard six to eight primary school Mathematics and Science teachers and 20,000 headteachers countrywide would be in-serviced to help them transform their classroom practice

es by embracing “Activity, Student-centred, Experiment, Improvisation (ASEI) and Plan, Do, See, Improve (PDSI)” approach in the teaching of Mathematics and Science in primary schools. The SMASE policy document identified primary school headteachers as a key target group (Republic of Kenya, 2008; CEMASTE, 2011). In spite of this, it remains unclear whether headteachers who form the bulk of school leadership are effectively supervising teachers in the implementation of the SMASE programme in their schools.

Many studies have established a relationship between effective school leadership and successful implementation of educational programmes. For instance, Her Majesty’s Inspectors (HMIs) undertook a study to identify factors which contributed to successful curriculum change in schools in Britain (Ofsted, 2008). This study noted that in most of the sampled schools, educational innovations had led to clear improvement in pupils’ achievement and personal development. The success of curriculum innovations in these schools was attributed to headteachers’ persuasive and visionary leadership. Notably, schools selected by HMIs for this study were those that whose headteachers had a certain degree of freedom to not only select applicable innovations but also direct curriculum change in a manner that facilitated improved educational outcomes (Ofsted, 2008). It is therefore likely that in such circumstances, headteachers tailored educational innovations to fit their schools. This implies that headteachers were likely to have positive perceptions towards the desired educational change.

The scenario may be different in those countries where curriculum change is determined by the educational bureaucracy and implemented using a top-bottom model as often happens in the Kenyan context. The Kenyan model of a highly centralized education management system leaves little room for schools heads’ self-direction and this might impede on school leaders’ and teachers’ motivation to effectively implement educational reform programmes. Under such circumstances, headteachers’ and teachers’ perceptions towards educational reform programmes become an issue of interest to educational researchers.

Jia, Eslami and Burlbaw (2006) quoted in Adedoyin (2010) assert that understanding teachers’ perceptions

and beliefs is important because teachers are not only practitioners of educational principles and theories but are also involved in various teaching and learning processes. Adedoyin noted that findings from research on teachers' perceptions and beliefs indicated that perceptions and beliefs do not only have considerable influence on teachers' instructional practices and classroom behaviour but they are also related to students' achievement. Perceptions, beliefs and attitudes are so highly related that many scholars use the three terms almost interchangeably.

According to Olatunde (2009), teachers are role models whose behaviours are easily copied by students. For instance, teachers' attitudes towards Mathematics as a subject and the teaching of Mathematics has been found to have far reaching effects on pupils' attitudes and also performance in the subject (Chako, 1981) This is because teachers' attitudes towards Mathematics play a significant role in shaping students' attitudes towards learning Mathematics. Tella (2008) asserted that when exploring the attitudes of primary school teachers towards Mathematics, it would be necessary to not only consider their attitudes towards Mathematics but also towards the teaching of Mathematics. Onocha (1985) reported that teachers' attitude towards Science was found to be a significant predictor of pupils' achievement as well as pupils' attitude towards the subject. Also, Igwe (1985) found out that, teachers' attitude to Mathematics was stronger on the students' mathematical achievement than on students' attitudes. However, in Tella's (2008) study, teachers' attitudes had very low insignificant correlations with pupils' achievement in Mathematics indicating a weak relationship between teachers' attitudes and pupils' academic attainment. Ogunniyi (1982) asserted that positive attitudes towards Science could be enhanced by the following teacher-related factors: teachers' enthusiasm, teachers' resourcefulness, teachers' helpful behavior and teachers' thorough knowledge of the subject matter that enables teachers to make learning of Science quite interesting. Teachers' learning-related beliefs and perceptions have been found to greatly affect teachers' classroom practices and learners' achievement (Bolhuis & Voeten, 2004). It is therefore important to establish headteachers' and teachers' perceptions towards educational programmes related to the teaching and learning of Mathematics and Science.

1.2 Statement of the Problem

In the endeavours to improve pupils' achievement in Mathematics and Science in primary schools, the Government of Kenya has collaborated with the Government of Japan in the implementation of the SMASE programme in all primary schools with effect from 2009 (Republic of Kenya, 2008; CEMASTE, 2010, SMASE-W ECSA Association, 2010). Successful implementation of the SMASE programme would depend on the headteachers' and teachers' support which may in turn be influenced by their perceptions towards the programme. This means that ultimately, headteachers' and teachers' perceptions towards the SMASE programme may affect pupils' achievement in Mathematics and Science in primary schools. Since the implementation of the SMASE programme has been ongoing for the last four years, this study sought to investigate the relationship between headteachers' and teachers' perceptions towards the SMASE programme and pupils' achievement in Mathematics and Science in primary schools in Murang'a County.

1.3 Objective of the Study

The main objective of this study was to investigate whether there was any statistically significant relationship between headteachers' and teachers' perceptions towards the SMASE programme and pupils' achievement in Mathematics and Science in primary schools in Murang'a County.

1.4 Hypotheses of the Study

The following null hypotheses (Ho) were tested in this study:

Ho1: There is no statistically significant relationship between teachers' perceptions towards the SMASE programme and pupils' achievement in Mathematics.

Ho2: There is no statistically significant relationship between teachers' perceptions towards the SMASE programme and pupils' achievement in Science.

Ho3: There is no statistically significant relationship between headteachers' perceptions towards th

the SMASE programme and pupils' achievement in Mathematics.

Ho4: There is no statistically significant relationship between headteachers' perceptions towards the SMASE programme and pupils' achievement in Science.

1.5 Conceptual Framework of the Study

Figure 1 shows the conceptual framework of this study.

Figure 1: Conceptual Framework of the Study

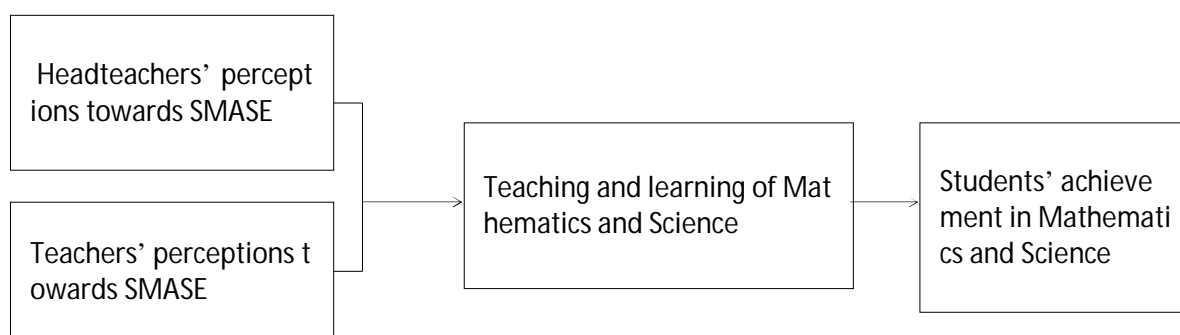


Figure 1 shows the independent variables of this study which are headteachers' and teachers' perceptions towards SMASE. These variables form the input that influences the teaching and learning of Mathematics and Science in the classroom. The results of this process are reflected in pupils' achievement which is the dependent variable of this study. From this conceptual framework, it was hypothesized that that headteachers' and teachers' perceptions towards SMASE have an ultimate effect on pupils' achievement in Mathematics and Science. This study sought to investigate the relationship between headteachers' and teachers' perceptions towards the SMASE in-service programme and pupils' achievement in Mathematics and Science in Murang'a County.

1.6 Methodology

This study adopted the descriptive survey research design. The study involved a sample of 37 headteachers

and 109 teachers drawn from 37 public primary schools in Murang'a County. The headteacher of the sampled school was involved in the study. Since each school was to send a minimum of three teachers to attend SMASE in-service courses, the three SMASE-trained teachers from each selected school were involved in the study. Systematic random sampling was applied to identify the 37 schools involved in this study. Stratified random sampling was applied to select three high performing pupils, four average performers and three low performing students in standard eight to get a total of 10 pupils from each school. Consequently, 370 pupils were involved in this study. Two sets of validated questionnaires were given out; one set being for headteachers and the other for teachers. Both questionnaires had items which gathered information on the respondents' attendance of SMASE in-service courses, roles played during SMASE training sessions and their perceptions towards the programme. Responses to items on perceptions towards SMASE programme were arranged in Likert format whereby respondents chose one option from a scale ranging from Strongly Agree (SA), Agree (A), Not Sure (NS), Disagree (D), to Strongly Disagree (SD). Testing of null hypotheses was done using Pearson correlation coefficient r ($\alpha = .05$).

2. Results

This study sought to investigate the relationship between headteachers' and teachers' perceptions towards the SMASE programme and pupils' achievement in Mathematics and Science in primary schools in Murang'a County. Four null hypotheses were formulated for this study. Results obtained after testing the null hypotheses are discussed below.

2.1 Teachers' Perceptions and Pupils' Achievement in Mathematics and Science

The first null hypothesis (H_0) stated that there is no significant relationship between teachers' perceptions towards SMASE in-service programme and pupils' achievement in Mathematics. Teachers' mean perceptions towards SMASE were calculated from Likert scale items designed to measure their perceptions towards the SMASE in-service programme. Teachers' mean perceptions towards the SMASE in-service programme ra

nged between values of 1.6 and 3.3. Mean perceptions towards SMASE programmes were measured using a scale with values between 1.0 and 5.0. A mean perception value between 1.0 and 3.4 showed that the teacher had negative perceptions while values between 3.5 and 5.0 implied positive perceptions towards SMASE. It is therefore clear from teachers' mean perception values which ranged between 1.6 and 3.3 that teachers involved in this study generally had negative perceptions towards the SMASE programme.

Teachers' mean perception values formed the independent variable for this objective. The dependent variable was the school mean scores attained by pupils in the Mathematics and Science achievement tests. Pearson correlation coefficient r , obtained for the first null hypothesis which stated that there is no statistically significant relationship between teachers' perceptions towards SMASE in-service programme and pupils' achievement in Mathematics showed a statistically insignificant correlation of -0.005 ($p = .477$) which indicated that H_01 should be accepted. This implied that teachers' perceptions towards the SMASE programme had no significant relationship with pupils' achievement in Mathematics.

The second null hypothesis (H_02) stated that there is no statistically significant relationship between teachers' perceptions towards SMASE in-service programme and pupils' achievement in Science. Testing H_02 yielded Pearson correlation coefficient value of -0.021 ($p = .414$); indicating that H_02 should be accepted. These results showed that there is no statistically significant relationship between teachers' perceptions towards SMASE in-service programme and pupils' achievement in Mathematics or Science.

2.2 Headteachers' Perceptions and Pupils' Achievement in Mathematics and Science

The independent variable for the third and the fourth null hypotheses was headteachers' mean perception towards the SMASE in-service programme. Each headteacher's mean perception was calculated from the headteacher's responses to the Likert scale items designed to measure perception towards SMASE. Headteachers' mean perception towards SMASE ranged between values of 1.8 and 3.0. Headteachers' mean percep

tions towards SMASE programme were measured using the a five point Likert type scale that was used for teachers. It is therefore clear from headteachers' mean perception values which ranged between 1.8 and 3.0 that headteachers involved in this study had negative perceptions towards SMASE programme. Further headteachers were generally more negative towards SMASSE than teachers perhaps because they were less involved in teaching mathematics and Science. Headteachers' mean perception values formed the independent variable for the fourth and fifth null hypotheses. The dependent variable was school mean scores in Mathematics and Science. Pearson's r was used to test the two null hypotheses.

The third null hypothesis (Ho3) stated that there is no statistically significant relationship between headteachers' perceptions towards the SMASE programme and pupils' achievement in Mathematics. Pearson correlation coefficient r for Ho3 was a statistically significant $- .420$ ($p = .005$) and thus Ho3 was rejected. This meant that there was a statistically significant negative relationship between headteachers' perceptions towards the SMASE in-service programme and pupils' achievement in Mathematics.

Testing of Ho4 which stated that there is no statistically significant relationship between headteachers' perceptions towards the SMASE programme and pupils' achievement in Science, yielded a Pearson's r value of $- .111$ ($p = .257$). These results pointed to an insignificant relationship between headteachers' perceptions towards SMASE and pupils' achievement in Science. As a result, Ho4 was accepted showing that there was no statistically significant relationship between headteachers' perceptions towards the SMASE programme and pupils' achievement in Science.

3. Discussion

This study found that there was no statistically significant relationship between teachers' perceptions towards the SMASE in-service programme and pupils' achievement in Mathematics and Science. That is, teachers' perceptions towards SMASE did not significantly affect pupils' achievement in both Mathematics and Science. The possible explanation for this observation is that majority of the teachers' involved in this study di

d not view SMASE positively and their perceptions could not inspire any meaningful positive effects on pupils' achievement. More data may be required to explain why SMASSE teachers did not play their role in modelling student achievement.

It was also established from the study that there was a statistically significant negative relationship between headteachers' perceptions towards the SMASE in-service programme and pupils' achievement in Mathematics. However, there was no statistically significant relationship between headteachers' perceptions towards the SMASE programme and pupils' achievement in Science. This seems to us to be an interesting finding. Why would schools of teachers who do not seem to value SMASSE perform well as implied by the negative correlation? Headteacher's negative perception towards SMASE could not inspire any much pupils' achievement because their perceptions might be a barrier to the implementation of the SMASE programme. Also, it could be that such headteachers and teachers who are negative towards SMASSE use other methods to achieve results. A guess, that was not confirmed in this study, would be that other traditional methods, such as corporal punishment could have been used to push students to perform in mathematics where few students would be motivated to study. These results further suggest that headteachers, just like the teachers who were involved in this study, are yet to come to terms with the effective implementation of SMASE programme in their schools to intrinsically motivate students to higher achievement in mathematics and science .. Headteachers may be muddled up in the transition from the "pre-SMASE traditional teacher-centred period" and the "post-SMASE learner-centred era". Fullan (1993), notes that educational reforms are hard to conceive and even harder to put into practice.

Further, the above results may be attributed to the Kenyan education system which is heavily examination-oriented and attaches a lot of importance to examination results rather than student learning. Therefore, headteachers are likely to support teacher-centred strategies such as rote learning and drilling of learners which are perceived to enhance passing of examinations instead of supporting SMASE which encourages student

nt learning. Bonyo (2012) notes that the current Kenyan system of summative assessment at the end of the primary level dictates the teaching-learning process towards examinations as opposed to learning.

4.0 Conclusion

In the study, only headteachers' perceptions towards SMASE in-service programme had a statistically significant relationship with pupils' achievement in Mathematics, albeit a negative one. Headteachers' perceptions had no statistically relationship with pupils' achievement in Science. On the other hand, teachers' perceptions towards SMASE had no significant relationship with pupils' achievement either in Mathematics or Science. It can therefore be concluded that headteachers' and teachers' negative perceptions towards the SMASE in-service programme could not inspire any meaningful positive effects on pupils' achievement in Mathematics and Science. Instead, these negative perceptions might be an impediment to the realization of the SMASE objective of strengthening pupils' achievement in Mathematics and Science.

4. Recommendations

The study recommends that the Ministry of Education (MoE) and CEMASTEAs should urgently address headteachers' and teachers' negative perceptions towards the SMASE programme. These negative perceptions may aggravate teachers' resistance to the SMASE programme thereby derailing the programme from achieving its objective of improving pupils' achievement in Mathematics and Science. Failure by SMASE to achieve its objective would translate to high wastage of public funds channeled towards this programme by the Governments of Japan and Kenya.

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