

Research article

INSTRUCTIONAL LEADERSHIP: THE KEY TO IMPROVED ACADEMIC ACHIEVEMENT IN MATHEMATICS IN KCSE

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Abstract

Instructional leadership refers to the activities that the principal engages in or delegates to others to promote growth in student learning. It involves giving direction, coordination, and providing resources for the improvement of curriculum and instruction. The principals' primary responsibility is to promote the teaching and learning of all students.

This study focused on principals' instructional leadership practices and their relationship with students' academic achievement in Mathematics in KCSE. The study was guided by the transformational theory postulated by Leithwood & Wahlstrom (2004). According to the theory, instructional leaders are expected to communicate shared goals, monitor and provide feedback on the teaching/ learning process and promote school-wide professional development. The study made use of the descriptive survey research design which enabled the respondents to report on the instructional leadership practices by themselves or their principals and how such practices have impacted on students' academic achievement. The target population was all secondary school principals and Mathematics teachers in Makueni County. The sample was obtained through purposive and simple random sampling techniques. A total of sixty eight principals and the same number of Mathematics teachers were selected for the study. Data was collected using questionnaires for the principal, a different one for the Mathematics teachers and an interview guide for the principal. The chi-square test was used to test the research hypothesis. A Significant relationship was noted between principals' instructional leadership practice and academic achievement of students in Mathematics in

KCSE. The study therefore proposes that all principals should perfect the practice of instructional leadership to realize higher academic achievement among their students.

Key Words: Instructional leadership, Academic achievement, instructional leadership practices

Introduction

Instruction is a systematic process that is employed to develop education and training programmes in a consistent and reliable fashion (Senge, 2006). It provides a framework for developing lessons that; increase and enhance the possibility of learning, makes acquisition of knowledge and skills more efficient, effective and appealing, encourages the engagement of learners so that they learn faster and gain deeper levels of understanding (Merril, et al, 1996). Different strategies are used in instruction depending on the content and also the level of the learners. Some of these strategies include direct instruction, indirect instruction, interactive instruction, independent study and experiential learning. In all these methods the learning goals must be very clear to both the teacher and the learner. So what is the role of the principal in this and how can principals help teachers in their instruction roles effectively, particularly in Mathematics?

The principals need to provide leadership to clarify instructional goals and work in collaboration with the teacher to improve teaching and learning in order to meet these goals, making him an instructional leader. He needs to help the teachers shift the focus of instruction from what they are teaching to what students are learning by practicing instructional leadership. The role of the instructional leader is to help the school to maintain a focus on why the school exists, and that is to help all students learn (Blasé, Blasé & Philips, 2010, Smylie, 2010).

The definition of instructional leadership has been very diverse and is generally given in terms of traits, behaviors, roles and processes. According to Ngware (2006) leadership involves a process whereby intentional influence is exerted by one person over other people to guide structure and facilitate activities and relationships in a group or organization. Hoy & Miskel (2000) asserted that leadership should be defined broadly as a social process in which a member of a group or organization influences the interpretation of internal and external events, the choice of goals or desired outcomes, organization of work activities, individual motivation and abilities, power relations and shared orientations.

Instructional leadership is the ability of a principal to initiate school improvement, create a learning oriented educational climate and to stimulate and supervise teachers in such a way that the latter may exercise their tasks as effectively as possible (Van de Grift & Houtveen, 1999). Hoy & Hoy (2003) said that the principal must communicate a clear vision on instructional excellence and continuous professional development consistent with the goals of the improvement of teaching and learning. Other activities are promoting school wide professional development which encompasses behaviors of the leader which are consistent with lifelong learning (Tanner & Tanner, 2007). The instructional leader encourages teachers to learn more about student achievement through data analysis, provides professional development opportunities that are aligned to school goals and provide professional literature and resources to teachers.

Mathematics is recognized worldwide as a very important subject in the human endeavor. Its usefulness in technological activities, Commerce, Economics and in Education is almost at par with the importance of education as a whole (Tella, 2008). In Kenya, the education system has three levels namely primary, secondary and post-secondary (university, college, certificate and vocational training). At the end of the primary level of education, learners sit for a national examination, the Kenya Certificate of Primary Education (KCPE) to qualify for admission to secondary school. At the end of the secondary education learners again sit for another examination, the Kenya Certificate of Secondary Education, (KCSE) in order to graduate to the tertiary level of education. At both levels Mathematics is a compulsory subject of study (KIE 2001).

The government of Kenya therefore recognizes the important role Mathematics should play in the realization of its goals among them the Vision 2030 in order to become a globally competitive and prosperous country by the year 2030 (GoK, 2007). This has been reflected in the amount of resources both human and otherwise channeled towards enhancing the teaching and learning of Mathematics at all levels of the education system (JICA, 2007). At the secondary school level there have been a number of intervention strategies that the government has put in place to ensure effectiveness in the teaching/learning of this subject. The government has also institutionalized In-Service Education and Training (INSET) of serving Science and Mathematics teachers under the Strengthening of Mathematics and Sciences in Secondary Education (SMASSE) programme, with quite a substantial amount of the Ministry of Education budget going towards this course (MoE, 2005).

Despite putting in place these strategies, academic performance in Mathematics has continued to be low in most schools in terms of mean score as compared to the other subjects. This is based on the scales by the Kenya National Examinations Council (KNEC). This is the body in charge of administering, marking and grading of examinations in Kenya at the primary and secondary school level of education. At the secondary school level, the Kenya Certificate of Secondary Education (KCSE) level, examination grades are awarded based on a scale of one to twelve (1-12) in each subject and these values are also known as mean scores. The highest value of mean score in KCSE is twelve which corresponds to a grade A, while the lowest is one which corresponds to a grade E in the examination. Table 1 shows the average performance in Mathematics in KCSE in Makeni County between 2008 and 2011.

Table 1: Students' Mean Scores in Mathematics in KCSE in Makeni County

SUBJECT	YEAR			
	2008	2009	2010	2011
MATHEMATICS	2.85	2.86	2.79	2.68

Source: County Education Office, Makeni

The results above show that the mean score value was an approximate value of three which is equivalent to grade D. This being an average value indicates that students in some schools are doing very well while others are

doing poorly. This study therefore seeks to investigate if the principals' instructional leadership practices have a relationship with their students' academic achievement in Mathematics in KCSE.

The instructional leadership construct used in this study conceptualizes three models of instructional leadership namely; Defining and communicating shared goals, monitoring and providing feedback on the teaching learning process and promoting school wide professional development which are inextricably interwoven. It synthesizes the predominant models of instructional leadership (Weber, 1996; Murphy, 1990; Hallinger & Heck, 1996) of the last ten years, and encompasses current research to propose a model of instructional leadership that meets the needs, expectations and government mandates for the next generation.

Statement of the Problem

Education is seen as the means through which students achieve a fulfilling life and the major vehicle for individual and national development. The learning experiences that learners acquire in school play a pivotal role in their lives after schooling and especially those acquired in secondary school. Often principals have been posted to schools and failed to meet the expectations of the school community due to poor performance of their students in general and specifically in Mathematics. Others have enjoyed a record of good performance wherever they have been irrespective of the school status.

Therefore what exactly is it that principals need to do that ripples through classrooms and boosts learning especially in Mathematics? How can principals help teachers to clarify instructional goals and work collaboratively to improve teaching and learning in their schools?

This study, therefore sought to examine the instructional leadership practices which different principals use and their relationship with students' academic achievement in Mathematics.

Purpose of the Study

The purpose of the study was to examine the relationship between selected principals' instructional leadership practices and students' academic achievement in Mathematics in KCSE.

Research Hypothesis

The following null hypothesis was tested:

HO. There are no statistically significant differences between the principals' instructional leadership practices and students' academic achievement in Mathematics in KCSE

Methodology

The study adopted the descriptive survey research design which enabled the respondents to report on the instructional leadership practices by themselves or their principals and how such practices have impacted on students' academic achievement in Mathematics. The target population for the study was all Principals and Mathematics teachers from Makueni County.

The sample for the study was selected through proportionate sampling in order to get a representation of schools from each of the nine districts that constitute Makueni County. In each school the principal and a Mathematics teacher were the respondents. Once the schools were selected the principal was the first respondent, while the Mathematics teacher was selected through random sampling.

Data was collected using two sets of questionnaires administered on the school principals and the Mathematics teachers. The Teachers' Attitude Questionnaire (TAQ) was used to collect views of teachers about the principals' instructional leadership practices and their impact on students' academic achievement. The Principals' Questionnaire (PQ) collected views from the principals themselves on their instructional leadership practices. Interview guides were also administered on the principal of every school to provide more in depth information on the principals' instructional leadership practices.

Three types of validity needed to be ascertained in the study which are face, content and construct validity. To ascertain face validity, the questionnaires and in depth interview questions were presented to experts in the School of Education for constructive criticism and then revised according to their comments. Content validity and construct validity were similarly ascertained by requesting experts in the field of study including the researcher's supervisors to provide their comments on the relevance of each item on the instrument.

To ensure reliability of the research instruments the researcher conducted a pilot study of the instruments in one school, and this school was not included in the main study. An internal consistency measure or analysis of inter-rate reliability was utilized, and as proposed by Hallinger (1983), a Cronbach alpha coefficient of 0.8 was got for the various items in the research instruments. The Cronbach alpha coefficient in this study was found to be 0.961 and above through calculation for each of the items.

Data was collected by four research assistants who were trained on data collection techniques. The collected data was coded for analysis which was done through SPSS version 21.5. Descriptive statistics was used for this study because it involves the description, analysis and interpretation of circumstances prevailing at the time of the study (Cohen et al, 2004). Since the study involved the analysis of scores between two groups (principals and teachers, performing and nonperforming schools) a Chi square test was conducted to determine if there existed statistically significant differences between and within the two groups. Findings of the study were presented in form of tables and graphs.

Results and Discussion

Instructional Leadership Construct

The instrument used to measure instructional leadership consisted of 40 items grouped into ten subsections derived from the three models of instructional leadership. The ten subsections are; 1.) Frames the school goals, 2) Communicates the school goals, 3) Supervises and evaluates instruction, 4) Coordinates the curriculum, 5) Monitors students progress, 6) Protects instructional time, 7) Maintains high visibility, 8) Provides incentives for teachers, 9) Promotes professional development, 10) Provides incentives for learning. These were all derived from the three main functions of instructional leadership namely; framing and Communicating shared goals, Monitoring and Providing Feedback on the Teaching and Learning Process and Promoting School Wide Professional Development.

Responses from the teachers and principals were collected using the instruments and these were used to calculate the average scores for each principal and each given a percentage for instructional leadership. A five point Likert scale was used to show how often the principal practiced instructional leadership. The responses were assigned values as based on the level of practice of the different practices grouped as; Almost Never =1, Rarely =2, Sometimes =3, Frequently =4, Almost Always =5. The lowest level on the scale meant the principal practiced instructional leadership Almost Never and the highest level being Almost Always. These scores were used to categorize the principals as exemplifying high or low instructional leadership behaviours. For purposes of this study, a value of four was established as the threshold mean for consistent (frequently or almost always) demonstration of the specific behaviour or behaviour function. The scores were set up in a range where those who had a mean of four and above from the scale were considered to exemplify high instructional leadership practice and those with a mean below four as low in instructional leadership practice. The results in Table 2 indicate that 52.7 percent were categorized as high in instructional leadership whereas 47.3 percent were classified as low in instructional leadership.

Table 2: Instructional Leadership Category

		Frequency	%	Valid %	Cumulative %
Valid	High	29	52.7	52.7	52.7
	Low	26	47.3	47.3	100.0
Total		55	100.0	100.0	

The Null Hypothesis sought to establish if there is a significant relationship between instructional leadership practices and students' academic achievement in Mathematics. It was observed that among the principals who exemplified high instructional leadership practices 14.3 percent of their students scored a mean score below four in KCSE which corresponds to a mean grade below D+, 57.1 percent scored between four and six (Between D+ and C plain), 25 percent scored between six and nine (Between C and B+) while 3.6 percent scored above nine in

Mathematics. Their counterparts in the low category had 85.2 percent scoring below four, 11.1 percent scored between four and six, 3.7 percent scored between six and nine while none scored above nine as shown in figure 1.

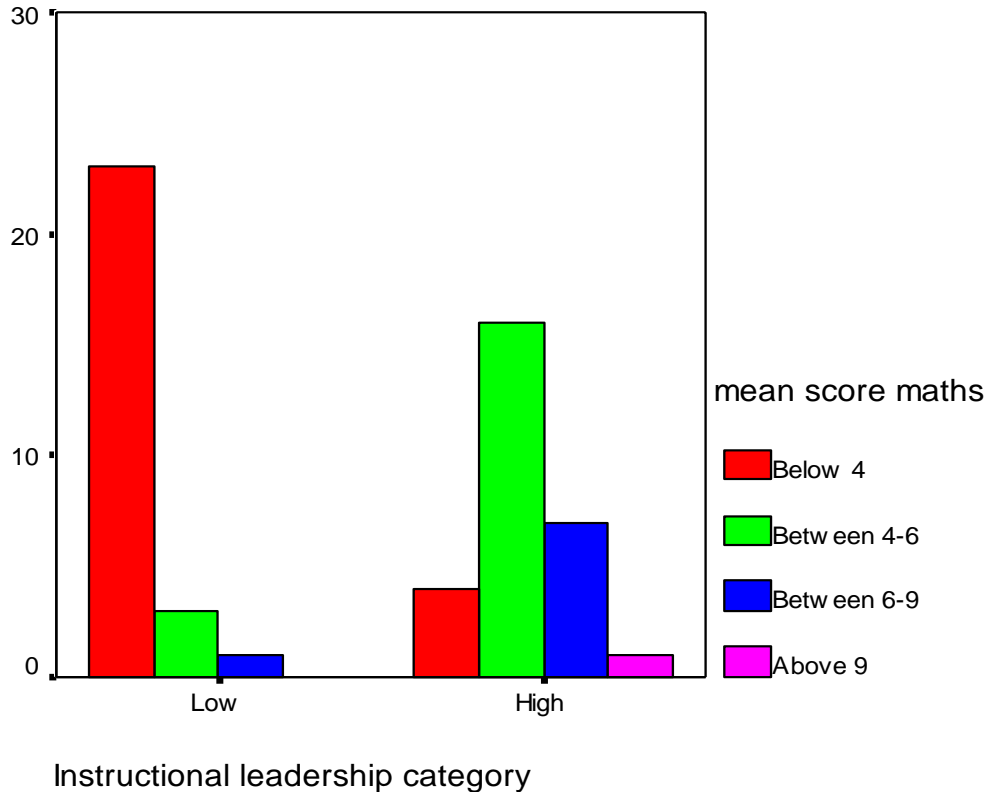


Figure 1: Graph of Mean Score Mathematics against Instructional Leadership

The study found that principals who practice instructional leadership to a high extent have their students scoring better grades in Mathematics than those who practice it to a low extent. The study found that success in Mathematics involves helping students develop a positive attitude towards the subject which the school should seek to achieve. It was also found that the principal has a key role to play through fostering the right climate for high quality instruction by the teachers. Through the teachers the principal was found to instill the right attitude towards Mathematics and works closely with the students motivating them to strive for better results. These findings collaborates findings by Cayetano, (2011) in his earlier study.

The practice of instructional leadership among the principals helps the learners know what the goals of the school are in terms of academic achievement in Mathematics and how to attain them with the guidance of the teachers. Though principals did not teach in many cases, students were able to get the principals' mood and tempo regarding academic achievement in Mathematics through the mechanisms and strategies he puts in place. Principals who practiced instructional leadership therefore had their students performing better than their counterparts who did not practice instructional leadership. Teachers expect a lot of support from the school principal and also among

themselves as they exemplify their teaching duties. The principal therefore has a great responsibility in creating an atmosphere of unity of purpose and well directed efforts in all staff which also agrees with findings by Knezek, (2001) who found out that instructional leadership determines students' academic achievement, specifically in Mathematics and reading.

In order to relate the principals' instructional leadership practice and academic achievement in Mathematics, a Chi-square test between the instructional leadership category and the students' mean score in Mathematics was done with a confidence level of 95%. The study found out that the calculated value of Chi square gave a significance level of 0.000 which is lower than 0.05 and chi square values that are higher than the calculated values of similar degrees of freedom based on the theoretical values. This shows that there is a significant relationship between instructional leadership practices and students' academic achievement in Mathematics and so the null hypothesis should be rejected as shown in Table 3.

Table 3: Chi-Square Test for Principals' Instructional Leadership Category and Students' Mean Score in Mathematics

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.756(a)	3	.000
Likelihood Ratio	30.973	3	.000
Linear-by-Linear Association	21.706	1	.000
N of Valid Cases	55		

Discussion

The findings of this study were similar to other studies that have been conducted in related areas. Knezek (2001) found that there were differences in the behaviour of leaders at high performing schools and those at low performing schools. Findings from his study showed that there was collaboration, reflection and the leader was knowledgeable about research on methodology and pedagogy. Klinginsmith (2007) found a significant relationship between instructional leadership factors and student academic achievement. Hanna (2010) found that principals in high performing schools establish and articulate vision and goals, focus on learning and achievement and were effective accountable leaders who fostered communication in their schools.

According to Hanna's (2010) study, through the actions of school principals their actions in these categories they accomplish the task of capacity building in teachers which translates into greater student achievement. Cayetano (2011) found that students who attend schools led by leaders who exemplify high instructional leadership practices had higher mean scores than those who did not implying that students who attend schools led by instructional leaders have higher chances of success in Mathematics and English. He proposed that more of the leaders of secondary schools should embrace and follow the principles of instructional leadership. Alig-

Mielcarek (2003) and Ubben et al (2011) found out that although principals do not directly teach the students, the climate they foster helps to set the standard and quality of instruction, hence helping to determine the quality of education offered in each institution. Mwangi (2009) on the other hand found out that principals had a key role to play to ensure the success of their students in Mathematics. Though they are not necessarily involved in teaching, the steps they put in place either promote students' academic achievement or not.

Conclusions

School leadership has become a priority in education policy agendas both nationally and internationally because it has been widely accepted that it plays a key role in improving school performance by motivating teachers, as well as influencing the school climate(Pont, Nusche, & Mooman, 2008; Lyons, 2010). It is therefore imperative that principals have knowledge and an in depth understanding of what it means to be an instructional leader. Given the scope of responsibilities carried out by principals and identified by the literature, it is appropriate to note that a state of balance needs to be maintained. An example is in the function of "Coordinating the Curriculum" where the principal need not be an expert in a specific curricular area, but rather needs to show genuine interest in, have knowledge of, and remove barriers to those whose function is to provide the expert professional development in this domain.

The instructional leadership of the principal is a critical factor in the success of a school's improvement initiatives and the overall effectiveness of the school. The primary responsibility of the principal is to promote the learning and success of all students. The above results show a marked difference between the students' academic performance in Mathematics between principals who are high in instructional leadership and those who practice instructional leadership to a lower level.

Recommendations

This study recommends that:

- i. Principals need to adopt instructional leadership principles of defining and communicating shared goals. This helps their students and teachers know what the principal stands for and how well they need to position themselves so that they are in tandem with the principal. The principal need to be committed to monitoring and providing feedback on the teaching and learning process to ensure that the teaching and learning process is in line with the set goals. Principals similarly need to embrace promoting of school wide professional development. Supervision is the glue that holds the educational system in place and it calls for the principals to do clinical supervision. This ensures that teachers are supported in their classes so that instruction improves and student academic achievement also increases.
- ii. All teachers need to realize their role in the success of their students. In the current study, cases were cited of schools with leaders with low instructional leadership behaviour and they had students who performed better than some students who had leaders with high instructional leadership behaviour. This could be a

result of teacher preparation, teacher self efficacy and teacher motivation, teachers can therefore have successful students if they are prepared to work hard.

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