INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

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INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

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APPENDIX/ANNEXURE

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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
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CONTRIBUTIONS TO BOOKS
- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES
- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS
- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

UNPUBLISHED DISSERTATIONS AND THESES
- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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WEBSITES
- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

EFFECTIVE USE OF TRAINING FEEDBACK FOR REINFORCEMENT OF LEARNING AND EMPLOYEE DEVELOPMENT

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ABSTRACT

The technology intensive telecom industry mandates a radical approach to training management, delivery and calls for an integrated holistic feedback mechanism to positively impact employee productivity and performance. Organization learning and development function is an important catalyst that facilitates the creation of an agile and engaged workforce capable of meeting the current and future business requirements. An effective learning & development framework coupled with a multi dimensional feedback mechanism is a precursor to building a highly competent work force. This paper is based on primary research data from a leading telecom company, compiled over a span of ten months, and provides conclusive linkages between an effective feedback mechanism and employee competency development in the telecom industry.

KEYWORDS
CVP, EVA, EVP, Training Delivery Index, Trainee Satisfaction Index.

1.0   INTRODUCTION

The telecom industry is highly technology centric and requires a pool of highly skilled and technically competent workforce for managing its operations. This study is based on primary data from a integrated information and communications company with over 160 million subscribers and a pan-India, high-capacity, integrated (wireless and wireline), convergent (voice, data and video) digital network, offering services spanning the entire communication value chain. Its network is a convergence ready broadband network, spread over large geographical area through terrestrial, submarine and satellite links, with a scalable and restorable global NGN footprint, MPLS enabled CORE data network, certified MEN network (e.g. MEF forum), integrated BSS-OSS to support complex suite of services with end-to-end connectivity provided over fibre. The highlights of the network include the following:

- Over 800 global, regional and domestic carriers
- Over 2,100 Indian and Multinational corporations
- Providers of cutting edge connectivity to over 850 of top 1000 companies in India
- Connecting 2.5 million individual overseas customers
- 190,000 Kms of fiber optic cable connecting over 1 million buildings with over 1.4 million access lines
- 9 Data Centre's with data storage space of over 6.5 Lakh sq. ft.
- Fiber-to-the-building approach helping in creating a network with unlimited capacity and ability to support gigabit per second bandwidth services for customers

The present day telecom networks are layered as shown in figure 1. The transport layer provides the common photonic framework that interconnects the access networks and elements. Switching, signalling and NGN services are provided by the core layer in the middle which consists of MSCs, GSMCs, Fixed Line Switches, Trunk Automatic Exchanges, Home Location Registers, Value Added Services platforms etc. The application layer at the top hosts contents and services on application servers and access networks facilitates connectivity to the end-users. The technologies deployed include Plesiochronous Digital Hierarchy (PDH), Synchronous Digital Hierarchy (SDH), Dense Wavelength Division Multiplexing (DWDM), Optical Transport Network (OTN), Microwave, VSAT and Optical Burst Switching (OBS) on the transport domain, 2G to 3G, GSM to UMTS, CDMA to HSD in the Wireless domain, IP to MPLS, Circuit Switched to IP Multimedia Subsystem (IMS), Utilities, OSS and many more. The services provided includes POTS, PRI, Leased line, VoIP, HSD, Video Calling, Ethernet Leased Lines, L3-VPN, Mobile TV, Mobile broadband on 3G, etc.

FIGURE 1 – LAYERED TELECOM NETWORK

The Network entity of the telecom company is responsible for planning, deployment, monitoring, operation and maintenance of its overall telecom network. The primary network functions include Planning & Engineering, Installation & Commissioning, Provisioning & Fault Management, Operation, Maintenance, Administration & Performance (OMAP), Quality and other Support functions.

The Learning Center (LC), an ISO 9001:2008 certified entity established in the year 2002. Over the past ten years, LC has trained & certified more than 56,000 employees through instructor led trainings as well as distance learning programs. In addition over 61,000 employees were certified using proprietary self learning methodologies. The LC portfolio comprises of over 220 Instructor Led Training (ILT) courses and 92 Self Learning Modules (SLM) on cutting edge telecom equipment, technologies and services covering all telecom layers. The LC lead trainers (Subject Matter Experts – SME) are functionally aligned to the domain experts. Learning & Development function ensures the readiness of the organizational manpower to quickly adapt to the technological advancements and maintaining high quality standards as per the business requirements.

Individuals in an organisation are distinct in terms of their personality, experience, skills and capability. Meeting key performance indices (KPI) of a modern day telecom network calls for a team effort in order to deliver sustained performance. With the change in technology, increasing complexity of equipments and resultant operation & maintenance (O&M) issues inconsistencies in team & individual performance will translate into poor network performance. A holistic feedback mechanism is required in order to provide effective customised learning solutions targeted at satisfying the network requirements while measuring on-the-job impact of the trainees. The feedback mechanism should be capable of integrating participant perceptions, track assimilation of skill sets and on-the-job assessments of the participants and provide objective inputs to the design process. This will facilitate the design and development of customized learning solutions that will lead to employee competency development (as opposed to skill development using conventional design methodologies). A competent workforce forms the corner stone of an organization leading to enhanced EVA, employee (EVP) and customer value proposition (CVP).

2.0   RESEARCH PROBLEM

The design, deployment, maintenance and management of the modern day state-of-the-art telecom networks mandates a pool of competent technical manpower that is capable of quickly adapting to technological and product changes. A dynamic learning and development framework is an important precursor to employee competency development. A competent workforce helps an organization build and sustain a long-term competitive advantage. The major challenges faced by the telcom industry are enumerated below:

- Increasing number of customers, development of new bandwidth intensive applications, design and exponential growth in online gaming results in frequent network expansion for capacity expansions. This results in dynamic changes in network architecture, traffic engineering and deployment of new products and technologies. The technical manpower is thus expected to develop new skills and competencies to keep abreast of the latest technology and products deployed in the network. This calls for frequent "learning and un-learning" cycle putting additional pressure on the workforce
- There is a gap in academic learning verses skill requirement at the industry. Studies (NASSCOM-McKinsey report, 2005) have revealed that only about 25% of total engineering graduates passing out of colleges/universities are possessing skill sets relevant to the telecom industry
- The telecom industry has the highest rate of attrition in the industry. Organizations thus need to invest substantially on training to scale up its employee competencies
- More than 90% of the high end telecom equipments are manufactured in the American, European and Chinese markets. The availability of technical literature and trainings are thus at a very high premium
- In-depth knowledge is a pre-requisite to effective troubleshooting and impacts business performance

A holistic feedback mechanism is thus imperative and a pre-cursor to organizational learning & development.

3.0   LITERATURE SURVEY

Literature survey was undertaken to study the subject in hand. The key works that were highly pertinent to the research problem have been reproduced in this section. The study of literature validated the research solution.

Training Needs Assessment (Janice A. Miller, February 1996 Reviewed July 2002)

This research paper highlights the importance of training need assessment. The training needs assessment is a critical activity for the learning and development function. This study provides an overview of the training and development function and highlights how the need assessment fits into this process, followed by an in-depth look at the core concepts and steps involved in conducting a training need assessment. Designing a training and development program involves a sequence of steps that can be grouped into five phases: needs assessment, instructional objectives, design, implementation and evaluation. To be effective and efficient, all training programs must start with a needs assessment. Long before any actual training occurs, the training manager must determine the who, what, when, where, why and how of training. To do this, the training manager must analyze as much information as possible about the following:

- Organization and its goals & objectives
- Jobs and related tasks that need to be learned
- Competencies and skills that are need to perform the job
- Individuals who are to be trained

There are three levels of needs assessment: organizational analysis, task analysis and individual analysis.

1. Organizational analysis looks at the effectiveness of the organization and determines where training is needed and under what conditions it will be conducted
2. Task analysis provides data about a job or a group of jobs and the knowledge, skills, attitudes and abilities needed to achieve optimum performance
3. Individual analysis analyzes how well the individual employee is doing the job and determines which employees need training and what kind

Developing An Effective 360 Degree Feedback Survey And Conducting A Successful Campaign (Corporation, 2007)

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The 360 degree feedback process involves gathering a full circle of ratings from various perspectives (self, manager, peers, subordinates and customers) in order to diagnose skills and provide feedback to participants. While 360 degree feedback has several advantages, they are often not fully realized due to flaws in the survey design and/or poor implementation of the 360 assessment process. This Insight white paper offers suggestions on how to develop a valid and effective 360 degree feedback survey, and how to conduct an effective process that can lead to valid assessments of capabilities and employee development.

Transfer of Training: The Role of Feedback In Supportive Social Networks (Piet Van den Bossche, June 2010)

The transfer of training to the workplace often fails to occur. The authors argue that feedback generated within the work environment about the application of newly learned skills in the workplace helps to close the gap between the current performance and the desired goal of full application of what is learned during training. This study takes a social network perspective and explores the role of feedback generated within the social network in fostering motivation-to-transfer and the transfer of training. The results show that the number of people providing feedback and the helpfulness of this feedback are positively related to the motivation for and actual transfer of training. The frequency of feedback appears to be negatively related. This study underlines the importance of feedback in turning the workplace into a learning environment fostering the transfer of training.

The literature survey helped to get insights about feedback from unconventional sources like employee mentoring, network performance report analysis, MTTR and even post training validation. The analysis of these feedbacks will form the basis of development of dynamic learning solution to cater to the changing requirements.

4.0 MULTI-DIMENSIONAL FEEDBACK MECHANISM

LC uses a proprietary multi-dimensional feedback mechanism for evaluating effectiveness of its training program. The figure 2 illustrates this feedback mechanism. The multi-dimensional model integrates feedback from multiple sources including participants of training programs – classroom, virtual and self learning, trainers, impact analysis reports, on-the-job training assessment sheets, mentoring reports, graduate engineering trainees (GET) 6-monthly and confirmation presentations, senior management reviews, open houses, quarterly quality management reviews (QMR), Network performance reports (Daily, Weekly, Fortnightly, Monthly, Quarterly and Annual), validation test scores and assessment, certification and online quizzes. The learning's are translated to actionable points through integration with the development life-cycle.

FIGURE 2 – MULTI-DIMENSIONAL FEEDBACK MECHANISM

The conventional approaches of collating training feedbacks are not a sufficient indicator of the efficacy of the training programs. In fact there are many other avenues for tapping feedbacks for productivity and performance improvement of a telecom network. Current methods of participant validation involve a mandatory test at the end of a training program, the scores of which are deemed to be indicative of the participants' knowledge of the subject. However unattempted or wrong answers in the validation test can provide ample insights into the learning gaps of the participants' learning and are never looked into.

In addition, network performance indicators, Mean-Time-To-Repair (MTTR), Root Cause Analysis (RCA), network failures etc provide good insights to potential learning gaps and should be used as training design inputs to improve upon the existing training modules and its delivery. In-depth knowledge is a pre-requisite to effective troubleshooting and impacts business performance.

Network performance reports of all the network elements (NEs) are generally captured by operation support systems. These reports provide key performance indices (KPIs) of cellular radio network, packet and TDM core networks, value added services (VAS) platforms etc. Performance parameters, its threshold settings and observed gap give insight on network quality, performance. These important feedbacks provide ample opportunity to uncover potential learning gaps and reinforcing redesigned course modules to improve competency level of employees. Return of investment (ROI) from training can be maximised when holistic feedback is taken into account in current training process.

The constituents of the multi-dimensional feedback system developed by the LC are enumerated in the following section:

- Trainer Feedback on any critical points or supplementary observations raised by training participants
- Impact Assessment is carried out by taking specific feedback (half-yearly) from the reporting managers of the training participants on the outcomes of training programs
- On-the-job feedback is used to evaluate and modify the trainings imparted to the fresh engineering recruits. This feedback also forms an important source for training need identification, course design & development and delivery
- Mentoring feedback provide details about the performance of the mentees. Because of their regular interaction with mentees, mentor is able to capture feedback which is not captured during normal training delivery
- GET project 6 monthly and confirmation presentations provide direct feedback on their learning and shortcomings during the training period
- Organizational learning and development activities and progress are presented and tracked at senior management meetings and the feedback obtained in ploughed back as a design input

Training programs supplemented with self learning modules (SLM) enhances the learning efficiency. A paradigm shift is required in Training Need Identification (TNI), equipping trainers (SMEs) with sufficient skills and knowledge, course design & development, thorough feedback capturing & analysis and training delivery. It is conclusively established that continuous learning and skill updation is mandatory to the various stakeholders in the telecom domain – the individuals as well as teams/organizations.

The following points summarises the need for a multi-dimensional feedback mechanism:

1. There are many potential areas for obtaining critical feedback for the learning & development function, which are not generally included in the normal evaluation process. These include on-the-job feedback, validation test, impact analysis, mentoring, presentations by participants, meetings, network performance reports, MTTR and downtime analysis among others
2. The curriculum design & development process is incomplete without translating multi-dimensional feedback into learning objectives. Learning solutions without a holistic feedback mechanism would not be able to improve the training delivery

5.0 LEARNING AND DEVELOPMENT FRAMEWORK

LC has developed two models for providing customized learning solutions to meet the technological challenges, business requirements while keeping in mind the unique requirements of individual learners. The ALS model has been developed to accelerate the learning curve of fresh engineering graduate recruits while 3T's model meets the requirements of the experienced engineers.

ACCELERATED LEARNING SOLUTION FRAMEWORK

The Accelerated Learning Solution Framework (ALS) offers instructor led conventional and virtual classroom (video conference) learning supplemented by a self learning framework.

3TS (TELECOMMUNICATION, TECHNOLOGY AND TRAINING)

3Ts (Telecommunication, Technology and Training) model is a cost effective learning solution in comparison with conventional & virtual classroom techniques. It is tempered with a voluntary self learning and mandatory certification mechanism, thereby increasing its effectiveness and creating a learning organization. The model goes beyond traditional e-learning and is an amalgamation of online learning, virtual learning, distributed learning, networked or web-based learning techniques. 3Ts training model includes hands-on experience on live equipments in training labs that can be accessed locally as well as remotely over Intranet/Internet. Trainers provide online guidance and evaluation to individual participants during practical sessions. 3Ts model facilitates balances learning while developing proficiencies required in managing huge multi service global networks within specified quality levels.

5.1 TRAINING NEED ASSESSMENT

Designing a training and development program involves a sequence of steps that can be grouped into five phases: needs assessment, instructional objectives, design, implementation and evaluation. The training needs are assessed by a 4-tier hierarchy comprising of the immediate supervisor, department head, Learning Center and HR. Training needs are assessed broadly based on

- Organization and its goals and objectives
- Jobs and related tasks that need to be learned
- Competencies and skills that are need to perform the job
- Individuals who are to be trained

The learning solutions are structured into three levels basic, intermediate and advanced.

5.2 CURRICULUM DEVELOPMENT

Learning solutions are developed based on the inputs received from training need analysis and the multi-dimensional feedback mechanism. These include conventional courseware, presentations supplemented with e-learning modules (self learning), videos, best practices, route cause analysis (RCA) duly validated by LC and functional subject matter experts.

5.3 TRAINING DELIVERY

The reinforcement of training solutions after taking into account all the training needs is done through following methods:

- Conventional classroom
- Video Conference (VC) based distance learning
- Voluntary self learning & mandatory certification
- On-the-job learning

Conventional classroom based training is primarily used for Induction training of fresh engineers and employees present at training location. To infuse required skills and capability, LC offers them 3Ts (Telecommunication, Technology and Training) blended learning exposure of theory and hands-on on telecom technology and network equipments. It is a cost effective learning solution, developed by leveraging LC's experience in delivering learning solutions for over a decade, as compared to conventional & virtual classroom techniques. The model goes beyond traditional e-learning and is an amalgamation of online learning, virtual learning, distributed learning, networked or web-based learning techniques. Training on diverse and complex telecommunication technologies gives leverage to a corporate on doing strategic planning, data security, offering competitive B2B & B2C solutions, efficient network operation and management.

5.4 TRAINING EVALUATION & FEEDBACK

Training program include an evaluation mechanism to track employees learning. Certified task-force is the key in achieving set targets, productivity and growth. Improved service quality, customer satisfaction and retention, higher network usage and hence higher revenues are then achievable goals. Learning environment in an organisation creates a win-win situation for both employees and the organisation.

6.0 RESEARCH METHODOLOGY

The broad objective of this research is to present and analyze the impact of a multi-dimensional feedback mechanism on employee competency development and productivity improvement in the telecom industry.

6.1 RESEARCH OBJECTIVES

The specific objectives include:

- To establish the impact of feedback on training delivery and employee competency development
- To measure the effectiveness of a holistic feedback mechanism on employee productivity and performance

6.2 HYPOTHESIS

Hypothesis for this research is as below:

H1: A multi-dimensional feedback mechanism positively impacts Employee Learning and Development
H2: A multi-dimensional feedback mechanism contributes to the development and delivery of effective enterprise Learning Solutions

6.3 SAMPLING DESIGN

The research employed stratified variable sampling with a sample size of 100. The issue of variable sampling has been used extensively in conceptual development but has received almost no empirical evaluation. The development of both validity and reliability models has used the concept of variable sampling. For example, content validity "is established by showing that the test items are a sample of a universe in which the investigator is interested" (Cronbach & Meehl, 1955, p. 285). Likewise, internal consistency definitions of reliability, such as KR-20 or coefficient alpha, have relied on variable-sampling arguments (Cronbach, 1951; Kuder & Richardson, 1937).

This research study was based on the data collected from the core network period 2011-2012. A sample size of 100 participants is deemed to be statically significant for the purpose of hypothesis testing.

6.4 DATA COLLECTION

The primary data for this research has been collected through online feedback system, LC management information system (MIS), PMS records, mentoring feedback, impact assessment, CTO review meetings, National Network Operation Center (NNOC) performance reports on core switch MTTR, switch availability & answer to seizure ratio.

6.5 DATA ANALYSIS AND INTERPRETATION

The participant feedback is captured online after the end of every course and Training Delivery Index (TDI) and Trainee Satisfaction Index (TSI) is computed from the feedback. TDI & TSI of courses on telecom Core domain – function Switch is shown in figure 3 & 4.

FIGURE 3 – TRAINING DELIVERY INDEX OF CORE DOMAIN - SWITCH

Training Delivery Index (%)
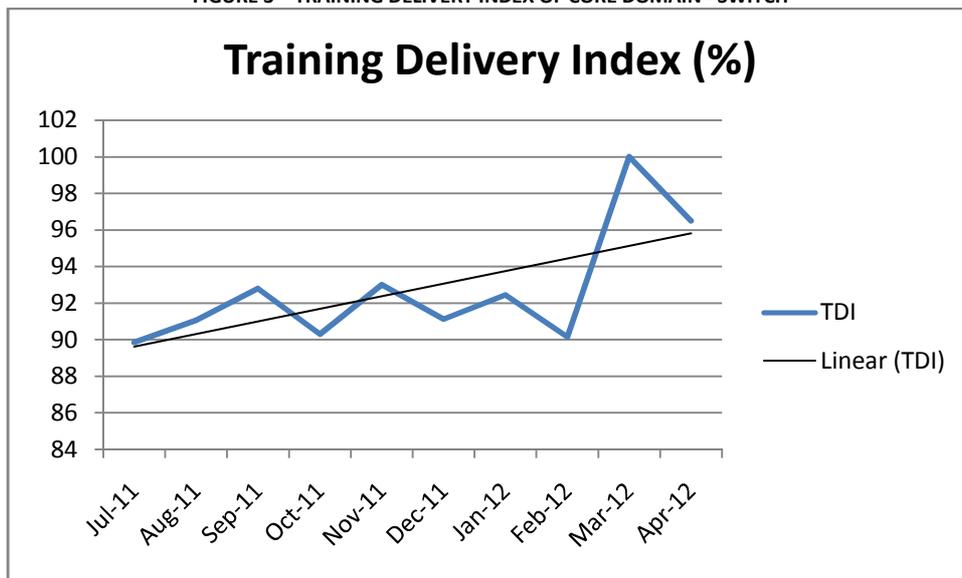
FIGURE 4 – TRAINEE SATISFACTION INDEX OF CORE COURSES

Trainee Satisfaction Index (%)
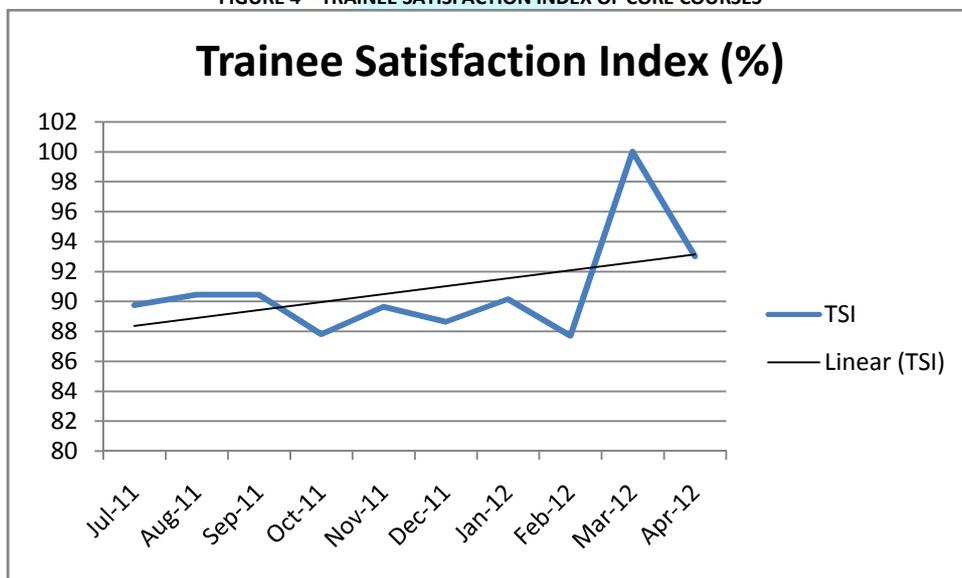
Feedback of participants and few main telecom network KPIs – MTTR, Availability and Answer to Seizure Ration (ASR) are analysed for hypothesis testing. MTTR is a basic measure of the maintainability of repairable items. It represents the average time required to repair a failed component or device. It is the total corrective maintenance time divided by the total number of corrective maintenance actions during a given period of time. Network MTTR for critical and non-critical faults is set at 2 hrs and 4 hrs respectively. The Switch MTTR in figure 5 shows that switch MTTR is well within the minimum limit of 2 hrs for all types of faults.

FIGURE 5 – CORE SWITCH MTTR

Switch MTTR
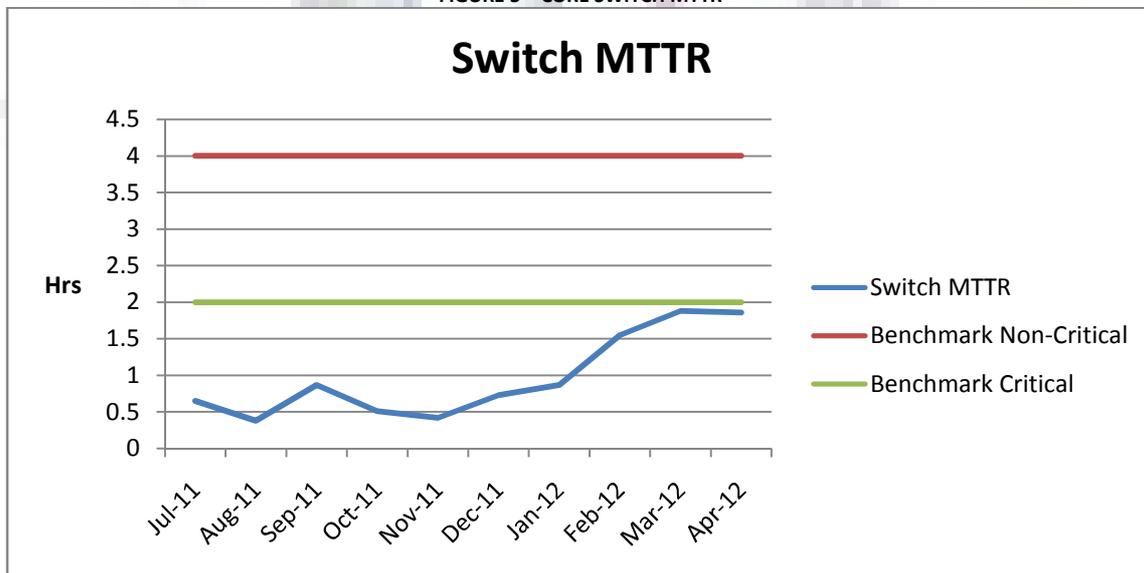
Improved switch availability directly represents the readiness of the exchanges to carry subscriber call or services. It leads to increase in or sustained level of ARPU (Average Revenue Per User), Wireless MoU per sub (Minutes of Use), RPM (Revenue Per User), EBITDA (Earning Before Interest Tax Depreciation & Amortisation) and customer satisfaction. Figure 6 shows sustained high core switch availability over the observed period.

FIGURE 6 – CORE SWITCH AVAILABILITY
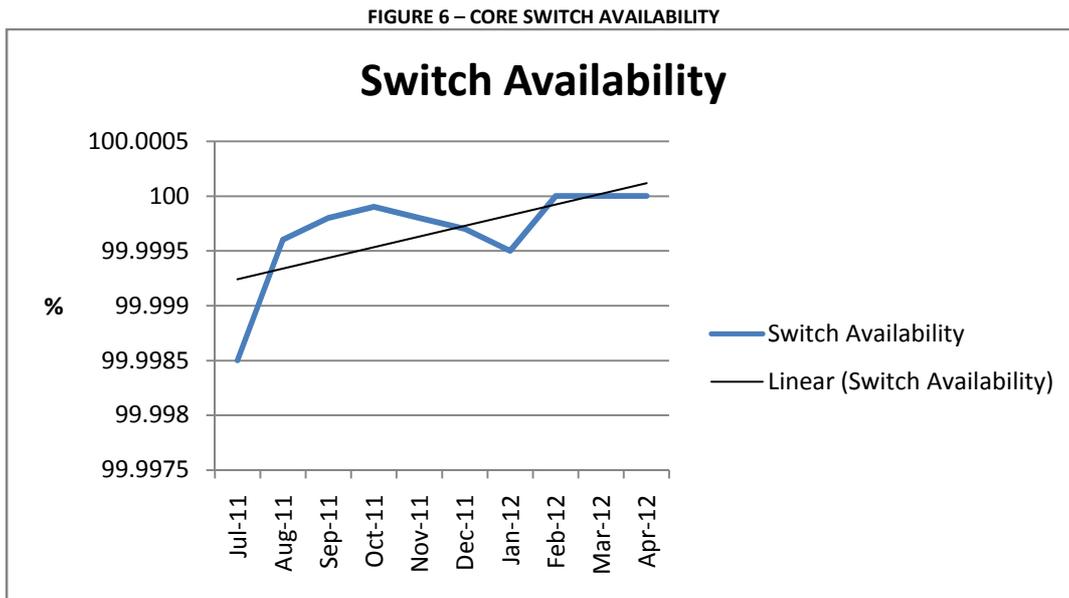
Figure 7 represents Answer to Seizure ratio of telecom switches. ASR represents a ratio of successful call to all call attempts received by the exchange. All call attempts (seizures) do not result into revenue for the operator. An answered call ensures revenue from the call. There are many factors beyond network, affecting ASR. Some of the reasons of poor ASR is no answer by the called party, rejecting a call by the subscriber, ring out and no answer etc. Improvement on ASR can be achieved by high network availability and improved network KPI or quality. Improvement on ASR over a long period indicates improved and healthy network.

FIGURE 7 – CORE SWITCH - ANSWER TO SEIZURE RATIO
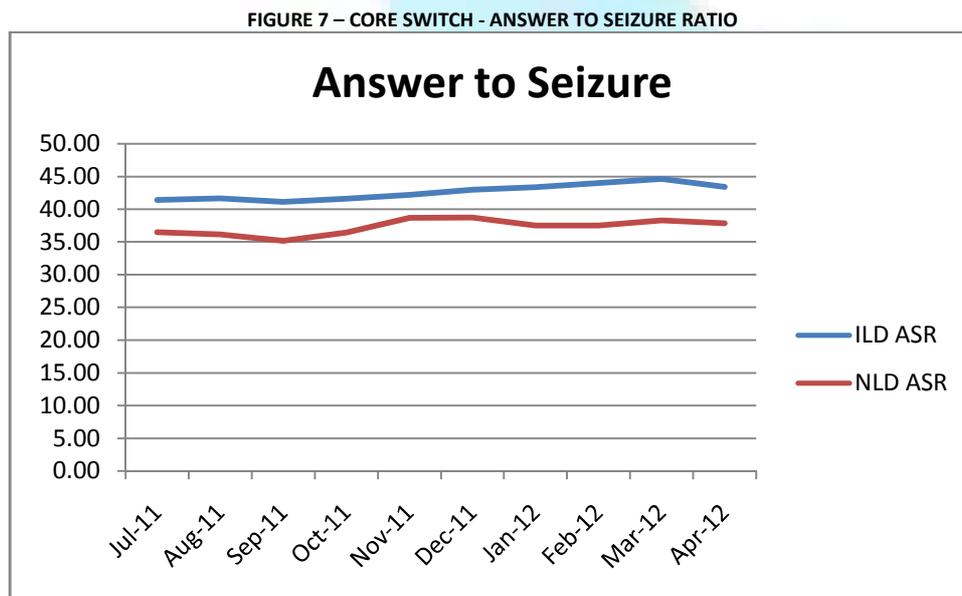
6.6 HYPOTHESIS TESTING

Null Hypothesis

H_01: A multi-dimensional feedback mechanism does not impact organizational learning and development

TABLE 1 – HYPOTHESIS TEST SUMMARY FOR FEEDBACK & LEARNING

		PAIRED SAMPLES TEST							
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ILDASR - TDI	4.12927	2.72879	.86292	2.17721	6.08133	4.785	9	.001
Pair 2	SwitchAvail - TDI	7.2766800	3.2222849	1.0189760	4.9715962	9.5817638	7.141	9	.000
Pair 3	ILDASR - TSI	6.09427	3.17177	1.00300	3.82533	8.36322	6.076	9	.000
Pair 4	NLDASR - TSI	-6.06255	3.92055	1.23979	-8.86714	-3.25795	-4.890	9	.001

It can be observed that from Table 1 that p<0.05 for Pair 1 & 2. The null hypothesis stands rejected.

It can thus be inferred that a multi-dimensional feedback mechanism positively impacts organizational learning and results in employee competency development.

H_02: A multi-dimensional feedback mechanism does not contribute to the development and delivery of effective enterprise learning solutions.

It can be observed that from Table 1 that p<0.05 for Pair 3 & 4. The null hypothesis stands rejected.

Thus it can be inferred that the multi-dimensional feedback mechanism results in the development and delivery of effective learning solutions that positively impacts employee and network performance.

7.0 KEY FINDINGS

7.1 DESCRIPTIVE STATISTICS

TABLE 2 - DESCRIPTIVE STATISTICS

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
TDI	10	10	90	100	92.72	1.019	3.222	1.559	.687	2.073	1.334
TSI	10	12	88	100	90.76	1.135	3.588	2.206	.687	5.546	1.334
ILD ASR	10	4	41	45	42.61	.384	1.215	.315	.687	-1.286	1.334
NLD ASR	10	4	35	39	37.27	.378	1.195	-.399	.687	-.845	1.334
Switch Availability	10	0	100	100	100.00	.000	.000	-2.355	.687	6.243	1.334
Switch MTTR	10	2	0	2	.97	.183	.577	.807	.687	-1.019	1.334
Valid N (listwise)	10										

7.2 CORRELATIONS

TABLE 3 - CORRELATIONS

		TDI	TSI	ILD ASR	NLD ASR	Switch Availability	Switch MTTR
TDI	Pearson Correlation	1	.936**	.593	.382	.442	.703*
	Sig. (2-tailed)		.000	.071	.276	.200	.023
	N	10	10	10	10	10	10
TSI	Pearson Correlation	.936**	1	.527	.250	.218	.628
	Sig. (2-tailed)	.000		.118	.486	.546	.052
	N	10	10	10	10	10	10
ILD ASR	Pearson Correlation	.593	.527	1	.700*	.464	.797**
	Sig. (2-tailed)	.071	.118		.024	.176	.006
	N	10	10	10	10	10	10
NLD ASR	Pearson Correlation	.382	.250	.700*	1	.281	.319
	Sig. (2-tailed)	.276	.486	.024		.431	.370
	N	10	10	10	10	10	10
Switch Availability	Pearson Correlation	.442	.218	.464	.281	1	.437
	Sig. (2-tailed)	.200	.546	.176	.431		.206
	N	10	10	10	10	10	10
Switch MTTR	Pearson Correlation	.703*	.628	.797**	.319	.437	1
	Sig. (2-tailed)	.023	.052	.006	.370	.206	
	N	10	10	10	10	10	10
. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

INTERPRETATION: Following is observed from the above correlations.

1. Training Delivery Index has strong correlation with Trainee Satisfaction Index. Multi-dimensional feedbacks when taken into account for course improvement and delivery, positively impacts trainee satisfaction i.e. improved training contents are helpful in achieving on-the-job competence.

2. Training Deliver Index has strong correlation with switch Mean-Time-To-Repair. MTTR is observed well within the allowed specification limits. Improvement in training programs by incorporating multi-dimensional feedbacks has led to high levels of competence among the participants resulting in efficient handling of network O&M issues. This is reflected in sustained high levels of Switch MTTR. Following can be inferred from the TDI & MTTR correlation.
   a. A positive impact of training delivery on employee competencies
   b. Fulfilment of training needs
   c. Training ROI

3. Answer-to-seizure ratio of international long distance calls has high correlation with MTTR and hence TDI. This shows that learning solutions developed taking into account the multi-dimensional training feedback has resulted in less downtime of the network and high amount of successful calls which results into enhanced MoU, ARPU and EBITDA.

7.3 RELIABILITY STATISTICS

TABLE 4 - RELIABILITY STATISTICS

Cronbach's Alpha	N of Items
.754	6

INTERPRETATION: Cronbach's (alpha) is a coefficient of reliability. Cronbach's alpha will generally increase as the inter-correlations among test items increase, and is thus known as an internal consistency estimate of reliability of test scores. Because inter-correlations among test items are maximized when all items measure the same construct, Cronbach's alpha is widely believed to indirectly indicate the degree to which a set of items measures a single uni-dimensional latent construct. Cronbach's Alpha values > 0.7 shows an acceptable level of internal consistency.

7.4 FACTOR ANALYSIS

TABLE 5 - PRINCIPAL COMPONENT ANALYSIS

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.644	60.731	60.731	3.644	60.731	60.731	2.554	42.565	42.565
2	1.014	16.897	77.628	1.014	16.897	77.628	2.104	35.063	77.628
3	.759	12.655	90.282						
4	.471	7.855	98.137						
5	.097	1.620	99.757						
6	.015	.243	100.000						
Extraction Method: Principal Component Analysis.									

TOTAL VARIANCE EXPLAINED

INTERPRETATION: Principal component analysis (PCA) seeks a linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. This is called the principal axis method and results in orthogonal (uncorrelated) factors. Factor analysis on the above mentioned components shows two principal factors that

account for more than 77 percent variability. In other words effective feedback has a direct positive impact on training, employee on-the-job competency development and telecom network productivity & performance.

8.0   SCOPE FOR FURTHER STUDY
- Current study was conducted with 100 samples on Core Switch domain. Study may further be extended to other areas of telecom network e.g. GSM & CDMA Wireless, wireline, Access, Transport network etc with a large sample size
- To findings of this study may be validated through analysis of secondary data from similar studies in other telcos

9.0   CONCLUSION
- The study conclusively establishes the positive impact of feedback on training delivery and employee on-the-job competency development
- Holistic feedback mechanism ensures better training delivery. Effective training delivery enhances employee competencies and translates to effective O&M practices those results in improved network availability & performance

10.0   THEORETICAL, PRACTICAL IMPLICATIONS & LIMITATIONS OF THE STUDY
Evaluating training effectiveness is important because it sheds light on four aspects. This includes:
- How well the training program met the learner's needs and objectives
- What knowledge and skills it has imparted to learners
- What desirable change it has brought in the learners' performance
- What organizational benefits it has yielded

Financial assessment of a training program is crucial in that it provides useful insights into the Returns on Investment (ROI). This assessment depends on evaluating how well the employees implemented the skills they have learnt in the training program.

Effective use of training feedback for reinforcement of learning solutions is a pre-requisite for employee productivity enhancement and competency development. The proactively use of a feedback mechanism:
- Helps employees to monitor their own improvement
- Builds morale, by demonstrating an interest in staff development
- To maximize the training ROI (return on investment)
- Helps to determine the form of future training programs
- Assists with identifying the effectiveness of different forms of teaching (such as classroom based or distance learning)

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APPENDIX

TABLE 6 – MONTH WISE TDI & TSI

Month	TDI	TSI
Apr-12	96.5	93
Mar-12	100	100
Feb-12	90.15	87.7
Jan-12	92.45	90.15
Dec-11	91.13	88.63
Nov-11	93	89.65
Oct-11	90.3	87.8
Sep-11	92.8	90.45
Aug-11	91.05	90.45
Jul-11	89.85	89.75

TABLE 7 – SWITCH MTTR

Month	Switch MTTR	Benchmark Non-Critical	Benchmark Critical
Apr-12	1.86	4	2
Mar-12	1.88	4	2
Feb-12	1.55	4	2
Jan-12	0.87	4	2
Dec-11	0.73	4	2
Nov-11	0.42	4	2
Oct-11	0.51	4	2
Sep-11	0.87	4	2
Aug-11	0.38	4	2
Jul-11	0.65	4	2

TABLE 8 – SWITCH AVAILABILITY

Month	Switch Availability
Apr-12	100
Mar-12	100
Feb-12	100
Jan-12	99.9995
Dec-11	99.9997
Nov-11	99.9998
Oct-11	99.9999
Sep-11	99.9998
Aug-11	99.9996
Jul-11	99.9985

TABLE 9 – ILD & NLD ANSWER TO SEIZURE RATIO

Month	ILD ASR	NLD ASR
Apr-12	43.40	37.83
Mar-12	44.63	38.30
Feb-12	43.98	37.51
Jan-12	43.35	37.49
Dec-11	42.94	38.72
Nov-11	42.18	38.69
Oct-11	41.57	36.4
Sep-11	41.1	35.15
Aug-11	41.62	36.12
Jul-11	41.38	36.45

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