Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.6, No.2, 2015

An Assessment of the Challenges facing the Implementation of SMASSE Project Activities in Bomet District, Kenya

Ronoh Obadiah Cheruiyot
University of Eldoret, Kenya
ronohobadi@gmail.com

Prof. Lusweti Kituyi
University of Eldoret
joluki@yahoo.com

Aloo Wilson Ogondi
Moi University, Kenya
wilsonaloo2012@gmail.com

Titus M. Muthoka
University of Eldoret
scientifictito@gmail.com

ABSTRACT

The Poor performance of students in science subjects (physics, chemistry and biology) in Kenyan secondary schools has been a persistent problem. In an attempt to stop this, the government implemented the SMASSE program in conjunction with JAICA from the government of Japan. The implementation of this program has encountered copious challenges over the years which are threatening its success. Thus, this study aimed to investigate the challenges facing the implementation of SMASSE Project Activities. The study was conducted in Bomet County in Kenya. The target population comprised of all the 121 secondary school head teachers and science teachers in the study area. Out of these, a sample size of 50 respondents was randomly selected from principals and teachers of public secondary schools in the district. The schools were stratified into boys', girls' and mixed secondary schools to ensure uniformity. Data was collected from the respondents using structured questionnaires. Data was analyzed descriptively using SPSS. Results were presented in form of frequencies and percentages. The results indicate that 65% of the teachers sampled were not adequately prepared for the program. In addition, 75% of the teachers stated that the boarding facilities during SMASSE were inadequate and of low standards. 70% were of the opinion that catering services offered to them during the training were of low quality. The findings further revealed that 75% of the teachers lacked sufficient time to apply ASEI-PDSI concept in lessons, while 90% stated that heavy teaching load was a challenge. 100% considered low morale among teachers a challenge. 75% of the head teachers agreed that conflict of interest was a major challenge, that is, science and mathematics teachers attend INSET during the holidays while their art-based counterparts were free to attend their personal interests. 90% agreed that another challenge during the implementation of SMASSE was non- collection/non- remittance of SMASSE funds to District Planning Committee (DPC). Finally 75% of the head teachers agreed that high staff turnover and the transfer of trainers to non-curriculum implementing posts challenged the implementation process. The study concluded from the findings that SMASSE project implementation is facing major challenges. The ministry of Education should employ more mathematics and science teachers to address the widespread teachers" shortage and in the process deal with some of these challenges. In addition, the negative attitude towards the project can be changed through payment of allowances for those attending the INSET, provide decent boarding and catering facilities during the training. Finally, the principles of SMASSE INSET should be incorporated into the training curriculum of secondary teacher training institutions. This would save on costs and time.

KEY WORDS: SMASSE, INSET, Challenges

1. Introduction

It is generally agreed that in the current society, science, technology and innovation play a major role towards the achievement of the Millennium Development Goal number 3; achieve universal primary and secondary education (Sachs & McArthur, 2005). The poor performance of students in science subjects (physics, chemistry and biology) in Kenyan secondary schools has been a persistent problem (Glewwe et al., 2009). Several factors contribute to the poor performance of in science subjects in Kenya. These include lack of relevant policies, inadequate curriculum content and delivery, insufficient teaching materials and negative socio-cultural attitudes and practices (Hungi & Thuku, 2010; Yara & Catherine, 2011). The government of Kenya through Ministry of Education (MOE) has made several steps in an effort to improve this performance. The most prominent strategy was the implementation of SMASSE (Strengthening of Mathematics and Sciences in Secondary Education) program in conjunction with JAICA from the government of Japan from a pilot phase (1998-2003) to national phase (2003-2008) (Sifuna & Kaime, 2007). The program was officially launched in 1998 (SMASSE Project, 2004).

Waititu and Orado (2009) stated that though the cascade system (from national to district level) of SMASSE INSET program succeeded, it had some limitations: First the training process was lengthy and thus took along period before the learners could gain at the classroom level. Secondly the content could be diluted and distorted down the ladder of training and in such cases, the trainers needed to do a comprehensive preparation and mastery of knowledge and information that they were required to disseminate, unless quality assurance vetted the trainers‟ content before it was disseminated. Finally, at times, the trainees in the flow system may not have readily accepted the trainers and consequently may have been opposed or failed in response to the training.

The effectiveness of the SMASSE project was assessed by evaluating the extent to which the project had achieved its purpose and was based on the purpose-output relationship (Sifuna & Kaime, 2007). Results from the baseline studies revealed that Mathematics and Science education was facing numerous problems of which some were beyond the scope of SMASSE and some within its scope (Ndirangu, 2006). The results of the assessment are summarized in the table below:

Table 1: Challenges to mathematics and science education: within and beyond the scope of SMASSE

Challenges within scope of SMASSE	Challenges beyond scope of SMASSE
a) Attitude – head teachers, teachers and subsequently students and parents. b) Lack of appropriate teaching methodology-Pedagogical issues- teacher-centeredness. c) Mastery of Subject content	a) Lack of staff houses and other facilities and/or equipment textbooks; water, electricity b) Poor communication and funding of school activities and programs c) Interrupted school programs –fees collection

This SMASSE project Impact Assessment Survey (SPIAS) was carried out nationwide aiming to investigate the impact of the training on the teachers and the students and came up with the following findings (Matachi, 2011). It was reported that teachers were able to plan for instructions more consistently and attend students' needs confidently after the INSET (Boniface, 2013). They also carried out teaching as a team, try new methods and face challenges of lack of resources through improvisation. As a result of the INSET, SPIAS

reported that learners' became actively involved in classroom activities with great interest and responsiveness which was evident by positive response to do assignments and carry out group discussions. They were punctual and regular as they attend the lessons (Sifuna & Kaime, 2007).

The government of Kenya realizes the important role of science and mathematics in national development and this has been reflected in the amount of resources both human and financial channeled to Science education programs in secondary schools. The government deploys qualified teachers, provides science equipment and has introduced in-service education and training program (INSET) for serving teachers (Waititu and Orando, 2009).

SMASSE has had a positive impact as evidenced in lesson participation and increased enrolment in Science subjects, especially Physics which is an elective subject. This has been particularly observed in the case of girls. Lesson observation carried out from time to time show changes from teacher-centered towards learner-centered methods. In particular, students' activities and participation were more frequent as a result of the INSET (Boniface, 2013).

Since 2004, SMASSE monitoring and evaluation task force has been conducting achievement test known as SMASSE Project Impact Assessment Survey (SPIAS) to find out the impact of INSET on learning achievement. Every year about 6,000 students from 150 schools in 10 districts have been sampled and given a multiple choice type test based on Bloom's taxonomy. Although improvements in KCSE examination grades have been observed, analysis of SPIAS data towards establishing the impact of learning attainments found the INSET promising to be effective on teaching/learning quality as long as INSET will be continuously offered to teachers (SMASSE, 2004). From their findings student attitude towards science and mathematics have improved and that the quality of INSET has impacted the learning activities in the classroom. This study sought to investigate into the perceptions of the impact of SMASSE

Hanushek, E. A., & Wößmann, (2004) reported that the quality of education directly affects enrolment, participation, completion rate and quality of graduates from the education system, and subsequently, the country's development. According to Heneveld and Craig (1996), low grades in mathematics and sciences are interpreted to mean that the students have not learnt well or the subjects are either difficult to teach or learn, regardless of other factors affecting their teaching and learning including school and home environment. Other factors that affect performance include: shortage of teachers, inadequate and poor facilities; shortage of instructional materials and low teachers' morale due to low remuneration and poor terms of service. Studies on how to improve the quality of education indicate that this can be done through improvement of the quality of teachers. That is, equipping them with relevant competencies.

According to Waititu and Orando (2009), the quality of teaching and learning has not been attained as revealed by results of the performance in KCSE. These findings are similar to those obtained from the study in Bomet district secondary schools. According to a survey (Kibe et al., 2008), it was found that the quality of teaching in the classroom becomes better after the teachers completes the INSET cycles. Because of application of SMASSE approaches the extent of student participation was improved and hence better mastery of concepts was achieved.

The SMASSE project has realized a number of successes. However, these successes have been outweighed by limitations, shortfalls and challenges in the program implementation. The SMASSE project in Kenya is currently experiencing difficulties with teachers storming out of the SMASSE –

INSET centers due to poor services (Mureithi & Kaluoch, 2012). The phase I and II of SMASSE-INSET (2003-2008) has been completed in Bomet District but so far, no studies have been carried out to establish the challenges facing the implementation of this project in this particular district despite poor performance in science subjects over the years, hence the basis for this study.

2. Methodology

The research was carried out in Bomet district of Rift Valley province in Kenya. The district lies between latitudes 0o 39' and 1o 02' South of the Equator and between longitudes 35o 00' and 35o 32'east of the Prime Meridian. It is bordered by four districts, namely, Bureti to the North East, Chebalungu to the South West, Molo to the East and Narok South to the South.

The research adopted a descriptive survey design in which a sample group was used to provide information relating to the problem of study. The dependent variable in this study was the use of ASEI/PDSI approach in the teaching of mathematics and sciences. The main independent variables were the challenges faced by:

a. Secondary school principals in implementing SMASSE at school level.
b. Science teachers in the use of ASEI/PDSI approach in their teaching.

The target population of the study comprised of all the secondary school head teachers and science teachers in Bomet district secondary schools. Out of these, a sample of 20 head teachers and 30 teachers was chosen for the study. A probability sampling and purposive sampling were used together to obtain the secondary schools to be used in the study. In order to control the effects of the extraneous variables, the sample was obtained from trained Chemistry teachers who had undergone SMASSE INSET but for the head teachers, some were art-based but were involved in secondary school management of teaching and learning.

A structured questionnaire was used as the main data collection instrument during the research. The head-teachers questionnaire was different from that of science teachers. Reliability of the research instrument was determined using test- retest method. The validity of the questionnaires was assessed by a panel of three district SMASSE-INSET trainers.

The questionnaires were administered to the selected respondents. They were granted sufficient time to effectively fill in the required information after which the researcher collected the filled questionnaires and extracted the data into Ms-Excel spreadsheets.

Completed questionnaires were scrutinized to ensure accuracy and consistency and uniformly to facilitate the coding process. The coded data was entered in the computer using the statistical package for social sciences (SPSS). Data were analyzed by using means, frequencies and percentages. Results were presented in form of frequencies and percentages.

3. Results and Discussion

For the principals the response was 100% while for the teachers, the response was 93%. The findings were presented in percentages, frequencies, charts and tables.

The research ascertained the gender of the respondent. 60% of the head teachers and 85.7% of the teachers were male, while their female counterparts comprised of 40% of the head teachers and 14.3% of the science teachers.

The data on the type of school where the respondent works were ascertained and the results are summarized in table 2.

Table 2: Type of School

Type of school	Head teachers		Teachers	
	Freq	**%**	**Freq**	**%**
Boys	4	20.0	5	17.9
Girls	5	25.0	8	28.6
Mixed schools	11	55.0	15	53.6
Total	**20**	**100.0**	**28**	**100.0**

From the findings it shows that the highest proportions of respondents were from mixed schools as compared to boys and girls schools. This means that most of the teachers in the district teach in mixed secondary schools which also form a higher number in the district.

The data on the highest level of education of the respondents was obtained and summarized in Table 3 below.

Table 3: Education level of Respondents

Education level of Respondents	Head teachers		Teachers	
	Freq	**%**	**Freq**	**%**
Diploma	2	10.0	5	17.9
Bachelor's degree	17	85.0	23	82.1
Masters	1	5.0		
Total	**20**	**100.0**	**28**	**100.0**

The findings show that majority of the head teachers had taught over 10 years while chemistry teachers had an experience of 5 to 10 years. This means that teachers in the field were experienced and therefore were capable of carrying out instructional activities as outlined in the curriculum.

The percentage of teachers that had attended SMASSE-INSET in various schools is presented in figure 1 below:

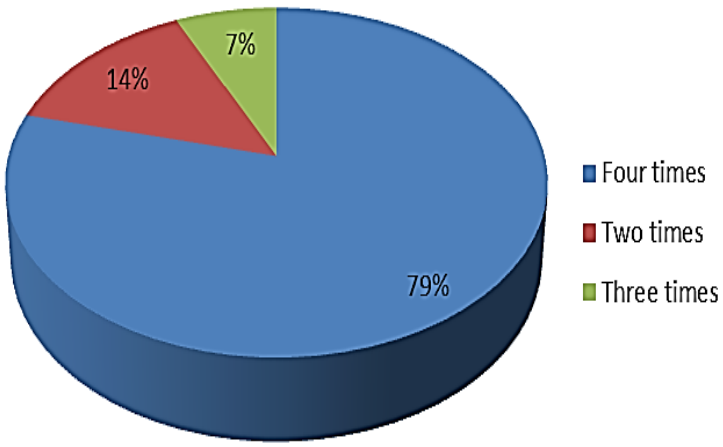

Figure 1: SMASSE Inset Cycles Undergone

From the findings, majority of the teachers had undergone four SMASSE- INSET cycles, thus enabling them be acquainted with relevant skills and techniques to handle and teach chemistry. Since a good number of teachers had completed the INSET cycles there could be a change in terms of classroom activities and the extent of student participation. This is also in agreement with the findings of (Kibe et al, 2008).

The head teachers were asked to give their views on the much they agreed or disagreed with the challenges in implementing SMASSE project approaches in secondary schools. 55% of the head teachers agreed that some teachers had not appreciated the role of INSET in their individual continuous professional development, with 40% disagreeing and 5% undecided. Most of the head teachers (60%) agreed that few field officers and principals have not been supportive while 20% disagreed and the same number remained undecided. A higher number of the head teachers (70%) agreed that lack of effective incentives beyond getting students to do well in their studies was a challenge in implementing the approach with 15% disagreeing and the same percentage remained undecided.

Three quarters (75%) of the head teachers agreed that conflict of interest, that is, science and mathematics teachers attend INSET during the holidays while their art-based counterparts were free to attend their personal interests. This challenged the implementation process. Sixteen head teachers (80%) agreed that coordination of INSET and other programs that have future financial or promotional gains was a challenge in implementing SMASSE approaches while 5% disagreed and three head teachers (15%) were undecided. Most of the head teachers (90%) agreed that another challenge during the implementation of SMASSE was non- collection/non-remittance of SMASSE funds to District Planning Committee (DPC). This was due to non-payment of fees by parents which made it difficult for schools to make their contribution towards SMASSE fund. 80% of the head teachers agreed that strengthening INSET management capacity at the district level besides coordination of educational activities to enhance attendance of INSET was a challenge in the implementation of SMASSE with only 10% disagreeing and the same percentage remained undecided. 75% of the head teachers agreed that high staff turnover and the transfer of trainers to non-curriculum implementing posts challenged the implementation process, while 15% disagreed and 10% were undecided. Most of the head teachers (75%) agreed that harmonization and collaboration of QASO and SMASSE monitoring and evaluation activities/duties challenged the implementation process of SMASSE teaching approaches while 5% disagreed and 20% were undecided.

Despite the successes registered, there were many challenges facing the implementation of SMASSE approaches; From the findings it show that some teachers may not have appreciated the role of INSET in their professional development. This could be because there is no clear government set policy on INSET activities and that evaluation based on SMASSE activities was rarely done in the district level. The INSET being conducted during the holidays while other teachers were free coursed a conflict of interest among the teachers affecting the implementation process.

It was also found that the implementation process was affected by other programs which have financial or promotional gains. For example, post graduate studies conducted during the holidays. This could prevent teachers from attending INSET. Similar findings were obtained in research (Kibe et al., 2008). High percentage (71.8%) of the population in the district is illiterate and hence the poverty level is high Bomet District Development plan (Gachu, 2013). Due to poverty level most of the parents in the district were unable to pay school fees for their children and therefore making it difficult for schools to make their contributions towards SMASSE fund. This challenged the management of INSET. It was found that transfer of competent trainers to other positions was a hindrance in implementation. Finally, education inspectors have not harmonized their evaluation instruments to meet the demands of SMASSE and hence teachers may not take the INSET practices seriously.

It was evident from the findings that 65% of the teachers sampled the trainers were not adequately prepared while 35% disagreed with the view that trainers were not adequately prepared. Another 75% stated that the boarding facilities were of low standards as 25%

disagreed with this opinion. Another 60% considered those boarding facilities‟ inadequate as 8(40%) considered them adequate. Still 70% were of the opinion that catering services offered to them during the training were of low quality and 30% did not agree with this observation. Another 65% asserted that they were served the same foodstuffs throughout the training, while 35% said that this was not true.

The above stated problems highlighted by some teachers might have impacted negatively on their perception of the SMASSE – INSET. This could be linked to responses they gave when asked about their opinion about SMASSE – INSET. In this study when the science teachers were asked their opinion about SMASSE INSET, 75% stated that the project was a waste of time and resources and had not improved the teaching and learning of mathematics and sciences. Only 25% stated that the INSET had improved teaching and learning of mathematics and sciences.

The findings revealed that 75% of the teachers lacked sufficient time to apply ASEI-PDSI concept in lessons, while 25% did not. Another 90% stated that heavy teaching load was a challenge as 10% did not consider it as such. Still 100% considered low morale among teachers a challenge. According to 75% of the teachers, overloaded syllabus posed a challenge and for 25% this was not a challenge to them, as for another 95% pressure to cover the syllabus was challenging the use of ASEI – PDSI approach in their lessons as 5% disagreed with this opinion.

4. Conclusion

This study concluded from the findings that SMASSE project implementation is facing major challenges. The major challenge faced by the principals is attributed to understaffing in public secondary schools. Due to understaffing teachers have heavy workload with some with over 30 lessons in a week. They therefore do not have time to plan for the lessons, design experiments, improvise learning materials, give out assignments and mark them or even evaluate the lessons so as to make improvements. Teachers further, have to handle overcrowded classes with some having over 50 students. In these circumstances it becomes difficult for the teacher to involve the students in learning activities, attend to individual students or even mark their assignments on time. All the Principals and majority of the teachers cited pressure to cover the syllabus as a challenge to use of student-centered teaching methods encouraged by SMASSE-INSET. This could be linked to the need to have adequate time for revision in form 4 as candidates prepare for their terminal examination, the KCSE. Teachers seem to be having a negative attitude towards SMASSE-INSET. This could be deduced from their opinions about the program when majority of them asserted that SMASSE-INSET had not made any difference in the teaching and learning of Mathematics and Science subjects and that the INSET was a waste of time and resources. This negative attitude could be as a result of the challenges they faced during the INSET and the low morale which was affirmed by both the Principals and the Teachers as a challenge to the implementation of SMASSE project.

5. Recommendations

The following recommendations were made from the study:-

- The ministry of Education should employ more mathematics and science teachers to address the widespread teachers‟ shortage and in the process deal with some of these challenges.
- This negative attitude towards the project can be changed through payment of allowances for those attending the INSET, provide decent boarding facilities during the training and improving the catering services. On completion of the training cycles, the

teachers should be awarded certificates, salary increment or promotion to the next job group.

- The Kenya Institute of Education in consultation with other stakeholders in the education sector should review the syllabuses for the Mathematics and Science with a view of making them manageable.
- The principles of SMASSE INSET should be incorporated into the training curriculum of secondary teacher training institutions. This would save on costs and time and ensure that all teachers are equipped with knowledge, skills and attitude as outlined in the SMASSE- INSET curriculum.

REFERENCES

Boniface, M. (2013). The impact of SMASSE project on the teaching methodology and learning in secondary schools in Kangundo/Matungulu district (Doctoral dissertation, Unversity of Nairobi).

Gachu, P. W. (2013). Perception Of Mathematics And Science Teachers In Public Secondary School Of The Effectiveness Of The Training Program On Strengthening Mathematics And Science Education (SMASE) In Kiambu County (Doctoral dissertation, University of Nairobi).

Glewwe, P., Kremer, M., & Moulin, S. (2009). Many children left behind? Textbooks and test scores in Kenya. American Economic Journal: Applied Economics, 1(1), 112-135.

Hanushek, E. A., & Wößmann, L. (2007). The role of education quality for economic growth. World Bank Policy Research Working Paper, (4122).

Hungi, N., & Thuku, F. W. (2010). Differences in pupil achievement in Kenya: Implications for policy and practice. International Journal of Educational Development, 30(1), 33-43.

Kibe, S., Odhiambo, J. and Ateng'Ogwel J. (2008). Practice of INSET in Mathematics and Science Teachers and its impact on Quality of Basic Education in Kenya, Unpublished paper presented in Maputo, Mozambique.

Matachi, A. (2011). Science Education for Developing Core Skills Necessary for Scientific and Technological Development; Experiences in Japan and Africa. ADEA Working Document.

Mureithi, F., & Kaluoch, M. (2012, May 2). Teachers walk out of training over pay. Nation Newspaper [Nairobi], p. 26.

Ndirangu, C. W. (2006). An Evaluation of SMASSE in-service project in biology in Kajiado district, Kenya (Doctoral dissertation, University of Nairobi).

Sachs, J. D., & McArthur, J. W. (2005). The millennium project: a plan for meeting the millennium development goals. The Lancet, 365(9456), 347-353.

Sifuna, D. N., & Kaime, J. G. (2007). The effect of in-service education and training (INSET) programs in mathematics and science on classroom interaction: a case study of primary and secondary schools in Kenya. Africa Education Review, 4(1), 104-126.

SMASSE Project (2004). 'ASEI' movement and 'PDSI' approach. Cycle 1 of district INSET. Bomet/ Transmara.

Waititu M. and Orando G. (2009). Managing Teachers and Instructions of Mathematics and Science. Unpublished paper presented at Secondary Education in Africa (SEIA) Technical workshop in Tunis.

Yara, P. O., & Catherine, W. W. (2011). Performance Determinants of Kenya Certificate of Secondary Education (KCSE) in Mathematics of Secondary Schools in Nyamaiya Division, Kenya. Asian Social Science, 7(2), p107.