# IDENTIFICATION OF E-LEARNING QUALITY PARAMETERS IN INDIAN CONTEXT TO MAKE IT MORE EFFECTIVE AND ACCEPTABLE

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A B S T R A C T

*In India, eLearning is showing an increasing trend over the past two decades. Cost-effectiveness and learning flexibility are the key differentiators in favor of Indian eLearning progress. Success and effectiveness of eLearning mainly depend on content quality, representation, and infrastructural support for learning. Also, observed variations are quite high for content quality, media usage, and performance of the online learning resources. Availability of a standard set of quality parameters could have reduce the variation. In this paper, an attempt has been made to identify important eLearning quality parameters for the Indian context. Multiple focus group discussions were conducted to summarize the expectations of Indian eLearning stakeholders. Finally, a set of key parameters was identified. By focusing on these can improve overall eLearning quality, effectiveness, and acceptance by the users.*

## 1. INTRODUCTION

Defining learning is very important as it makes our life complete. Though professionals have defined learning from time to time times, considering continuous evolution, it is difficult to define learning in a precise manner. Abbott (1994) defined learning as, a reflective activity which enables the learner to draw upon previous experience to understand and evaluate the present, so as to shape future action and formulate new knowledge. Many research has been conducted to understand and explain the learning process. Kolb (1984) and Dennison et.al. (1990) have developed a learning model based on PDCA. Do, Review, Learn and Apply are the four steps for their model. Gross (2010), concluded that learning is all about acquiring new knowledge, skills, and values as a result of processing different types of information. The learning results in a change in behavior, attitude, and competencies of the learners. Hence, learning has a direct impact on overall development.

In the early 1900s, the term "Quality" became very popular. The concept was first adopted by the manufacturing sector. Then by the companies from service sectors (Lockwood, 1995). Initially, the education sector was not interested in evaluating learning quality. However, change in aspiration of the learners and advances in education technologies put pressure on the educational institutes to think on quality of learning (Blackmore, 2009). Quality gradually became important for the educational sector (Gallifa and Batalle, 2010).

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In the last five years, there is a continuous growth in the usage of online learning across the globe (E-learning Media Group, 2015 and Debco, 2014). The trend is similar in India also (Debco, 2016). A drastic change in the cost of internet usage (Meeker, 2017) played a pivotal role in creating online learning awareness in India. Subsequently, the number of online learners has also increased. More learners, which include students and working professionals are taking online courses for examination preparation, higher studies and professional developments. To make online learning more efficient, effective and acceptable, there is a need to identify quality attributes of e-learning in the Indian context. Continuous improvement of the identified quality attributes will improve learners experience, engagement, and satisfaction. This will eventually improve learning effectiveness, which is the desired objective.

## 2. LITERATURE REVIEW

It is difficult to define learning quality in a nutshell. It is qualitative in nature and perception based. Srikanthan and Darlymple (2003) concluded that students, academicians, strategy makers, and employees of the sector are four types of stakeholders in the learning chain. The perception differs significantly from stakeholders to stakeholders (Harvey and Green, 1993; Martin and Stella, 2007; Newton, 2010; Bobby, 2014). The educational service providing organizations are not full-phased industries, their process is complex and complicated (Vroeijenstijn, 2003). As discussed earlier, learning quality definitions are not static it is dynamic, in a goal to achieve excellence in educational excellence (Harvey, 2005; Bobby, 2014; Singh, 2006). Education quality is also looked as a stakeholder-relative concept (Harvey and Green, 1993). Learners feel that learning quality is similar to service quality (Clewes, 2009).

Gravin (1987) explains that there are four approaches (product based, system based, user based and value-based) for achieving quality. Harvey and Green (1993) consider quality in a different angle, excellence, fitness and value addition. Campbell and Rozsnayi ( 2002) defined quality based on excellence, zero error, fitness for the purpose, the process of transformation, exceeding the threshold, value for money and enhancement or improvement. Mystical, Reputational, Resource, Outcomes and Value-added views are five different views on the quality of learning as explained by Astin(1980). Based on the TQM philosophy, Mustafa and Chiang (2006) and Peat et al. (2005) suggested one framework for the education sector. The suggested framework covers most of the critical areas in higher education like faculty, infrastructure, policy, curriculum design process, learning and non-learning administration process. Viswanadhan and Rao (2005) also worked on the applicability of the TQM model in the education sector. They identified nine parameters like top management commitment, customer focus, course delivery, communication, campus facilities, congenial

learning environment, continuous assessment, and improvement.

Sakthivel et. al. (2005) proposed another model based on TQM philosophy with five different parameters, which includes Top Management Commitment, Course delivery, Learning Facility, Curtsy, and Learners' Feedback. Srikanthan and Dalrymple (2002) reported inadequacy and non-applicability TQM model across all function of the education sector. They also proposed a holistic quality model for differentiating learning function from the service function of the education sector. Gallifa and Batalle (2010) concluded quality as the process outcome of the education system. However, McCoy et al., (1994) concluded that traditional measurement (teacher-student ratio) of educational outcome is inadequate. Ramsden (1991) expressed that, student assessment of the quality of teaching and learning can be a measure of outcome-based quality assessment. Hence, assessment of learning quality based on student experience and satisfaction is an approach of interests of many researchers (Gaell, 2000; Wiers-Jenssen et al., 2002). This approach will be helpful in bridging gaps between traditional educational approaches with stakeholder oriented perspective.

There are continuous changes in learning theories and patterns due to technological advancement. New technologies are evolving day by day and "Changing the way the world learns. To make learning more interesting, effective and engaging learning technology was introduced in the early 1990s. Once it became popular among the learners, online learning was adopted as a part of organizational learning strategy by the major corporates. Cost-effectiveness, self-paced mode, and availability on-demand basis made it acceptable for the learners. Slowly the education sector also started accepting this mode of learning and incorporated this learning mode as a part of their curriculum. This was a paradigm shift for the education sector and new companies came up for developing educational contents. The overall learning process was named as e-learning.

The term e-learning (electronic learning) is ambiguous to those outside the e-learning industry, and even within its diverse disciplines, it has different meanings to different people. For example, in companies, it often refers to the strategies that use the company network to deliver training courses to the employees. In most of the schools and Universities, e-learning is defined as a specific mode to deliver course content and activities or program of study online. There are several definitions of e-learning, a couple of which are described as follows:

*"The delivery of a learning, training or education program with the help of electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material."* (Zine, 1995)

*"The use of network technologies to create fosters, deliver, and facilitate learning, anytime and anywhere."* (Zine, 1995)

*"A phenomenon that delivers accountability, accessibility, and opportunity allowing people and organizations to keep up with the rapid changes that define the Internet world."* (Bates and Sangara, 2011)

*"A form of teaching and learning - which may represent a part or the whole of the education model in which it is used - that makes use of electronic media and devices to facilitate access, promote evolution and improve the quality of education and training."* (U.S Department of Education, 2017)

In the digital age, e-learning is found in higher education as well as in workplace learning. There has been 150% growth in technology-enabled learning in work-force development from 2000 to 2015 as reported by the Association for Talent Development. Technology enabled learning being used in 16% of training purpose in 2000 and 41% in 2015. There has been an increase of 105% (between 2004 and 2012—from 15.6% to 32%) in the number of students opted for e-learning mode of learning as reported by The United States National Center for Education Statistics. Hence there is an increase in demand for e-learning (U.S Department of Education, 2017). It is important to go through the different reports to understand the trend of e-learning across the globe. The December reported (2014) that the world e-learning market reached $51.5 billion in 2016 from $35.6 billion in 2011 with an aggregated growth rate of 7.5%.

Implementation of e-learning was found beneficial in Kazakhstan (Baymuldina et.al. 2012), Jordon (Al-adwan et.al. 2012) and Tanzania (Lwoga, 2014). The corresponding research also identified a couple of important factors impacting the success of e-learning implementation which includes infrastructure, awareness, availability of online content, quality of the content etc. Different studies (Baymagambetova, 2013 and Nurgaliyeva, 2013) concluded that the implementation of e-learning has a positive impact and it is the platform of a new paradigm of learning in US universities.

Researches (Ossiannilsson et.al. 2012 and Pawlowski, 2012) have revealed the impact of the availability of open resources on making higher education available and affordable. Based on the outcome of e-learning impact, new policies are getting implemented which also have a positive impact on school qualities (Mee, 2012).

After globalization, Indian organizations realized that cost-effective and value-added products or services is the only way to sustain in the business. A competent and skilled workforce is capable of doing that. Hence, "employee skill enhancement" for "overall performance improvement" became a key business priority of Indian industries. As a consequence, the organizations started looking for some hassle-free, cost-effective alternative way of employee training (Driscoll, 2012). A separate study by Litting (2006, 2010) on "importance of media in learning" and "use of technology in talent management" provided some guidelines which are helpful for Indian organizations in meeting their own expectations. Considering the positive impacts, organizations started implementing e-learning for employee training (Lee, 2012). A study by Little (2010) revealed the positive impacts of blended learning on university students and at the workplace. Also, the implementers were not sure about the acceptability, availability, performance, and effectiveness of e-learning at the initial stage of implementation. Hence, classroom training continued as a parallel practice. As an initial step towards e-learning, blended learning was initiated as a strategy for learning and development by some organizations.

In recent times, the introduction of cloud computing made some difference in the application and implementation of e-learning. In a Study Chandra et.al.(2012) concluded that application of cloud computing in Education not only relieve the educational Institutions from the burden of handling the complex IT Infrastructure management as well as maintenance activities but also lead to huge cost savings and it also created new business opportunities(Laisheng et.al. 2011). In Tanzania blended learning was adopted through cloud computing and was found to be beneficial (Mtebe, 2014). Though cloud computing is gaining importance, at the same time information security risk is also increasing. Hence, addressing security risks a fundamental step towards ensuring secure cloud computing environments (Carroll et.al. 2011).

In developing countries, e-learning is showing positive growth. However, learners are facing challenges while accessing e-learning (Bhalalusesa et.al.2013). Swan et.al. (2014) has proposed and implemented a collaborative and design-based approach to improve teaching in core courses in an online program. The results indicate positive learning outcomes in most core courses. Sharma (2013) identified probable strategies to manage the open learning material for networking and collaborative approach to learning.

Through online and face to face, discussion gives similar social interaction, teachers generally prefer face to face interaction. A Study by McConnell (2013) revealed that e-learning has several positive impacts that including an increase in learners' motivation, fulfillment of current educational needs. However, it cannot replace the traditional educational system. In spite of high initial investment, there are several benefits of e-learning which can make a difference in the overall learning process (Yusuf et.al. 2013).

Researches on e-learning reported rapid growth in past and moderate future growth till 2021. Predictions by Debco(2015) indicates slow growth rate in developed countries. However, there will be high demand of simulations and game-based solutions in developing countries. Also, there will be a high demand for the game and simulation-based learning.

In India, with the availability of high speed and cost-effective internet, the number of Internet users have been increased drastically (Meeker, 2017), a majority of which are mobile internet users (Meeker, 2017). Also, the number of visitors has been considerably increased in the regional language web pages. All these eventually boosting the online learning activity up. Now, starting from a smart class of K2-12 sector, the learner is also taking the advantages of online learning for their regular learning, comparative examination preparation, mock tests, and professional developments. Premium Indian institutions like IITs and IIMs are providing convenient and requirement based online learning opportunities to the students at an affordable price. Indian corporates are also not far behind in taking the advantages of technology-enabled learning, are using online learning in the following areas:

- Product Training
- HR, Regulatory and Compliance Training
- Workplace Safety
- New Hire Onboarding
- Software and Systems Training
- Sales and Service Training
- Quality and Processes
- Soft Skill and Leadership

After the initial success, corporates are now looking to incorporate "Augmented Reality", "Virtual Reality" in their online learning practices to make it most effective and improving the learning experience.

There are several studies to identify the eLearning quality parameters or defining measurement framework for eLearning quality.

Achieve (2011) , set up by the Institute for the Study of Knowledge Management in Education (ISKME), gives eight criteria areas in a framework called Achieve-OEREvaluation. Objective of this framework is to assess OER quality according to the USA guideline. This framework uses technical jargons and is very complex. That make the adoption of this framework challenging.

Bakken & Bridges (2011) provided theory for accessing the quality of online material in primary and high school. It comprises of five criteria which include; content, instructional Design, assessment, technology, and quality evaluation of the Course and technical Support. These criteria are very basic and essential for quality evaluation of online courses. Hence, adaptation of these criteria will be helpful while are international standards and could be

useful developing open education resources for the students' end-users.

Baya'a, Shehade & Baya'a (2009) considered four areas to evaluate overall web-based learning system. Usability include some important aspects like, the purpose, landing page, navigation, design, enjoyment, and readability. Content is the backbone of a learning material and quality of content is ensured by authority, accuracy, relevance, completeness and, appropriateness. The most important part of an education system is the value addition. The Educational Value to be measured by learning activities, activity plan, resources, communication, feedback mechanism, help and utility. Last area is the Vividness. It includes whether links are functioning and the contents and links are updated on regular basis.

Binns & Otto (2006) while a discussing a distance education quality assurance framework suggested four areas, Products, Processes, Production and delivery and generic ideas. Norman (1984), and Robinson (1993) suggested these areas prior to them.

Camilleri & Tannhäuser (2012) gave eight dimensions as technical criteria and two as pedagogical criteria for measuring quality of distance open education system. The technical criteria are ;Compatibility with a Standard, Flexibility and Expandability, Customization and Inclusiveness, Autonomy of the users, Comprehensibility of the graphics, Comprehensibility of learning contents, Motivation, engagement and attractiveness of modules and/or learning resources, Availability of reporting tools

The cognitive and didactic criteria are:
(ix) Interaction between the OER and Learner, and (x) Instructional Design respectively.

In a Quality Assurance of Multimedia Learning Materials (QAMLM) framework in 2009, CEMCA (2009), provided five criteria areas. The framework is based on the ADDIE model. The ADDIE model is a process consisting of five stages. As per CEMCA this model can be used for developing open education resource material.

Ehler (2012) provided seven criteria areas for quality assurance of eLearning courses.

Nine criteria areas as domains of eLearning quality was given by Frydenberg (2002) in 2002.Actually these are areas, however labelled as domains.

Based on the proposition of Badrul Khan, Khanna & Basak (2013), gave six criteria areas, as quality assurance parameters for evaluating the quality online content. The area proposed by them include pedagogical, technological, managerial, academic, financial, and ethical.

Kwak (2009) provided twelve criteria areas in a framework which is based on ISO-9001 certificate criteria. These criteria include: requirement analysis, teaching design, content, strategy, interactivity, support, evaluation, feedback, reusability, metadata, ethical practice and copyright.

As per McGill (2012) five major criteria for evaluating quality of open education resource are; accuracy, reputation of author / institution, level of technical production, accessibility, and relevance for the purpose.

Seven criteria given by Merisotis & Phipps (2000) given are: course structure, development, learning, evaluation. These criteria also include support parameter like content, student and faculty support.

The Quality Matters Program (2011) provided eight certification checking criteria areas for certifying the quality of online and blended courses. The parameters are: Course Overview and Introduction, Learning Objectives (Competencies),Assessment and Measurement, Instructional Materials, Learner Interaction and Engagement, Course Technology, Learner Support, and Accessibility

Overall curriculum design, Management, and Evaluation are three evaluation criteria of online courses as reported by SREB - Southern Regional Education Board (2012). This is applicable for evaluating material for K6-12 web-based courses.

Ebba et.al. (2015) in a report of International Council for Open and Distance Education (ICDE) explain the different models and their applicability in online learning.

Garcia et.al (2012) provided comparative analysis of standards or specifications provided by following six organizations:
- ISO (International Organization for Standardization)
- CEN (European Committee for Standardization)
- AENOR (Spanish association for standardization and certification)
- EFQM (European Foundation for Quality Management)
- EFQUEL (European Foundation for Quality in eLearning)
- QAA (Quality Assurance Agency for Higher Education)

All these standards and frameworks are developed in different countries at different times. As the best practice, these can be followed in India also.

However, in India, the differences in languages, cultures, socio-economic patterns and limited availability of learning infrastructure are quite common. Also, there are differences in the learning patterns, choices, and medium

of instructions. Hence, it is a matter of challenge to comply with some standards aimed for development, deployment and management procedure of e-learning in the context of other countries. It is true for the quality parameters identified by the standards as well. Till date, no specific quality criteria are available for the development and management of e-learning products and services in India. Hence, there might be a need for identification of e-learning quality parameters in Indian context based on the expectations of the Indian e-learning stakeholders. This would eventually help in development, implementation and maintaining the quality of e-learning products as well as the processes in the Indian context.

## 3. STUDY DETAIL

### 3.1 Objective

The objective of the study was identification and validation of e-learning quality parameters from the Indian e-learning stakeholders' perspective to make it more effective and acceptable.

### 3.2 Methodology

The objective of the study was identification and validation of e-learning quality parameters from the Indian e-learning stakeholders' perspective to make it more effective and acceptable.

### 3.2 Methodology

*Identification of Quality Parameters*

To capture the requirements of the Indian e-learning stakeholders multiple focus group discussions were conducted. Participants of the focus group were selected randomly from the e-learning community across India. The participants came from core e-learning companies, different organizations who implemented e-learning, teachers, policymakers, and end users from different colleges and universities. Specialists from the learning and development domain also participated in the focus group discussion. The focus group discussion was based on the open end question: What are the key quality parameters in the context of Indian eLearning? Their feedback was captured and a summary report was prepared.

*Validation of Identified Quality Parameters*

Once the identification of e-learning parameters are done for the Indian context, detailed documentation was done and shared with the focus group participants. Then an online survey was conducted with the focus group participants to understand if the identification of the parameters was correctly done.

Ten dichotomous questions (with Yes" or "No" as options) were used in the questionnaire to capture the voice of the participants in following five broad categories;

- the requirement of the parameter identification (2)
- comprehensiveness i.e. completeness and adequacy of the identified parameters (2)
- easy of understanding and interpret (2)
- easy to implement (2)
- will add value to the overall e-learning ecosystem (2)

The number within the brackets represents the number of questions under that category. The learner has the flexibility of skipping a question but answering at least one question under a particular category was mandatory.

The content validation of the questionnaire was done by the e-learning experts. The questionnaire was pre-tested with Sixty five (65) professionals are no readability issue was observed. The reliability was checked by repeating the process once again with the feedback providers and calculating the percentage of the same response by the same feedback provider. In this case, the reliability was 0.83 i.e. 83%.

### Hypotheses Validation

The validation hypotheses were;

*Null hypothesis*: The feedback for the proposed framework will be similar like other non-structured effective measurement approaches

*Alternate hypothesis*: The feedback for the proposed framework will more positive than other non-structured measurement approaches

In the mathematical term the hypothesis was;

Null Hypothesis **H$_0$:** $p_0$ **= 0.5**

Alternate Hypothesis **H$_1$:** $p_0$ **> 0.5**

Where $p_0$ is the positive response proportion under a category. Here, 0.5 signifies, 50% of the responses.

### Sample

Total 1500 Indian e-learning stakeholders were invited to take part in the focus group discussion. The response summary is available in Table No 1.

Out of one thousand and five hundred (1500) invitees, one thousand and thirty-four (1034) participated in the focus group discussion.

**Table 1.** Sample Summary

| Stakeholder | Response Count | Response Percentage (overall) |
|---|---|---|
| e-learning Strategy Maker | 19 | 2 |
| Learning and Development Professionals | 26 | 3 |
| Subject Matter Expert | 139 | 13 |
| e-learning Developer | 307 | 30 |
| e-learning Support Provider | 27 | 3 |
| e-learning Implementer | 62 | 6 |
| e-learning End-user | 416 | 40 |
| e-learning Support Provider | 38 | 4 |
| **Total** | **1034** | 100 |

## 3.3 Analysis and Outcome

### Summary of Identified Parameters

The main expectations form e-learning stakeholders are twofold. One is related to the overall learning process including product development and overall product quality. The expectation from both the aspects are clubbed with the criteria described by Wright [130] and summarized below;

### Overall Learning Process (OLP)
- Need, Scope and process identification
- Stakeholder identification and involvement
- Overall Strategy development

### Need, Scope and Process Identification

This is the main part of an e-learning initiative, development or end use. The need, scope, and processes should be appropriate, for the purpose, well defined and documented. In Indian scenario the expectations are;
- The objective of the initiative should clear for development/ usage or both
- The scope of the activity to be well defined. If development then areas i.e. only development, deployment i.e. only LMS support or both. If usage then who will access, how will access, from where courses will be access
- Availability of well-defined processes for development, deployment, and usage

(All these requirements are related to the management of e-learning ecosystem)

### Stakeholder Identification and Involvement

Identification of stakeholders is an important part of an e-learning initiative, development or end use. Based on

the requirements of stakeholders strategy will be developed. In Indian scenario the expectations are;

- Identification of stakeholders for development/ usage or both should be done in a proper fashion
- Skill and competency to be properly identified for achieving the goal
- Proper infrastructure should be available to the stakeholders for achieving their goals

(All these requirements are related to the management and collaboration of e-learning ecosystem)

### *Overall Strategy Development*

Development of strategy is the key part of an e-learning initiative. This should cover strategy for product development, deployment or end use. Need, scope;

- The development strategy should be transparent and easy to understand. The answer to the following question should be available in the development strategy:
  - Types of the courses to be developed
  - Availability of resources(human resource, software and hardware resources)
  - Quality control and assurance process
- Deployment strategy should be clear. The strategy should be able to answer the following questions:
  - Where deployment will be done?
  - How secured the deployment environment is?
  - How ease the extraction process is?
  - How will change management be handled?
- Well defined strategy for management of the e-learning process is also very essential. Management of the e-learning process should include:
  - Development, quality control, and deployment process
  - Overall learning process including tracking, monitoring, and measurement of efficiency and effectiveness
  - Expectation and stakeholder management
  - Access control and management
  - Change and risk management
- Improvement strategy should be defined properly. The answer to the following questions should be available in the defined strategy.
  - What will be the feedback mechanism?
  - How action items for improvement will be defined, implemented, evaluated on a continuous basis

(All these requirements are related to the management of e-learning ecosystem)

### *Overall Product Quality (OPQ):*

The parameters related to the overall learning quality are:
- Learning goals and objective

- Course Content
- Content Organization
- Instructional or Learning Strategies
- Language
- Resources
- Evaluation
- Course look and feel
- Accessibility
- General Information (including adherence to Information Security, Copy Right etc.)

The specific requirements under these broad categories are discussed in the following sections.

### *Learning Goals and Objectives:*

Identification of Learning goals and objectives should be very clear before course development starts. Also, the motivation for the course development should also be very clear. It is also very important to clearly mention the learning goals and objectives in the course content. The expectation of Indian context can be summarized as follows;

- The learning goals and objectives should be relevant and aligned with the learning purpose
- Learning outcomes (skill, knowledge, competencies, and attitudes) should be declared in the learning objectives
- The objectives should be measurable, clear, easy to understand and precise
- The learning goals and objectives should clearly communicate the expectations out of the learning

(All these requirements are related to the content structure of e-learning ecosystem)

### *Course Content*

This is the heart of the e-learning courses. The content should be appropriate, easy to understand and correct. While developing the content on a given subject matter, it is important to keep the learners' background in mind. In Indian scenario the expectation is, content is;

- Aligned with the learning goals and objectives
- Adequate, complete and properly reviewed by subject matter expert
- Suitable for the learners' profile i.e. ability, maturity level, and experiences
- Consistent with the available courses
- Accurate, Relevant and Current
- Content chunking to be done and presented in a logical way
- Content should be available in regional languages and the quality of the content in the regional language should be correct, accurate, complete
- New information to be presented along with proper explanation and example

- Proper referencing should be done, reference should be provided whenever required
- Avoid using copyrighted material, if essential, obtain the permission

(All these requirements are related to the quality of content, multilingual content, IPR of e-learning ecosystem)

### Content Organization

- Based on the requirement of the subject matter, the organization or sequencing of the content should be done
- One main chapter or units should be logically divided into topics and sub-topics. There should be the proper relationship between chapters and it's topics and sub-topics
- The content organization should be consistent throughout the learning module
- References to other parts of the material should be correct and updated
- Any links used for referring the same course or the external sources should be accurate

(All these requirements are related to the content of e-learning ecosystem)

### Instructional or Learning Strategies

The instructional or learning strategies should be developed in such a way that enables learners to learn effectively. This should engage learners in activities while learning. Ultimately this will helps in the translation of the knowledge into the skills, which is the ultimate requirement. The expectations are:
- Instructions or directions should be given in properly. Also, these should be clear, concise and easy to understand
- Proper instruction should be available for synchronous and asynchronous activities.
- Responsibilities of the learners and expectations from the learners should be properly communicated
- Any timeline and the impact of missing the timeline should be clearly communicated
- Illustrations, photographs, animations, and other forms of multimedia should be used to present the fact and course content only
- Learners should have the flexibility of selecting the learning content and activities on the basis of their learning need, skill, competency and experience
- Activities should
  - engaging and motivate the learners to learn using the online platform
  - be effective for developing the required skill and competencies
  - be presented in a proper order i.e. simple, medium and complex

- realistic and appropriate time should be allocated to complete the same
- adequate for proper and effective learning
- To improve the learning experience, frequent, constructive relevant feedback should be provided
- Proper summarization of the content should be done at the end of the chapter or the topics

(All these requirements are related to the quality of content, quality of media, learning assistance of e-learning ecosystem)

### Language

The appropriate level of the language to be used on the basis of the target audience. The course content should be free from any grammar, language, and content issue. The expectation is summarized as follows;
- Direct, clear writing using a common word, active voice and with encouraging tone is preferred
- Spelling, punctuation and grammatical errors shouldn't be there
- Small paragraphs with short sentences are preferred for better learning outcome
- Terms should be consistent throughout the texts
- Instructions should be stated simply and are easy to understand
- Spelling and grammar should be consistent and accurate
- The content should be free from any bias relative to age, culture or ethnicity, race, gender, or sexual preference

(All these requirements are related to the language of e-learning ecosystem)

### Learning Resources

The learning resources accessible, appropriate, and accurate. The expectations are;
- Learning resources should be appropriate, accurate, and current and aligned with the subject. Also, proper classification is required for "mandatory" and "optional" resources
- Learning resources should be used on the basis of the learners' choice, skill, and style of learning
- Any multimedia clips, such as audio and video clips, should be included if learners' can access the same and format should be specified.

(All these requirements are related to the learning resources and usage of media in e-learning ecosystem)

### Evaluation

The evaluative activities should be feasible, relevant, accurate, and aligned with the goals, objectives, content,

and practical applications of the content. The expectation form the evaluation are summarized as;

- The learners should be clear about the learning outcomes, evaluation strategies, and assessments. If any relationship exists between the individual assessments and the course end result, then it should also be communicated to the learners
- Expectations from the learners in the assessment should be clear to the learners. The evaluation process and grading (if any) should be communicated to the learners
- The due date of the assessments should be reasonable
- If there is any relationship between individual assignments and the final course grade, that should be clearly communicated to the learners
- The evaluative exercises should be relevant to the learners and the career or profession they may pursue and facility of self-progress tracking is essential
- The assessment design should be proper and interesting to the learners
- There should be some provision so that learner can track their own performance
- (All these requirements are related to the evaluation process of e-learning courses)

### *Course Look and Feel*

The course look and feel should facilitate learning. The material should be attractive and appropriate for the course content and the intended audience The key expectation form the course look and feel is summarized as follows;

- Course layout to be done according to the learners' profile
- Font, navigational icons, headings, and sub-headings should be consistent
- Capitalization and Bold-face type should be used for giving emphasis and underlining is to be used only for hyperlinks
- The contrast between text and the background color should be good
- Graphic elements like diagrams, tables, and photographs should be used for illustration or clarification purpose. Also, only those illustrations to be used which can be easily viewed in any computer
- Use of tag text is essential for the images and illustration inaccessible courses

(All these requirements are related to the look and feel of e-learning ecosystem)

### *Accessibility*

Learners find information quickly and the course should be accessible to the learners easily. The expectation of Indian learners are summarized as follows;

- Availability of help, utility, table of contents, glossary, page numbers are essential in an e-learning course
- Each section of the course or module should begin with a preview and navigation facilities to be open in most of the cases unless it is mentioned
- Proper care to be given for differently abled learners
- Proper infrastructure should be there to handle concurrency and provision for selecting the courses for high or low-speed connections

(All these requirements are related to the accessibility of e-learning courses)

### *General Information*

The summary of expectation is summarized as follows;

- Prerequisites and/or co-requisites should be identified
- A list of required and recommended resources
- Adherence to all technical standards
- Availability of infrastructure for e-learning
- Similar response by the overall system each time and every time
- Special requirements should be identified, such as recommended modem speed or Internet bandwidth, hardware (computing speed and storage capacity), software (including an e-mail program adequate for handling assignments and other attachments), and plug-ins
- Learning support during emergency scenarios
- Proper access control mechanism for accessing the e-learning ecosystem
- Ease of scale-up and scale-down of number of course development and assignment
- Personalization of e-learning while assigning the courses
- The estimated time required to complete the module and/or course should be stated. Guidelines for participating in online discussions also to be referred.
- The availability and detailing of the technical support should be stated, and links to online technical information are provided.
- The availability of the instructor (if any) should be specified, as is the turnaround time for responses to learners' questions
- The quality standard should be easy to integrate with other popular standards already implemented by the organizations
- A section on "frequently asked questions" to be provided to the learners pertaining to online learning
- Learners should be informed about their right to privacy and the conditions under which their names or online submissions may be shared with others

- The developers and reviewers of the course should be listed
- If some information taken from other sources, proper credit to be provided. The students should know the source of the information

(All these requirements are related to the **Learning Support Continuity, Scalability, Personalization, Ease of Integration, Access Control, and Reliability of** e-learning ecosystem)

Hence, the expectations of the Indian e-learning stakeholders are twofold, one from product perspective and other from process perspective. The key quality parameters in e-learning ecosystem categorized into three major areas as in Table-2.

Out of these, some of the parameters already been identified earlier. Figure No-1 represents all key e-learning quality parameters in the Indian context.

### Summary of parameter validation

The collected responses were summarized and one sample proportion test (at 95% confidence level) was conducted. The objective was to check whether thought processes of more than 50 % of the respondents' are aligned with the alternative hypotheses provided against the parameters in the analysis summary table (Table 3).

**Table 2.** Summary of key e-learning quality attributes in the Indian context

| Product Related | Management/ Process Related |
|---|---|
| • Content, Functionality, and Media<br>• Assessment<br>• Interoperability<br>• Maintainability<br>• Reusability<br>• Correctness and Integrity<br>• Accessibility<br>• Adherence to Learning Theory<br>• Portability<br>• Flexibility and Expandability<br>• Reliability<br>• Multilingual Availability | • Management<br>• Process<br>• Statutory and Legal Compliance<br>• Personalization<br>• Ease of Integration with other frameworks<br>• Collaboration |
| | **Support Related** |
| | • Infrastructure and Technical Support<br>• Learning Support Continuity<br>• Access Control |

**Table 3.** Summary of key e-learning quality attributes in the Indian context

| Sl. No | Parameters | Alternate Hypotheses | Response Detail | | Test Result (p-value) |
|---|---|---|---|---|---|
| | | | Yes | Total | |
| 1. | The requirement of the parameter identification | there is a requirement for parameter identification | 1456 | 1938 | 0.00 (significant) |
| 2. | Adequacy and completeness of the identified parameters | all relevant parameters have been identified | 1237 | 1921 | 0.00 (significant) |
| 3. | Understanding and interpretation of the parameters | easy to understand and interpret | 1108 | 1876 | 0.00 (significant) |
| 4. | Parameter Implementation | not very difficult to implement | 1098 | 1947 | 0.001 (significant) |
| 5. | Value Addition | Identification of parameters will add value | 1522 | 1853 | 0.00 (significant) |
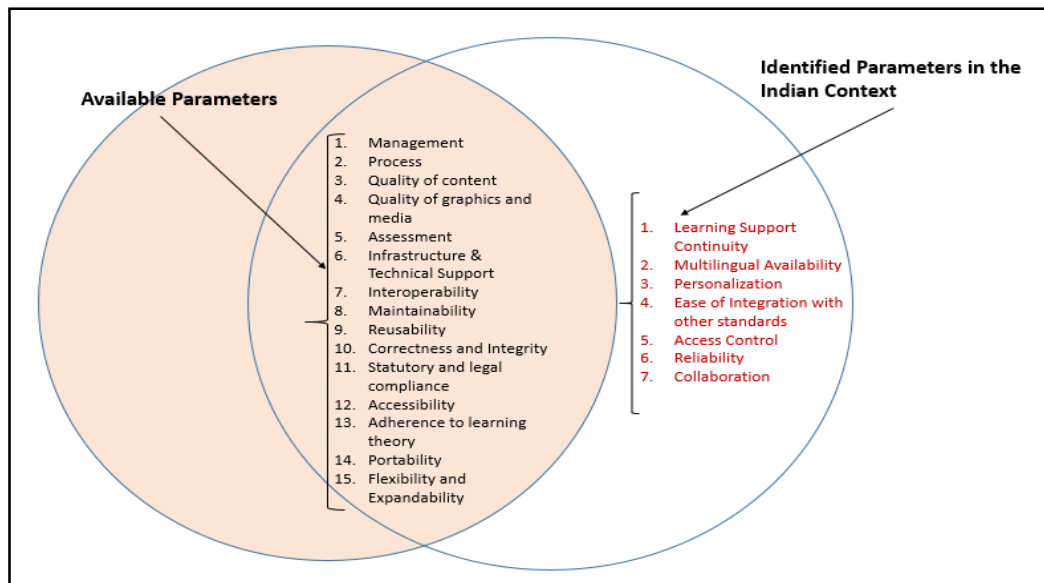
**Figure 1.** Complete set of key e-learning parameters vs. parameters specific for India

## 4. DISCUSSION

Based on the analysis outcomes (the p values of the tests) in Table 2, following conclusion can be drawn:

- professionals strongly feel that identification of e-learning quality parameters was essential in the Indian context for improving overall e-learning outcomes;
- the parameters identified as the measure of e-learning quality are adequate and interpretation of the standard is not difficult;
- analysis outcome indicates that implementation of the parameters won't be challenging task as these parameters can be integrated with other available standards; and
- professionals also feel that inclusion of these parameters as standard practice for measuring e-learning quality will add value to the overall e-learning ecosystem in the Indian context.

Also, analysis of the qualitative feedback provided by the respondents revealed that:

- the majority (74%) of the respondents feels that identification of parameter is good considering Indian requirements
- segregation of the sections for development, implementation, and support could have been helpful (59% of the respondents feels so)

The advantages of incorporating these parameters in the Indian e-learning ecosystem will help in the following areas.

- the inclusion of a reliability-based approach will help to address uncertainties
- it will results in an integrated approach, covering all domains of e-learning i.e. development, implementation, and support in detail;

- information security the most burning issue in the digital domain can be addressed;
- management of stakeholder and externally originated assets will be systematic;
- special focus on compliance with statutory, legal and regulatory requirements, hence fewer compliance issues;
- will align with the basic objective of quality framework i.e. continual improvement which is ensured through management and process-related parameters; and
- integration with the other mostly used global quality standards will be easier

## 5. CONCLUSION

India is showing a positive trend toward online learning. Majority of these are structured learning using proper e-learning framework. Also, there are some concerns of Indian e-learning stake holders, related to acceptance and effectiveness of e-learning. In this scenario, the identification of e-learning quality parameters is an important step. This will help in developing the content in a more learner-centric way. There will be an improvement of overall management and processes of e-learning. As these parameters come from all e-learning domains, it is expected that there will be an improvement in the support activities also. However, old experience suggests that maintain the improved results will be challenging, if improvement activities are not integrated with the regular practices. This is only be possible if identified parameters can be integrated with the process framework of the e-learning industry, i.e. with one of the widely used process model. Hence, development of a quality framework using available best practices and incorporating the identified quality parameters can be considered as the future scope of work, which is extremely important and highly required.

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