

Success Factors for Fire Safety Projects in Public Secondary Schools in Kenya

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ABSTRACT

The ministry of education, Kenya, recognises fire disasters in schools as a serious challenge to learners' ability to record good performance in schools. As a result, numerous fire safety projects have been installed in secondary schools to mitigate the concerns. Despite the effort, many fire incidences have been reported in several secondary schools destroying properties worth millions and leading students to be given unplanned holidays. This paper aimed at establishing the influence of fire safety preparedness on success of fire safety projects in public secondary schools in Kenya. The study adopted descriptive research design targeting 11 fire safety projects in public secondary schools within Nairobi County. Semi-structured questionnaires were used and data analysed using descriptive statistics and inferential statistics. The study findings indicated that fire safety trainings were being carried out. However, the training offered was obsolete as they were theoretical. The results also indicated that the majority of the fire safety equipment are not monitored as there was no clear monitoring and evaluation framework. The study recommends that schools should have clear programmes which are intended to create awareness among the staff and student on fire safety. Training should be carried out on how to prevent and respond on fire safety emergencies to the staff, management and students especially on practical approaches to dealing with fire projects. The study also recommends that schools implementing the fire safety projects should have a clear monitoring and evaluation framework to continuously get the feedback on the progress of their projects and to ensure achievement of the intended results.

Keywords: Fire risks, project success, project evaluation & monitoring, training

INTRODUCTION

Project success is measured based on project management performance. A project is acknowledged successful if it is completed within budget frame and on schedule within a pre specified scope, and if it meets users' expectations, quality requisites, and technical specifications (Satankar & Jain, 2015). According to Dynes and Russell (2002), there is fast growth in urban places of all sizes from small markets to Mega-cities. The increased development interactions increase the risk of fire occurrences as well. Thus, all stakeholders especially users of the buildings need to be well equipped in terms of knowledge on how to prevent and react to fire outbreaks (Dynes & Russell, 2002).

The international community appreciates that fire safety poses a serious challenge in human development and thus the need to develop the way we design and implement projects to enhance safety and disaster risk reduction. Worldwide, notable failed fire safety projects have occurred either by negligence or incompetence. In Texas City Refinery explosion occurred due to negligence injuring over 100 and killing 15 people (NFPA, 2012). In September 2012, 289 people died in fire at the Ali Enterprises garment factory in Karachi, Pakistan which makes ready-to-wear clothing for Western export. A similar fire incident occurred in November 24, 2012 in Dhaka Tasreen Fashions fire killing at least 112 people. In April 17, 2013 an explosion occurred at the West Fertilizer Company storage and distribution (Dynes & Russell, 2002).

This is pointing to the fact that fire safety projects have not been successful in Europe, Asia and North America despite the mitigation measures in place.

In South Africa, the Safe Schools Project was launched in 2000 to create safe and disciplined learning environments. This project is a national initiative by the Education Department to promote safety at schools and involves surveillance of violence and injury at schools, develops discipline and behavior codes and provides learner training and after school safety activities (Rika, 2008). In Rwanda, the Ministry of Education developed a policy document that outlines the schools infrastructure standards expected to be met by all schools (Hirano, 2009).

Fires have contributed to the toll of manmade disasters in Kenyan Schools with varying losses of property and life. To mention a few cases of fire incidents, a fire blaze in 1998 killed more than 20 schoolgirls in a locked dormitory at Bombolulu Secondary School in Mombasa County. At Kyanguli Secondary School in Machakos County, fifty-eight learners were burned to death. In June 2001, 114 boys were left affected when a fire broke out at Nakuru Boys High School in Nakuru County destroying property worth Sh10 million including a dormitory, a dispensary and staff quarters, (Tonui, 2019).

Safety of students in school is a matter of concern to all governments in the world. All organizations and institutions of learning have safety measures put in place. Learning institutions are viewed as havens of peace for learners by many, but in the past few years there has been reported increase in the number of tragic incidences in public secondary schools in Kenya. The resultant trauma, injury loss of lives and property are attributed to failure by schools to strictly implement the safety projects. The successful implementation of fire safety projects will reduce or eliminate injuries and deaths in schools caused by fire accidents (Siringi, 2014).

In Kenya, an attempt has been made to make schools safe zones by the Ministry of Education by coming up with a school safety policy in 2018. The school safety policy includes: requirements that Head teachers should reside in school so that in case of emergency he/she is able to assist, other teachers where possible should also reside in school. According to Kukali (2019), lack of basics about fire safety issues or on how to react in event of fire disaster is to blame for the large number of casualties experienced.

Statement of the Problem

In Kenya, reports on lack of safety in learning institutions have been featuring prominently. This made the Government to prepare a safety and standards manual to create safer schools. Despite the Government's efforts, fire safety projects are still facing challenges resulting to loss of life and property through fire incidences. In Nairobi County, fire safety projects do not meet the requirements by the Ministry of Education school safety policy (GoK, 2016). There are numerous research studies done in Kenya on the safety in schools but focused different aspects other than specifically looking into the relationship between fire safety preparedness and implementation of fire safety projects in public secondary schools (Wainaina, 2022).

Objectives of the study

This paper is guided by the following objectives:

1. To determine the influence of training on the success of fire safety projects in public secondary schools in Nairobi County, Kenya.
2. To determine the influence of monitoring and evaluation on success of fire safety projects in public secondary schools in Nairobi County, Kenya.

LITERATURE REVIEW

This section discusses the empirical literature review, theoretical literature review and the conceptual framework.

Empirical Literature

Training and Project Success

In a study by Warui (2013) on impact of training on project management effectiveness among secondary schools' principals in Kirinyaga District, Kenya. Secondary schools principals are regarded as project managers, expected to plan, implement, manage, maintain and evaluate the entire education system: physical facilities, human resource, students, financial inputs and the curriculum (MOEST 2008). As such, there is need for adequate training of school heads and other stakeholders in safety preparedness and project management. The study sought to find the impact project management training of secondary school principals has on success of school projects. A survey among secondary principals established that training plays a great role in the management of projects. However, secondary schools are still facing project management challenges.

A study by Odhiambo (2005) on the influence of training on schools' projects success revealed that most principals had not received adequate training. The study was set to establish the influence of management training on the success of schools' projects. A survey on the secondary school principals, cited lack of adequate training, affected principals to a great extent in controlling projects. If this has been taken in to consideration, it means there are other factors contributing to unsuccessful projects as reflected by the unsuccessful fire safety project.

Macharia (2020) Study on Fire Safety Management in Government Buildings in Nairobi County. The study assessed fire safety management in government buildings. A survey on the government employees found out that 38 percent of the respondents had no basic training on fire safety. Less than 50 percent had participated in fire drills and 88 percent of the respondents claimed to know how to behave in case of fire outbreak. The study recommended that all the stakeholders to undergo fire safety training.

Wainaina (2022) study on fire safety management in government training institutions. A survey on various stakeholders found out that 52 percent of those involved had participated in fire drills. 92 percent confirmed availability of firefighting tools in the institutions while 84 percent confirmed that the firefighting equipment are well placed. Fire incidences continue to be experienced. Thus, the study sought to establish influence of fire safety preparedness on the success of fire safety projects in Nairobi County.

Monitoring and Evaluation and Project Success

Monitoring and evaluation are concerned with systematic measuring of variables and processes over time. Management and evaluation is an important instrument for the management of schools' projects and employs quantitative and qualitative measurement tools (Wambugu, 2021). This contributes to improving the implementation of projects by enabling continuous feedback of their performance allowing for identification of problems as they arise. Monitoring and evaluation of project improves overall efficiency of project planning, management and implementation (Jaylor & Taylor, 2003). Management of fire safety projects is a continuous process where all the phases of the plan are reviewed and revised constantly. Good plans do not get finished but are updated based on research, new experience and changing vulnerabilities (Kukali, 2019). Monitoring and evaluation of school safety projects should be a continuous exercise. It is also understood that monitoring and evaluation of projects is fundamental if the project objectives and success is to be achieved. Monitoring and evaluation are essential components of the school safety programme.

Omolo and Simatwa (2010) study on the assessment of the implementation of safety policies in public secondary schools in Kisumu East and West Districts, Kenya. The study assessed whether implementation of safety policies was taking place in secondary schools. A survey was carried out and revealed that head teachers decried inadequate funds, lack of skills and poor coordination from the MOE regarding safety policy issuance. The study also found out that QASOs cited lack of cooperation from head teachers and negative perceptions towards QASOs' assessment and Monitoring and Evaluation reports. The study did not

take in to consideration the effects of lack of proper implementation to the projects undertaken in secondary schools.

Nderitu (2009) study on monitoring and evaluation and successful implementation of safety projects in secondary schools in Kiambu secondary schools. The study sought to establish the influence of monitoring and evaluation on the success of safety projects in secondary schools. Sampling technique was used to collect data. The study found that, all the principal respondents were aware of MOE Safety Standards, but did not implement the Safety Standards on the safety projects in their schools. Secondary schools are still experiencing fire outbreaks. The study therefore established the influence of fire safety preparedness on success fire safety projects in public secondary schools in Nairobi County, Kenya.

Theoretical Review

Program theory by Bickman (1987) deals with the assumptions that guide the way specific programs, treatments, or interventions are implemented and expected to bring about change. Program theory is concerned with how to practice evaluation; program theory focuses on the nature of the program, treatment, intervention and policy being evaluated. In evaluation practice, program theory is defined as the construction of a plausible and sensible model of how a program is supposed to work (Bickman, 1987); a set of propositions regarding what goes on in the black box during the transformation of input to output, that is, how a bad situation is transformed into a better one through treatment inputs. The process through which program components are presumed to affect outcomes and the conditions under which these processes are believed to operate.

Bickman (1987) describes program theory as consisting of the organizational plan which deals with how to garner, configure, and how to organize program activities so that the intended service system is developed and maintained. The theory also deals with the service utilization plan which looks at how the intended target population receives the intended amount of the intended intervention through interaction with the programs service delivery system.

Conceptual framework

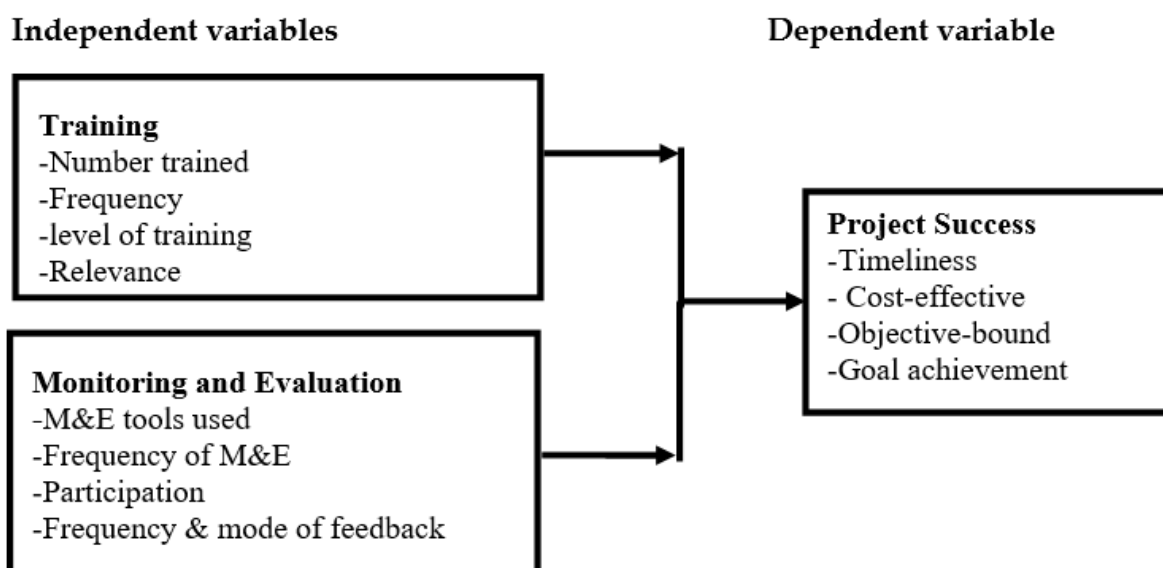


Figure 1: Conceptual framework

RESEARCH METHODOLOGY

The researcher employed a descriptive survey research design. The descriptive research design was preferred because it does not try to manipulate or control the study variables hence increasing the reliability of

obtained results (Kothari, 2004). The study targeted 11 fire safety projects in 11 public secondary schools in Starehe Sub- County, Nairobi County. The study employed census sampling design to enable the researcher to reduce selection bias that normally arises during sampling.

The pre-test of the questionnaires guided the researcher in modifying and improving the research questionnaires. Comments made by the respondents during pilot testing were used to adjust and improve the instruments. The Cronbach alpha coefficient was used to determine reliability of the instrument in this study because it's a better indicator of dimensionality. Sekeran (2009) indicates a desirable reliability coefficient would fall in the range of 0.80 to 0.90.

Questionnaires were administered to the respondents through a drop and pick method at the respondents' respective schools. The researcher left the respondents to fill the questionnaires at their own time and collected the complete forms after one week. For the quantitative data, analysis was done through descriptive statistics and inferential statistics. The statistical significance of the results was then examined at a = 0.05 statistical confidence level.

Ethical measures were employed in order for the research to be effective and to receive satisfactorily honest responses. This include seeking permission from respondents through the use of introductory letter. All respondents were assured that data would be collected and stored anonymously and confidentially.

RESEARCH FINDINGS AND DISCUSSIONS

Reliability test

Table 1: Reliability test

Variable	Cronbach's Alpha	Comments
Training	.707	Reliable
Monitoring & Evaluation	.711	Reliable

All the Cronbach's Alpha for the study variables shows that the study was within the acceptable range of reliability. The two variables obtained reliability of 0.7 which is deemed reliable as recommended by Sekeran (2009).

Descriptive statistics

Training and success of fire safety projects

Various statements in relation to training were given to the respondents to give their opinion using a likert scale where 1 = Strongly Disagree; 2=Disagree; 3= Not sure; 4= Agree; 5= Strongly Agree

Table 2: Parameters of Training

Statement	Mean	S.D
Teachers are trained on how to implement fire safety project in our school	2.83	0.859
I am satisfied with the training I get on fire safety project in this school	2.73	0.818
Training policy in the school give guidelines on fire safety project training	2.79	0.898
The trainings given on fire safety were relevant to my role in implementing fire safety related projects	3.00	0.923
Trainings on fire safety projects are conducted frequently in this school	2.96	0.713
Average	2.96	0.713

The results indicate that average mean is 2.96 and it depicts that the majority of respondents generally Agreed with the study believes. However, there was variations in the respondents’ opinion as evidenced by high value of the standard deviation (0.713). On the specific statements, the responses were skewed towards agree as evidenced by high values of means obtained, although the opinions varied as evidenced by high values of standard deviations.

Monitoring and Evaluation and success of fire safety projects

Various statements in relation to monitoring and evaluation were given to the respondents to give their opinion using a likert scale where 1 = Strongly Disagreed; 2=Disagree; 3= Not sure; 4= Agree; 5= Strongly Agree.

Table 3: Monitoring and Evaluation

Statement	Mean	S.D
Ministry of Education consistently monitors and evaluates fire safety project in our school	2.46	0.988
Management in our school regularly evaluate the fire safety project.	2.98	0.863
The monitoring and evaluation on fire safety project in our school has an influence on fire safety project success	2.52	0.652
Project stakeholders are involved to ensure fire safety project are successful in this school	2.85	0.825
Average	2.702	0.832

An average mean of 2.702 implies that most of the respondents agreed with the study beliefs since the mean obtained is above 2.5. On the other hand, the results were highly varied as evidenced by high value of standard deviation of 0.832. The Wambugu (2021) asserts that Monitoring and evaluation is an important instrument for the management of schools’ projects as it provide relevant data to inform on the areas of improvement towards the project success.

Success of Fire Safety Projects

The study measures the parameters of the success of fire safety projects and the results are displayed in the table 4.

Table 4 Parameters of Fire Safety Projects

Statement	Mean	S.D
The completion of fire safety project is always within the specified time frame in our school	3.29	1.091
Fire safety project in our school are always within the set budget	3.06	1.262
All the stakeholders are satisfied with Fire safety projects in our school	3.10	0.722
Fire safety project serve the intended purpose in our school (fire incidences reduction)	3.23	1.207
Average	3.17	1.071

The means of 3.17 shows that majority of the respondents agreed with the study beliefs since the aggregated means on different statements given is high. This indicate that the respondents viewed the statements as important in explaining the monitoring and evaluation. The high standard deviation on 1.071 implies that the responses were highly diverse.

Regression model

Regression diagnostics

Normality test

Normality test enables the researcher to establish whether data is normally distributed. Kolmogorov-Smirnov and Shapiro-Wilk coefficients were used to determine the significance of normal distribution in this data.

Table 5: Tests of Normality

		Kolmogorov-Smirnov ^b			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Fire safety	7.00	.273	12	.000	.736	12	.002
	14.00	.414	9	.000	.617	9	.000

The findings show that all the data collected for both independent and dependent variables had significant levels of normal distribution ($p < 0.05$). Shapiro-wilk test show that the study had correct data that met one of the most important regression assumptions.

Multicollinearity Test

The study employed Variance Inflation Factor (VIF) procedure to examine whether there was any multicollinearity among the independent variables. According to Kothari (2004), multicollinearity is said to exist when VIF is either less than 1 or greater than 10. Multicollinearity does not exist when VIF is between 1 and 10.

Table 6: Multicollinearity Test

Variables	Collinearity Statistics	
	Tolerance	VIF
Training	.959	1.043
Monitoring and Evaluation	.771	1.297

From the results, it can be shown that none of the variables were collinear. Since all the VIFs were between 1 and 10, therefore independent variables were unique and did not pose any threat of data redundancy.

Regression model

The model includes model summary, ANOVA and coefficients table all of which explain the implication of the relationship. The study employed 95 percent confidence interval to test the hypothesis that “the independent variables did not have significant influence on the success of fire safety projects”. This implies 0.05 was the threshold for statistical significance.

Model Adequacy

Table 7: Model Summary^b

Model	R	R - Square	Adjusted R-Square	Std. Error of the Estimate
1	.763 ^a	.632	.510	1.80998

From the model summary, it can be depicted that Monitoring and Evaluation, and training predicts 0.51 of the success of fire safety projects. It can further be explained that 0.49 of the success of fire safety projects was predicted by other factors that were beyond the scope of this study.

Table 8: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	21.443	4	5.361	1.636	.003 ^b
1 Residual	140.870	43	3.276		
Total	162.313	47			

The results shows that monitoring and evaluation and training significantly predicts the success of the fire safety projects

Regression results

Table 9: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	8.778	5.911		1.485	.145
1 Training	.092	.212	.063	.435	.046
1 Monitoring and Evaluation	.208	.221	.153	.943	.000

a. Dependent Variable: Success of fire safety projects

$$Y = 8.778 + 0.092X_1 + 0.208X_2 + e$$

Training of teachers, students and the school management was found to be a significant predictor of the success of fire safety projects. A unit increase in training would increase the probability of success of fire safety projects by 0.09. A study by Warui (2013) asserts that schools principals are looked at as project managers, expected to plan, implement, manage, maintain and evaluate the entire education system and as such training was found to significantly affect the way they implemented various projects bestowed to them.

Monitoring and evaluation was a significant and positive predictor of success of fire safety projects. The findings show that lack and poor compliance with the provisions of the project was the main reasons for non-attainment of project goals or complete failure. Respondents blamed poor compliance to inadequate and improper monitoring and evaluation. In fact, the respondents admitted that minimal supervision and realignment leads to much improvement in the success of the projects. Even lack of proper training was also blamed on poor monitoring and evaluation aspects. A unit improvement in proper monitoring and evaluation would lead to 0.208 improvements in success of fire safety projects. Furthermore, Management of fire safety projects is a continuous process where all the phases of the plan are reviewed and revised constantly. Good plans do not get finished but are updated based on research, new experience and changing vulnerabilities (Kennedy, 2004)

DISCUSSION OF THE FINDINGS

The findings of the study shows that training was actually being carried out; almost half of the respondents admitted that training was taking place in their institutions. However, a considerable proportion of the respondents disputed the kind of training taking place by terming it obsolete and lacked purpose. For instance, some respondents were angered by the manner in which training process is carried arguing that it emphasized theoretical aspects as opposed to practical bits. Moreover, the findings from the inferential analysis show that coefficient of training was a significant and positive predictor of success of fire safety projects. Respondents associated training with increased awareness, experience and confidence in execution of duties. It can therefore be argued that training of staff, students and all stakeholders in a school setup is crucial since it is the first line of ensuring successful projects.

Monitoring and evaluation happen to be one of the important aspects of project implementation and hence, its success. This study examined the opinions of the respondents in regard to availability of monitoring and evaluation aspects in execution of fire safety projects. On average, majority of the respondents agreed that monitoring and evaluation was taking place. However, respondents argued that the process lacked seriousness from the management. In fact, respondents called it a programme in papers since it rarely happened as it was documented with little implementation. Moreover, the regression findings show that monitoring and evaluation was the most significant predictor of success of fire safety projects. The findings show that majority of the respondents greatly associated monitoring and evaluation with the whole success of projects. The study further learned that if monitoring and evaluation was improved significantly, the challenges that arise could be detected even before they occur, training could be conducted from time to time and management could be more serious.

CONCLUSION

On the influence of training on the success of fire safety projects, this study concludes that training is an important aspect of project implementation that cannot be substituted with anything. In fact, respondents admitted that any project that is implemented without taking in consideration of adequate and proper training is bound to fail. Fire safety projects need trainees in methods of firefighting, signs of fire danger, various equipment of firefighting and the ways in which they can deal with casualties of fire.

The study concludes that monitoring and evaluation is an important aspect that was found to be the most significant of the factors of project success studied in this study. Projects that are not well monitored and evaluated from time to time are likely to fail. The study therefore finds monitoring and evaluation as an inevitable practice that must be considered if the planners of fire safety projects are to achieve their objectives.

RECOMMENDATIONS

Based on the findings and the conclusions made on the results obtained, this paper recommends that:

1. Schools should have clear programmes which are intended to create awareness among the staff and student on fire safety.
2. Training should be carried out on how to prevent and respond on fire safety emergencies to the staff, management and students especially on practical approaches to dealing with fire projects.
3. The study also recommends that schools implementing the fire safety projects should have a clear monitoring and evaluation framework to continuously get the feedback on the progress of their projects and to ensure achievement of the intended results.

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