A NOVEL FRAMEWORK FOR QUALITY EVALUATION OF E-LEARNING MODELS

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Abstract : E-learning is a method that demands task for both teachers and students. The proposed system offers independent time and place learning environment capable of automatically assessing student work individually with the support of their teachers. This system can be efficiently used to increase quality learning method. It relieves teachers from time consuming procedure and provides high quality teaching and course development. The proposed research work facilities student's collaboration, content delivery and study assessment. Student with the instructor's intervention can access the system and understand the various methods of learning. For instance if the student needs to learn any topic, the portal aids in supporting the content. The portal consists of activities for both teacher and student where the teacher uploads the topic related to the class in the form of quality e-learning material. The student access the content according to their individual needs. Once the student master the topic they pass on to the evaluation mode, if not an in-built feedback mechanism helps to post their individual queries to the corresponding teacher for further clarification. Then the teacher clarifies the doubts of the student by answering their queries. This process continues until the student master the topic through quality e-learning application.

IndexTerms **- E-learning, E-learning framework model, E-learning quality evaluation, User satisfaction.**

I. INTRODUCTION

In educational institutions, grading homework and tests for large lecture courses can be tedious work. Even in lower grades, teachers often find that class lecturing takes up a significant amount of time, time that could be used to interact with students, prepare for class, or work on professional development. While machine learning may not ever be able to truly replace human grading, it's getting pretty close. One of the key ways machine learning will impact education is through the application of greater levels of individualized learning. There will always be a role for teachers in education, but what that role it entails may change due to new technology in the form of intelligent computing systems. Machine learning can take over tasks like grading, can help students improve learning, and may even be a substitute for real-world tutoring.

The machine learning technique is applied to develop a model to overcome learning difficulties especially in e-learning application, for improving student's learning capability with query and feedback mechanisms. This method will enhance the students learning ability in quality e-learning and also aid the academicians in increasing the performance of the learners.

II. LITERATURE REVIEW

Rohini Arora and Indu Chhabra - "Extracting Components and Factors for Quality Evaluation of E-Learning Applications". In this paper they have explained that Quality evaluation and assurance are the prime factor behind quality education delivered by the e-learning applications. Quality evaluation is multi dimensional concept based on various key components and factors of the application. They have proposed an extraction learning model based on three key functions of feature and function analysis, behavioral analysis and quality analysis to derive the key components and factors contributing in the quality evaluation of e-learning application. This model is proposed keeping in mind the basic dimensions of e-learning framework and the proposed model will help to further enhance the quality of the application. The extraction model is proposed to extract key components and key factors from the eight dimensional framework of web based e-learning applications.

Alireza Hassanzadeh, Fatemeh Kanaani and Shaban Elahi - "A model for measuring e-learning systems success in universities". In this paper, by combining models and previous studies, a model for measuring e-learning systems success entitled "MELSS" is presented. In this they have tried to resolve the weaknesses of previous models and to reinforce the strength of them. Based on the results of experts questionnaire, components such as technical system quality, educational system quality, content and information quality, service quality, user satisfaction, intention to use, user loyalty to system, benefits of using system and

goals achievement, are suitable for measuring e-learning systems success. After finalizing the indicators of conceptual model, based on students, alumni and instructors opinions in universities, MELSS model was designed and its fitness was confirmed.

Yonas Hagos, Dr. Monica Garfield and Dr. Salehu Anteneh - "Measurement Factors Model for E-Learning Systems Success". It explores to effectively and efficiently evaluate the success of an e-learning system, success measurement factors must be identified and measured for any university that implements e-learning systems. To perform this study both qualitative and quantitative research methodologies are used. The theoretical framework used in this study is the Information System Success(ISS) model, because the DeLone and McLean framework is widely accepted as one of the more complete IS evaluation framework which has six interrelated dimensions of IS success. The additional construct defined in the model is "Computer Self-Efficacy" (CSE).

Mahmudul Hasan, Nurazean Maarop, Harmi Izzuan Baharum, Wardah Zainal Abidin, Ganthan Narayana Samy and Noor Hafizah Hassan - "Developing a Success Model of Research Information Management System for Research Affiliated Institutions". The main objective of this paper is to propose a success model of RIMS implementation. The higher education institutions must know the factors that affect research information management systems(RIMS) success towards enhancing research management and researcher performance. The proposed model is used to describe the multidimensional factors that influence the success and user acceptance of RIMS. This study utilized the D&M IS success model to measure RIMS success, and also studied three important aspects of IS success such as technological, organizational and human factors.

III. DESIGN OF THE SYSTEM

The clustering and classification algorithms can be implemented, to develop a machine learning application which can motivates and encourages the students to enhance their and learning and understanding capability.

PHASE I – CLASSIFICATION

The decision tree algorithm acts as an efficient algorithm to mainly classify the search keywords to give effective search results to the students in e-learning application. This algorithm is also used to classify the trained dataset that is the departments, subtopics names and the student feedback ratings to fetch the quality e-learning application and to generate the quality graph from the database with respect to its input and provide a better result. This retrieval can help the students to learn and understand the e-learning qualities easily and it helps to obtain good subject and general knowledge in their studies.

In decision analysis, a decision tree can be used to visually and explicitly represent decisions and decision making. The general motive of using **decision tree** is to create a training model which can use to predict class or value of target variables by learning decision rules inferred from prior data (training data). It uses a tree-like model of decisions. Though a commonly used tool in data mining for deriving a strategy to reach a particular goal, it is also widely used in machine learning. In the proposed work the tree learned from quality e-learning for classifying and for search keywords to render an efficient result. Classification is also used in the training dataset to classify the departments, subtopics and set of student's feedback rating points for quality graph generation. In the first split or the root, all attributes/features are considered and the training data is divided into groups based on this split to find most homogeneous branches, or branches having groups with similar responses. The mean of responses of the training data inputs of particular group is considered as prediction for that group.

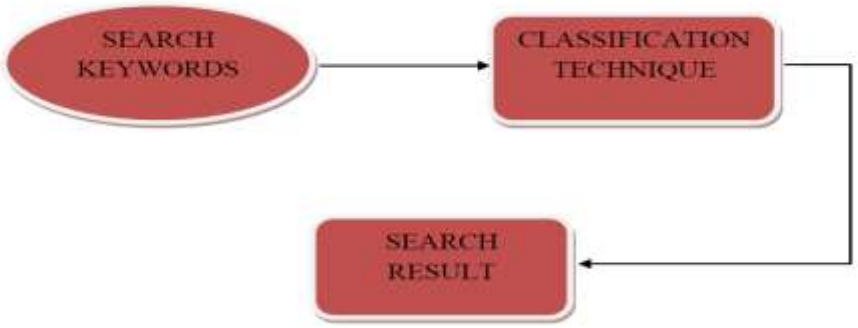

Fig. 1: Workflow of proposed system for Classification

PHASE II – CLUSTERING

Machine learning using *k*-means algorithm is becoming a popular clustering techniques. *k* - means clustering is a type of unsupervised learning, which is used when there is unlabeled data (i.e., data without defined categories or groups). The goal of this algorithm is to find groups in the data, with the number of groups represented by the variable *k*. The algorithm works iteratively to assign each data point to one of *k* groups based on the features that are provided. Data points are clustered based on feature similarity. *k*-Means clustering intends to partition *n* objects into *k* clusters in which each it partition the object belongs to the cluster with the nearest mean. This method produces exactly *k* different clusters of greatest possible distinction. The best number of clusters *k* leading to the greatest distance is not known as a priori and must be computed from the data. Generally clustering may take number of iterations, eventually to cluster centroids, in the proposed K-means clustering which identifies and cluster the subtopics and feedback ratings from the trained data (classified data) in a single iteration in terms of generating quality evaluation graph. K-means clustering works as follows:

1. Place K points into the space represented by the objects that are being clustered. These points represent initial group centroids.
2. Assign each object to the group that has the closest centroid.
3. When all objects have been assigned, recalculate the positions of the K centroids.
4. Repeat Steps 2 and 3 until the centroids no longer move. This produces a separation of the objects into groups from which the metric to be minimized can be calculated.

The proposed system uses the above mentioned k-means clustering algorithm to cluster the departments, subtopics and students feedback ratings based on its basic structure. Therefore the resulting data clusters are considered to be the trained dataset that will be taken as the input for classification. Thus the proposed methodology provides efficient result to encourage the students to understand their quality of e-learning application easier.

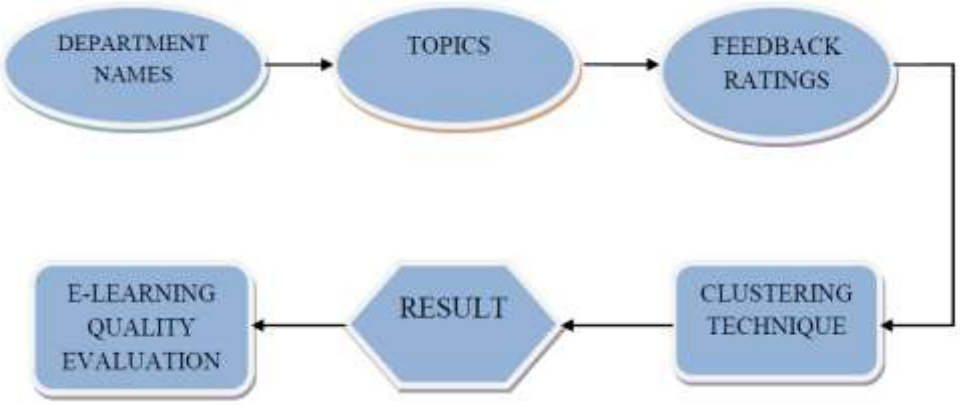

Fig. 2: Workflow of proposed system for Clustering

PHASE III – IN-BUILT SURVEY FOR THE PROPOSED WORK

Feedback from students has always played an important role in the maintenance of quality and standards in higher education. In the proposed system, an in-built survey has been conducted among 50 students from computer science department. The framework is developed and the quality evaluation of e-learning application is measured based upon the proposed work which is been circulated among computer science students to collect their feedback ratings for graph generation.

In responding to the consultation exercise, institutions referred the main purposes of student feedback as:

- Enhancing the student's experience of learning and teaching.
- Contributing to monitoring and review of quality and standards.
- Ensuring the effectiveness of course design and delivery
- Enabling a dialogue with students
- Helping students reflect upon their experiences
- As part of the teaching and learning process
- Identifying good practice

- Measuring student satisfaction

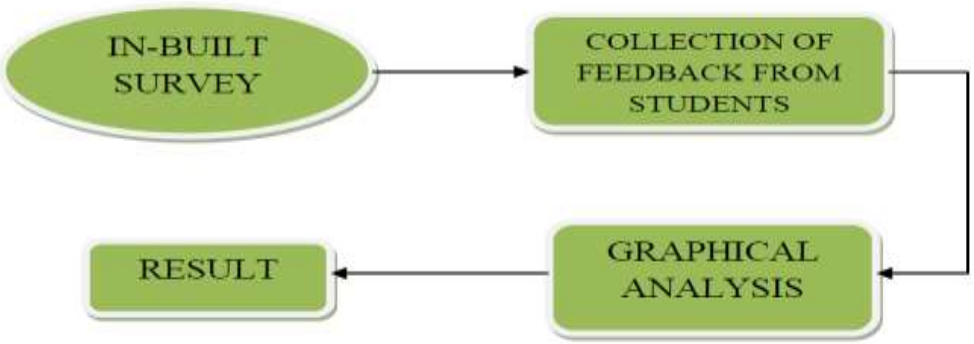

Fig. 3: Workflow of Graphical analysis

PHASE IV – WORKFLOW OF THE FRAMEWORK MODEL

The Workflow of the framework for quality evaluation of E-Learning Model is mentioned in **Fig. 3**. It shows the flow of the framework model which is proposed to enhance the quality evaluation in e-learning application.

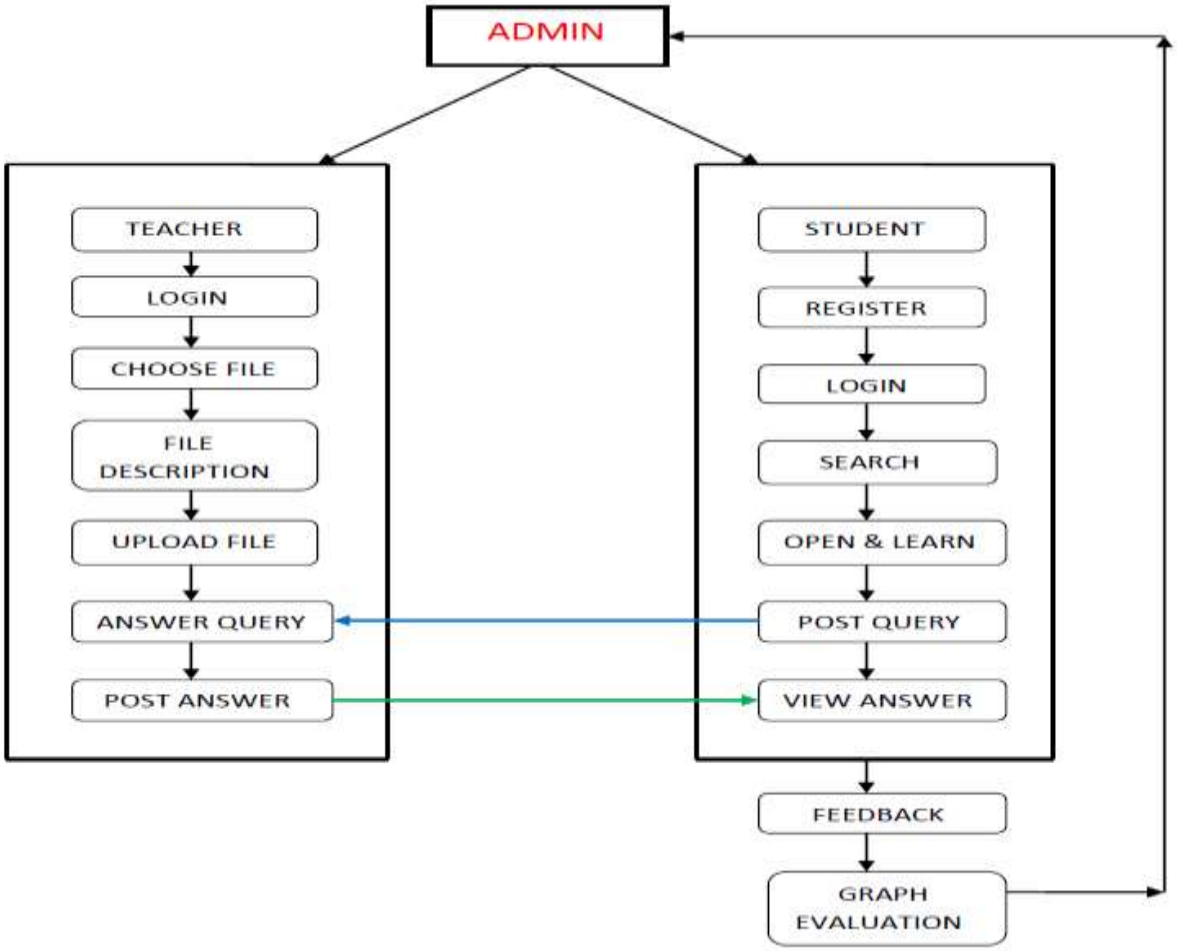

Fig. 4: Workflow of Framework Model

IV. RESULTS AND FINDINGS

Fig. 5: Introduction page

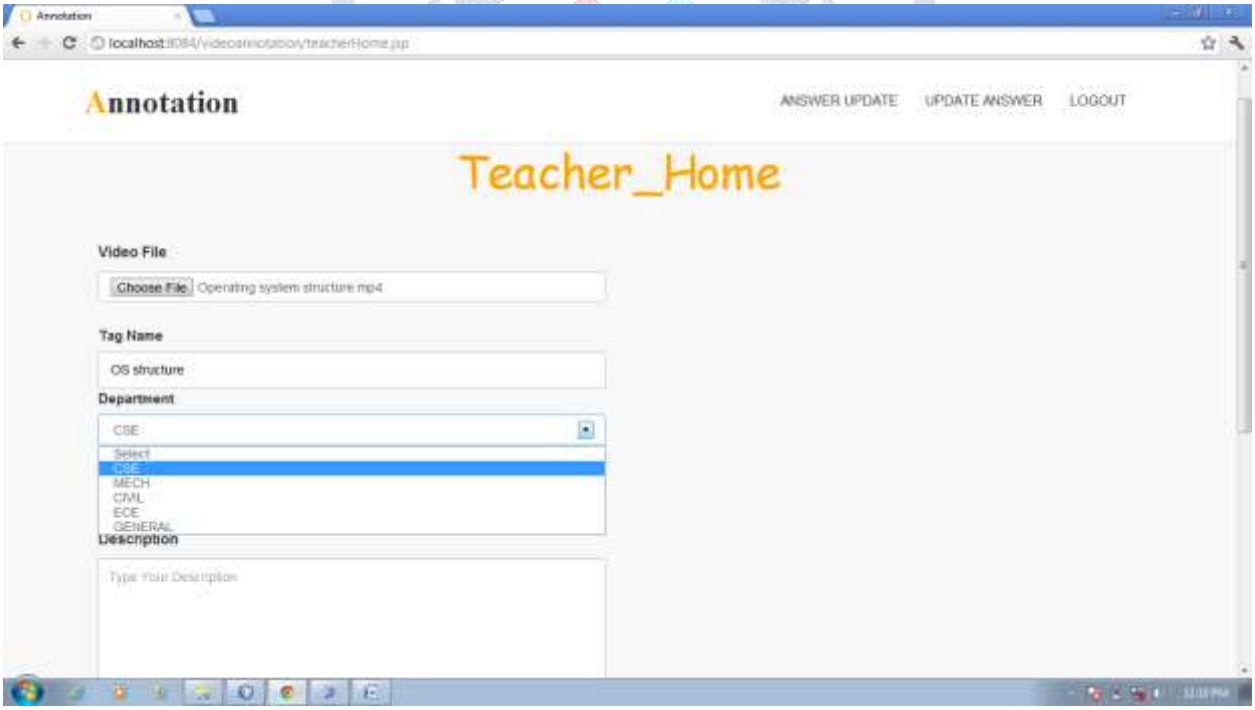

Fig. 6: Teacher upload file

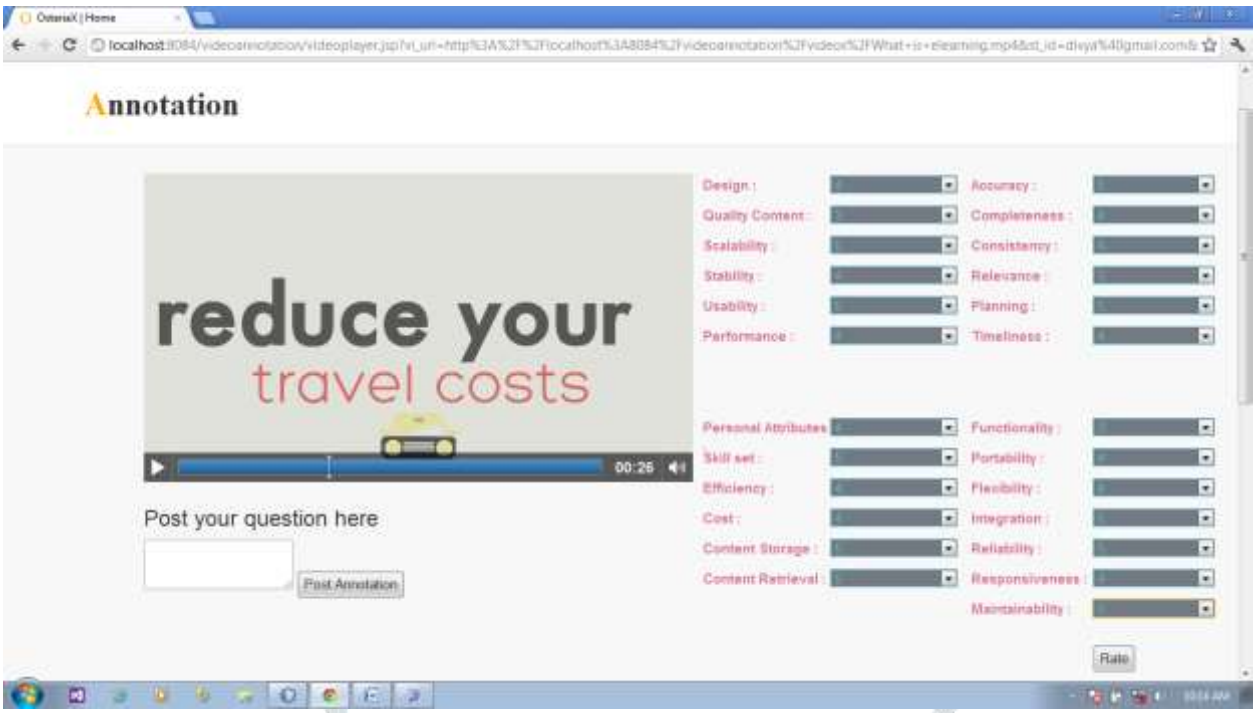

Fig. 7: Student feedback

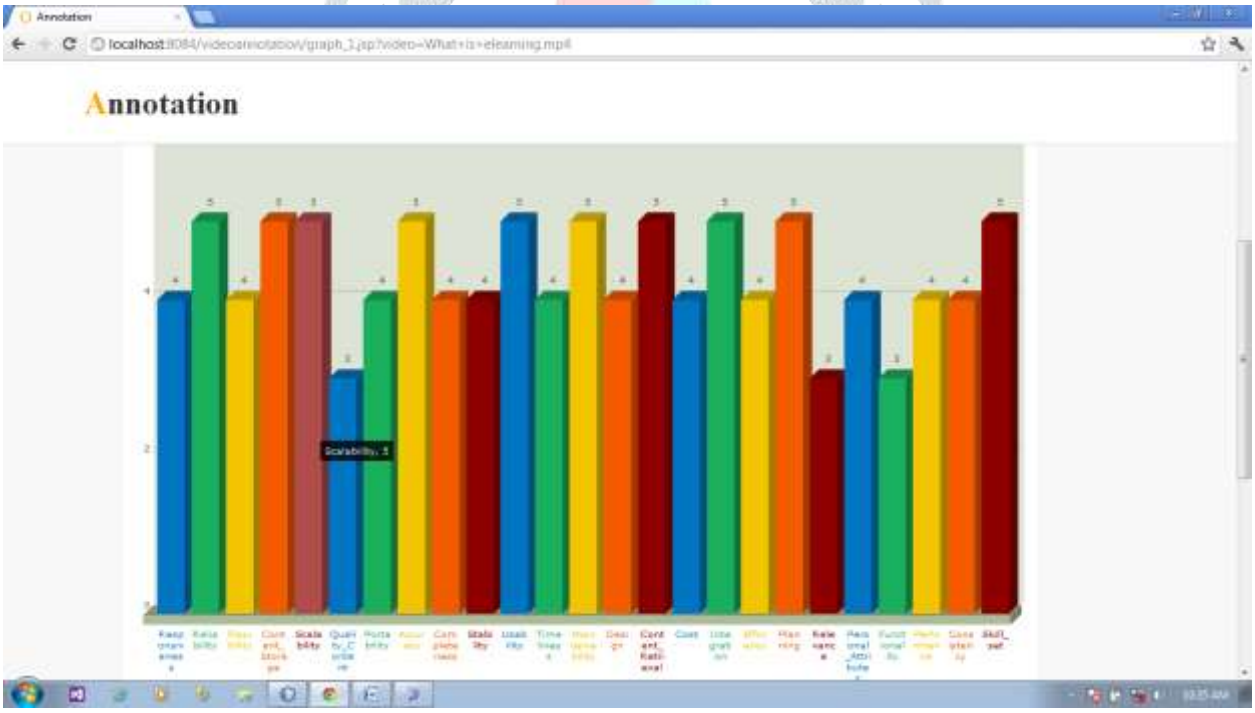

Fig. 8: Quality graph evaluation

V. CONCLUSION AND FUTURE WORK

The proposed research framework model can be used for evaluating quality e-learning applications. When compared with existing framework model system, it provides the students to access quality content in e-learning. The success rate of selection of best e-learning resources is directly proportional to quality delivered by the e-learning application. The software used in developing this system is built largely on open source code and hence can be adapted to future enhancements. The teachers upload their teaching material through the in-built portal where the student individually watch them and in case of any queries a

feedback mechanism is provided which helps the teacher to render their support for that particular student. Hence this approach is more easy to be executable by both students and teachers. The research work results in providing students encouragement to learn in quality e-learning applications by their own and also to ensured students to obtain better knowledge in their future studies. This framework model is proposed keeping in mind the basic dimensions of e-learning and the proposed model will help to further enhance the quality of the e-learning application**.**

In future research work this model will set a baseline to identify all the critical quality factors for given e-learning application. There are large numbers of statistical methods and quality models available which can be further analyzed and studied for the proposed model to measure goodness of fit for the extracted factors. It can also be extended for implementing model for creating ranking system based on their quality contribution which can also be used for further analysis to enhance the quality of the e-learning application. It is also possible to work in all applications as per the quality evaluation parameters. This can be more helpful in the field of education to fetch data for improving student's performance in their examinations and can also help them to carry forward to the next level of advancement in mastering subjects.

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