Effects Of On Job Information Technology Security Training On Network Security Management

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ABSTRACT

This study has been conducted to determine the effects of (on job) I.T security training on the management of computer network's security within Kenyan public Universities. Computer networks in Kenyan institutions have in the recent past experienced a number of security compromises, leading into huge financial loses and breaches of system integrity. Hacking communication channels is a daily occurrence in Kenya. Findings by Deloitte Kenya Ltd indicated that East African business computer networks are still vulnerable to attack, fraud and confidentiality breaches. To reduce the problem of hacking computer networks, institutions conduct on job- Information Technology security training for I.T professionals. While some people perceive the training to bring forth positive returns, others feel it may expose the internal I.T systems to even more risks. Despite the uncertainty, institutional managers continually invest heavily on IT security training. This has led to a focused attention in on job IT security Training and its effects on computer network security within the Kenyan public Universities, to analyze how its management is affected by this training. The major outcome of the study has been a positive correlation between the training and all the elements of computer network security management, thus determininhg the relationship under study. The findings could be significant to organizational policy makers, security trainers and IT heads in managing University network security more effectively.

INTRODUCTION

ICT security training has been perceived as an approach to equip I.T professionals with survival concepts to better protect organizational IT infrastructure. There has, however, been a discourse on the possible effects that imparting such skills to IT techies could have on information system

security. While some perceive the training to bring forth positive returns, others feel it may expose the internal IT systems to even more risks. Acry and Hovay (2008) found in their study, that between 50% - 75% of system security incidences originate from within an organization.

The problem is that while the effects of on-job IT security training on institutional network security management remains unclear, institutional managers continually invest heavily on IT security training. In spite of this apparent uncertainty, there is hardly any research work directed to computer network security, to analyze how it's management is affected by on-job IT security training. It is therefore crucial to determine effects of on-job IT security training on institutional network security management. A closer review of existing related studies indicate that they hardly focused on how on-job IT security training impacts on institutional network security management, hence the need for this study.

RESULTS AND DISCUSSIONS

Correlation analyses is done by considering correlation coefficient, usually denoted by r. r is a measure of the strength cum direction of a linear relationship between two variables. This research employed correlation analyses to establish the relationship (if any), between on-job IT security training and the listed aspects of network security, to explore how the training affects management of the elements of computer network security. Correlation coefficient takes on values ranging from (+1) to (-1). The sign before the numerical value shows the direction of relationship, while the numerical value indicates the strength of relationship between the two variables. The strength is interpreted as:

Values between 0 and 0.3 indicate a weak relationship in a linear rule. Values between 0.3 and 0.7 indicate a moderate linear relationship via a firm linear rule. Values between 0.7 and 1.0 indicate a strong linear relationship via a firm linear rule.

Correlation coefficient shows a relationship between two variables at certain confidence levels. The confidence level is shown using numerical values at the bottom of each table. The correlation coefficient value comes with p-value, which should be less than the value of the confidence levels for the relationship under study to be considered significant. All the p- values reported in this research were more than their respective confidence levels. This qualified all the reported relationships as significant.

Relationship between On–job IT Security Training and Network access control & monitoring

Table 1Correlation coefficient Values for Training VS Network access control

		Training	access control from external networks
Training	Pearson Correlation	1	.704[**]
	Sig. (2-tailed)		.000
	N	149	149
access control from external networks	Pearson Correlation	.704[**]	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 Correlation coefficient Values for Training VS Network access control

		Training	access control through internal networks
Training	Pearson Correlation	1	.740[**]
	Sig. (2-tailed)		.000
	N	149	149
access control through internal networks	Pearson Correlation	.740[**]	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in tables 10 and 11 above, the correlation coefficient values of +0.704 and +0.740 indicate a strong relationship between on-job IT security training and control of network access

from external (untrusted) and internal networks respectively. This implies that with more training, techies acquire more skills and adopt technologies for controlling access to, and within their networks.

Table 3 Correlation coefficient Values for Training VS use of IT systems for monitoring Network threats / risks

		Training	use of IT systems for risk monitoring
Training	Pearson Correlation	1	.272**
	Sig. (2-tailed)		.001
	N	149	149
use of IT systems for risk monitoring	Pearson Correlation	.272**	1
	Sig. (2-tailed)	.001	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

A correlation coefficient value of (+0.272) in table 24 above points to a weak positive linear relationship between on-job IT security training and deployment of IT systems to monitor risks / threats within a network. This means that so much increase in such training units results in only little increase in the deployment of such threat monitoring units within Kenyan public Universities' computer networks.

Table 4 Correlation coefficient Values for Training VS Levels of understanding network management tools

		Training	Levels of understanding network management tools
Training	Pearson Correlation	1	.713**
	Sig. (2-tailed)		.000
	N	149	149
Levels of understanding network management tools	Pearson Correlation	.713**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

From table 13 above, on job IT security training is strongly related to the levels of understanding network management tools among the University IT professionals, as the correlation coefficient value of (+0.713) is reported. This means the more the on-job IT security is administered, the more the techies get to understand these technologies for network security management.

The average r value for Network access control and monitoring is (0.713 + 0.272 + 0.740. + 0.704) / 4 = +0.6073. The correlation coefficient value of +0.607 seen between on-job security training and Network access control / monitoring as an element of network security indicates a positive moderate linear relationship between the two variables.

Relationship between On–job IT Security Training and Network data security (CIA)

Table 5 Correlation coefficient Values for Training VS Levels of Network- data encryption

		Training	Levels of data encryption
Training	Pearson Correlation	1	.741**
	Sig. (2-tailed)		.000
	N	149	149
Levels of data encryption	Pearson Correlation	.741**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

Table-14 above shows a correlation coefficient value of (+ 0.741), indicating a strong positive linear relationship between on-job IT security Training and levels of data encryption within the University networks.

Table 6 Correlation coefficient Values for Training VS Levels of sneaker-net control

		Training	levels of sneaker-net control
Training	Pearson Correlation	1	.270**
	Sig. (2-tailed)		.001
	N	149	149
levels of sneaker-net control	Pearson Correlation	.270**	1
	Sig. (2-tailed)	.001	
	N	149	150

**. Correlation is significant at the 0.01 level (2-tailed).

The r value of (+0.270) and (+0.282) in table 15 above and d below show weak positive relationships between the training and levels of sneaker – net control, and between training and successful restoration within 24 hours.

Table 7 Correlation coefficient Values for Training VS Levels of successful data back-ups

		Training	successful data back-ups
Training	Pearson Correlation	1	.764**
	Sig. (2-tailed)		.000
	N	149	149
successful data back-ups	Pearson Correlation	.764**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

There is a strong positive relationship between the training and successful data back-up, (table 28above), with an r value of (+0.764).

Table 8 Correlation coefficient Values for Training VS Levels successful restore within 24 hours

		Training	successful restore within 24 hours
Training	Pearson Correlation	1	.282**
	Sig. (2-tailed)		.000
	N	149	149
successful restore within 24 hours	Pearson Correlation	.282**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

There is a strong positive relationship between the training and successful restoration within 17 hours, (table 28above), as shown in table 29 above.

Table 9 Correlation coefficient Values for Training VS Levels of Unsuccessful restoration within 24 hours.

		Training	Unsuccessful restoration within 24 hours
Training	Pearson Correlation	1	-.813**
	Sig. (2-tailed)		.000
	N	149	149
Unsuccessful restore within 24 hours	Pearson Correlation	-.813**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

A more interesting value was noted in table 18 above, where the correlation coefficient value is (-0.813). This means a strong negative relationship between on-job IT security training and Unsuccessful data restoration within 24 hours. This implies that more training conducted results into more successful data restorations.

Table 10 Correlation coefficient Values for Training VS Levels of Unsuccessful archive retrievals within 1 hour

		Training	**Unsuccessful archive retrievals within 1 hour**
Training	Pearson Correlation	1	-.642**
	Sig. (2-tailed)		.000
	N	149	149
Unsuccessful archive retrievals within 1 hour	Pearson Correlation	-.642**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

A relationship similar to table 18is seen in table 19 above, which indicates a correlation coefficient value of (-0.642) between the training and unsuccessful archive retrievals within one hour. This means that as the Universities increase on-job IT security Training, the unsuccessful cases of archive retrieval reduces.

Table 11 Correlation coefficient Values for Training VS Regular centralized server back-ups

		Training	Availability of critical servers and applications
Training	Pearson Correlation	1	.428**
	Sig. (2-tailed)		.000
	N	149	149
Availability of critical servers and applications	Pearson Correlation	.428**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

Table 12 Correlation coefficient Values for Training VS Availability of critical servers and

		Training	Availability of critical servers and applications
Training	Pearson Correlation	1	.428**
	Sig. (2-tailed)		.000
	N	149	149
Availability of critical servers and applications	Pearson Correlation	.428**	1
	Sig. (2-tailed)	.000	
	N	149	149

**. Correlation is significant at the 0.01 level (2-tailed).

Table 13 Correlation coefficient Values for Training VS successful archive retrievals within 1 hour

		Training	successful archive retrievals within 1 hour
Training	Pearson Correlation	1	.385**
	Sig. (2-tailed)		.000
	N	149	149
successful archive retrievals within 1 hour	Pearson Correlation	.385**	1
	Sig. (2-tailed)	.000	
	N	149	149

Correlation is significant at the 0.01 level (2-tailed).

Tables above (21 -22) reveal a moderately positive relationship between on-job IT security training and; Regular centralized server back-ups, Availability of critical servers and applications, and successful archive retrievals within 1 hour.

The average r value for Network data security is obtained by adopting absolute values on-job IT security and each factor of network data security: |(0.741+ 0.270+0.764 + 0.282+ 0.813+ 0.642 + 0.437 + 0.428 + 0.385)| / 9 = +0.529.

The correlation coefficient value of +0.529, as seen between on-job IT security training and Network data security - as an element of network security, indicates a positive moderate linear relationship between the two variables.

CONCLUSIONS

The study found that on job IT security training improves network security management within Kenyan public Universities. It was also concluded that Kenyan public Universities which do training on IT security have greatly improved their network security management. As such, network data security, network access control and monitoring levels improve so much when an institution conducts on job IT security training for the IT professionals

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