

EMPLOYEES PERCEPTION OF THE IMPACT OF e-LEARNING TOOLS USE ON THE EXTENT OF THE USE OF ACQUIRED KNOWLEDGE IN ORGANIZATIONAL PROBLEM-SOLVING

by

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UPH/METI/CETM/MSCICT/s2010 – OG 003

A RESEARCH PROJECT

*Submitted in Partial Fulfilment of the Requirement for the Award of a Master of Science (MSc) Degree in
Information and Communication Technology Management (ICT Mgt).*

Jointly Awarded by the University of Port Harcourt, Nigeria and the Graduate School of Technology
Management, University of Pretoria, South Africa.

Centre for Engineering and Technology Management (CETM)

Institute of Engineering, Technology and Innovation Management (METI)

University of Port Harcourt

APRIL 2013

Abstract

Research Problem – Learning interaction and knowledge sharing primordially embody human choice and freedom. Learning activities and processes and, in particular tacit knowledge interaction, are influenced by individual and collective thinking styles, mental dispositions, and cognitive preferences. This provokes the question as to what is the impact of deploying e-learning tools on how employees think, learn and work in organizations.

Purpose – To know the impact of deploying e-learning tools on how employees think, learn and work in organizations. This study is also to establish the e-learning tool has highest employees' perception for learning and for solving organizational problems, and to identify factors that influence e-learning in a work environment.

Research Methodology/Strategy – This research uses Testing for Significance of Correlation and Correlation Coefficient to know employees' perceptions of the impact of e-learning tools use on the extent of the use of acquired knowledge in organizational problem-solving in five production districts in SPDC West. I carried out survey by administering questionnaires via email in these districts to also identify factors that influence e-learning in work environment.

Research Limitations - This study is only limited and applicable to SPDC West so as to get high response rate. It did not cover the whole Shell companies in Nigeria as there is no formulated hypothesis or model to support or generalize the result. It is basically applicable to SPDC West. The research would have been carried out in the whole SPDC but due to low response that one normally encountered from strangers and also due to time constraint to follow up when most of the questionnaires are not being responded to.

Findings – After correlation coefficient of employees' perceptions was calculated for each of the e-learning tools, it is ascertained that CD/DVD ROM is the only one that has very strong positive correlation. Therefore, CD/DVD ROM has highest employees' perceptions, and "rapid technological change" is the most chosen factor that influence e-learning in work environment.

Originality/Novelty – A survey to know employees perception of the impact of e-Learning tools use on the extent of the use of acquired knowledge in organizational problem-solving.

Paper type – Research.

Keywords – e-Learning, Change Management, Learning in Organizations.

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List of Acronyms

1.	SPDC – Shell Petroleum Development Company
2.	CD – Compact Disc
3.	DVD – Digital Video Disc
4.	ROM – Read Only Memory
5.	WBL – Web Based Learning
6.	IBT – Internet Based Learning
7.	ADL - Advanced Distributed Learning
8.	WBI – Web Based Instruction
9.	OL – Online Learning
10.	OFL – Open/Flexible Learning
11.	SaaS – Software as a Service
12.	3D – Three dimensional

Acknowledgement

I would like to thank my wife, Kemi for her support and understanding during this masters' programme.

Many thanks to Mr. Oghale Elebe, my formal work supervisor, who first advised me to put in for an online Masters programme in ICT management. He also doubled as my study tutor in this research. I will not forget to mention the assistance granted by Engr. Abatam Nwosu, our operations superintendent who always permits me to be out-of-office when I am at the workplace to attend classes and exams.

Also, my praise goes to my course-mates and classmates in METI for their unrelenting effort in giving support.

Special thanks to my research supervisor, Prof. Amadi-Echendu who always render advice and comments anytime I am not doing the right thing.

Chapter 1

1.1 Introduction

This research is worth studying based on the fact that the application and penetration of e-learning in Nigeria, a developing economy is very low, and there is need to move with the pace of technology advancement and to commit more time spent to online educational networking than social networking, e-learning has to be incorporated as part of learning in work environment to frequently update the knowledge base of employees. So before companies and educational institutions can fully achieve the potential found in e-learning, there is a need to carry out a study like this to know the employees' perceptions of the impact of e-learning tools use on the extent of the use of acquired knowledge in organizational problem-solving. Therefore, to be able to know employees' perceptions with high rate of response from respondents, I will carry out my research in SPDC West.

Due to SPDC highly use of updated e-Learning and collaborative tools in the country, SPDC West is chosen for my research so as to be able to answer my research question and objectives properly, to be able to get high response rate and also to serve as recommendation for future research in Nigeria's private and public sectors on the use of e-learning tools.

And because of SPDC highly technical nature, knowledge base of the staff needs to be updated frequently to be at par with technical equipment and information systems. In the process of updating their knowledge in different professional cadre, coupled with demanding time of producing and treating crude oil for export, e-Learning is found to be more appropriate.

SPDC West spread across swamp and land areas in Delta and Bayelsa states. It comprises of field location districts (Swamp 1, Swamp 2 and Land 1& 2), Forcados Oil Terminal, and Office areas (Main office, Edjeba and Ogonu).

The main purpose of SPDC West is to produce, treat and export crude oil via Forcados Terminal. During these routing and non-routing jobs, staff in SPDC West is so engaged due to demanding time of producing crude oil which is a non-stop process.

Below are the research question and objectives of this study.

1.2 Problem Statement

Learning interaction and knowledge sharing primordially embody human choice and freedom. Learning activities and processes and, in particular tacit knowledge interaction, are influenced by individual and collective thinking styles, mental dispositions, and cognitive preferences (Amadi-Echendu, J (Prof) – 2011).

This provokes the question as to what the impact of is deploying e-Learning tools on how employees think, learn and work in an organization.

1.3 Research Question

Research question: What are employees' perceptions of the impact of e-learning tools use on the extent of the use of acquired knowledge in organizational problem-solving in SPDC West?

This is break-down into the following sub-questions:

- (a) What e-learning tool has the highest employees' perception of the impact of e-learning use?
- (b) What e-learning tool has the highest employees' perception of the use of acquired knowledge in organization problem-solving?
- (c) What are employees' perceptions of the impact of different e-learning tools on the extent of the use of acquired knowledge in organizational problem-solving?
- (d) What is the level of relationship between employees' perceptions of the impact of e-learning tools use and how employees solve organizational problem?

1.3 Research Objectives

Research objectives are:

1. To establish the e-learning tool that its employees' perception is the highest for the impact of e-learning use.
2. To establish the e-learning tool that its employees' perception is the highest for the use of acquired knowledge in organizational problem-solving.
3. To highlight employees' perceptions of the impact of different e-learning tools on the extent of the use of acquired knowledge in organizational problem-solving.
4. To know the level of relationship between employees' perception of the impact of each e-learning tools use and how employees solve organizational problems.
5. To identify factors that
Influence e-learning.

1.4 Route Map

Chapter two illustrates research literatures which are relevant to this research. The presentation is in line with research in highly technical learning, video conferencing, synchronous and asynchronous learning systems.

Chapter three highlights the research strategy that will be used ranging from correlation coefficient to testing for significance of correlation coefficient in variation between impact of each e-learning tool on employees and the number of employees who has used the knowledge acquired through each e-learning tool to solve organizational problems.

Chapter four is the presentation of research result.

Chapter five discusses and interprets the result in chapter four.

Chapter 2

2.1 Literature review

This literature review is carried out to tap from the knowledge of relevant literatures that have been published which are relevant to this question, and also to contribute to this knowledge base.

In the course of this review, 31 relevant articles, 3 books and 12 journals were reviewed. Many literatures to broaden my knowledge about e-Learning were also reviewed.

The analysis of the selected relevant literature will be based on concept like the use of interactive synchronous e-learning tool (e.g. real-time video conferencing), highly technical training where asynchronous e-learning tool (recorded and not interactive training) may be needed, e-medicine or simulation can be used in replacement of training like teaching skills with a psychomotor component such as throwing a ball or performing surgery. All these criteria will be used to analyze and review the literature.

The sequence or organization of this review will base on concept earlier mentioned. This will be used to discover relationships between sources and identified critical gaps.

The scope of the review will basically be in the neighborhood of work organizations so as to know employees' perceptions of the impact of e-learning on how employees learn and work. Also, the definition of e-learning will be viewed as the delivery of course content via electronic media, such as internet, intranets, extranets, satellite broadcast, and audio/video tape, interactive TV, and CD/DVD ROM (Urban and Weggen 2000).

E-learning will not be viewed only as synchronous with web-based learning (WBL), internet-based training (IBT), advanced distributed learning (ADL), web-based instruction (WBI), Online learning (OL) and open/flexible learning (OFL) (Khan, 2001).

Also, training in educational institution will be out of the scope because the use of e-learning tools is not as effective as in work environment in Nigeria. It is also due to low penetration of effective and robust network that can stream video conferencing, audio conferencing, etc.

The use of network connected to fibre option is only feasible in Nigeria in work organization due to poor government policies or lack of implementation of good policies.

Urban and Weggen, 2000 viewed e-learning as the delivery of course content via electronic media, such as internet, intranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM. This is what I find as the real definition of e-learning because it comprises of internet, intranets, extranets which is also the view of Khan, 2001 (WBL, IBT, ADL, WBI, OL, OFL).

Synchronous e-learning (which is interactive in a real-time) is as a result of video/audio conferencing where the learner and the instructor interact and communicate in a real-time. During the course of training, slides presentation, hand –on practical is possible by the company's intranet or through a company's extranet for their third-party partners or even through internet. Internet contents can be obtained through cloud-computing (which is software-as –a –service, SaaS over the internet) or by the company's intranet.

A synchronous e-learning comprises of recorded training content which can be accessed online or through CD/DVD-ROM or even through audio conferencing in the form of slide presentation, etc.

Video conferencing as an e-learning tool plays a significant role in enhancing effective and convenient knowledge management. It is a visual real-time interactive collaborative tool where learner and instructor see each other, communicate to each other in a real-time.

Following are some of the research studies that are relevant to this study and the gaps that were noted during this literature review.

To analyze workers' perceptions and attitudes, Josep-Maria Batalla-Busquets and Carmen Pacheco-Bernal (2013), conducted an online survey of some employees of the leading European savings bank, CaixaBank, on perceptions, training habits, motivations, and disincentives of undertaking online instruction. The results reveal that workers perceive e-learning as a more flexible and up-to-date training methodology.

Such results state that while the benefits of distance methodology can be clearly identified from the company's point of view (i.e., as a flexible and efficient methodology to develop the employees' skills and knowledge), from the employees' standpoint, the advantage of virtual training are not so clear and depends to a great extent of their attitude towards the use of virtuality.

On preference for different e-learning tools, Christine Redecker et al. (2009) stated that multimedia application, visual and audio tools, immersive environments and serious games, and mobile learning devices address different sensory channels, supply more engaging learning opportunities and support individualized learning opportunities by allowing learner preferences to be accounted for.

A study by M. Gabriel (2004) was set out specifically to examine the range of perceptions, attitude, and responses of learners to an e-learning mode of delivery for Workplace Hazardous Materials Information System (WHMIS) training in a community health care organization.

He stated that e-learning is proved to be effective from the perspective of the learners. The program provided a three-dimensional presentation with actual photographs and video clips. The interactive components enhanced the understanding of the WHMIS concepts of an individualized pace for learner.

According to Welsh E. et al. (2003), "Other possible contingencies are that particular learners and particular content may be more suited to a particular medium or technology. Unfortunately, research is still needed to determine when any one particular technology is more appropriate than others". This is the literature that prompt setting of my questionnaire in which respondents will be asked to state whether they acquire knowledge from the use of e-learning tools like internet and intranet (interactive), video conferencing, audio conferencing and CD/DVD ROM.

Earlier to this, Judith B. Strother (2002) stated, "while few people debate the obvious advantages of e-learning, systemic research is needed to confirm that learners are actually acquiring and using the skills that are being taught online, and that e-learning is the best way to achieve the outcomes in a corporate environment. This will also be incorporated in the questionnaire that will be given to respondents. After 9 years, I can say that Brown and Ford (2002) research outcome is true that technology-delivered courses like using video conferencing as an e-learning tools is effectively vary in how they gain and keep the attention of learners, demonstrate key point, clarify misunderstandings, offer opportunities for practice, and provide clear and concise feedback. This point is also true for class-room-delivered courses.

In SPDC, for example, some instructors deliver training on technical process instruction via video conferencing in a way that they catch the attention and clarify misunderstanding when this is used to conduct the employees. Learners also receive concise feedback in a real-time.

Apart from the two-way visual communication, instructor can also display slide presentation on technical simulations to further the understanding of the learners.

Virtually all locations in SPDC west demand the installation of it because of the benefit of Video Conference. The employees in the field locations prefer this to class-room learning because it allows them to attend the courses assigned to them while working instead of scheduling class-room courses for them during their off period. Gold (2001) and Heinzen and Alberico (1990) also reported more positive attitude toward online instruction and improved perceptions regarding teleconferencing respectively.

Just like Johnson et al. (2000) reported that 98% of the participants in a continuing dental education delivered via two-way video would attend another class that used that method; the new employees in SPDC west that went through newly established Intensive Training Programme find video conferencing as a privilege to virtually communicate in real-time with their colleagues from advanced countries. This enables them to gain insight into the technical production practices unlike the previous intake that went through class-room-delivered Shell Intensive Training Programme. Not that the latter learners didn't tutored by expatriate instructors but not as many expatriates instructors from different countries in the case of using video conferencing. This is possible due to cost saving video conferencing.

The timely response of instructors via synchronous e-learning tool like video conferencing, audio conferencing significantly influences learner satisfaction compared to asynchronous e-learning tool (recorded). This is also supported by the research of Albaugh (2002) and Thurmond et al. (2002).

When instructor is available visually in real-time, it is possible for learners to get timely response. Most of the asynchronous e-learning tool like Shell Open University and soft24 are learners self-paced. This means that learners can conveniently learn at his /her own convenient time and continue from where he/she stopped the previous time. There is also multimedia instruction and recorded teacher-led instruction. Shu-Sheng liaw et al. (2007) also reported after statistical analysis, regarding to learners' attitudes, self-paced, teacher-led, and multimedia instruction are major factors to affect learners' attitudes towards e-learning as an effective learning tool.

Even though many organizations are turning to e-learning as a cost-saving measure, particularly when they want to reduce travel and class-room costs and time off-the-job, associate with off-site training according to Welsh et al. (2003), there are some highly technical training that involved travelling abroad because of lack of training facilities here.

With the advent of video conferencing, classes that teach skills with a psychomotor component, such as throwing a ball or performing surgery is now available. Video conferencing with 3D monitor is now used to stream classes that teach these skills. The 3D effect makes it possible for learner to see and view human anatomy that is being understandably. This is in contrast to what Welsh et al. (2003) reported 8 years ago.

Based on Welsh E. et al. (2003) that research is needed to determine when any one particularly technology is more appropriate than others. This research exactly looked into this by using a questionnaire to get the opinion of employees on their choice of technology so as to know a particular technology that is more

appropriate than others. The analysis of the qualitative data will definitely show this. Also, further research is needed to know the opinion of employees from different working background like banks, schools, etc. in using different e-learning tools.

There is also a gap in confirming that learners are actually acquiring and using the skills that are being taught online according to Judith B. Strother (2002). The gap will be dealt with as this research captures this by asking the respondents to state to what extent they have used the knowledge gained from using different e-learning tools to solve organizational problems.

E-learning has tremendous benefits according to Welsh E. et al. (2003):

People can learn effectively; reduce training costs if there are a large number of learners especially if the learners are geographically dispersed and if the course will be repeated several times; if course are perceived as optional or have little impact on the learners, low completion rates are likely; adults generally have positive attitudes towards technology-delivered classes.

Webster's (2001), and (Albaugh and Durrey, 2002, Wu et al, 2006) testify to what Welsh E. et al. highlighted as the benefits of e-learning. They stated respectively that e-learning students have 60% faster learning curves compared to classroom counterparts and that e-learning market has a growth rate of 35.6%, but failures exist.

I believe better results will be exhibited by SPDC west employees on the use of e-learning tool because of their sophisticated use of IT systems. Many employees in SPDC west used smart card to log on the computers, which are also on the company's intranet. This makes it a must for virtually all the employees to know how to operate computer effectively. Even the vehicle and pedestrian gates are controlled by smart card.

The above sophistication in use of IT systems which aids effective use of e-learning is corroborated by Piccoli et al. (2001) who reported that a more positive attitude toward IT systems, for example when students are not afraid of the complexity of using computers, will result in more satisfied and effective learners.

Furthermore, an e-learning tool like video conferencing which allows instructors and learners to collaborate in a visual real-time is better than audio conferencing and CD/DVD ROM because of timely response when collaborating. This is proved by the research of Albaugh (2002) and Thurmond et al. (2002) which stated that, "instructors' timely response significantly influences learners' satisfaction".

In SPDC west, training that's conducted via video conferencing is being streamed through interconnectivity fibre optics that is laid from London to Lagos and from Amsterdam to Lagos (fallback), then to Warri. This provides vivid multimedia used to stream synchronous learning instructions (real-time) and asynchronous (recorded). This is also backed by the results of Welsh E. et al. (2003), "based on the results of investigating instructors and learners attitudes, four guidelines should be considered when facilitating e-learning: vivid multimedia learning instruction highly autonomous learning environments, enhancing instructors and learners' asynchronous or synchronous communications, as well as improving learning effectiveness (including learners' problem solving or high order thinking skills)".

Employees in SPDC west have an added advantage than employees in other local companies in Nigeria due to its Shell Open University that allows tailored-system design for a working class. The delivery of the training is also interactive and multimedia. Also, the benefits of the system used in delivering these

instructions are incomparable. Clyde W. Holsapple and Anita Lee-post also have done a researched that confirmed this.

Due to the fact that larger percentage of employees in SPDC west use smart cards for computer and gate access, this has made it possible for virtually all the employees to be computer literate, and facilitates the online readiness because some are given company laptops and blackberry to enhance mobile working out-of-office. This contributes to the e-learning success in SPDC west. Clyde W. H. et al. (2006) corroborated this fact saying, "Critical factors of e-learning success are the online readiness of the students."

Shell learning centre can be compared with a mid-sized university. On a yearly basis before the introduction of Shell Open University about 3,000 professional staff from all over the world out of a 10,000 people in the global staff pool visits the centre to attend more than 200 different courses. Before the use of Shell Open University, the costs of training, travel, accommodation and being away from the business amounts in total to millions of dollars. Computer-based training and e-learning open up many possibilities for the reduction of costs and increases productivity. Khirallah, 2002 reported same as above that companies using online training can expect an average of 50% in time savings and 40% to 60% in cost savings, compared with conventional face-to-face training.

2.2 Review Conclusion

One of the major contributions to the research under review is from Welsh E. et al. (2003), who reported that organization are choosing e-learning for a variety of reasons including the desire to provide consistent and worldwide training, reduce delivery cycle time, increase learner convenience, reduce information overload, improve tracking, and lower expenses.

Brown and Ford (2002) pointed out that for technology to be effective, it must deliver well-designed instruction in a manner that facilitates (and does not inhibit learners' motivation and effort). Just like Heinzen and Alberico in 1990 after 21 years reported that participant across industries and professions generally reported improved perceptions regarding teleconferencing following its use. Importance of interactive collaborative e-learning like video conferencing cannot be over-emphasized in this information age. Johnson et al. (2000) make a major contribution in this area by reported that 98% of the participants in a continuing dental education course delivered via two-way video would attend another class that used that method.

This research is as a result of the gap in research that is noted from Welsh E. et al. (2003) research, who reported that other possible contingencies are that particular learners and particular content may be more suited to a particular medium or technology. They said, unfortunately research is still needed to determine when any one particular technology is more appropriate than others.

Chapter 3 **METHODOLOGY**

3.1 Research Strategy

The research strategy that will be considered in this study is survey. The survey strategy will be applied using questionnaire.

Questionnaire will be administered to employees in SPDC West through the company's intranet (e-mail) with a follow-up alert for quick and high percentage response.

The data that would be collected will be used to identify the e-learning tool that respondents chosen mostly, which represent the value that occurs most frequently (mode).

The reason for using this survey strategy is that it will give me more control over research process because when sampling is used in SPDC West, it will be possible to get results that are representative of the whole SPDC West's population.

Follow-up alert would be set on the Outlook email that will be used to send the questionnaire to the employees so as to get higher response rate. This will serve as a reminder even if the date of sending the mail has passed.

Additionally, phone call and Microsoft Office Communicator (MOC) will be used for follow-up too.

It will also be stated in the cover letter that would be sent to respondents prior the sending of questionnaire. In this, it will be stated that sensitive and confidential information are not required so as to get higher response rate. This is because the workers who receive a questionnaire via intranet or internet may be reluctant to complete it for a number of reasons.

The data analysis will be carried out using Excel.

3.2 Research Design

Data collection source will be from SPDC West (Swamp 1, Swamp 2, Land 1, Land 2, Forcados Terminal, Ogonu office, Edjeba office and Main office). These are chosen to get higher response rate, and because of my proximity to them. Many employees will not like to give information through questionnaire to someone they have not met before. These sources are chosen because of their forefront role in the use of latest and up-to-date e-learning tools in Nigeria. Nigerian local companies may not yield good response. The result of this study will also be used to enhance e-learning in Nigerian local companies.

Due to constraints of time and the reluctance of the employees (who receive questionnaire via intranet) to complete it for a number of reasons, SPDC West will be used as the source for data collection so as to have higher response rate.

For ethical reason, a cover letter to seek consent of the respondents to participate will be sent first through email via intranet.

Two questions each for the four e-learning tools (Intranet/Internet, Video conferencing, Audio conferencing and CD/DVD ROM) would be in the questionnaire. Each of them will have the eight-point Likert scale. Comment column will also be included in the eight items.

The two questions for each e-learning tool will be as follows:

1. Does using a particular e-learning tool has an impact on your learning?
2. To what extent have you used the knowledge you gained through a particular e-learning tool to solve organizational problem (s)?

Additionally, ninth question will be included to identify the factors that influence demand for e-learning in working environment. It also has "Other" column for the respondent's input.

All the questions are directed towards answering the research question and objectives earlier stated above.

Consequently, response percentage and response rate (frequency) for each of the eight Likert scale would be used to analyze the data collected, to plot bar and pie charts, and used to answer the research question and its objectives.

Mode will be determined in each of the question's response rate (frequency) to know the impact of different e-Learning tools on how the employees learn and work.

Then mode value will be compared among different e-Learning tools to know the e-Learning tool that is most suitable for the employees for learning.

Also, Rank correlation coefficient would be used to measure the extent to which one variable (number of respondents on impact of different eLearning tools on different Likert scale) changes when the other variable (number of respondents on the extent to which employees used knowledge gained to solve organizational problems on different Likert scale) change. This is to deduce the relationship between the variables.

X (independent variables) will be used to denote the number of respondents on “Impact of different e-learning tools” and Y (dependent variables) to denote the number of respondents on “the extent to which employees used knowledge gained to solve organizational problems”.

Finally, testing for significance of correlation coefficient would be carried out to determine whether the probability of variables in an e-learning tool is a real one and not by a chance occurrence.

Chapter 4

4.1 Research result

Getting seventy-one responses for this survey is not an easy task as many respondents did not respond to the questionnaire sent to them for the first time through company emails, but with the follow up I carried out with the aid of Microsoft Communicator, phone call and reminder I set on the email sent, there was latter high response rate. This shows that using email to get responses on questionnaire from respondents is not enough. There should be follow up.

The purpose of this chapter is to present facts in statements and charts as summarized below using Pearson Correlation Coefficient and testing the significance of correlation.

Findings (what I found out)

Correlation coefficient is calculated below for each of the e-Learning tool to ascertain the level of relationship between the number of employees who choose different Likert scale on the impact of e-Learning tool and the extent to how employees used the knowledge gained to solve organizational problems.

1. The table below shows the number of respondents on different Likert scale for Shell Open University's eLearning tool.

		Strongly agree	Agree	Slightly agree	Neither agree nor disagree/Not sure/Uncertain	Slightly disagree	Disagree	Strongly disagree	Not Applicable
Impact of e-Learning Tools (X)	SPDC Open University	31	24	13	1	0	1	0	0
Extent to how employees used the knowledge to solve org. problems (Y)		20	19	15	1	13	1	1	0
		To very large extent	To large extent	To quite large extent	To some extent	Not at all	To quite small extent	To small extent	Not Applicable

Table 1.10

Correlation coefficient, r is +0.8544 (strong positive correlation).

This shows that as the number of employees whom Shell Open University has an impact on is increasing so also is the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems.

Squaring r , that is $r^2=0.8544^2=0.73=73\%$.

This means that 73% of the variation in the number of employees whom Shell Open University has an impact on is related to the variation in the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problem is related.

To test the significance of $r = 0.8544$. That is to determine the probability that the strong positive correlation of variables in Shell Open University is a real one and not by a chance occurrence. In this case, I have to test the mutually exclusive hypotheses:

Null Hypothesis:	$r = 0$
Alternative Hypothesis:	$r \neq 0$

Table 1.11

Using significance level of $\alpha = 0.05$ and degree of freedom = $N-2 = 8-2 = 6$. Also, a two-tail test will be used since I have no strong prior theory to suggest whether the relationship between impact of e-Learning and the extent to which employees will use the knowledge acquired to solve organizational problems.

Therefore, the critical value = 0.7070 (two-tailed test).

Since my correlation coefficient, $0.8544 > 0.7070$ (i.e. test statistics > critical value), it means that it is not a chance occurrence and that the correlation between the number of employees whom Shell Open

University has an impact on and the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems is “statistically significant”.

I can now reject the null hypothesis and accept the alternative hypothesis. I can conclude that the odds are not more than 5 out of 100 that this is a chance occurrence.

44.3 percent of respondents strongly agreed that Shell Open University (interactive e-Learning) has an impact on their learning.

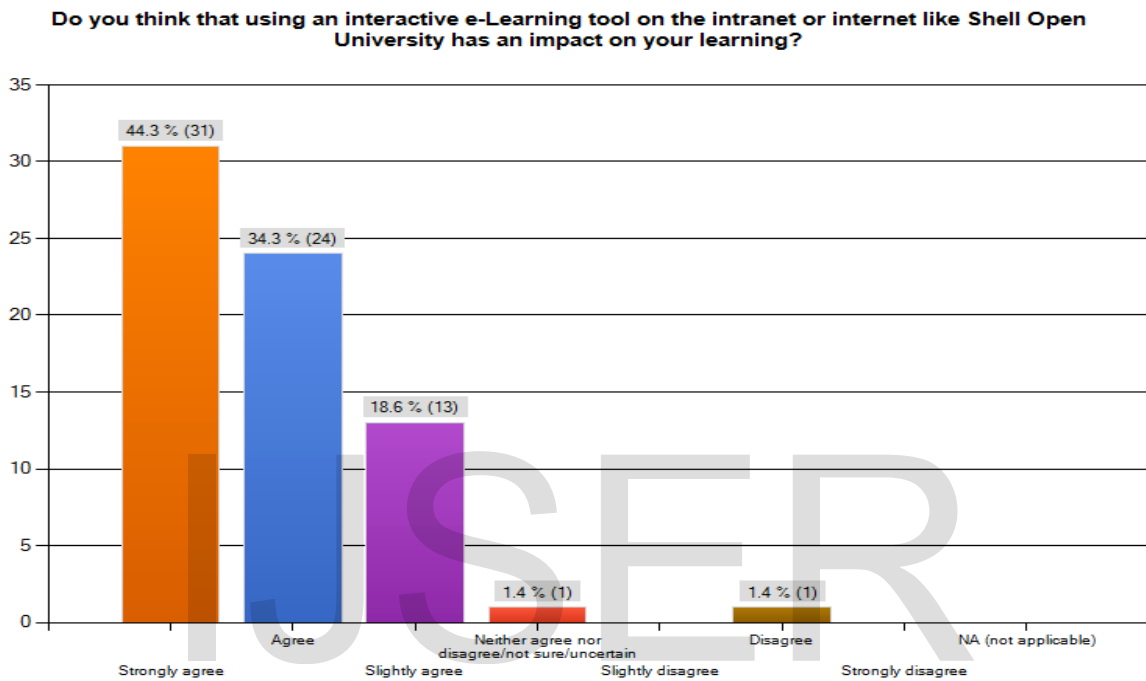


Figure 1.10

To a very large extent, 28.6 percent of respondents have used the knowledge they acquired through Shell Open University (interactive e-Learning) to solve organizational problems.

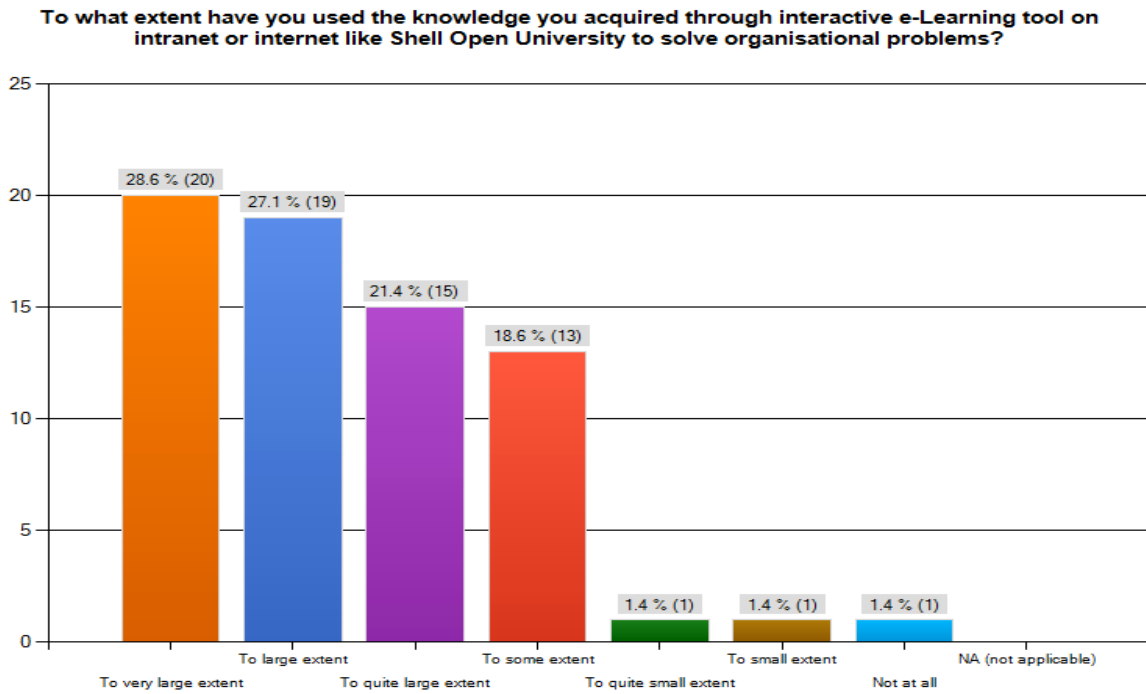


Figure 1.11

2. The table shows the number of respondents on different Likert scale for Video Conferencing.

		Strongly agree	Agree	Slightly agree	Neither agree nor disagree/Not sure/Uncertain	Slightly disagree	Disagree	Strongly disagree	Not Applicable
Impact of e-Learning Tools (X)	Video Conference	23	28	5	3	2	1	0	8

Extent to how employees used the knowledge to solve org. problems (Y)	15	21	12	5	8	0	0	9
	To very large extent	To large extent	To quite large extent	To some extent	Not at all	To quite small extent	To small extent	Not Applicable

Table 1.12

Correlation coefficient, r is +0.8898 (strong positive correlation).

This shows that as the number of employees whom Video Conference has an impact on is increasing so also is the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems.

Squaring r , that is $r^2=0.8898^2=0.7917=79\%$.

This means that 79% of the variation in the number of employees whom Video Conference has an impact on is related to the variation in the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problem is related.

To test the significance of $r = 0.8898$. That is to determine the probability that the strong positive correlation of variables in Video Conference is a real one and not by a chance occurrence. In this case, I have to test the mutually exclusive hypotheses:

Null Hypothesis:	$r = 0$
Alternative Hypothesis:	$r \neq 0$

Table 1.13

Using significance level of $\alpha = 0.05$ and degree of freedom = $N-2 = 8-2 = 6$. Also, a two-tail test will be used since I have no strong prior theory to suggest whether the relationship between impact of e-Learning and the extent to which employees will use the knowledge acquired to solve organizational problems.

Therefore, from the statistics table, the critical value = 0.7070 (two-tailed test).

Since my correlation coefficient, $0.8898 > 0.7070$ (i.e. test statistics > critical value), it means that it is not a chance occurrence and that the correlation between the number of employees whom Video Conference has an impact on and the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems is "statistically significant".

I can now reject the null hypothesis and accept the alternative hypothesis. I can conclude that the odds are not more that 5 out of 100 that this is a chance occurrence.

40 percent of respondents agreed that Video Conferencing has an impact on their learning.

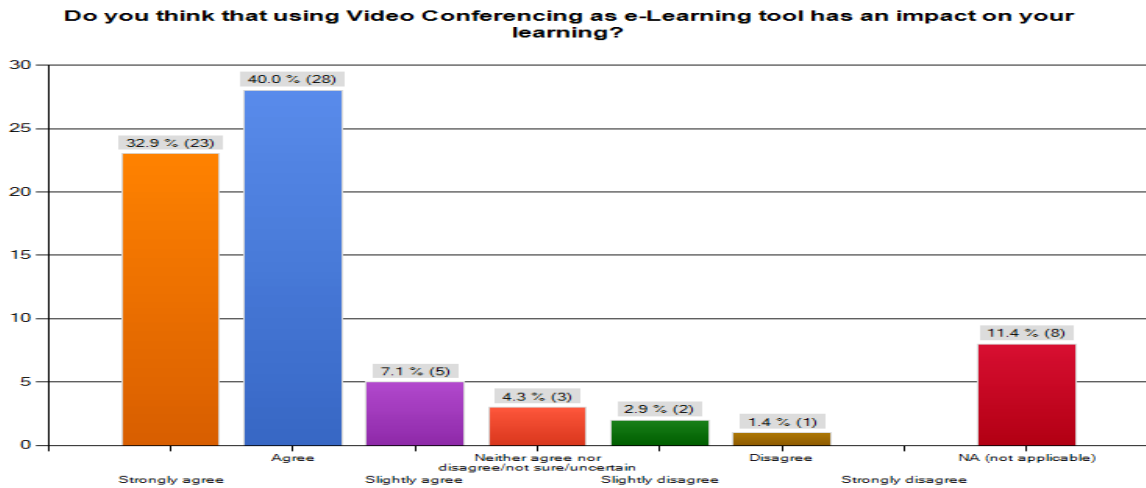


Figure 1.12

To large extent, 30 percent of respondents have used the knowledge they acquired through Video Conferencing to solve organizational problems.

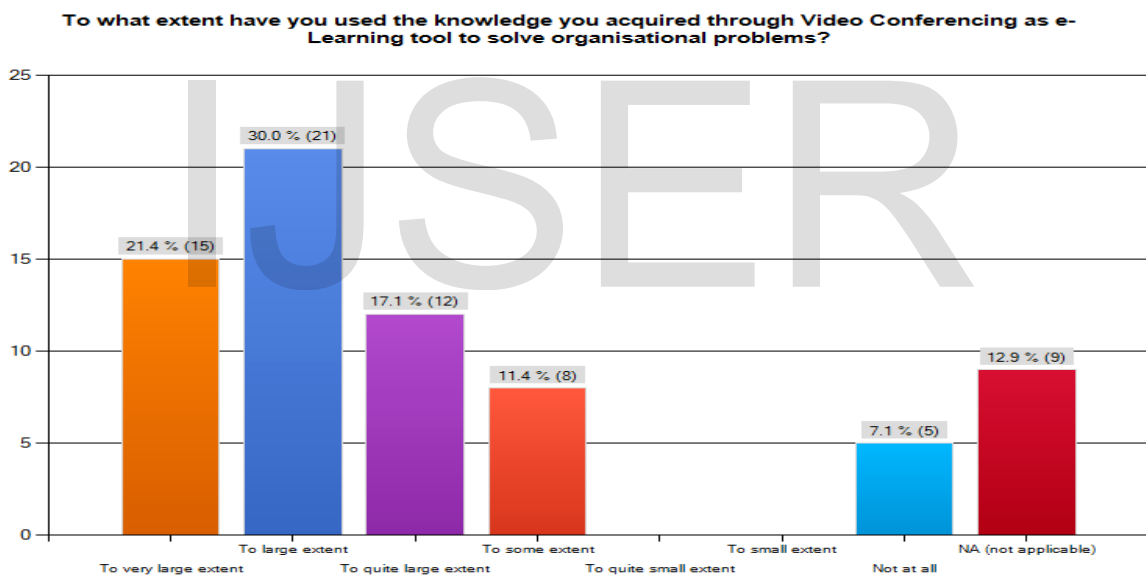


Figure 1.13

3. The below table shows the number of respondents on different Likert scale for Audio Conferencing.

		Strongly agree	Agree	Slightly agree	Neither agree nor disagree/Not sure/Uncertain	Slightly disagree	Disagree	Strongly disagree	Not Applicable
Impact of e-Learning Tools (X)	Audio Conference	9	26	22	1	7	3	0	2

Extent to how employees used the knowledge to solve org. problems (Y)	5	16	11	7	24	3	2	2
	To very large extent	To large extent	To quite large extent	To some extent	Not at all	To quite small extent	To small extent	Not Applicable

Table 1.14

Correlation coefficient, r is +0.5098 (fairly strong positive correlation).

This shows that as the number of employees whom Audio Conference has an impact on is increasing so also is the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems.

Squaring r, that is $r^2=0.5098^2=0.2599=26\%$

This means that 26% of the variation in the number of employees whom Audio Conference has an impact on is related to the variation in the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problem is related.

To test the significance of $r = 0.5098$. That is to determine the probability that the fairly strong positive correlation of variables in Audio Conference is a real one and not by a chance occurrence. In this case, I have to test the mutually exclusive hypotheses:

Null Hypothesis:	$r = 0$
Alternative Hypothesis:	$r \neq 0$

Table 1.15

Using significance level of $\alpha = 0.05$ and degree of freedom = $N-2 = 8-2 = 6$. Also, a two-tail test will be used since I have no strong prior theory to suggest whether the relationship between impact of e-Learning and the extent to which employees will use the knowledge acquired to solve organizational problems.

Therefore, from the statistics table, the critical value = 0.7070 (two-tailed test).

Since my correlation coefficient, $0.5098 < 0.7070$ (i.e. test statistics < critical value), it means that it is a chance occurrence and that the correlation between the number of employees whom Audio Conference has an impact on and the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems is not “statistically significant”.

I can now accept the null hypothesis and reject the alternative hypothesis. I can conclude that the odds are more that 5 out of 100 that this is a chance occurrence.

37.1 percent of respondents agreed that Audio Conferencing has an impact on their learning.

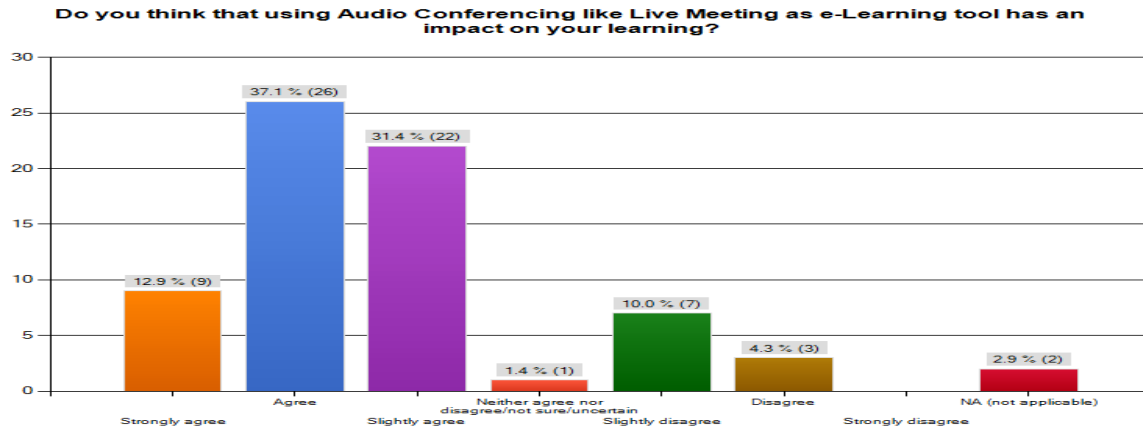


Figure 1.14

To some extent, 34.3 percent of respondents have used the knowledge they acquired through Audio Conferencing to solve organizational problems.

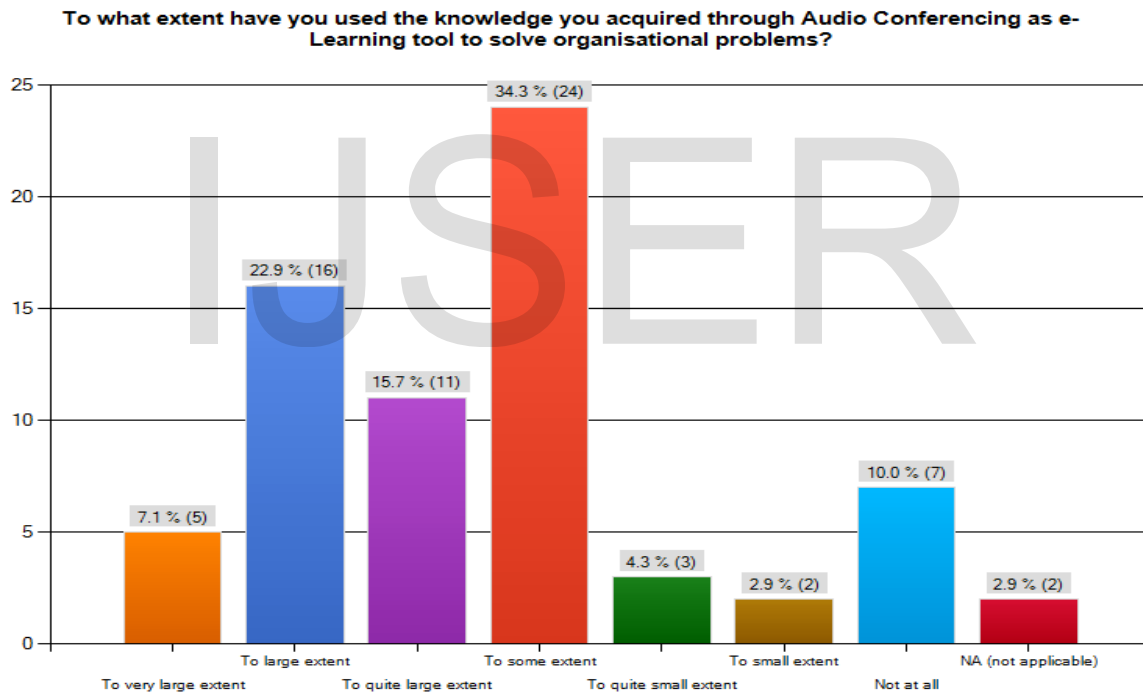


Figure 1.15

4. The below table shows the number of respondents on different Likert scale for Audio Conferencing.

Strongly agree	Agree	Slightly agree	Neither agree nor disagree/Not sure/Uncertain	Slightly disagree	Disagree	Strongly disagree	Not Applicable

Impact of e-Learning Tools (X)	CD/DVD ROM	37	20	10	2	0	0	0	1
Extent to how employees used the knowledge to solve org. problems (Y)		30	17	10	0	6	3	1	3
		To very large extent	To large extent	To quite large extent	To some extent	Not at all	To quite small extent	To small extent	Not Applicable

Table 1.16

Correlation coefficient, r is +0.9791 (very strong positive correlation).

This shows that as the number of employees whom CD/DVD ROM has an impact on is increasing so also is the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems.

Squaring r , that is $r^2=0.9791^2=0.9586=96\%$

This means that 96% of the variation in the number of employees whom CD/DVD ROM has an impact on is related to the variation in the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problem is related.

To test the significance of $r = 0.9791$. That is to determine the probability that the very strong positive correlation of variables in CD/DVD ROM is a real one and not by a chance occurrence. In this case, I have to test the mutually exclusive hypotheses:

Null Hypothesis:	$r = 0$
Alternative Hypothesis:	$r \neq 0$

Table 1.17

Using significance level of $\alpha = 0.05$ and degree of freedom = $N-2 = 8-2 = 6$. Also, a two-tail test will be used since I have no strong prior theory to suggest whether the relationship between impact of e-Learning and the extent to which employees will use the knowledge acquired to solve organizational problems.

Therefore, from the statistics table, the critical value = 0.7070 (two-tailed test).

Since my correlation coefficient, $0.9791 > 0.7070$ (i.e. test statistics > critical value), it means that it is not a chance occurrence and that the correlation between the number of employees whom CD/DVD ROM has an impact on and the number of employees who used the knowledge acquired by the same e-Learning tool to solve organizational problems is "statistically significant".

I can now reject the null hypothesis and accept the alternative hypothesis. I can conclude that the odds are not more than 5 out of 100 that this is a chance occurrence.

52.9 percent of respondents strongly agreed that CD/DVD ROM as e-Learning tool has an impact on their learning.

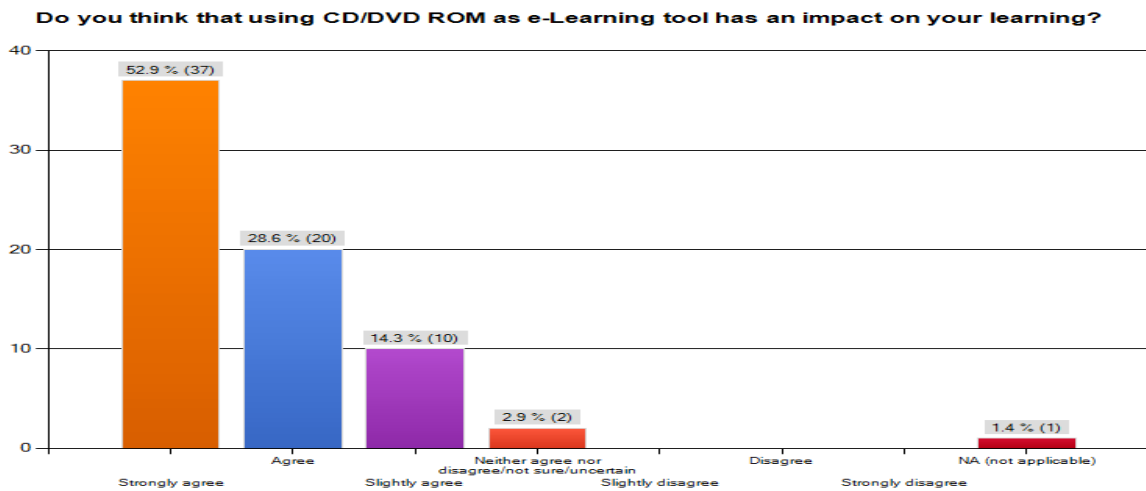


Figure 1.16

To a very large extent, 42.9 percent of respondents have used the knowledge acquired through CD/DVD ROM as eLearning tool to solve organizational problem.

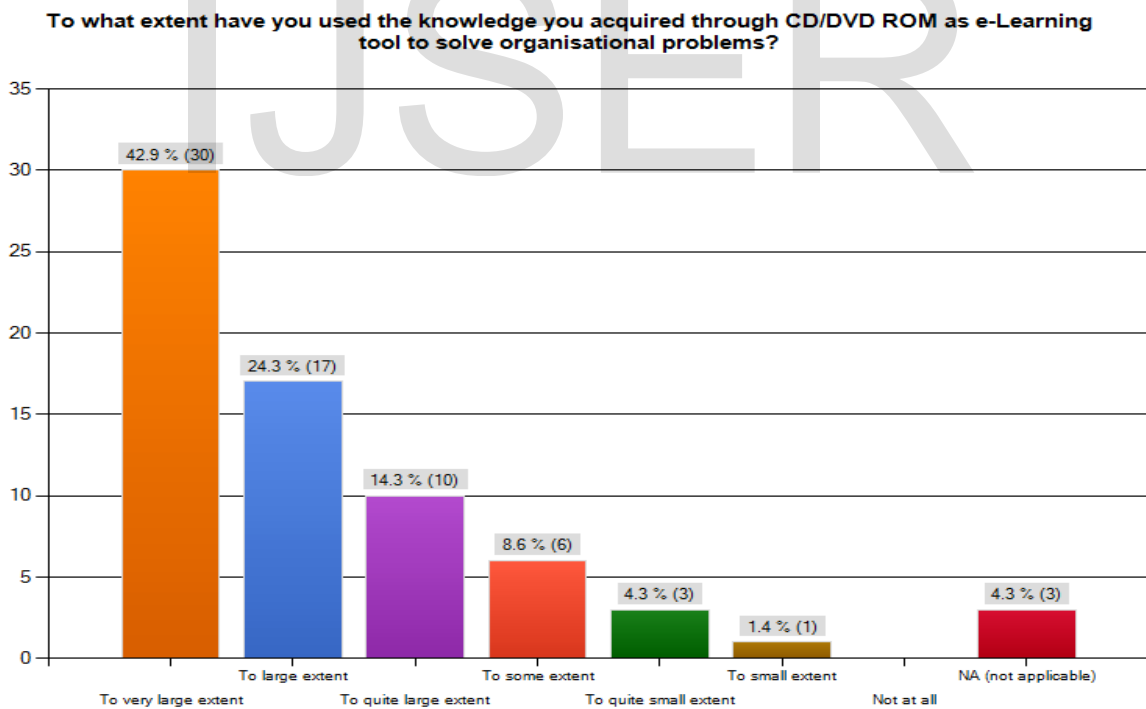


Figure 1.17

90 percent of respondents (46 responses) chosen “Rapid technological change” as factor which influence the demand for e-Learning in their work environment.

63 is the modal frequency of the factors which the respondents indicated that it influences eLearning in SPDC West’s work environment. That is 90 percent of respondent chose “Rapid technological change” while 65.7% chose “Increase in complexity of the work environment”, 30 percent chose “Shift from industrial to knowledge era”, 4.3 percent chose “The ever shortening product development cycles, 41.4 percent chose “Lack of skilled personnel”, 24.3 percent chose “Enterprise resource planning” and 18.6 percent chose “Extended enterprise”

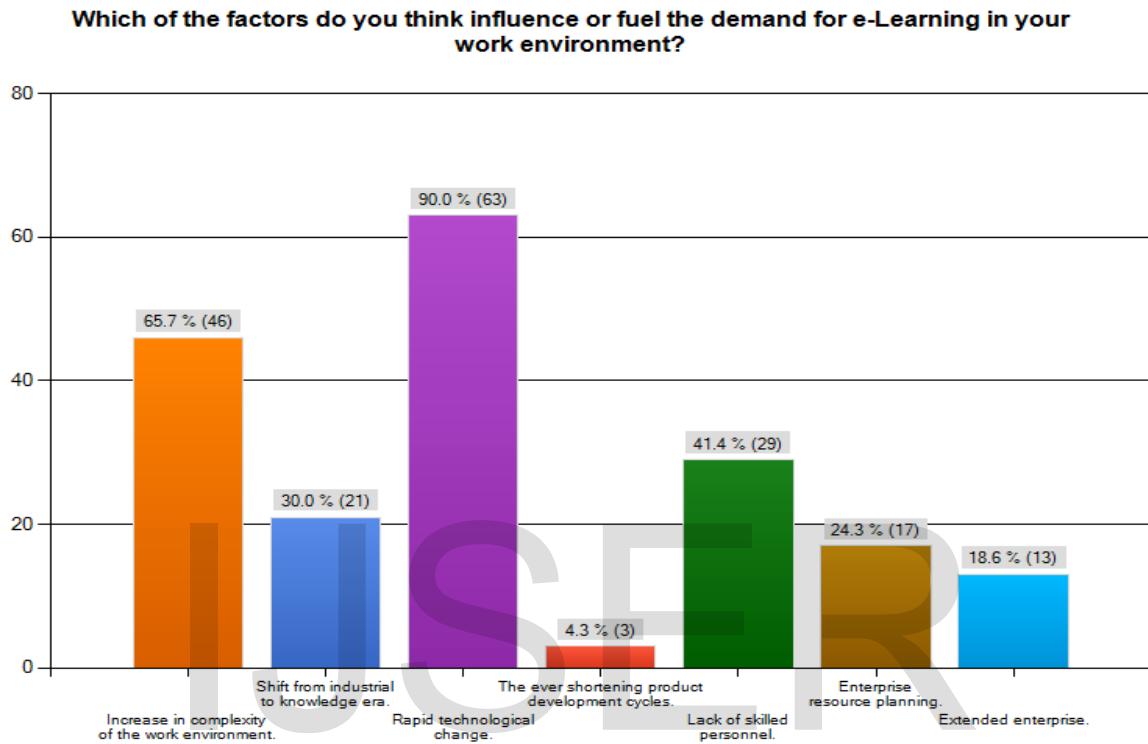


Figure 1.18

The discussion chapter, which is the next chapter will focus on the interpretation of the results in this chapter and will also state the relation of my findings to the research question and objectives. Also, I will discuss the strengths, weaknesses and limitations of my study in the discussion chapter.

Chapter 5 DISCUSSION

5.1 Discussion

As calculated above, the correlation between the number of respondent whom CD/DVD ROM has impact on and the number of respondent who used the knowledge acquired through this e-learning tool to solve organizational problems is the only one that has a very strong positive correlation. Self-ownership of this e-Learning tool as an inbuilt accessory on laptop and desktop computers by virtually all the respondents makes it to have huge impact on their learning and for solving organizational problems unlike other e-Learning tools which are owned by the company. The access to other e-Learning tool is only restricted to learning organized by the company where as CD/DVD ROM as e-Learning tool can be used at any time by the employees.

This shows that CD/DVD ROM is the most favorable e-learning tool to the respondents for learning and for solving organizational problems.

Testing the significance of correlation for Shell Open University, Video Conference and CD/DVD ROM confirmed that the odds are not more than 5 out of 100 that this is a chance occurrence.

Private and public sectors in Nigeria can now emulate what is being practiced in SPDC West by the provision of laptops or desktops CD/DVD ROM) to their employees in order to improve and enhance the way they are learning and working.

Based on the fact that 90 percent of respondents chose "Rapid technological change" as a factor that influence or fuel the demand for e-Learning in SPDC West, it means that in SPDC West the rate of technological change is so rapid. This is true because SPDC West is at par with latest technologies especially information systems. Based on this fact, "Rapid technological change" is actually the major factor that influences the demand for e-Learning in SPDC West.

The impact of Shell Open University as e-Learning tool is so great that more than half of the respondents (44.3 percent) strongly agreed that it has impact on their learning. This is so because it is an interactive platform on the web, which makes learners to access technical training in a simulation format. It also allows learners to pause a training course whether he or she log out or not from computers. Virtual tutors are also on hand for the training course as if it is a real-time training. Shell Open University definitely has huge impact on how some of the employees in SPDC West learn because it is only two respondents that chose between "Neither agree nor disagree/not sure/uncertain" and "Strongly disagree" in the survey.

During the course of training using Shell Open University platform, a lot of discipline specific knowledge is acquired in the process. Thereby, allows the employees to simultaneously or subsequently apply the knowledge to solve organizational problems. Based on 28.6 percent of respondents, which is to a very large extent used this knowledge; it shows that SPDC West's employees gained a lot from using this platform. Also based on the fact that 98.6 percent of respondents have used knowledge gained from this e-learning tool to solve organizational problem compared to 1.4 percent of respondent who have not used the knowledge at all, it show that Shell Open University hugely enhances how most employees in SPDC West work.

Considering the modal percentage of 40 percent of respondents who agreed (with 80 percent of respondents chosen between "Strongly agree" and "Slightly agree") that Video Conferencing has an impact on their learning, it can be deduced that Video Conferencing with its real-time visual and audio interaction between the learner and tutor is really a good e-Learning tool which can be compare to classroom learning system. It gives opportunity to learners to schedule a specific time for learning and join the video conferencing from any part of the globe. SPDC West's video conferencing is very effective because of its connectivity through fibre optics which aid good streaming of multimedia. What makes the percentage of SPDC West's employees who agreed that video conferencing actually has an impact on their learning is the fact that it allows file (e.g. slides) to be shared or displayed during learning couple with audio and video features.

30 percent (modal frequency) of respondents indicated that to a large extent, they have used the knowledge acquired through video conferencing to solve organizational problems. Also with 79.9

percent of respondents who chose between "To a very large extent" and "To some extent", it shows that employees in SPDC West who took part in the survey have used the knowledge acquired through video conferencing as e-Learning tool to solve organizational problems.

Audio Conferencing like Live Meeting in SPDC West is of tremendous importance because it allows learner to carry out voice communication via VoIP on their computers, share a file and remotely support a learner during training. All these contribute to the response rate of 26 respondents (37.1 percent), who agreed that Audio Conferencing like Live Meeting has an impact on their learning. Considering 81.4 percent of respondents who chose between "Strongly agree" and "Slightly agree", it shows that employee perception is strong that Audio Conferencing has an impact on the learning of employees who took part in the survey. Also considering the fact that only 15.7 percent of respondents disagreed, it shows that Video Conferencing is actually aiding employees' learning in SPDC West.

In SPDC West's field locations, there are many technicians, engineers, and other disciplines working in flow stations, offices, and on the crude oil's production platforms. These employees are so busy that going for classroom training to update their knowledge base is an uphill task, so the option of using Audio Conferencing is actually paying off as 34.3 percent of respondents to some extent said they have used Audio Conferencing (Live Meeting) to solve organizational problems. Also based on the fact that 87.2 percent chose between "To a very large extent" and "To some extent" with 10 percent indicated that they have not used the knowledge acquired to solve organization problems, it shows that SPDC West's employees who took part in the survey actually used the knowledge gained through the use of Audio Conferencing for e-Learning to solve organizational problems. In addition, Audio Conferencing is readily available to the learners in SPDC West anytime unlike Video Conferencing which is limited and restricted.

Based on the survey carried out, 52.9 percent of respondents strongly agreed that CD/DVD ROM (e-Learning tool) has an impact on their learning. This is a significant response because most often the other e-Learning tools earlier mentioned are not readily available due to cost implication and restriction while training CD and DVD is cheaper and easier for the learners to procure and access on the company computers or the learners' personal computers. It is significant because 95.8 percent of respondent chose between "Strongly agree" and "Slightly agree", and only 2.9 percent chose "Neither agree nor disagree/not sure/uncertain".

Furthermore, due to the ready availability of recorded CD/DVD for training because of employees' salary scale to afford them, 42.9 percent of respondent indicated that "To a very large extent" they have used the knowledge acquired through the use of CD/DVD ROM to solve organizational problem. Also, with the fact that 95.8 percent of respondent chose between "To very large extent" and "To small extent", it shows that SPDC West's employees have used CD/DVD ROM for e-Learning to solve organizational problems. Since "Strongly agree" is the most appealing Likert scale for the eLearning tools, therefore CD/DVD ROM which has the highest response rate (frequency) of 52.9 percent is the most favorable e-Learning tool for SPDC West's employees who took part in the survey. This fact is also corroborated by the value of correlation coefficient earlier discussed.

The result of this survey now partly confirmed Welsh E. et al. (2003) study that stated that, "Other possible contingencies are that particular learners and particular content may be more suited to a particular medium or technology" because learners chose different e-Learning tool that has impact on their learning and the one that they have used the knowledge they acquired through to solve organizational problems. I propose further research to be carried out on "...particular content may be more suitable to a particular medium of technology".

This study also confirmed Judith B. Strother (2002) study that, "while few people debate the obvious advantages of e-learning, systemic research is needed to confirm that learners are actually acquiring and using the skills that are being taught online". With respondents in this study indicating the extent to

which they have used the knowledge they acquire through different e-Learning tools, the study has been dealt with.

Also, I propose that the same research should be carried out in educational institutions, private and public sectors in Nigeria to the impact of e-learning tools on students and workers.

5.2 Limitation and strength of this research

This study is only limited and applicable to SPDC West where the survey is carried out. It did not cover the whole Shell companies in Nigeria as there is no formulated hypothesis or model to support or generalize the result. It is basically applicable to SPDC West. The research would have been carried out in the whole SPDC but due to low response that one normally encountered from strangers and also due to time constraint to follow up when they are not responding to the questionnaire.

The strength of the research is that the result represents the opinion of all SPDC West's employees who are entitled to assess a company's intranet because the same e-learning tools are obtainable in all the districts in SPDC West. Also based on the fact that the respondents are not predetermined by me, it represents the opinion of all SPDC West's employees because a survey was sent out to virtually all SPDC West's employees and seventy responses were received through randomization, which is unbiased.

IJSER

Chapter 6

SUMMARY AND CONCLUSION

6.1 Conclusion

The idea of researching the impact of e-learning tools on how employees think, learn and work is a good one as most of the students and workers at the educational institutions, and public and private sectors respectively are more involved in social networking activities which make them to be more close to these e-learning tools for learning nowadays.

To know the impact of e-learning tools on how employees think, learn and work in an organization, I computed correlation coefficient for each of the e-learning tools and discovered that CD/DVD ROM has the highest correlation coefficient (relationship) follow by Video Conference while Shell Open University while Audio Conference has the lowest. The high correlation coefficient of CD/DVD ROM probably may be due to availability CD/DVD ROM on the personal computer of virtually all the respondents while the low correlation coefficient of Audio Conference may be due to its voice interactive feature only without video between learner and tutor.

Also to test the significance of correlation in the research question above, I found out that the odds (probability of a chance occurrence of variables) for Shell Open University, Video Conference and CD/DVD ROM are not more than 5 out of 100 that this is a chance occurrence while Audio Conference's odds are more than 5 out of 100 that this is a chance.

Also "Rapid technological change" identified to be the most chosen factor that influences the demand for e-learning in SPDC West. This shows that "Rapid technological change" is the most favorable factor that influences the demand for e-learning.

The impact on learning and the extent of the use of knowledge acquired through Shell Open University to solve organizational problems which 80 percent and 98.6 percent of respondents respectively indicated may be due to the interactive features, and the flexibility of pausing the training course.

Also based on the fact that percentages for Video Conferencing, Audio Conferencing and CD/DVD ROM are 80%/79%, 81.4%/87.2% and 95.8%/95.8%, it means that this research project has met the first two research objectives due to these significant percentages.

CD/DVD ROM as e-Learning tool with 95.8 percent for impact on learning and the extent of the use of knowledge acquired through this learning tool to solve organizational problems, it means CD/DVD ROM is the most favorable e-Learning tool which also met research objective three. The highest percentage may be due to affordability of the employees to buy CD/DVD and no time constraint because training courses can easily be accessed using their personal computers.

The fact that 90 percent of respondents selected "Rapid technological change" as the factor that influences or fuels the demand for e-Learning in SPDC West means that in SPDC West, it is the real factor that does this. This may be due to rapid technological change in information systems and plant facilities.

All the above-mentioned facts show the impact of deploying e-Learning tools on how employees learn and work in SPDC West. And it has actually answered my research question.

The outcome of this research can be applied to Nigerian schools, private and public sectors by provision of laptops to students and workers so as to aid the use of CD/DVD ROM as e-Learning tool. Video and audio conferencing can also be recommended for them so as to facilitate and enhance their knowledge base via real-time interaction with specialists in another location or country.

6.2 Main Findings

Due to the fact that this study is able to partly answer two literature recommendations which are "particular learners may be more suited to a particular medium or technology (e-Learning)" and "confirmation that learners are actually acquiring and using the skills that are being taught online", it means that the findings discovered in my results which are relevant to these recommendations are my main findings. That is the two questions and answers for each of the e-Learning tool.

Future research is needed to confirm whether particular content may be more suited to a particular medium or technology as "whether particular learner may be more suited to particular medium or technology has been dealt with in this study".

As I have earlier stated concerning the research process used in this study, to get high response rate is not an easy task without proper follow up on response to questionnaire sent through email. It is even better to send questionnaire to people that may know you as it with aid in quick response because it is difficult for a respondent to give information to a stranger. In effort to get high response rate, proper follow up was done.

Hypothesis is set for this research as it is necessary to answer my research question and objectives.

Correlation coefficient, mode and percentage are also used to answer virtually all my research question and objectives.

Further research should focus on the use of e-learning tools like video conference in Nigerian universities so as to critically examine the gap and blockers of using it effectively and efficiently.

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Appendices

8.1 Blank copy of questionnaire used

Dear Sir/Ma,

This questionnaire is part of a research project to carry out an investigation into e-Learning models. Your responses are important in enabling me to obtain as full and understanding as possible of this topical issue.

The questionnaire should take you about five minutes to complete. Please, answer the questions with the options provided. If you wish to add further comments, please feel free to do so. The information you provide will be treated in the strictest confidence. You will notice that you are not asked to include your name or address anywhere on the questionnaire.

The answers from your questionnaire and others will be used as the main data set for my research project for my master's degree in Information and Communication Technology (ICT) Management at the Graduate Programmes of International Co-operation between Graduate School of Technology Management, University of Pretoria, South Africa and METI, University of Port Harcourt, Nigeria.

I hope that you will find completing the questionnaire enjoyable. Please, kindly complete the questionnaire on or before 11th November 2011. If you have questions or would like further information, please do not hesitate to call me on 08057760228 or email me at olasunkanmi.alabi@shell.com.

Thank you for your help.
Alabi, Olasunkanmi

1. Does using an interactive e-Learning tool on the intranet or internet like Shell Open University has an impact on your learning?

- Do you think that using an interactive e-Learning tool on the intranet or internet like Shell Open University has an impact on your learning? Strongly agree
- Agree
- Slightly agree
- Neither agree nor disagree/not sure/uncertain
- Slightly disagree
- Disagree
- Strongly disagree
- NA (not applicable)

Comment (please specify)

2. To what extent have you used the knowledge you acquired through interactive e-Learning tool on intranet or internet like Shell Open University to solve organizational problems?

- To what extent have you used the knowledge you acquired through interactive e-Learning tool on intranet or internet like Shell Open University to solve organizational problems? To very large extent
- To large extent
- To quite large extent
- To some extent
- To quite small extent
- To small extent
- Not at all
- NA (not applicable)

Comment (please specify)

3. Does using Video Conferencing as e-Learning tool has an impact on your learning?

- Do you think that using Video Conferencing as e-Learning tool has an impact on your learning? Strongly agree
- Agree
- Slightly agree
- Neither agree nor disagree/not sure/uncertain
- Slightly disagree
- Disagree

- Strongly disagree
 - NA (not applicable)
- Comment (please specify)

4. To what extent have you used the knowledge you acquired through Video Conferencing as e-Learning tool to solve organizational problems?

- To what extent have you used the knowledge you acquired through Video Conferencing as e-Learning tool to solve organizational problems? To very large extent
- To large extent
- To quite large extent
- To some extent
- To quite small extent
- To small extent
- Not at all
- NA (not applicable)

Comment (please specify)

5. Does using Audio Conferencing like Live Meeting as e-Learning tool has an impact on your learning?

- Do you think that using Audio Conferencing like Live Meeting as e-Learning tool has an impact on your learning? Strongly agree
- Agree
- Slightly agree
- Neither agree nor disagree/not sure/uncertain
- Slightly disagree
- Disagree
- Strongly disagree
- NA (not applicable)

Comment (please specify)

6. To what extent have you used the knowledge you acquired through Audio Conferencing as e-Learning tool to solve organizational problems?

To what extent have you used the knowledge you acquired through Audio Conferencing as e-Learning tool to solve organizational problems? To very large extent

To large extent

To quite large extent

To some extent

To quite small extent

To small extent

Not at all

NA (not applicable)

Comment (please specify)

7. Does using CD/DVD ROM as e-Learning tool has an impact on your learning?

Do you think that using CD/DVD ROM as e-Learning tool has an impact on your learning? Strongly agree

Agree

Slightly agree

Neither agree nor disagree/not sure/uncertain

Slightly disagree

Disagree

Strongly disagree

NA (not applicable)

Comment (please specify)

8. To what extent have you used the knowledge you acquired through CD/DVD ROM as e-Learning tool to solve organizational problems?

To what extent have you used the knowledge you acquired through CD/DVD ROM as e-Learning tool to solve organizational problems? To very large extent

To large extent

To quite large extent

To some extent

To quite small extent

To small extent

Not at all

NA (not applicable)

Comment (please specify)

9. Which of the factors do you think influence or fuel the demand for e-Learning in your work environment?

Which of the factors do you think influence or fuel the demand for e-Learning in your work environment? Increase in complexity of the work environment.

Shift from industrial to knowledge era.

Rapid technological change.

The ever-shortening product development cycles.

Lack of skilled personnel.

Enterprise resource planning.

Extended enterprise.

Others (please specify)

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Keywords

e-Learning is the use of technology to enable people to learn anytime and anywhere. e-Learning can include training, the delivery of just-in-time information and guidance from expert.

Software as a service (SaaS) is a software delivery model in which software and associated data are centrally hosted on the cloud.

Cloud Computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the internet). The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagram.

Synchronous Learning System is the learning system which is done in real time and focused around virtual classroom. It allows teachers to conduct live classes.

Asynchronous Learning System is the learning system which allows each student to learn at his or her own pace and is recorded.

Intranet is a computer network that uses Internet Protocol technology to share information, operational systems, or computing services within an organization.

Extranet is a computer network that allows controlled access from the outside, for specific business or educational purposes.

Interactive TV describes a number of techniques that allow viewers to interact with television content as they view it.

Web-Based Learning (WBL) is often called online learning or e-learning because it includes course content. Discussion forums via email, video conferencing, and live lectures (video streaming) are all possible through the web. Web based courses may also provide static pages such as printed course materials.

Internet Based Training (IBT) is synonymous to e-learning.

Advanced Distributed Learning (ADL) is the product of the ADL initiative, established in 1997 to standardize and modernize training and education management and delivery. The Department of Defense (DoD) Office of the Under Secretary of Defense for Personnel and Readiness (OUSD P&R) oversees the ADL initiative. The vision of the ADL Initiative is to provide access to the highest-quality learning and performance aiding that can be tailored to individual needs and delivered cost-effectively, at the right time and in the right place.

Web-based Instruction (WBI) is teaching and learning supported by the attributes and resources of the internet (Khan, 1997; Relan & Gillami, 1997).

Online Learning (OL) also known as e-learning, is a learning experience delivered via a computer and the internet. Course work is conducted through electronic forums, discussion groups, external resources, quizzes, social rooms, and online submitted assignment.

Open/Flexible Learning (OFL) is a set of educational philosophies and systems, concerned with providing learners with increased choice, convenience, and personalization to suit the learner.

Stream is a sequence of data elements made available over time. A stream can be thought of as a conveyor belt that allows items to be processed one at a time rather than in large batches.

Optical Fiber is a flexible, transparent fiber made of glass (silica) or plastic, slightly thicker than a human hair. It functions as a waveguide, or "light pipe", to transmit light between the two ends of the fiber.

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