

# Effect of Integrating Information Communication Technology in Curriculum and Instructional Management on Secondary Schools' Management in Nairobi City County

By

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## Abstract

*The purpose of the study was to investigate the effect of integrating ICT in curriculum and instructional management on the management of secondary schools in Nairobi City County. Specific objectives of the study were to establish the effect of integrating ICT in management of curriculum and instruction on school management and to establish whether there is a difference between ease of use of ICT applications for management by managers in public secondary schools and those in private secondary schools. The study employed the descriptive research survey method. The research instruments used were questionnaires, an interview guide and an observation schedule. Quantitative data was analyzed using descriptive statistics and presented in the form of tables. Qualitative data was coded according to content and analyzed based on emerging themes and presented in narrative form. The findings of the study was that there was no significant effect of integrating ICT in the management of curriculum and instruction on secondary school management in Nairobi City County. The study also established that there was no significant difference between ease of use of ICT applications for management by managers in public schools and those in private schools. Among the recommendations made are that more ICT infrastructure should be availed to boost integration in management. Frequent targeted training for the managers is also suggested.*

**Keywords:** *Information Communication Technology, Integration, instructional management*

## 1. Introduction

The new millennium heralded rapid technological advancements, which have impacted on the management practices of organizations including learning institutions worldwide. The integration of information communication technology in organizational management including learning institutions is rapidly gaining ground worldwide. Brooks-Young (2006) asserted that integrating Information Communication Technology (ICT) in school management can better assist school managers in accomplishing their administrative tasks. Fluck (2003) defined integration as the process of seamlessly combining components, parts or elements into a complete but harmonious whole. The component parts include the school context, the technology provided, the technical skills of managers, technical support and maintenance. Visscher (2003) and Maki (2006) affirmed that integrating ICT in management could provide administrators and teachers with information required for informed planning, policy making and evaluation.

Studies done in Malaysia on the effects of integrating ICT on the management of schools revealed positive changes including better accessibility of information, more effective administration and higher utilization of school resources (Zain, Atan & Idrus, 2004). Brunigess (2003) outlined some of the specific tasks in management where ICT could be used including curriculum management, human resource

management, financial management and communicating with the school community. With respect to the integration of ICT in the management of curriculum and instruction, a study done in Australia by Gurr (2000) showed that the use of ICT by school managers lessened their workload and made the management process to be more effective, helped use time more efficiently and increased the quality of in-school communication. This in turn led to enhanced supervision of student progress as well as the improvement of school resources management. A similar finding on the use of ICT to address teacher workloads in the United Kingdom noted that ICT can have a significant role to play in improving institutional effectiveness due to its ability to reduce routine administration, improve the effectiveness of support staff, facilitate the transfer of some tasks from teachers to support staff and enable teachers to more effectively plan and deliver teaching and learning (PriceWaterhouseCoopers, 2004).

In Kenya, the government has come up with policies that advocate for the integrating of ICT in education in general and school management in particular. In line with these policies, many schools especially in Nairobi City County have invested in ICT infrastructure for use in various school operations such as the management of curriculum and instruction. However, these investments can only be considered worthwhile if there is evidence that they have made a corresponding impact on the management of schools. There was therefore a need to investigate the effect of integrating ICT in the management of curriculum and instruction on the management of secondary schools in Nairobi City County. The research objectives of the study were: to establish the effect of integrating ICT in the management of curriculum and instruction on secondary schools in Nairobi City County and to establish whether there is a difference between ease of use of ICT applications by managers in public secondary schools and those in private secondary schools.

## **2. Research Methodology**

The study was conducted using a descriptive research design. The data was collected from a cross section of respondents (principals, deputy principals and heads of department) to obtain picture of the effect of integrating ICT in curriculum and instructional management on the management practices of secondary schools in Nairobi City County. The target population comprised 80 principals, 80 deputy principals and 560 Heads of Department (HoDs) in public schools and 140 principals, 140 deputy principals and 980 HoDs in private secondary schools in Nairobi City County.

In this study, stratified random sampling, simple random sampling and purposive sampling was used to select respondents from public secondary schools while purposive sampling was used to select respondents from private schools. The public secondary schools were categorized into 11 boys' boarding schools, 8 boys' day schools, 13 girls' boarding schools, 8 girls' day schools, 33 mixed day schools, 6 mixed boarding schools and 1 girls' day and boarding school. A sample of 24 public schools was selected for the study (30 percent of the population). Stratified, simple random sampling and purposive sampling was thereafter used to select 24 principals, 24 deputy principals and 120 heads of department from public schools while purposive sampling was used to select 13 principals 13 deputy principals and 65 heads of department from private secondary schools. The sample for the private schools was included because these schools are different in terms of facilities and management practices when compared to public schools and their inclusion in the study was for comparative purposes only.

The research instruments for data collection were: questionnaires, an observation checklist and an interview guide. The questionnaires were a combination of both closed and open-ended type of questions. The questionnaires were divided into sections with section A eliciting demographic information; Section B eliciting information on accessibility to ICT facilities; Section C eliciting information on frequency of use of ICT in supporting curriculum and instructional management; Section D eliciting information on

rating of effect of integrating ICT in curriculum and instructional management on school management and Section E elicited items on ease of use of ICT in management tasks. An observation checklist was used to assess the use of ICT in the schools including the facilities and frequency of use. The interview guide was administered to a selected number of principals to counter check the questionnaire responses and confirm the observations made.

A pilot study was conducted in five secondary schools in Nairobi City County. The five schools were however not used in the main study. The reliability of the principals' questionnaire was found to be 0.75 while that of deputy principals was 0.71 and that of heads of department was 0.73. Descriptive statistics (means and percentages) were used to analyse data. ANOVA test was use in testing the null hypothesis.

### 3. Results and Discussions

This study sought to establish the effect of integrating ICT in management curriculum and instruction on school management. In this study, the effect of integrating ICT in curriculum and instructional management on school management was determined by converting the principals' and deputy principals' responses on whether or not the integration of ICT in management had generally had a positive effect on school management which was then correlated with each aspect of curriculum and instructional management task. The results of the responses are shown in Table 1.

**Table 1: Responses on the effect of integrating ICT in curriculum and instructional management**

Tasks		Principals				Deputy Principals			
		Low	Moderate	High	Total	Low	Moderate	High	Total
Timetable	Impact	1(6)	3(18)	12(75)	<b>16(100)</b>	2(10)	2(10)	17(81)	<b>21(100)</b>
	No impact	4(20)	2(10)	14(70)	<b>20(100)</b>	6(40)	1(7)	8(53)	<b>15(100)</b>
	<b>Total</b>	<b>5(14)</b>	<b>5(14)</b>	<b>26(72)</b>	<b>36(100)</b>	<b>8(22)</b>	<b>3(8)</b>	<b>25(69)</b>	<b>36(100)</b>
Student progress report	Impact	0(0)	2(13)	14(87)	<b>16(100)</b>	1(5)	1(5)	19(91)	<b>21(100)</b>
	No impact	1(5)	0(0)	19(95)	<b>20(100)</b>	0(0)	4(27)	11(73)	<b>15(100)</b>
	<b>Total</b>	<b>1(3)</b>	<b>2(6)</b>	<b>33(92)</b>	<b>36(100)</b>	<b>1(3)</b>	<b>5(14)</b>	<b>30(83)</b>	<b>36(100)</b>
Co-curricular activities	Impact	11(69)	4(25)	1(6)	<b>16(100)</b>	18(86)	3(14)	0(0)	<b>21(100)</b>
	No impact	16(80)	3(15)	1(5)	<b>20(100)</b>	13(87)	1(7)	1(7)	<b>15(100)</b>
	<b>Total</b>	<b>27(75)</b>	<b>7(19)</b>	<b>3(8)</b>	<b>36(100)</b>	<b>31(86)</b>	<b>4(11)</b>	<b>1(3)</b>	<b>36(100)</b>
Teachers' schemes of work	Impact	9(56)	6(38)	1(6)	<b>16(100)</b>	10(47)	6(29)	5(24)	<b>21(100)</b>
	No impact	13(65)	6(30)	1(5)	<b>20(100)</b>	5(33)	7(47)	3(20)	<b>15(100)</b>
	<b>Total</b>	<b>22(61)</b>	<b>12(33)</b>	<b>2(6)</b>	<b>36(100)</b>	<b>15(42)</b>	<b>13(36)</b>	<b>8(22)</b>	<b>36(100)</b>

*Note:* Figures in parentheses represent percentages

As shown in Table 1, whereas the proportion of principals who rated integrating ICT in management of the school timetable as having a high effect were 75 percent followed by moderate effect at 18 percent and low effect at 6 percent, the proportion of deputy principals who rated integrating ICT in timetable management as having a high effect on school management were 81 percent, followed by moderate effect at 10 percent and low effect at 10 percent. Findings from interviews with selected principals revealed that software for timetable construction had enabled them to drastically reduce the time for making timetables thus enabling them to use the saved time in other management duties.

With respect to the management of student progress reports, while the proportion of principals who rated the integration of ICT in the management of this task as having a high effect was 87 percent followed by moderate effect at 13 percent, the proportion of deputy principals who rated the integration of ICT in the management of student progress reports as having a high effect was 91 percent followed by moderate effect at 5 percent and low effect at 5 percent. Through the open-ended questions, the principals and deputy principals indicated that integrating ICT in this task made monitoring of students' progress easier thus improving overall school management. This observation is supported by findings of a study by Makhanu (2010) who found that principals who used ICT in monitoring learners' progress closely associated it with good performance. Given that performance of students is a major area where schools are held accountable by parents and other stakeholders, many of the principals reported that they had made heavy investments in terms of training and ICT applications for management of students' progress.

The analysis also shows that while the proportion of principals who rated integration of ICT in the management of co-curricular activities as having a high effect were 6 percent followed by moderate effect at 25 percent and low effect at 69 percent, the proportion of deputy principals who rated the integration of ICT in this task as having a moderate effect were 14 percent followed by a low effect at 86 percent. The fact that a high proportion of principals and deputy principals rated integration of ICT in co-curricular activities as having a low effect on school management could be attributed to inadequate training on a range of some ICT applications for management. Indeed, data collected through interviews and open-ended questions revealed that the training that principals and deputy principals received could not enable them exploit the full potential of ICT in management. This view is supported by a study undertaken by Topracki (2006) who found that insufficient training of school staff pose a serious challenge to integration in some management activities. Similarly, Bauer and Kenton (2005) argued that the reason teachers did not integrate technology on a consistent basis was due to lack of appropriate software and skill levels.

With respect to integration of ICT in management of teachers' schemes of work, the proportion of principals who rated the integrating ICT in this task as having a high effect on school management were 6 percent, followed by moderate effect at 38 percent and low effect at 56 percent while the proportion of deputy principals who rated the integration of ICT in the management of teachers' scheme of work as having a high effect were 24 percent followed by moderate effect 29 percent and low effect at 47 percent. The higher proportion of deputy principals rating the integration of ICT in management of teachers' schemes of work as having a high effect relative to the principals could be attributed to the fact that most principals delegating the duty of curriculum implementation and supervision of teachers schemes of work to deputy principals (Mbugua, Miriti, Mungiria and Reche, 2012) hence they are most likely to use ICT applications more frequently for this task.

A Chi-Square test was done to determine the significance of association between integrating ICT in curriculum and instructional management of schools by principals and deputy principals and effect on management of secondary schools in Nairobi City County. The results are shown in Table 2

**Table 2: Chi-Square Test of effect of integrating ICT in curriculum and instructional management**

			Value	df	Asymp.Sig (2-sided)	Cramer's V
School timetable management	<b>P</b>		1.837	2	.399	.219
	<b>DP</b>		4.742	2	.093	.361
Students' progress reports	<b>P</b>		4.474	2	.107	.305
	<b>DP</b>		4.468	2	.107	.333
Co-curricular activities	<b>P</b>		.629	2	.730	.133
	<b>DP</b>		2.238	2	.327	.227
Teachers' scheme of work	<b>P</b>		.286	2	.867	.089
	<b>DP</b>		1.277	2	.528	.188
<b>Overall p-value</b>	<b>P</b>				<b>.513</b>	
	<b>DP</b>				<b>.118</b>	

The Chi-Square Test in Table 4.34 shows that there was not a significant effect between integrating ICT in the following tasks and the management of schools: Integrating ICT in school timetable management had a p-value .399,  $p > 0.05$  for principals and .093,  $p > 0.05$  for deputy principals; integrating ICT in management of students' progress reports had a p-value .107,  $p > 0.05$  for principals and .107,  $p > 0.05$  for deputy principals; integrating ICT in the management of co-curricular activities had a p-value .730,  $p > 0.05$  for principals and .327,  $p > 0.05$  for deputy principals and integration of ICT in the management of schemes of work had a p-value .867,  $p > 0.05$  for principals and .528,  $p > 0.05$  for deputy principals. Overall, there was not a significant effect between integrating ICT in the management of curriculum and instruction and the management of schools given that the overall p-value was .513,  $p > 0.05$  for principals and .118,  $p > 0.05$  for deputy principals.

The Table also shows that the strongest association of effect of integrating ICT on school management was the integrating of ICT in the management of the school timetable which had a Cramer's  $V = .361$  for deputy principals while that of principals had a Cramer's  $V = .219$ ; and the integration of ICT in the management of students' progress reports which had a Cramer's  $V = .305$  for deputy principals and Cramer's  $V = .305$  for principals. With respect to the school timetable, the higher scores for the deputy principals could be attributed to the fact that this task is normally delegated to them so they were more likely to use ICT more for this task than the principals while the higher scores by deputy principals with respect to student progress reports is similarly attributed to their higher frequency of use of ICT for the task hence higher impact scores. These observations are consistent with research done in Syria among teachers by Albirini (2006) which found that individuals with higher levels of competence and frequency of use of technology have more positive attitude towards its uses.

The least association of the effect of integrating ICT on school management was integrating ICT in the management of schemes of work which had a Cramer's  $V = .089$  for principals and Cramer's  $V = .188$  for

deputy principals respectively; and integrating ICT in management of co-curricular activities which had a Cramer's  $V=.133$  for principals. From findings by the open-ended questions it was evident that ICT was rarely used for these activities hence the least association of impact on management of schools.

### Ease of use of ICT applications in management

Principals, deputy principals and heads of department were requested to rate the ease of use of ICT applications in their management tasks. They were asked to rate the extent to which they agreed or disagreed with the following statements based on the Technology Acceptance Model, a model proposed by Davis (1989): Learning to operate ICT systems is easy; I find it easy to get ICT to do what I want it to do; I find it to be skillful at using ICT; I find ICT to be flexible to interact with; I find it easy to use ICT systems. They were then required to rate these statements based on a 5 point Likert scale.

The findings were disaggregated in terms of users in public secondary schools and those in private secondary schools. The mean scores of the five items on the ease of use of ICT applications in the management of schools were computed, the objective being to determine whether the mean scores would differ between principals, deputy principals and Heads of Department in public secondary schools and those in private schools. To achieve this objective, a Two Way ANOVA test was run on the scores. The ANOVA test was based on the following null hypothesis:

**H<sub>0</sub>: There is no significant difference between the ease of use of ICT applications by managers in public secondary schools and those in private secondary schools.**

The outcome of the ANOVA test is displayed in Table 3.

**Table 3: Managers' mean scores on ease of use of ICT applications by school category**

Type of school	Respondent	Mean	N	Std. Deviation
Public	Principal	3.94	23	.81
	Deputy Principal	3.68	23	.95
	Head of Department	3.72	107	.82
	<b>Total</b>	<b>3.75</b>	<b>153</b>	<b>.84</b>
Private	Principal	3.72	13	1.07
	Deputy Principal	4.17	13	.61
	Head of Department	3.80	48	.79
	<b>Total</b>	<b>3.86</b>	<b>74</b>	<b>.81</b>
Total	Principal	3.87	36	.90
	Deputy	3.86	36	.86
	Head of Department	3.74	155	.81
	<b>Total</b>	<b>3.78</b>	<b>227</b>	<b>.83</b>

*Note.* 1.00-1.55-Strongly Disagree; 1.56-2.55-Disagree; 2.56-3.55- Undecided  
3.56-4.55- Agree; 4.56-5.00- Strongly Agree

As shown in Table 4.29, the overall mean score attained by the managers in both public and private schools on ease of use of ICT in school was above 3.55 out of a possible 5.00, indicating that they rated

ICT applications as easy to use. This finding could be attributed to the training that the managers may have received from time to time in various workshops and seminars in addition to the policy interventions by the government to encourage the use of ICT in school management.

Though overall, the managers from public schools rated the use of ICT applications in management as easy to use ( $M= 3.75, SD=.85$ ), this was still lower than the rating given by managers from private schools ( $M=3.86, SD=. 81$ ). This finding could be attributable to the fact that users in private schools are endowed with more ICT infrastructure and better opportunities for training than their public school counterparts.

**Table 4: ANOVA summary of the managers' rating of ease of use of ICT applications in management by school category.**

**Table 4: ANOVA for ease of use of ICT applications of managers by school type**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
School Category*Manager	2.145	2	1.073	1.553	.214
Error	152.657	221	.691		
Total	3406.500	227			

The hypothesis was tested using ANOVA and at 0.05 level of significance, the overall mean scores for the respondents was 3.78. The results showed that the F-ratio was 1.55. The degrees of freedom was 2 and the P-value was 0.21. At 0.05 level of significance, the null hypothesis that the ease of use of ICT applications between managers in public schools would not significantly differ with those in private schools was accepted since the P-value was above 0.05.

The non-significant ANOVA test implies that the ease of use of ICT applications by managers is similar in both school categories. This can be attributed to the training that the managers had received. These results are similar to Ncunge, Sakwa and Mwangi (2012) whose study on ICT adoption in Thika found that principals both in public and private schools perceived the use of ICT applications to be complex but this was attributable to the low levels of IT skills on use of computer applications. It therefore follows that training in the use of ICT is a critical component of ICT integration in schools. Previous studies (Cox, Preston and Cox, 1999) identified a wide range of skills and competencies which teachers felt they needed in order to find ICT easy to use among them being training, availability of computers regular use to boost confidence and experience.

#### 4. Conclusion and Recommendations

From the study findings, the following conclusions were made:

1. There was not a significant effect between the integration of ICT in the management of curriculum and instruction and the management of schools in Nairobi City County.
2. The study has also established that there was no significant difference between ease of use of ICT applications for management by principals, deputy principals and heads of department in public schools and those in private schools.

Based on the findings of the study the following recommendations were suggested:

1. All teachers in schools should be enabled to have access to ICT facilities for full integration to succeed in all aspects of school processes including curriculum and instructional management.
2. Strategies that make ICT usage in daily tasks should be adopted. These strategies could include teachers submitting their daily preparation electronically once they have internet connectivity or conveying notices for staff meetings and other important notices via email.
3. To realize the full potential of ICT and proper use in school management, the Kenya Educational Management Institute as the government agency responsible for providing management training in the education sector should consider training principals, deputy principals and HODs through short targeted workshops beyond the basic computer literacy. According to Mulkeen (2003) ICT integration-focused courses have a stronger impact on overall usage of ICT than basic ICT courses.

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