

## **Compliance Education (CE) In Presence of Noise in the Form of False Beginner- The Effects of Flipped ‘LI & Assessment ‘model**

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**Abstract:** Compliance Education (CE) is one of the critical performance functions of the Corporate L&D (CLD) department of all organizations where compliance matters. The price of non-conformance as well as price of conformance, is high stakes too. One of the key factors of compliance measurements is conformance to norms, and the norms include compliance towards the subject of CE itself from a knowledge management perspective.

The compliance to CE acts as one of the prime performance criteria of CLD, with high stakes for business continuity, as well as Business Process Excellence (BPE); many functions at an organization level are dependent on a reliable CE for their process integrity. Further, CE itself, is closely linked to continuing education, and in many cases the learners are participating in the CE Learning Intervention (LI) not for the first time. Therefore, there is a high degree of repetition of Terminal Objectives (TO), and therefore enabling Objectives.

This paper aims to address 2 aspects of this problem in sequence. The first is to organize and analyze the current challenges in Compliance Education, and assessing the current state of the Teaching Learning Environment (TLE) in the target segment considered for this experiment. The CE participants include the CE learners, as well as the sponsors, and analysts involved in identifying, creating, disseminating, and tracking of CE. Basis these, this paper establishes that CE deals with an extreme case of the False Beginner (FB) factor which affects the desired results, and compliance to CE from a business continuity as well as Business Process Excellence perspective by causing ‘noise’/entropy in these processes. The second is based on further surveys, and experiments conducted for CE participant groups to assess the nature of false beginner factor, and establishes the effectiveness of a flipped curricula design approach and the 70/20/10 model towards reducing the FB factor leading to towards BPE. Thus establishing cognitive reasonings’ closed loop, which on implementation ensures implementation of differentiated integrity LI, totally eliminating CLD/HR’s compliance non-adherence stress/risk.

**Keywords:** False Beginner, Teaching Learning Environment, Corporate L&D, Corporate University, Compliance Education, Continuing Education, flipped curricula, 70/20/10 learning model, compliance non-adherence risk, differentiated integrity, Learning Environment.

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### **I. Introduction**

The organized sector, and the workforce as we know, is producing products and services that affect and influence almost every human being on the planet directly or indirectly. Post the industrial revolution, and many other large milestones such as the IT boom and IOT (Internet of Things) make all these product and services not just business critical, but also life critical to the consumers as well as the workforce and environment that are involved in the production, rendering, dissemination, maintenance, and usage of such products and services.

With such mass scale of production, rendering, and consumption, even small failures potentially have an exponential impact. Hence the significance of standards, conformance, and compliance become utmost important for all business processes. This has seen an advent of multiple regulatory bodies as well as standards and compliance bodies that define, regulate, audit, and certify against stated standards for compliance. Such bodies are active in all industries as well as individual business processes.

Much later after the industrial revolution, and post the first world war around 1918, the differences in standards across industries and countries was posing a huge challenge to trade and growth. This period saw multiple standards organizations coming into play to overcome this challenge. Few examples include ANSI: The American National Standards Institute which is a private, not-for-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the

United States. The ANSI organization also coordinates the inter-relation of U.S. standards with international standards so as to enable American products to be compatible and usable worldwide[1]. On a similar line of goals there are other similar organizations such as French AFNOR (Association Française de Normalisation). Other industries such as education, publishing, banking, finance, insurance, and securities industries also have their respective bodies in different countries and economies. Some examples include IRDA (India), SEBI (India), FINRA (US), State specific DOIs (US).

## **II. Compliance Education Evolution, Taking a Prominent Place in L&D**

The advent of hundreds of standards, regulations, and bodies led to the need for compliance as a very prominent and explicit business function in each industry. While compliance has its benefits, it can only be fruitful for a business if it is implemented, and sustained. Which leads to the need for compliance education.

The world population of employed workforce has crossed 3 billion a few years ago, and continues to increase [2]. This continuing growth must maintain and continue compliance to stated standards applicable to the respective industry and business they are part of. And the definition of 'ready to perform' (RTP) workforce on a continued basis to balance responsiveness to customers with workforce talent management. The RTP definition is compelled to include 'compliance educated' as part of the readiness criteria.

Compliance training becoming an integral part of business operations highlights the importance of compliance training and its impact with and through the workforce. The percentage of workforce in different roles need to be trained, and assessed for compliance at regular intervals, and the percentage of such training, assessment and certifications itself becomes one of the goals of the corporate L&D (CLD) to ensure stable and high standards of quality of services and products towards organizational mission and goals [3]. The maintenance of such compliance training and the corresponding records are also an integral part of the overall compliance as a process; so much that attaining and sustaining an acceptable level of compliance to regulations, guidelines, or directives presents a challenge to every business organization[4]. Compliance education programs usually combine in-house tailored programs with extramural courses, both of which are very valuable.

## **III. The cyclic nature of CE: CE as a subset of Continuing Education**

Compliance is not a one-time activity. Compliance is an ongoing process, a continuing process, which is inherent to adult education/professional education to remain current[5]. Once an organization is part of a compliance program, it needs to continually comply with the standards and norms defined by the compliance undertaken. This applies to all segments and industries where compliance matters, and applies to almost all industries, including but not limited to IT, banking, clinical research, and law firms. The need for compliance education is growing[6][7]. Due to this nature, there is a cyclic refresher training need, even if the workforce is once trained, and none of the compliance standards have undergone a change [8].

For the other permutations, there are scenarios including first time learners, as well as learners who have gone through a previous cycle(s) of compliance training. This is seemingly a compliant scenario, but what if there has been a regression, or there has been changes in the regulation since then? In such cases, there is need for quality processes in place[4]. The relevant employees/learners need to be put through a Learning Intervention (LI) that will bring them up to speed on compliance as an end to end LI, or as a delta training for the changes in regulations and compliance thereof. To achieve this, in some organizations, compliance education is being brought in as early as new hire orientation[9].

At a higher level in CLD, there are competencies and skills areas that call for continuous training and education even in absence of being driven by an external regulatory[10]. For a business to sustain competitiveness, there are competency areas that need a constant refresher, as well as up-skilling /upgrading of workforce for optimal performance of the individual, summing up to team performance, and organizational performance[11]. This applies to all industries for businesses to remain competitive, and to stay out of compliance risks [12].

## **IV. Terminal Objectives, Learning Objectives, and Enabling Objectives in CE.**

Each LI in the compliance TLE ecosystem is aimed at attaining Terminal Objectives (TOs)[13] of that compliance LI. The TOs are defined by the regulatory body that demands conformance.

In a Teaching Learning Environment (TLE) for any subject area, to reach a desired learning outcome or Terminal Objectives (TO), there occurs, an interplay between the Instructional Agent(s) (IA) and the learner. Each of the terminal objectives, have a corresponding part in the LI, most commonly called, Learning Objects which itself is modelled around a Learning Objective (LO)[14].

While the Terminal Objectives (TO) define the desired end outcomes, the LOs act as enabling objectives towards TOs. There may be one or more LOs that enable a TO. For ease of understanding, all such interactions are collectively called the LI to produce the stated learning outcomes or meeting TOs. A LI is scoped by the achievement of desired objectives, or intended TOs, and starts with the learners at the Entry

Profile (EP). The journey starts as what is defined as the EP level for that LI. And the journey of taking the learner from the EP through the TOs to attain the exit level is the LI.

## **V. Task centric view of CE and the interdependence of Task Centricity TOs with Process Centricity at a higher level in CLD ecosystem**

The compliance education inherently aims towards adherence to stated conformances, and everything else in the TLE is oriented towards achieving this adherence[15]. In other words, CE TLE is focused on meeting the TOs. The LOs act as enabling objectives towards the respective TOs. The assessment too, is oriented towards the TO. The LOs are aimed towards instructions for the pre-determined specification, and to achieve pre-determined (expected) results. Hence these LOs are task centric, and the LI comprising of such LOs is task centric as well. At this stage of understanding, it is important to note that given the 'tasks' may or may not be sequential or in progression with respect to each other, hence the individual corresponding LOs too are discreet (independent) from each other.

However, at a high level, above LI, the LI itself is part of a compliance process which is cyclic in nature, and interlinked with subsequent progression of compliance cycle. The LI, is also interlinked to various performance criteria as well as related compliance norms. Hence part of a larger process ecosystem where the LI is linked to a specific business process towards BPE. Hence the LI and especially the cyclic repetition for continuing compliance is process centric at that level in CLD ecosystem.

## **VI. Established Fact: FB in ELT and CLD TLE**

In an earlier paper, it is established that False Beginners (FB) exist in ELT as well as CU and CLD TLE[16]. Consequently, it is important to research how to cope with FB in CE specifically. The exit level for each compliance cycle in an LI is clearly defined by design in an LI for compliance, with little variation expected across learners because that is verified and remediated by various method inside the LI, ranging from end-assessments to scaffolding and fading while the learner is still in the LI. The entry or beginner level is usually defined as prerequisite knowledge [17]. In other words, the minimum level that will qualify a learner to gain an entry to the LI.

But not all learners may be exactly at the entry level as intended, by design, for a given LI. Especially, the learners who have been part of the compliance cycle before, have had exposure to same (or similar) LI in the previous cycles for the same TOs. While interventions such as entry test eliminate the ones who know less than desired beginner level (pre requisite knowledge), it may allow learners who know 'more' (in context of the LI TOs), to enter the LI. This extra knowledge has an effect on the outcomes or effectiveness of the LI[16].

In either case, it is an anomaly to the original design of the LI as a process, as input integrity failure in the IS view of the LI[18]. Because the LI was designed for a particular input profile (input to the IS process), but for various reasons multiple learners entering the LI are not the exact match of the intended input profile, exhibiting variability across learners (heterogeneous population).

Beginner is a learner who is almost exactly at the start line of a LI. A learner will travel the distance (figuratively) to the exit level during the LI, learning path(s). There are learners however, who are slightly ahead of the curve for various reasons (who know more than the pre-requisite), and hence not exactly 'beginners'. This learner can be anywhere between the two ends of the 'scope' of the LI, and that is where multiple possibilities arise. Such a learner is being called a False Beginners (FB) in this writing[16].

While most LIs take into account prerequisite knowledge[19], there is yet another factor, Prior Knowledge, which has an important role to play[20][21]. The concept of prior knowledge playing a vital role in the learning process is by now a familiar one, which has a marked effect on learning outcomes. Researchers typically rely on a number of methodologies to control for that factor in learning design. Some of the experiments reported, demonstrate that such methodological controls are relatively insufficient, compared to controls for testing pre-requisite knowledge [20]. To be more specific, such learners who have a more than zero level of prior knowledge on the Learning Objectives(LOs) yet to be covered in the LI [22], are called is False Beginners [23]. Learners who lack pre-requisite knowledge are not to be confused with such FBs [16].

## **VII. Learner population categories in CE**

In the CE paradigm, the CE TLE (Teaching Learning Environment) and the LIs within that are largely dependent on the learner population type, and the flux in compliance matter is directly related to the changes in regulation, and the nature and frequency of such changes. The learner population comprises of learners with varying attributes and compliance applicability. Therefore, in the CE context in particular, given the cyclic nature of CE, and given that the TOs defined are same for all learners, the first time participants in a compliance program are tested for pre-requisites, and are True Beginners (TB) [16]. However, the returning learners, who have participated in same compliance program in previous cycles, tend to know more than the assumed TB profile of the LI. This is illustrated in the diagram below:

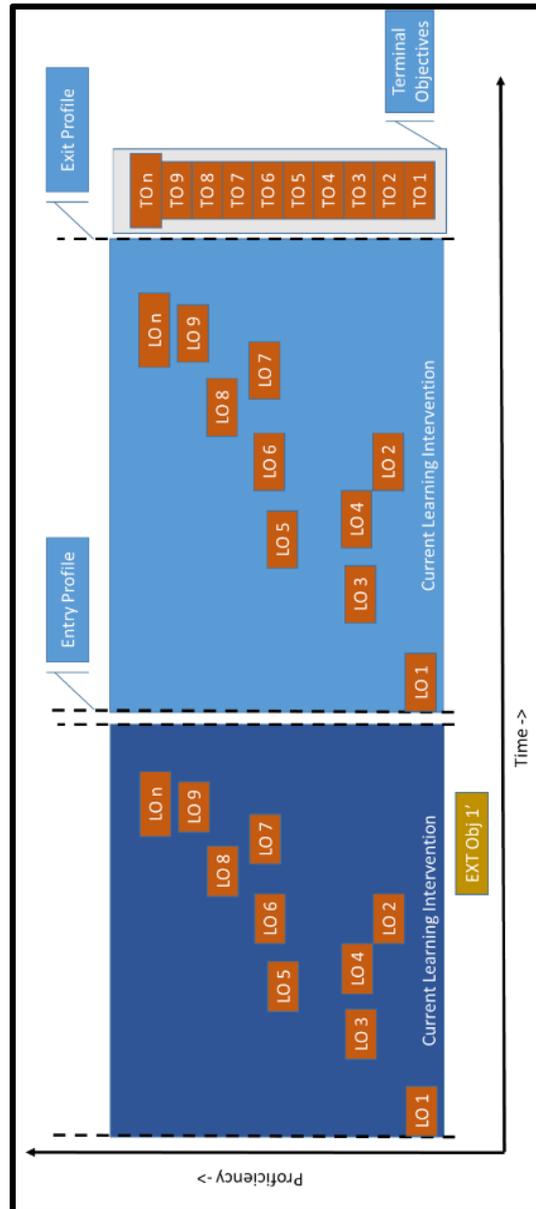


Fig 1: Returning learners in second cycle for same CE

In view of task centricity and process centricity of CE TLE, this can be better understood, by observing individual LOs in context of, and as a subset of an LI. To illustrate a True Beginner (TB), in a LI that will cover 3 main objectives (LOs), and say 18 sub objectives(LOs), with a possible score gradient of 10. In such a scenario, if these 18x3 sub objectives are to be taught, the true beginner, if given an entry test that comprises of same questions as the exit test for each of the sub objectives (TOs in case of CE), should ideally score zero for each. Note that this test is not the entry test to test for pre-requisite knowledge, but rather, for the objectives that are going to be covered in the current LI. And by way of definition of true beginner, he/she should know the pre-requisites, but not the objectives yet to be covered. In contrast to this, if the learners or audience of a given LI have already undergone the same (or similar LI) for the same CE (and therefore same TOs), then that sub objective should not be a part of the LI in the first place. Or, at an objective level, such a returning learner will score a score higher than the TB. In reality, such a learner may score near or more than the threshold exit score level in some cases. The representation below describes such a scenario, contrasting TB with returning learner in CE.

Sub Obj 18	0	0	0	Sub Obj 18	8	9	10
Sub Obj 17	0	0	0	Sub Obj 17	9	10	10
Sub Obj 16	0	0	0	Sub Obj 16	10	9	10
Sub Obj 15	0	0	0	Sub Obj 15	10	10	10
Sub Obj 14	0	0	0	Sub Obj 14	10	8	10
Sub Obj 13	0	0	0	Sub Obj 13	9	10	7
Sub Obj 12	0	0	0	Sub Obj 12	10	8	10
Sub Obj 11	0	0	0	Sub Obj 11	9	0	10
Sub Obj 10	0	0	0	Sub Obj 10	10	1	10
Sub Obj 9	0	0	0	Sub Obj 9	-2	2	10
Sub Obj 8	0	0	0	Sub Obj 8	1	8	10
Sub Obj 7	0	0	0	Sub Obj 7	5	8	7
Sub Obj 6	0	0	0	Sub Obj 6	5	8	10
Sub Obj 5	0	0	0	Sub Obj 5	8	10	-1
Sub Obj 4	0	0	0	Sub Obj 4	0	8	7
Sub Obj 3	0	0	0	Sub Obj 3	8	8	10
Sub Obj 2	0	0	0	Sub Obj 2	10	10	10
Sub Obj 1	0	0	0	Sub Obj 1	7	8	10
Sub Obj 0	0	0	0	Sub Obj 0	9	0	10
	Obj 1	Obj 2	Obj 3		Obj 1	Obj 2	Obj 3
	Learner #1 TRUE BEGINNER				Learner # - Extreme FB in CE		

Fig 2: Representation contrasting a True Beginner with a Returning Learner in CE.

In the technical view of TLE, and Integrity Learning Systems (ILS)[18], the presence of such TB as well as FB in the CE TLE causes 'noise'(even distortion) in the system which is recognized in the form of challenges in CE.

### VIII. CE: challenges of completion, and cost of compliance and cost of non-compliance

The CE TLE in the Corporate Universities (CU) as well as CLD faces multiple challenges. Some of those are common to all LIs independent of whether they are related to formal CE or not. Few challenges are specific to compliance itself. The challenges in CE TLE are not entirely different from challenges in the LIs other than CE, but the implications are much more severe because the consequences include operational implications (inward out), as well as external (outward in). This is evident from the multitude of compliance notices, restrictions, and penalties issued by different regulatory bodies[24][25]. The percentage of workforce participation and out of that, percentage of completion of compliance training is an important attribute of measurement, which has a direct implication on quality of services coherent with organizational strategies, standards, and mission(s)[3]. To summarize, the primary challenges with highest frequency and impact are:

- Percentage of employees compliant to be kept high. That is, number of candidates complying with the completion norms within the completion deadline.
- L&D Costs per compliance cycle need to be kept low. While there are many kinds of costs, this study focuses on L&D costs specifically.
- Level of compliance within the compliant workforce needs to be kept high. Given that the exit test is the criteria, and pass percentage is usually relaxed to a number lower than 100% score (say 90%), this clearly indicates that for any individual participant who has attained passing score, less than 100%, there are some TOs where compliance is at risk for this participant.

The CE TLE in an organization works like any other Quality process. The SIPOC is predefined [26]. These concentrate on execution of tasks as per conformance norms set in the form of pre-defined supplier, inputs, process tasks, output specification, and end customer acceptance criteria. These quality processes assume collective requirement of learners and the quality system makes an assumption that they are all the same/similar. But in reality, the learner population is heterogeneous as observed in the current state data that shows compliance is being met above threshold, but below 100%; which indicates quality is existent, but not sufficient. As a consequence to these compliance challenges, like any other quality system, there is a cost measurement applicable which are normally measured as Cost of Quality in terms of quality as well as non-conformance [27]. The cost implications exist not just in monetary terms, but also from a business operations consequence perspective. The first kind of cost is Cost of Compliance (CoC) which comprises of cost(s) incurred by a compliance driven/governed business for ensuring compliance. At the minimum, such costs are the nominal pre-budgeted cost incurred for planned (budgeted) compliance activities. However, there can be situations where an unforeseen compliance challenge comes up, and an unbudgeted, disproportionate expense/investment has to be incurred to recover from a potential non-compliance, to ensure compliance. The second kind of costs are more severe. These are Cost(s) of Non-Compliance (CoNC). These are costs incurred by a compliance driven/governed business for remedial action towards recovery from a situation of non-compliance which has already occurred. In some cases this could be a remedial cost, whereas in some other cases, where the non-compliant task or process is irrecoverable from a compliance perspective, costs have to be incurred towards

regulatory penalties, warranties, and compensation to affected parties. In some regulatory scenarios[24], the CoNC can be as severe as temporary or permanent suspension of license to do business.

### IX. They key hypothesis of this study:

FBs are an established observation in ELT TLE as well as CLD and CU[16]. The CE TLE by its cyclic nature, fosters learner population to become FB with the repetition (cyclic) of same set of TOs to same population set. If the FBs already possess a certain level of knowledge in context of LOs, this causes 'noise' in the functioning of TLE (almost like noise in signals context). Especially in TLE with LI designed for TBs. Thus, re-engineering the LI to have a differentiated instruction set for FBs will have a positive impact on the key challenges of CE. In particular, redesigning toward a flipped Assessment & LI model.

### X. Material and Methods: To confirm the effects of a flipped assessment & LI model on CE levels.

In 2016, a detailed study was conducted through series of surveys and LI experiments on a target group of analysts and learners to confirm the effects of a flipped assessment & LI model on CE levels. The experiment comprises of four progressive stages, where findings from one stage led to a deeper investigation through experimentation in the subsequent phase.

Study design	This study comprises of 4 stages: <ul style="list-style-type: none"> <li>• Part A: Objective survey of training managers (sponsor, team lead, and analysts) to identify current state and business concerns that are preventing BPE.</li> <li>• Part B: Survey of participants to understand participant concerns.</li> <li>• Part C: Experiment to observe effect of exit test given before LI</li> <li>• Part D: LI and assessment re-sequenced, implemented, and observations made</li> </ul>
Study period	2016
Study location	Analysts, customer, and compliance stakeholders: from Europe. Learners present in India
Population size	Workforce: >3 Billion [2]
Sample size	35 Learner participants from: 1 Fortune 1000 organization + 1 Indian MNC
Selection method	A set of multinational organizations, who are part of at least one compliance rule set governed by a regulatory body external to the organization, and organization's circle of control.  Multiple organizations were contacted for consent to participate in this study. This study involves 2 organizations; names, projects, and locations to be kept anonymous. NonProbability sampling was used, to attain a subset of 'expert sampling'
Inclusion criteria	Companies which have 500+ employees, and formal L&D function. Governed by at least one regulatory body external to the organization, and organization's circle of control. This was also a function of reach, which is the set of eligible people within the network of reach. Respondents: L&D managers, or training sponsoring managers. From a respondent profiling perspective (analysts), a specific set of respondents from a specific role and set of organizations were chosen, who have observed multiple Learning Environments and LIs in CE, due to their job role, and hence would have relevant exposure to respond with.
Exclusion criteria	Organizations smaller than 500 headcount, no formal L&D function, or no compliance requirement.

Organizations were profiled basis the following criteria:

- That have at least 500+ employees
- That have an explicit investment in employee training
- Have an explicit function dedicated to L&D with at least 2 employees dedicated to this function
- Respondent Profile chosen:
- Individuals from L&D department
- Individuals from Learner Community were also chosen
- Individuals from 'sponsoring' position were chosen. The sponsors are typically managers, who makerecommendations, and business sponsorship from an expense and time perspective to recommend and facilitate the enrollment of individuals (learners) who will be attending a training. This can be supervisors who sponsor the employees, OR Individuals who sponsor creation of LI itself (in the form of budgets to the L&D division).

### XI. Glossary and critical terminology

- BPE: Business Process Excellence. BPE refers to a state where the key performance parameters of a business process are increasing and tending to, or surpassing the desired levels.
- BPO: Business Process Outsourcing.

- **CB: Continuing Beginner.** Is a learner who is repeatedly participating in a LI, and the LI assumes as if this learner is participating in this LI as a true beginner for first time. In other words, the LI does not distinguish between first-time learners vs. repeat learner, or learners who have prior knowledge of the LOs being covered in the LI owing to a prior LI of same or almost the exact same TO/LOs.
- **CE: Continuing Education.** This refers to certain scenarios in education, where, although the TOs remain more or less constant, their specifications or details undergo changes. And hence need a cyclic implementation to ensure retention and progression.
- **CLD: Corporate L&D.** The Learning and Development division in a corporate.
- **CU: Corporate University.** CUs are distinct from formal universities and not to be confused with 'university' per se[28]. In many corporates, the L&D function performs the responsibility of employees learning progression with almost as much rigor and formality as a university would, to help the employee attain the next level of knowledge, and almost like a degree, this L&D department also awards a certification to the learner. This certification may be recognized only within the organization, or in some cases beyond the organization as well. For example, a Microsoft official certification of a Microsoft employee would be recognized across industry.
- **CoC: Cost of Compliance.** This is the cost incurred by a compliance driven/governed business for ensuring compliance. In some cases the costs are nominal pre-budgeted cost incurred for planned compliance activities. However, there can be situations where an unforeseen compliance challenge comes up, and an unbudgeted, disproportionate expense/investment has to be incurred to recover from a potential non-compliance, to ensure compliance.
- **CoNC: Cost of Non-Compliance.** This is the cost incurred by a compliance driven/governed business for remedial action towards recovery from a situation of non-compliance which has already occurred. In some cases this could be a remedial cost, whereas in some other cases, where the non-compliant task or process is irrecoverable from a compliance perspective, costs have to be incurred towards regulatory penalties, warranties, and compensation to affected parties. In some regulatory scenarios[24], the CoNC can be as severe as temporary or permanent suspension of license to do business.
- **Current LI: Current Learning Intervention.** In a series of LIs, this is the intervention that is currently ongoing, and being observed/studied.
- **ELT: English Language Training**
- **FB: False Beginner**
- **IA: Instructional Agent.** IA is the source of instructional dissemination in a TLE. IA can be best understood by examples. In an ILT (Instructor Led Classroom) the instructor and any props or PPTs are IA. Similarly, a podcast, a book, a WBT, or a PDF can be IA in respective TLEs.
- **L&D: Learning and Development.** L&D is most commonly used term for referring to the function/group in an organization that is responsible for learning and development of workforce within that organization. In some organization, the L&D department may also be responsible for learners other than employees of the organization who are in some or the other way related to the BPE of the organization. Most commonly, such external learners may include external sales and service channel, technicians, scholars, and in some cases customers too.
- **LI: Learning Intervention.** LI is an intervention made to an individual(s) to achieve a particular learning outcome, commonly referred to as Terminal Objective(s).
- **LO: Learning Objectives.** LOs are a set of supporting or enabling objectives that together take the learner towards TOs.
- **RTP: Ready To Perform**
- **TB: True Beginner.** TB is a learner in a LI, who has the exact level of knowledge as defined as the pre-requisites of that LI. More importantly, the TB essentially has zero prior knowledge of the LOs to be covered in the LI. The nearest matching term used in the learning industry for TB, is 'entry profile'. However, Entry profile focuses primarily on pre-requisites, and not prior knowledge about the LI.
- **TLE: Teaching Learning Environment.** The TLE is the environment where teaching and learning is taking place. The teaching is not essentially led by a named teacher, but can be any instructional agent in any form. The learner undergoing learning is essentially a human in common context, but can be a machine [29]too.
- **TO: Terminal Objectives.** TO define the learning designer's expectations of learner towards performance criteria after the Learning intervention has been completed.
- **TTP: Time To Performance.** This is the time taken by an LI (as a process) to take the learner from a nascent state of LOs to a state where the learner is ready to perform the desired tasks (attained TOs).

## **XII. Procedure and Methodology**

After consent was obtained, a well-designed sequence of questionnaires were used to collect the responses as well as experiments conducted on the corresponding target group of professionals who are part of the compliance program. To achieve this, a set of professionals were chosen from the customer as well as provider organizations. In this case, the compliance is stated, and governed by the customer organization based on their established standards. These two organizations are here onwards referred to as 'regulatory organization' and 'business organization' respectively. The live project included in the study: The project is part of a multi-year contract, where certain production is to be made as per guidelines specified in a version controlled compliance manual, and be complied to. The teams who are governed by the compliance are spread all over the globe, together comprising of hundreds of professionals for this particular compliance requirement.

Compliance cycle: There are certain updates to the guideline document which are published on an ad-hoc basis, as and when there is an amendment or addition/deletion to an existing compliance norm. For each such change, a formal email is sent out, targeted to a pre-defined distribution list (called the "Update-DL"), comprising of all personnel working on the project. All participants are required to comply with the updated norms as and when they are released, and each such release mail specifies the date from where onwards the change needs to take effect. The compliance document is updated and circulated once a month, and people need to be re-certified every quarter (3 months), to ensure that when they produce output, it will comply with the latest guidelines set.

This study comprises of 4 stages:

- Part A: Objective survey of training managers (learning analysts, team leads, and sponsor from both organizations) to identify current state and business concerns that are preventing BPE.
- Part B: Survey of participants to understand participant concerns.
- Part C: Experiment to observe effect of exit test given before LI
- Part D: LI and assessment re-engineered, implemented, and observations made

What follows, is the findings from each of these 4 stages.

### **XIII. Part A: Objective survey of training managers to identify current state and business concerns that are preventing BPE.**

The first part of this study aims at understanding of the current state, and current challenges. This was done basis objective survey and open ended questionnaire discussions with the training managers (sponsor, team lead, and analysts), and a study of data available from previous compliance cycle. The following summarizes the observations based on interviews, and compliance data shared from previous cycle about the compliance requirements in this scenario:

#### **Summary of responses to questionnaire and open ended questions exchanged with training managers:**

- There are a total of 20 TOs. On an average, every compliance cycle (quarter), specs change for about 5 TOs. The overall 20 TOs as objectives remain constant.
- The average 5 changes to TOs are received by all project participants, and they begin complying with these changes during the compliance cycle period, even before the LI and compliance certification test. Effectively, by the time they appear for the LI and test, they are already applying those LOs in real life. *This is possibly a reason why the individuals, as well as their managers feel that the LI and test is only an obligation/formality to be completed.*
- However, it cannot be assumed that all team members have read, understood, and internalized all the updates in all the mails from the Update-DL. This is reconfirmed by the fact that even after attending the training, not all passed students scored a 100%. *Which means, that there are certain participants, who lack knowledge on certain LOs.*
- The average cost per hour in the organization for this skillset workforce is approximately 15 US\$ per hour.
- The LOs and test items are already designed to the smallest granular level, and all test items are collectively, exhaustively testing for all delta items for the period. The relation between the TOs, LOs and test items is 1-1 in this case.
- The trainings (LI) are elongated because they take into account the first time learners.
- At the same time, past interventions of creating separate tests for first time learners Vs. returning learner, has not yielded good results. All TOs are important even for returning learners. Because even the learners who 'know', do not know 'all'. Hence there is risk in omitting repeat LOs for returning learners. Rather continue with them, with design improvements.

#### **Summary of observations from current state data, and inferences from questionnaire responses:**

- Out of total population, 83% appeared for test,

- Out of the total population, 17% did not attempt, 71% passed the test in the allowed 2 attempts, and 11% did not pass.
- There are certain TOs where one or more participants answered incorrectly, yet attained passing score overall. Such TOs were 75%, which is a high compliance risk. Only 25% of TOs were found, where all candidates answered correctly.
- Across all candidates (who attempted test) and TOs, the percentage of correct responses is 94%. Which implies that there is a 6% compliance risk from an LO perspective.
- Average seat time for LI + test is 4.84 hours. This translates to a total L&D dissemination cost of 2,541\$ per cycle for this batch of 35.
- Cost incurred by L&D included the following cost heads:
  - T<sub>A</sub>: Time spent by analysts in creating the initial and delta trainings
  - T<sub>B</sub>: Time spent by team members in attending training.
  - T<sub>C</sub>: Time spent by team members in attempting certification test.
- While T<sub>A</sub> will still be a requirement, T<sub>B</sub> and T<sub>C</sub> can be varied by change in design of LI and test.

Table 1: Previous cycle CE results

Candidate	Current State	Pass score	Training time (Hrs)	Test time allowed(Hrs)	Actual test time (Hrs)	Total time: training + test (Hrs)
Candidate 1	18	90%	4	1	0.8	4.8
Candidate 2	19	95%	4	1	0.8	4.8
Candidate 3	17	85%	4	1	0.8	4.8
Candidate 4	17	85%	4	1	0.8	4.8
Candidate 5	18	90%	4	1	1	5
Candidate 6	20	100%	4	1	0.8	4.8
Candidate 7	Did Not Attempt	#VALUE!	0	0	0	0
Candidate 8	Did Not Attempt	#VALUE!	0	0	0	0
Candidate 9	20	100%	4	1	0.8	4.8
Candidate 10	18	90%	4	1	1	5
Candidate 11	16	80%	4	1	0.8	4.8
Candidate 12	20	100%	4	1	0.8	4.8
Candidate 13	18	90%	4	1	1	5
Candidate 14	16	80%	4	1	0.8	4.8
Candidate 15	20	100%	4	1	0.8	4.8
Candidate 16	18	90%	4	1	1	5
Candidate 17	Did Not Attempt	#VALUE!	0	0	0	0
Candidate 18	16	80%	4	1	0.8	4.8
Candidate 19	20	100%	4	1	0.8	4.8
Candidate 20	18	90%	4	1	1	5
Candidate 21	13	65%	4	1	0.8	4.8
Candidate 22	19	95%	4	1	0.8	4.8
Candidate 23	Did Not Attempt	#VALUE!	0	0	0	0
Candidate 24	19	95%	4	1	0.8	4.8
Candidate 25	19	95%	4	1	0.6	4.6
Candidate 26	19	95%	4	1	0.6	4.6
Candidate 27	17	85%	4	1	0.8	4.8
Candidate 28	17	85%	4	1	1	5
Candidate 29	Did Not Attempt	#VALUE!	0	0	0	0
Candidate 30	Did Not Attempt	#VALUE!	0	0	0	0
Candidate 31	19	95%	4	1	0.8	4.8
Candidate 32	20	100%	4	1	1	5
Candidate 33	20	100%	4	1	0.8	4.8
Candidate 34	19	95%	4	1	1	5
Candidate 35	17	85%	4	1	0.8	4.8
<b>Average</b>	<b>18.17</b>	<b>91%</b>			<b>Average of non zero</b>	<b>4.84</b>
<b>Average of attempted</b>	<b>18.17</b>	<b>91%</b>			<b>Total</b>	<b>140.4</b>

Table 2: Previous cycle CE Summary

Parameter	Units of measurement	Desired	Previous cycle records
Candidate HeadCount (HC)	HC	35	35
Compliance to attendance of LI and test	HC %	100%	83%
Compliance to required test score (Passed) First/second attempt	HC % including absent	100%	71%
Compliance to TOs in test	% of TOs where non-absent population answered correct	100%	25%
Compliance to TOs/LO in test	% of total correct responses across non-absent population	100%	94%
Compliance requirement on hours	Hours spent /HC per Quarter for compliance prep. Time spent per HC in informal learning of delta concepts PLUS Average Seat time/HC for test + LI	3	7.84
Candidates not appeared for LI and test	HC %	0%	17%
Test not passed in allowed attempts	HC %	0%	11%
Time spent in informal learning of delta concepts.	Hour spent in compliance updates related emails, group discussions, trying in project	NA	3
Average Seat time/HC for test + LI	Hours spent/HC for non-absent population	Minimum	4.84
Total seat time for test + LI	Total hours spent for full compliance (including prorated for absent HC)	Minimum	169.45
Cost of seat time to organization	LIS \$ calculated basic average hourly cost	Minimum	\$ 2 541 77

#### XIV. Part B: Survey of participants to understand participant concerns

The second part of this study aims at understanding of the current challenges, as seen by the workforce who is working on the project, attending the compliance LIs and tests. The following summarizes the observations and inferences from the team members:

- Individuals feel the LI is a repeat of what they already know and practicing.
- Individuals realize importance of compliance test and that they don't score 100% every test.
- Individuals feel that they can score passing percentage without LI.
- Individuals face a challenge in some parts of the test, because when they encounter similar challenge during live projects, they are free to access the original documentation and email updates to help make a decision.
- All individuals stated that they would prefer to be put through the test directly, without having to go through LI in every compliance cycle.

Basis these observations, and scores from the previous CE cycle, it is evident that learners do have a high level of prior knowledge, and hence the situation is of FB of an acute nature. Hence it is prudent to create and implement a scenario of imparting the test without the LI to observe the impact on compliance and seat time.

#### XV. Part C: Experiment to observe effect of exit test given before LI

For the subsequent CE cycle, the test was directly made available to the participants before having to attend the LI. The following observations and inferences were made:

- Out of total population, 97% appeared for test:
- Out of the total population, 3% did not attempt, 63% passed the test in the allowed 2 attempts, and 34% did not pass.
- There are certain TOs where one or more participants answered incorrectly, yet attained passing score overall. Such TOs were 95%, which is a high compliance risk. Only 5% of TOs were found, where all candidates answered correctly.
- Across all candidates (who attempted test) and TOs, the percentage of correct responses is 88%. Which implies there is a 12% compliance risk from an LO perspective.

Another critical fact that came up in the answer patterns is a strong similarity in the pattern or responses between the exit test of previous CE cycle, and the current test conduction without the LI. Fig 3 and Fig 4 help in a visual comparison of the two:

Test A	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	
Candi date 1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
Candi date 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 3	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 4	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1
Candi date 11	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 16	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 18	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
Candi date 19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 20	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 21	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Candi date 22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 33	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1

Table 3: Answer pattern of exit test of previous cycle

Test B	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	
Candi date 1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 2	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 3	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 4	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 6	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA									
Candi date 9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 11	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 16	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 17	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 18	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Candi date 19	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 20	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 21	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 22	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 25	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 27	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Candi date 28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 29	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 32	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 33	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Candi date 34	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Candi date 35	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0

Table 4: Answer pattern of test conducted without LI

**Inferences:**

The scores show that out of the total questions asked in the test across the set of candidates, 88% were answered correctly. This is a clear indication of a FB presence of an acute nature, where on an average, 88% prior knowledge exists about the LOs in the LI. At the same time, the scores also indicate that on an average, 12% responses were incorrect. This indicates that the prior knowledge is not 100%, and it is possible that 12% of the prior knowledge either did not exist, or existed in the form of incorrect prior knowledge. Hence an LI is still important. The scores also show that only 5% of TOs were 100% correct across respondents, which implies that the LOs/TOs for which incorrect responses were marked, are not the same set across respondents. Hence the need for a differentiated instruction set in the LI.

While one of the ways to achieve such a differentiated instruction set in the LI as this is through a dynamic learning path or adaptive assessment, compliance requires exhaustive assessment result. The dynamic learning paths test the learner at input stage, and basis those test scores, assign or exempt certain topics from the curricula for that learner. The adaptive tests are applied towards the end of the learning path. While the questions are coming from a taxonomy based question pool, the test adapts itself basis learner responses. As the learner progresses the test by answering questions (mix of correct as well as correct answers), the testing algorithm accordingly selects and serves the next question. In an ideal situation, a learner who attempts each question correctly, may finish the test by attempting lesser questions as compared to another learner who answered some questions incorrect. The 'selective' nature of dynamic learning paths and adaptive tests pose a challenge to exhaustiveness. Hence a different approach is implemented in Part D of this study.

**XVI. Part D: LI and assessment re-sequenced, implemented, and observations made**

In part D of the study, a flipped curriculum approach is implemented, and the results observed. Another way of looking at the same experiment is a course-less curricula, where the LI is eliminated as a prerequisite to an end assessment in such a special case where the amount of prior knowledge is very similar to the exit level competency of the same LI for the given learner population.

In this experiment, the LI is re-engineered/redesigned without reducing, removing, or adding any parts of the LI or the test. It is assumed that all team members have gone through the deltas basis Update-DL. This assumption is supported by, and evident from the multiple implementations that the team members are making on a day to day basis, and their deliveries are being verified for compliance by another set of team members as part of quality assurance.

**The following changes were made to the LI and test:**

- The existing learning elements were listed as: Update-DL, LOs.
- All TOs translated to a structure in the LMS to create a TO taxonomy.
- Each Update-DL email was converted to a searchable repository element in the LMS and added to the taxonomy structure in LMS, similar to a WIKI page which has instructional material from that delta concept at the top, and any additional information/updates/discussion below it in chronological order. In

case of a future update to contents corresponding to a TO, Previous versions would be removed from main taxonomy and archived for version traceability.

- Each visit to a taxonomy page is tracked by LMS to add a counter for seat time
- The test questions were structurally modified. Each question stem was added with a hint link, which deep links to the corresponding DL page in taxonomy, the LO, and the relevant section in guideline document so that if a team member attempting the test does not know the right answer they can readily refer to it.
- Now that the LI is not a precursor to the test, and that some of the time during the test will be spent on referring to the hint links, the test duration was increased from 1 hour to 1.5 hour, allowing half an hour for reference purpose.

This new sequence of TOs, Enabling objectives / LOs, searchable repository, tracking of repository access, interlinking of test with all of formal as well as social learning, forms the cognitive reasonings' closed loop. Metaphorically, such a loop is present at various levels. For instance, there is yet another higher loop, at a higher order, which is at the compliance cycle level across cycles.

At this stage, the team members were given an overview of the new CE procedure, and the test was implemented for all participants. The test scores, responses, and time taken for test attempt was recorded. The following observations were made:

- Out of total population, 97% appeared for test. Upon informal questioning with the candidates and their sponsors, they mentioned that due to reduced seat time requirement, and not being forced into the LI, the team members and their line managers were more willing than before, to attend the CE. The one team member who was absent, was out on a medical leave, and if this candidate is excluded as exception, attendance is 100%.
- Out of the total population, 3% did not attempt, 97% passed the test in the allowed 2 attempts, and there were none who appeared but did not pass.
- There were no TOs where one or more participants answered incorrectly. Which implies that compliance has improved.
- Across all candidates (who attempted test) and TOs, the percentage of correct responses is 100%. Which implies compliance has improved. There are no candidates who have an incorrect knowledge about an LO at least at the time of writing the test.
- Average seat time for LI + test is gone down. The table below summarizes the results of each part of the experiment and the overall improvements achieved.

Table 5: Summary of results

Parameter	Units of measurement	Desired	Previous cycle records	Test Given without LI	After new LI	% change	change nature
Candidate HeadCount (HC)	HC	35	35	35	35	0	Unchanged
Compliance to attendance of LI and test	HC %	100%	83%	97%	97%	17%	Increased
Compliance to required test score (Passed) First/second attempt	HC % including absent	100%	71%	63%	97%	36%	Increased
Compliance to TOs in test	% of TOs where non-absent population answered correct	100%	25%	5%	100%	300%	Increased
Compliance to TOs/LO in test	% of total correct responses across non-absent population	100%	94%	88%	100%	7%	Increased
Compliance requirement on hours	Hours spent /HC per Quarter for compliance prep. Time spent per HC in informal learning of delta concepts PLUS Average Seat time/HC for test + LI	3	7.84	NA	3.99	-49%	Decreased
Candidates not appeared for LI and test	HC %	0%	17%	3%	3%	-83%	Increased
Test not passed in allowed attempts	HC %	0%	11%	34%	0%	-100%	Decreased
Time spent in informal learning of delta concepts.	Hour spent in compliance updates related emails, group discussions, trying in project	NA	3	NA	3	0%	Unchanged
Average Seat time/HC for test + LI	Hours spent/HC for non-absent population	Minimum	4.84	NA	0.99	-80%	Decreased
Total seat time for test + LI	Total hours spent for full compliance (including pro rated for absent HC)	Minimum	169.45	NA	34.59	-80%	Decreased
Cost of seat time to organization	US \$ calculated basis average hourly cost	Minimum \$	2,541.72	NA	\$ 518.82	-80%	Decreased

## XVII. Results and discussion

By comparing the observations made during this study in part A through D, The following changes are noticed after re-engineering the CE TLE (LI and test): Attendance improved by 17%, nearing to 100%. Failed attempts and non-compliance to TOs now tend to zero. Average seat time and compliance L&D spend for this group reduced by 80%.

Basis these observations, the CE passing score threshold percentage can be changed to 100%, CE clearance can be mandated for allowing to perform project tasks, and the dilution in CE due to lack of TO compliance can be considered eliminated.

From a compliance perspective, the seat time is important. And in the current experiment the seat time for LI ( $T_B$ ) seemingly tends to zero. However, accounting in the time spent by team members reading the Update-DL while they are on the job, is now being tracked, and adds towards achieving the LO, and hence seat time. Basis the observations in part A, B, and C of the experiment so far, the current TLE exhibits attributes, which are similar to the well-established 70-20-10 learning model which highlights that:

*"The odds are that development will be about 70% from on-the-job experiences - working on tasks and problems; about 20% from feedback and working around good and bad examples of the need; and 10% from courses and reading"*[30].

In the reengineered learning model implemented in Part D, the learning processes constantly alive. Learning process is active while team members read the updates (collaborative portal), when they learn it from peers or supervisors, when they practice these learnings on the job, and when they explicitly launch a LO to learn.

The test itself becomes a feed-backwards environment to help the learner during the compliance cycle and assessment to revisit what they have learnt, reconfirm or correct their understanding, and accordingly attempt forward. In this model, it is not that compliance is not threatened. In fact, it will be threatened, but there will be an action (corrective) in the TLE through the 70 and 20 factor. This model works on a structure (non-rigid) which will scaffold the learner, and the process (rather participants of the process) will survive (compliant). And this will happen not once, but multiple times, thus making the process sustainable (Integrity System), and make the CE L&D process stress free, risk free.

In a subsequent study, it is worth exploring areas other than CE, where there are FBs of similar high level of prior knowledge, and how a differentiated integrity may apply in those scenarios. It is worth exploring in the areas of lateral hire trainings, as well as role change training and development plans for individuals who are high performers, and may already be near the 'ready to perform independent' or 'ready to solo' stage. Another possible exploration is in the area of CE itself, as an extension of Part D; to create a self-evolving TLE for first time, as well as repeat/returning learners.

## XVIII. Conclusion

FBs exist in CE scenario, especially because of the cyclic nature of CE TLE. The prior knowledge in returning learners on subsequent CE cycles increases the FB factor in the CE TLE. The re-engineering calls for inclusion of feed-backwards mechanisms, re-sequencing of the LI, and differentiated instruction set. This forms the cognitive reasonings' closed loop in the CE TLE. This re-engineering of LI leads the CE TLE as a process to a more sustainable state (integrity system).

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