

The Appropriateness of Training Facilities and Administrative Procedures in SMASSE INSET Program in Gem Sub County, Kenya

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Abstract

Efforts to improve students' performance in Mathematics have been initiated all over the world as the teaching and learning of Mathematics undergoes continuous improvements and reforms. One of the most recent efforts to improve the teaching and learning of Mathematics in Kenya is the Strengthening Mathematics and Sciences in Secondary Education In-Service Training (SMASSE-INSET) enacted in 2004. However, despite the in-service training program, the performance in Mathematics has remained averagely low. This study looked at the perception of secondary school teachers of Mathematics on SMASSE-INSET program concerning the appropriateness of the training facilities and its administrative procedures. The study utilized a descriptive survey design and quantitative approach with a sample of 110 respondents. Data was collected using questionnaires. Stratified and simple random sampling methods were used to select the sample out of a population of 144. The findings indicated that the program was wanting in that the training facilities were inappropriate in meeting adult learners' needs for the achievement of the program objectives. The administrative procedures were wanting as well in that they did not allow consultative management with the trainees and were punitive contrary to adult learning requirements. The study recommends the need for the program designers to improve the training facilities and instructional materials. In addition, the study recommends that the training venues should be changed to conference facilities which would be more adult friendly. The study further recommends that the timing of the training be changed from school holidays to other sessions in the course of school terms dates; the calling letters to adopt a diplomatic language and participative management be embraced by the program designers. Further, the participants can be rewarded through certificates, promotions and through out of pocket incentives. The study will inform policy decision makers on in-service training for teacher education in Kenya and other parts of the world.

Key Words: Mathematics, In-Service Training, SMASSE, Perception, Facilities, Administrative Procedures

INTRODUCTION

Throughout its history, Mathematics has been generally regarded as a difficult subject to most learners (Bernal, 2000) and it has been performed relatively poorly as compared to other subjects (Puttaswamy, 2000). Anderson (1981, p.12) notes that —majority of people today are scared of Mathematics and mathematicians and feel powerless in the presence of Mathematical ideas. Ernest (1996) observes that most people's image of Mathematics is that it represents the subject negatively, such that mathematics is perceived to be difficult, cold, abstract and in many cultures largely masculine. It is claimed that to many

people, Mathematics is perceived as a difficult subject to learn and teach. However it is also the notion of difficulty in Mathematics that attracts some people to it (Otunga, Odero & Barasa, 2011). Brown and Peter (1994) allude that it is mathematicians themselves who are to blame for lack of appreciation of the subject by the public. This is because mathematicians fail to define and explain their subject in a global sense to their students, to the public and to the government and industry. However, due to its central role in the society, efforts have been made all over the world to improve student's attitudes and performance in Mathematics (Kline, 1998). Efforts to improve Mathematics have been initiated all over the world as Mathematics undergoes continuous improvements and reforms globally. One of the most recent efforts to improve the teaching and learning of Mathematics in Kenya is the Strengthening Mathematics and Sciences in Secondary Education In-Service Training (SMASSE-INSET) enacted in 2004. However, despite the in-service training program, the performance in Mathematics has remained averagely low. This study looked at the perception of secondary school teachers of Mathematics on SMASSE-INSET program concerning the appropriateness of the training facilities and its administrative procedures.

Research Purpose and Objectives

The purpose of this study was to investigate the perception of secondary school teachers of Mathematics on Smasse-Inset program in Gem Sub County in Kenya. The objectives were:

- (i) To find out the perception of secondary school teachers of Mathematics on the appropriateness of facilities for Smasse Inset program.
- (ii) To find out the perception of secondary school teachers of Mathematics on the appropriateness of the administrative procedures used in Smasse-Inset program.

SMASSE-INSET Program in Kenya

In Kenya, the efforts have been going on since independence in 1963 to improve the teaching and learning of Mathematics. These include Strengthening Primary Education (SPRED II & III), Primary School Management (PRISM), and Strengthening Practical Subjects in Primary Education (PRE-SUPE) among others. SMASSE-INSET was initiated in pilot phase in a few districts in 1998 but has since been rolled nationwide since 2004. The program endeavors to bring together secondary school teachers who teach Mathematics and Sciences to discuss how best to deliver the subjects. SMASSE programs for primary school teachers have been enacted too.

Literacy, greater cognitive abilities and better student performance in examination are good indicators of effectiveness and efficiency (Deolalikar, 1999). This being the case, the major question is the role of SMASSE-INSET in alleviating the low performance in Mathematics. Table 1 shows pre SMASSE-INSET Kenya Certificate of Secondary Education (KCSE) Mathematics percentage mean scores for seven years. These mean scores are quite low and this necessitated in-service training of secondary school teachers' of Mathematics to improve on the performance of Mathematics in KCSE.

Table 1. Pre SMASSE KCSE national Mathematics percentages mean scores for seven years from 1989-1995 by gender

Sex	Percentage means scores 1989-1995						
Years	1989	1990	1991	1992	1993	1994	1995
Male	14	16	20	24	17	12	15
Female	9	10	13	9	11	9	10

Adapted from- Deolalikar, 1999

Table 1 indicates KCSE Mathematics national performance mean scores were between 13% to 24% for boys and 9% to 13% for girls in Kenya. This are way below 50% average pass mark in any standard examination. According to Kenya National Examination Council (KNEC Reports, 2009) a large part of poor performance in national examinations in Kenya is contributed by poor performance in Mathematics. The performance of students in Mathematics in national examinations has continued to be poor even after SMASSE-INSET roll out. From the year 2005 to 2009, the performance in Mathematics at KCSE was lower than performance in other compulsory subjects despite the introduction of SMASSE-inset see in Table 2.

Table 2. Post SMASSE KCSE national percentage means score for compulsory subjects in secondary schools in Kenya: 2005 – 2009

	Percentage mean score 2005-2009				
Subject/year	2005	2006	2007	2008	2009
Mathematics	21.8	18.4	23.1	21.2	21.6
English	49.5	48.6	46.5	42.8	51.5
Kiswahili	45.2	46.5	47.6	41.9	47.6

Adapted from KNEC reports, 2006-2010

Table 2 shows the mean score in Mathematics after the introduction of SMASSE-INSET. The performance in Mathematics is lower compared to other compulsory subjects which have fairly higher mean scores despite the in-service training. As participants in SMASSE-INSET program, teachers were found to be the most reliable sources in generating data on the program. This is also because they are the implementers of Mathematics subject in schools. The facilitators of SMASSE are teachers of Mathematics too. Apart from this, the question of facilities and resources as well as the administrative issues of programs have been found to greatly influence the implementation of programs (Bishop, 1985; Shiundu & Omulando, 1992; Otunga et al., 2011). This raises the question of perception of secondary school teachers of Mathematics on SMASSE-INSET program specifically on the appropriateness of the training facilities and administrative procedures. This called for an empirical investigation in Gem Sub County in Kenya. The research area was purposively selected out of the researcher's convenience and the fact that the researcher was a teacher of Mathematics in the area and a participant in SMASSE-INSET program. Deolalikar (1999) observes that the notable thing in Kenya educational system is that Science subjects tend to register lower scores than non-science subjects. This problem affects Mathematics too which is a critical subject in higher education and job placement in the country with its targets of industrialization by the year 2030 (Vision 2030) and the Millennium Development Goals (MDG) of quality Education for All (EFA) by the year 2015.

In an article titled ‘KNEC blames teachers for poor performance’ in local newspaper (2011, April 27th :16), there was a slight improvement of Mathematics paper 2 from a mean of 19.82% in 2008 to 19.89% in 2009 while there was a decline in Mathematics paper 1 from a mean of 23.76% in 2008 to a mean of 23.37% in 2009. This indicates almost a consistent performance of between 18% and 22%. The report further recommended that teachers undergo in-service training on how to properly handle the 8-4-4 syllabus. While SMASSE-INSET program has received donor backing and government support, little has been done to assess perception of teachers’ on the in-service training in order to improve the in-service training effectiveness. It is out of this background information that this study was conceived. The rationale of the study included the June/July 2009 country wide situational analysis research findings that indicated that only 17.7%, 14.7%, 12.5% and 32.3% of the teachers attended SMASSE-INSET since 2004 in cycles one, two, three and four respectively (SMASSE-Report, 2009). Based on these findings, the question in the mind of the researcher was: Why were teachers not very keen in attending the in-service training? The study provided recommendations that can improve future planning in teacher education.

MATERIALS AND METHODS

The study was based on adult learning theory by Speck (1996) which notes that adults will be committed to learning when the goals and objectives are considered realistic and important to them and that adult learners’ personal and professional needs are of ultimate importance. Professional development programs and in-service trainings needs to give participants some control over the What? Who? How? Why? When, and Where of their learning? This implies that the facilities provided in SMASSE-INSET programs as well as the administrative procedures should favor adult learning requirements on What? Who? How? Why? When? and Where? of their learning.

A descriptive survey design was used. Teachers were selected through stratified and simple random sampling method from the 43 Secondary Schools in GemSub County. Stratified sampling method was used to divide the schools into county and sub-county categories from the two divisions of Yala and Wagai in Gem Sub-County. Stratified sampling involves putting the subjects into stratas to ensure equal representation of entire population (Dessler, 2005). Simple random sampling method was then used to select 60 and 43 teachers of Mathematics from Yala and Wagai divisions respectively making a total of 103 teachers. Simple random sampling method involves giving each case an equal chance of being picked for the study to eliminate any bias and increase objectivity (Fraenkel & Wallen, 2008). All the Four (4) and three (3) facilitators of SMASSE-INSET from Yala and Wagai divisions were selected too through census technique. The study used a sample size of 110 out of the entire population of 144. Out of these, 32 respondents were female while 78 were male. Hart (2005) recommends a sample of 70% or above for population less than 500. The facilitators of SMASSE in the two divisions were teachers of mathematics in the secondary schools as well.

The study used questionnaires as research instruments. There were two sets of questionnaires: Questionnaire for teachers of Mathematics and for facilitators of SMASSE INSET program. Validity of the instruments was enhanced through piloting. The reliability of the research instruments was ensured through the test re-test technique.

Ethical concerns like informed consent, anonymity and confidentiality were addressed by the study. The research tools were distributed and collected face to face using drop and pick technique to avoid data loss. Being a descriptive survey, data from the questionnaires was analyzed using frequencies, percentages and reported in tables and charts using statistical package for social sciences (SPSS) to give the status of the existing conditions (De Vaus 2002).

RESULTS AND DISCUSSIONS

This section presents and discusses the findings of the study.

The Demographic Characteristics of the Teachers of Mathematics

The Demographic characteristics of the teachers of mathematics are represented in Table 3.

Table 3. Demographic characteristics of teachers of Mathematics (N=103)

		(f)	(%)
Education level of teachers	Masters degree	10	9.71
	B.A/B.sc + PGDE	2	2.06
	Bachelor's	62	60.19
	Diploma	18	17.46
	Certificate	11	10.68
Total(s)		103	100.00
Teachers' length of service	Below 4years	26	25.20
	4-6years	37	35.90
	7-9 Years	9	8.70
	10 Years & Above	31	30.10
Total(s)		103	100.00
Sessions of training attended	Above 4 Sessions	35	34.00
	4 Sessions	15	14.60
	3 Sessions	13	12.60
	2 Sessions	13	12.60
	Less than 2 Sessions.	27	26.2
Total(s)		103	100.00

Table 3 indicates that majority of the teachers who participated in the research had a Bachelor's degree as their highest level of education, had a teaching experience of 4 to 6 years and had attended more than 4 training sessions. About the facilitators of SMASSE program, all the 7 had Bachelors as their highest educational level, all had taught Mathematics for more than 10 years and all had attended more than 4 training sessions. These respondents were reliable for this study.

Perception of Teachers of Mathematics on the Appropriateness of Facilities for the SMASSE-INSET Program

The study sought Perception of secondary school teachers of Mathematics the appropriateness of facilities for SMASSE-INSET program. The specific facilities focused

on were the SMASSE-inset venue, bedding conditions, quality and quantity of meals, auditorium/rooms, and instructional materials. Respondents were questioned on each item and responses tabulated. Respondents were also asked to suggest the preferred incentives and venue for the in-service training. Table's 4 and 5 show the summaries.

Table 4. Perception of secondary school teachers of Mathematics on the appropriateness of facilities for SMASSE-inset program (N=103)

Appropriateness of facilities	Responses (frequency & percentages)			Totals frequency & percentages
	Agreed	Undecided	Disagreed	
School as SMASSE-inset venue	38(37.0)	14(14.0)	51(49.0)	103(100.0)
Bedding conditions	10(10.0)	43(42.0)	51(49.0)	103(100.0)
Quality and quantity of meals	66(64.0)	20(19.0)	18(17.0)	103(100.0)
Auditorium/rooms suitability	26(25.0)	19(18.0)	68(66.0)	103(100.0)
Learning materials	23(22.0)	18(17.0)	62(60.0)	103(100.0)

Table 5. Perception of facilitators of SMASSE on the appropriateness of facilities for SMASSE-inset program (N=7)

Appropriateness of Facilities	Responses (frequencies & Percentages)			Totals (frequency & percentages)
	Agreed	Undecided	Disagreed	
School as SMASSE-inset venue	2(28.6)	1(14.3)	4(57.1)	7(100.0)
Bedding conditions	1(14.3)	2(28.6)	4(57.1)	7(100.0)
Quality and quantity of meals	5(71.4)	1(14.3)	1(14.3)	7(100.0)
Auditorium/rooms suitability	1(14.3)	1(14.3)	5(71.4)	7(100.0)
Learning materials	1(14.3)	1(14.3)	5(71.4)	7(100.0)

Table 4 shows that on the facilities used in the training, 51 (49%), 51 (49%), 68 (66%) and 62 (60%) did not find the venue, beddings condition, auditoriums and instructional materials appropriate for the training purposes respectively. Only the meals quality and quantity got approval at 66 (64%) from the respondents. In addition 53% of the respondents suggested that the venue be changed to hotel conference facilities while 54% suggested that out of pocket financial incentives be given to participants as motivation. On incentives, 54% wanted financial incentives, 7% wanted certificates while 22% wanted higher job grades. The findings on Table 5 on the views of for facilitators more or less conforms to teachers views in Table 4.

Table 6. Perception of secondary school teachers of Mathematics on the appropriateness of the administrative procedures adopted in SMASSE-inset program (N=103)

Administrative Procedures	Responses Percentage Responses			Totals frequency & percentages
	Agreed	Undecided	Disagrees	
Holiday SMASSE-inset timing	27(26.0)	13(13.0)	63(61.0)	103(100.0)
Good calling letters	24(23.0)	24(23.0)	56(54.0)	103(100.0)
Three times per day roll call	14(14.0)	18(17.0)	71(69.0)	103(100.0)
Rules and guidelines	19(18.0)	22(21.0)	63(61.0)	103(100.0)

Table 7. Perception of facilitators of SMASSE on the appropriateness of the administrative procedures adopted in SMASSE-inset program (N=7)

Administrative Procedures	Frequencies & Percentage Responses			Totals frequency & percentages
	Appropriate	Average	Not appropriate	
Holiday SMASSE-inset timing	1(14.3)	1(14.3)	5(71.4)	7(100.0)
Good calling letters	0(0.00)	1(14.3)	6(85.7)	7(100.0)
Three times per day roll call	4(57.1)	2(28.6)	1(14.3)	7(100.0)
Rules and guidelines	7(100.0)	0(0.00)	0(0.00)	7(100.0)

As shown in Table 6, the study found that 63 (61%), 56 (54%), 71 (69%) and 63 (61%) disapproved of the SMASSE-INSET holiday timing, nature of the invitation letters, facility conditions, three times daily roll calls and rules and guidelines respectively. 40% of the respondents further suggested that that SMASSE-INSET be made voluntary and out of pocket be issued as a way of improving the in-service training program. Table 7 shows the findings from the facilitators which concur with the findings from the teachers of Mathematics.

FINDINGS AND DISCUSSIONS

The perception of teachers' of Mathematics on the appropriateness of the facilities for the SMASSE-INSET in Gem sub county was that teachers disapproved facilities like the secondary schools being used as venues for SMASSE-INSET program. The scoring was a response of 37% in support while 49% of respondents disagreed. Weinstein (2007) observes that there exist several types of arrangement styles for which different activities are best suited for. Given the methods of teaching and activities in SMASSE training, the hall was not the best preferable place with benches as seats for adults.

The bedding conditions were not appealing to the participants with only 10% accepting their suitability, 49% were undecided while 42% disagreed with the bedding conditions. Meals quality and quantity were satisfactory to participants with a response of 64% in support of the feeding arrangement, 19% were undecided while 17% were in disagreement. Auditorium /rooms' suitability for learning was also satisfactory to a large extent with only 24% dissatisfied. The availability of instructional materials was not of satisfactory level in the training with a 60% disapproval of the adequacy and a 22% approval and 17% of respondents undecided.

On the administrative procedures used in Smasse-inset, the school holiday timing stood at 26 % while those against was 61%. Daresh and Playko (1985) assert that teachers will resist an activity that seems to eat into their holidays which may explain the poor rating of the school holiday timing in the study.

There was mixed feeling on the framing of the calling letters with 54% disagreement and 23% agreement with some saying the wording had punitive intonations. The three times roll call per day was the most unpopular with 70% rejecting the system as colonial and unnecessary for adults who need not be monitored like children. Giving adult students

opportunities to develop their time management skills can most likely benefit their learning and achievement; self-monitoring is a key aspect of learning and achievement more so with adults (Santrock, 2009).

Sixty one percent (61%) of respondents were unhappy with the rules and guidelines in the training sessions and viewed them as punitive and too strict for adult learners who may have a myriad of responsibilities. Adults have self-drive that should propel them to participate in the training voluntarily given proper handling (Knowles, 1984). While norms should be set by participants in such workshops and seminars, SMASSE-INSET program seemed to have its rules and guidelines set well in advance.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the findings of this study, the following conclusions were arrived at:

The first research objective sought to find out the perception of secondary school teachers on the appropriateness of facilities for SMASSE-INSET program. Based on the findings, the study concluded that the SMASSE-INSET program was wanting and inappropriate in terms of facilities that can meet adult learners' needs so as to achieve the program objectives. Only the meals quality and quantity were approved by majority of the respondents while the venue, auditoriums, learning materials, and bedding conditions were disapproved by majority of the respondents.

The second research objective sought to find out the perception of secondary school teachers of Mathematics on the appropriateness of the administrative procedures used in SMASSE-INSET program. From the findings, the study concluded that the teachers felt that the SMASSE-INSET administrative procedures were punitive and did not engage the trainees in consultative management contrary to the requirements of adult learning theories. The three times daily roll calls, timing, rules/guidelines and calling letters achieved were disapproved by majority of the respondents.

Consequently, the study concluded that the perception of secondary school teachers of Mathematics on the SMASSE-INSET program in Gem Sub County in Kenya was that the teachers had disapprovals on the program. They found many of the facilities used in the training and the administrative procedures inappropriate.

Recommendations

The study made the following recommendations:

On perception of secondary school teachers of Mathematics on the appropriateness of the facilities for SMASSE-INSET program, the study recommended the need for the program designers and the government to improve the facilities and resources used like the auditoriums, learning materials, and bedding conditions. Further the venue of the program can be made more adult friendly by making use of hotel facilities instead of the schools.

On the perception of secondary school teachers of Mathematics on the appropriateness of the administrative procedures of SMASSE-INSET program, the study recommended that the timing of the training be changed to school term dates and that the calling letters be diplomatically addressed to teachers. Further, the participants can be rewarded through certificates, promotions and through out of pocket incentives. Also, participative management should be embraced by the program designers.

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