

## A Framework for Measuring Service Quality of E-Learning Services

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### **Abstract**

*Service quality (Parasuraman et al 1985) is defined as the difference between predicted or expected service and perceived service. The SERVQUAL (Parasuraman et al., 1985, 1988) instrument was designed to measure service quality and was structured around five dimensions viz., tangibles, reliability, responsiveness, assurance and empathy. SERVPERF (Cronin & Taylor 1992) developed a performance based alternative to SERVQUAL. However all these tools measure service quality around five service quality dimensions as listed above. However, as the service industry grows, there are many services where these dimensions may not be relevant. To measure service quality of electronic services, E-S-QUAL, a modified SERVQUAL scale (Parasuraman et al 2005) was designed. This scale focusses on e-shopping and does not apply to all e-services. With the rapid spread of internet, e-learning is getting more and more popular as a medium of learning. Massive Open Online Courses [MOOCs] from large institutions of repute offer free and open online courses. Apart from educational institutions, there are numerous other learning organisations that offer courses on e-learning mode. Adoption and diffusion of e-learning courses is dependent on the perceived service quality of these courses. However, not many tools are available to measure service quality of e-learning. This paper attempts to devise a framework for measuring service quality of “E-Learning” services.*

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**Keywords:** E-learning, on-line learning, service quality, information quality, system quality

## **1. Introduction**

Numerous surveys and research has shown that India today needs massive skilling if she has to reap the demographic dividend of having over half the population under the age of 25. Be it in schools or colleges or in vocation education space, there is a severe shortage of skilled teachers, professors and trainers. Also the organisations of today need to re-invent and re-orient themselves every few years, if not months, to keep themselves ahead of the competition. This again requires intense training and re-training. The only way to fill the gap in learning in primary/ higher education, vocational education and skills training in organisations is to embrace E-Learning. The time is ripe now to adopt E-Learning since exponential growth in communication technology has resulted in high level of diffusion of internet at a lower cost. Also users can access the learning content from anywhere through multiple devices like tablets, mobile phones etc. apart from computers. MOOCs (massively open on-line courses) add another dimension to e-learning. In such a scenario, we can expect a massive upsurge in e-learning in India in the immediate future. India's online education market is expected to grow from around US\$ 20 billion in 2013 to US\$ 40 billion in 2017. [ICT Post, 2012]

## **2. Theoretical Background**

### **2.1 E-Learning**

E learning can be defined as learning happening through electronic means. It can include different media such as CD ROM, TV, internet/ web etc. The focus of this study is internet/ web-based e-learning or on-line e-learning and the word "e-learning" is used to refer on-line E-learning only. The word 'e-learning' and 'on-line education' are used in a similar sense in this study.

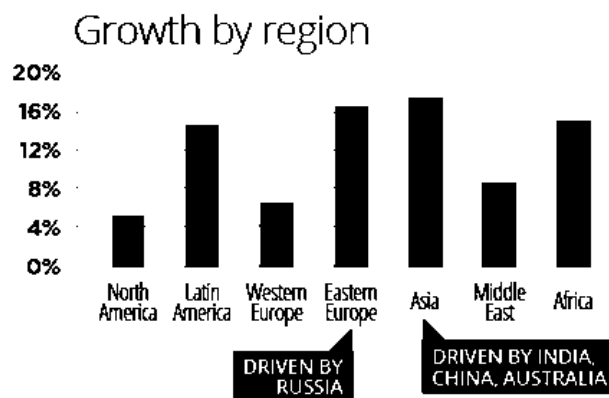
E-learning can be classified as either synchronous or asynchronous. (Zhang, 2004)

1. Synchronous learning: This is a term used to refer to instructor led learning. Teaching and learning happening at the same time and the participants can interact with the instructor and if needed among themselves via the Web in real time
2. Asynchronous learning: This term is used for 'self-paced learning' and can be taken up at a time convenient to the participant from anywhere. In asynchronous e-learning, content is uniform and once produced can be used repeatedly and the participants complete training without trainer facilitation. The asynchronous e-learning uses games, simulations, videos, charts and graphs, text and audio to deliver the learning experience.

As per "E-Learning Market Trends & Forecast 2014 - 2016 report By Docebo", the worldwide market for self-paced e-Learning was \$35.6 billion in 2011 and is expected to grow to \$51.5 billion by 2016 (Docebo, 2014), of which Asia Pacific is expected to contribute \$11.5 billion. The strongest rate of growth is expected to come from Asia Pacific region on

the back of strong government initiatives, adoption of mobile technology and literacy development. Of the total e-learning market, 50% is likely to come from K-12 segment, 12% from corporate and 38% from higher education. In the US, as per a study conducted in 2011, one third of all students enrolled for higher education have undergone at least one e-learning course.

Figure 1: E-Learning Market Trends & Forecast 2014 - 2016



Report By Docebo, March 2014

This study will focus on asynchronous self-paced e-learning, specifically individual learning in higher education space. i.e. the K-12 e-learning and corporate e-learning is beyond the scope of this study.

E-learning is well accepted as an effective and vital method of learning. E-learning provides the users better control on learning by providing options for learning and exploring the content at their pace and skipping content they have already learnt. It is learner led rather than teacher or faculty led. E-learning is more of passive learning though the learning can be made more interactive with appropriate tools. Generally, those who are pursuing e-learning are self-directed, hence it is found that that the learners perceive a higher level of learning compared to classroom learning. However, the studies have shown that in terms of effectiveness of e-learning, the results are mixed.

In India, the individual centric online education is offered by many educational institutions, notably IITs and some state Technological Universities. The Indian students also opt for MOOCs offered by foreign universities and organisations like Coursera, Khan Academy etc. Apart from these open courses, there are quite a few organisations offering on-line education for individuals in India, the prominent among them being Tutorvista, Meritnation, Avagmah etc. apart from a host of companies in the test preparation arena.

Typically in a MOOCs, the completion rate is estimated at just 10%. The three elements that determine the success of e-learning, from the service provider's perspective are content, presentation and reinforcement. Worldwide, usage of e-learning has grown phenomenally and

it is estimated that students spend 20% of their time in self-study e-learning.(Yusuf et al, 2013)

For all the advantages the e-learning provides, still e-learning is not an unqualified success. It was found that in learner led e-learning (Granger & Levine, 2013) the effectiveness of learning complex content was significantly low, whereas the effectiveness of learning simple content was high. It was found from a study conducted in US on 40,000 students who have taken on-line courses, almost all of them have performed worse in on-line courses compared to face to face courses (Grossman, 2013).

On-line services like e-banking and e-retailing have been around for more than 10 years and hence were subjected to lot of research. However e-learning, especially from the point of view of asynchronous individual learning and higher education has gained in popularity only in the past 5 years and hence studies on e-learning as a service is quite limited. Further the studies on service quality of e-learning too are severely restricted. This paper attempts to develop a framework for measuring service quality of e-learning.

## **2.2 Service Quality**

Quality of service, unlike a product quality cannot be easily measured. For example, quality of a product, say an automobile can be easily measured by different parameters like power, torque, fuel consumption, features, time to accelerate, time to brake, crash co-efficient etc. However, in service, the parameters are difficult to measure due to the inherent characteristics of service like intangibility, heterogeneity and inseparability (simultaneous production and consumption). Hence service quality is more a measure of perception of customer satisfaction and hence difficult to have a standard construct. Parasuraman & Zeithaml (1985, 1988, 1991) define service quality as the difference between consumer expectations and perceptions of service performance and proposed SERVQUAL, a scale to measure service quality. SERVQUAL had 22 items across five dimensions – Tangibles, reliability, responsiveness, assurance and empathy. Several researchers questioned the relevance of the expectation – performance gap as the basis for measuring service quality, specifically Cronin J J and Taylor S A (1992) and they developed a performance based alternative SERVPERF. SERVPERF was confirmed of its efficacy with 15 items by Fogarty G, Catts R, and Forlin C (2000). SERVPERF was also proven for making quality comparisons across industry by Jain S K and Gupta G(2004), while SERVQUAL is best suited for identifying a firm's service quality. Smith A M (1995) argues the efficacy of SERVQUAL with 2 sets of questionnaire, instead recommends using only one questionnaire that measures perception which can be an indicator for service quality. Lien N H and Kao S L (2008) classified service quality as technical quality which referred to the outcome of service and functional quality that referred to the service delivery process. Based on the type of

service, they postulated that either technical quality or functional quality has greater impact on customer satisfaction.

### **2.3 Service quality and E-Services**

The SERVQUAL and SERVPERF instruments were meant primarily for services where human interaction is involved but for services delivered electronically, these instruments fail in their suitability in any e-service, service quality plays a major role in customers' choice; however the dimensions of service quality will vary between e-services. The studies have shown that service quality dimensions of each e-service is different. For example, the service quality dimensions for e-banking will be different from e-retailing or e-support or e-learning.

Tan C W et al (2013) conclude that e government service quality has service content and service delivery as its antecedents. Jia & Reich (2011) explains IT service quality through IT service climate, which contain three key components – service leadership, service vision and service evaluation. IT service climate is internal to the organization and is defined as IT employees' shared perceptions of the practices and behaviours in their workplace that support the provision of IT services to business customers. Pitt L F et al (1995) explains that in addition to service quality, system quality and information quality have to be considered for software product quality. Though the study concludes that SERVQUAL can be used to measure Information Systems service quality, it also indicates that reliability of 'tangibles' construct is low. Xu et al (2013) postulate that the three type of quality viz., system quality, information quality and service quality are not independent with respect to e-service. Their study indicates that perceived system quality and information quality can impact online service quality. Kritikos et al (2013) classify service quality for software services as Quality of Service (QoS) and Quality of Experience (QoE). Further they define quality of service as attributes that can be objectively measured and quality of experience as attributes that are subjective in nature. Jayawardhena C, (2004) explains that e-banking service quality can be measured with twenty-one items across "five dimensions, namely, access, website interface, trust, attention and credibility".

Benlian A et al (2012) conclude that security, flexibility, efficiency, fulfillment, system availability and privacy as the dimensions of service quality for 'software as a service' offering. Parasuraman A et al (2005) suggests use of E-S-QUAL, a tool built for measuring service quality for electronically delivered services. This tool is built for on-line shopping and consists of 22 items under four dimensions namely efficiency, fulfillment, system availability and privacy.

As we have seen, there are various studies that have proposed different tools for measuring service quality of e-services. However these are not found to be appropriate for E-learning. For example, E-S-QUAL by Parasuraman et al (2005) is designed for on-line

shopping that is discrete and transaction based, while e-learning is continuous. Assessment of service quality in a service like 'E-Learning' is more daunting due to the fact that service is offered over a period of time and the fulfillment process can continue for days or even months and hence there is a need to develop an appropriate framework for E-Learning.

### **3. E-Learning Service Quality & The proposed model**

#### **3.1 E Learning Service Quality**

Researchers have been measuring satisfaction in E-learning that includes teaching quality and satisfaction with information system. Wang (2003) developed a model which contains four factors impacting satisfaction and these are "learner interface, learning community, content, and personalization". However since service quality is antecedent to satisfaction, we need to define factors that constitute e-learning service quality. Loiacono et al (2007) created WebQual, a tool that rates websites on 12 dimensions. However, this tool does help only in evaluating the websites and not measuring service quality as experienced by customers. Wong and Huang (2011) while discussing service quality considers information quality and system quality as constituents of service quality. Their research was centred around the organizational e-learning.

In order to measure the service quality of E-learning, it is imperative to define the components of E-learning. In order to define the different dimensions and components of E-learning, extensive focus group studies were conducted with 20 participants who have completed e-learning courses. As a result of these discussions, the following components emerged.

#### Content

- Design and presentation
- Structure
- Completeness

#### Usability

- Attractive interface
- Ease of navigation
- Interactivity
- Progress tracking

#### Technology

- Fast
- Reliable
- Support

#### Responsiveness

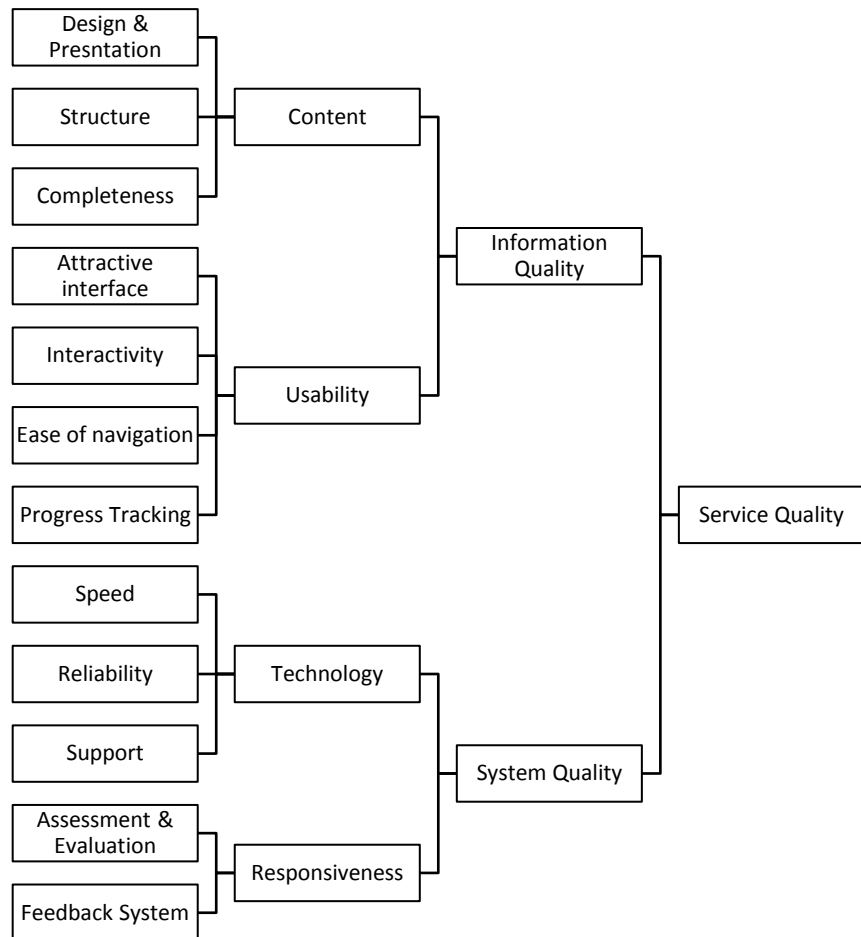
- Assessment & Evaluation

- Feedback

Delivery platform or the learning management system is not being considered since this is more a background function.

### 3.2 The proposed model

The above components are categorized as 12 dimensions and are represented as below:



a) **Content:** The ‘content’ in an e-learning service must provide well-organised, well-structured, and understandable content and these can be further explained by the following three dimensions

- i) Design and presentation: The design and the presentation of the e-learning module is appropriate to the course.
- ii) Structure: The content is structured well with appropriate texts, animations, mind maps, quizzes etc.
- iii) Completeness: The e-learning course is comprehensive and complete.

b) **Usability:** This refers to the ease of use of content and can be explained by the following four dimensions

- iv) Attractive interface: The interface is attractive, free of clutter and user friendly.
- v) Interactive: The course is interactive enabling active learning.

- vi) Ease of navigation: The course/ website is easy to navigate and the learners can easily access the chapters/ modules they need and can move between pages easily.
- vii) Progress tracking: The website provides for easy tracking of completed chapters, the scores etc. and also enables resuming from where left earlier
- c) **Technology:** This refers to the role technology plays in enabling learning and can be further explained by the following three dimensions
  - viii) Fast: The website is fast and does not buffer
  - ix) Reliable: The site functions correctly and accurately.
  - x) Support: The e-learning organization provides adequate support in case of any glitches and is quite responsive.
- d) **Responsiveness:** This refers to the result/ outcome process of learning and is shown by the following two dimensions
  - xi) Assessment and evaluation: The assessments are adequate and is consistent.
  - xii) Feedback: The e-learning service provider takes the feedback seriously and accordingly implements changes for better learning experience.

The content and usability contributes to the information quality while technology and responsiveness contributes to the system quality. The information quality is users' evaluation of the content and usability while system quality is users' evaluation of technology and responsiveness. The users' perception about information quality and system quality will influence beliefs about service quality. The customers while evaluating service quality, will apply their perception of information quality and system quality.

### **3.3 Design of instrument**

The questionnaire was designed broadly based on the information and system quality constructs of Xu et al (2013) since it has adequate reliability and validity in measuring e-services, but has been modified suitably to measure E-Learning services. The instrument is designed to measure service quality through two constituents – information quality and system quality. The information quality is constructed with two dimensions viz., content and usability. Content has three sub-dimensions - design & presentation, structure and completeness, while usability has four sub-dimensions - attractive interface, interactivity, ease of navigation and progress tracking. The system quality is constructed with two dimensions – viz. technology and responsiveness. Technology has three sub dimensions – speed, reliability and support while Responsiveness has two dimensions – Assessment and evaluation and feedback system. The questionnaire was designed with a total of 36 items – with each sub dimension being represented with 3 items. Due to the complexity in understanding negative worded items, only positive worded items were used. The Likert scale was used with 5-point



scales ranging between 1 and 5 and all the scale points were labelled 1 – Strongly disagree; 2 – Disagree; 3 – Neither agree nor disagree; 4 – Agree; 5 – Strongly agree. The labelling of all item scales is to ensure high reliability and consistency, Subsequent to the development of the initial questionnaire, personal interviews were conducted with students undergoing e-learning courses. The interviews helped the researchers to clarify the tasks and evaluate whether the questionnaire was able to capture the research data adequately. It also helped to ensure that important aspects are not omitted. The interview process was an iterative one and continued till further changes to the questionnaire was not necessitated.

The final questionnaire was tested in a pilot study with a sample of 50 participants to assess the construct validity of the questionnaire. To assess the suitability of the instrument, reliability, factor loading criteria were used. Reliability was confirmed by determining Cronbach's alpha ( $\alpha$ ) that measured internal consistency. All the Cronbach's alpha values ranged between 0.81 to 0.92 (above the recommended level of 0.7). The convergent validity of each construct was tested with Confirmatory Factor Analysis.

#### **4. Conclusion**

The research examined the components of e-learning service quality as information quality and system quality and further identified the dimensions of both. Based on the insights provided by the research studies conducted earlier on service quality and the antecedent information and system quality, this model has been conceptualized and constructed. The dimensions were used to design the construct and the instrument for measuring service quality of e-learning from the individual perspective. The organisations and institutions that deliver e-learning should consider these components that pertain to content, usability, technology and responsiveness while designing e-learning courses. The scale developed based on the information and system quality is a suitable tool for determining service quality of e-learning. However, only pilot study has been done with the instrument. Further research has to be continued with a larger sample for a better understanding of the relationship between information, system and service quality. The objective of this tool is to measure e-learning service quality especially from the individual point of view and not corporate e-learning. Also the model does not differentiate between paid or subscribed individual e-learning courses and free courses, especially massive open on-line courses (MOOCs.). The models for assessment of service quality for paid courses and MOOCs could be possible areas where further research can be taken up.

#### **References**

Benlian, A, Koufaris, M, & Hess, T 2011-12, 'Service Quality in Software-as-a-Service: Developing the SaaS-Qual Measure and Examining Its Role in Usage Continuance', *Journal of Management Information Systems*, vol. 28, no. 3, pp. 85–126.

- Cronin, J J & Taylor, S A 1992. 'Measuring Service Quality: A Reexamination and Extension', *Journal of Marketing*, vol. 56, no.7, pp. 55-68.
- Docebo, 2014. E-Learning Market Trends & Forecast 2014 - 2016 Report
- Fogarty G, Catts R, & Forlin C. 2000. 'Measuring Service Quality with SERVPERF', *Journal of Outcome Measurement*, vol. 4. No.1. pp. 425-447.
- Granger, L & Levine, E 2013, 'Complexity Compromises Learner-led E-Learning', *T+D*, April 2013.
- Grossman, R J, 2013, 'Organisational and Employee Development', *HR Magazine*, August 2013
- <http://ictpost.com/2013/11/18/indias-online-education-market-size-is-set-to-grow-to-40-billion-by-2017/>
- Jain, S K & Gupta, G 2004. 'Measuring Service Quality: SERVQUAL vs. SERVPERF Scales', *Vikalpa*, vol. 29, no. 2, pp. 25-37.
- Jayawardhena, C 2004. 'Measurement of Service Quality in Internet Banking: The Development of an Instrument', *Journal of Marketing Management*, vol. 20, pp. 185-207
- Jia, R & Reich, B H 2011. 'IT Service Climate – An Essential Managerial Tool to Improve Client Satisfaction With IT Service Quality', *Information Systems Management*, vol. 28, pp. 174-179.
- Kritikos, K, Pernici, B, Plebani, P, Cappiello, C, Comuzzi, M, Benbernou, S, et al 2013. 'A Survey on Service Quality Description', *ACM Computing Surveys*, vol. 46, no. 1.
- Lien, N H & Kao, S L 2008. 'The Effects of Service Quality Dimensions on Customer Satisfaction Across Different Service Types: Alternative Differentiation As a Moderator', *Advances in Consumer Research*, vol. 35, pp. 522-526.
- Loiacono, E T, Watson, R T & Goodhue, D L 2007, 'WebQual: An Instrument for Consumer Evaluation of Web Sites', *International Journal of Electronic Commerce*, vol. 11, no. 3, pp. 51-87.
- Parasuraman, A, Zeithaml, V A & Berry, L L 1985, 'A Conceptual Model of Service Quality and its Implications for Future Research', *Journal of Marketing*, vol. 49, no. 4, pp. 41-50.
- Parasuraman, A, Zeithaml, V A & Berry, L L 1988, 'SERVQUAL: A multiple item scale for measuring consumer perceptions of service quality', *Journal of Retailing*, vol. 64, no. 1, pp. 12-40.
- Parasuraman, A, Zeithaml, V A & Berry, L L 1988, 'Refinement and Reassessment of the SERVQUAL scale', *Journal of Retailing*. vol. 67, no. 4, pp. 420-450.

- Parasuraman, A, Zeithaml, V A & Malhotra, A 2005. 'E-S-QUAL - A Multiple-Item Scale for Assessing Electronic Service Quality', *Journal of Service Research*, vol. 7, no. 10, pp. 1-21.
- Pitt, L E, Watson, R T & Kavan, C B 1995 'Service Quality: A Measure of Information Systems Effectiveness', *MIS Quarterly*, vol. 10, no. 2, pp. 173-188.
- Smith, A M 1995. 'Measuring Service Quality: Is SERVQUAL now redundant?', *Journal of Marketing Management*, vol. 11, pp. 257-276
- Tan, C W, Benbasat, I & Cenfetelli, R T 2013, 'IT-mediated customer service content and delivery in electronic governments: an empirical investigation of the antecedents of service quality', *MIS Quarterly*, vol. 37, no. 1, pp. 77-109
- Wang, Y S 2003, 'Assessment of learner satisfaction with asynchronous electronic learning systems', *Information & Management*, vol. 41, no. 1, pp. 75-86.
- Wong, W T & Huang, N 2011, 'The Effects of E-Learning System Service Quality and Users' Acceptance on Organizational Learning', *International Journal of Business and Information*, vol. 6, no. 2, pp. 205-228
- Xu, J, Benbasat, I & Cenfetelli, R T 2013, 'Integrating Service Quality with System and Information Quality', *MIS Quarterly*, vol. 37, no. 3, pp. 777 – 794
- Yusuf, N & Banawi, N 2013, 'The Impact Of Changing Technology: The Case Of E-Learning', *Contemporary Issues In Education Research*, vol. 6, no. 2, pp. 173-180
- Zhang, D 2004, 'Virtual mentor and the lab system – Toward building an interactive, personalized, and intelligent e-learning environment', *Journal of Computer Information Systems*, Spring 2004, pp. 35-43.