

Quality Indicators and Models for Online Learning Quality Assurance in Higher Education

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Abstract: In the scenario of Covid-19, the online learning capacity has increased much more than the face to face or traditional learning. Due to the increased capacity of online learning in higher education, the quality of online learning has serious concerns. To achieve the minimum requirements of quality in online learning for sustainable development, it is important to review the quality assurance principles and strategies. A brief review of the literature was conducted to define the quality of online learning, presented some quality assurance indicators for online learning, and discussed some online learning models by selecting 27 published articles through inclusion and exclusion criteria for performing a systematic review of the literature. The review showed that learner-teacher interaction, learner's prompt feedback, learner's support service, applying appropriate media, tools for online learning, and planned documented technology application for the assurance of quality in online learning are important quality indicators. Some quality assurance models for online learning are also presented in this study for the implication of these models according to the learning requirement to ensure the online learning quality.

Keywords: Indicators, Quality Assurance, Higher Education, Sustainable Development

1. Introduction

Learning is a necessary part of progress and the advancement of a state (Hafeez et al., 2020). There have been two modes of learning: one is called face-to-face mode and the second is called online or blended mode of learning as described in the previous studies (Ajmal and Hafeez, 2021; Saira and Hafeez, 2021). The mode of distance or online learning in higher educational institutions has increased in recent years due to the advancement of technological tools and the spreading of the deadly Covid-19 Pandemic. Distance or online learning happens in environments where learners and teachers are conversating from space and time. In this type of learning mode, technology plays an important role (Martin and Bolliger, 2018).

In Covid-19 pandemic conditions, most the higher educational institutions have shifted their modes of learning from face-to-face mode to online mode. Due to the shifting of learning modes from face-to-face to online modes in higher educational institutions, the instructors and the students faced many challenges including the quality of online learning. The quality of learning is the most important element for the sustainable development of any country in the world (Dhawan, 2020).

Universities are facing significant challenges as a result of increased globalization, transparency, and sustainability consciousness (Salvioni, Franzoni, and Cassano, 2017; Crane et al., 2019). One of the helpful motivators is the use and effects of rapidly evolving technology. In higher educational institutions, a paragon shift is taking place during Covid-19 that mainly concerns how higher education institutions can approach customized and interactive online learning with learning as the primary concentration. Changes in pedagogical and didactic methods that concentrate on the learner and where course content could be accessed through transparency, collaborative learning, and networking are urgently needed in the Covid-19 conditions (Ortagus and Derreth, 2020).

To foster innovation, creativity, and excellence, education and research must be of high quality. Competition and cooperation in education and research are driven by improved efficiency, increased accountability, and transparency. In the international educational arena, universities must cooperate as well as compete. They must be viable not only in sense of their educational, communal, decision-making, and technical dimensions but too

in terms of working internationally as innovators and contributing to sustainable development. Enhancing university efficiency and modernizing universities must be on the agenda for both universities and decision-makers in this context (Markova, Glazkova, and Zaborova, 2017).

1.1 Problem Statement and Objectives of the Study

Due to present COVID-19 conditions, a growing number of higher educational institutions are discovering online delivery choices for course materials (Dias et al., 2020). Exploring present conditions and problems with the higher education system online learning is critical in order to provide a clearer context for ways to enhance the pupil's learning capacity and provide quality education. There are many features of online learning that can affect faculty implementation and course progress (Giatman, Siswati and Basri, 2020). The quality of education is the most important parameter for the sustainable development of a state. It is necessary for an institution to have a clear policy about the assurance of quality in online learning. Facilitating indicators for quality assurance in higher education institutions' learning process provides guidelines for the faculty members and students to work together to achieve the required quality education for sustainable development (Lynch et al., 2017). As many of the higher educational institutions are facing the problems in providing the online quality education due to the suddenly increased shifting of face to face mode of learning to online mode in Covid-19 conditions, the objectives of the current study are (i) To discuss the meaning of quality in higher educational institutions (ii) To present the various quality indicators necessary to achieve the required quality education in online learning (iii) To present some quality assurance models to be used in the different online learning environments to ensure the quality assurance in the online mode of learning in a higher education perspective.

2. Methodology

2.1 Procedure for Article Selection

The main purposes of the current systematic review research were to discuss the meaning of the quality in higher education, to present the quality indicators required for the quality assurance in online learning in higher education, and to present some models used to achieve the quality in online learning under different learning environments in higher education. To achieve these objectives, Scopus and Web of Science indexed databases were searched. In Web of Science and Scopus search engines, "Quality Assurance Indicators", "Online Learning Models" and "Higher Education" were entered as the main contents by selecting custom years from 2005-to 2021. The main reason for using these indexes listing articles was to explore a variety of research and review papers that are related to the quality assurance indicators and models in online learning mode for higher education. The search was completed from 10th to 27th June 2021. Based on the initial outcomes, 123 research and review articles were found. The particular inclusion criteria were implemented to limit the articles based on quality assurance indicators and models for online learning in higher education. The 1st criteria were to practice "Educational research" as a Scopus and Web of Science category. "Only items" as word documents and Pdf were the additional inclusion criterion. After using the inclusion criteria, 45 review and research papers were recorded. Specific exclusion criteria were then adopted in order to bring the research and review papers to be finally selected for the current study. The 1st criterion of exclusion was to reject more than once the repeated research and review papers. Secondly, papers not presented in the full text were to be omitted. The final criteria for exclusion comprised the elimination of papers that had no direct association with online learning. Finally, the main sample of this brief review of the research was obtained by selecting a total of 27 research documents. The article collection procedure is shown in figure 1.

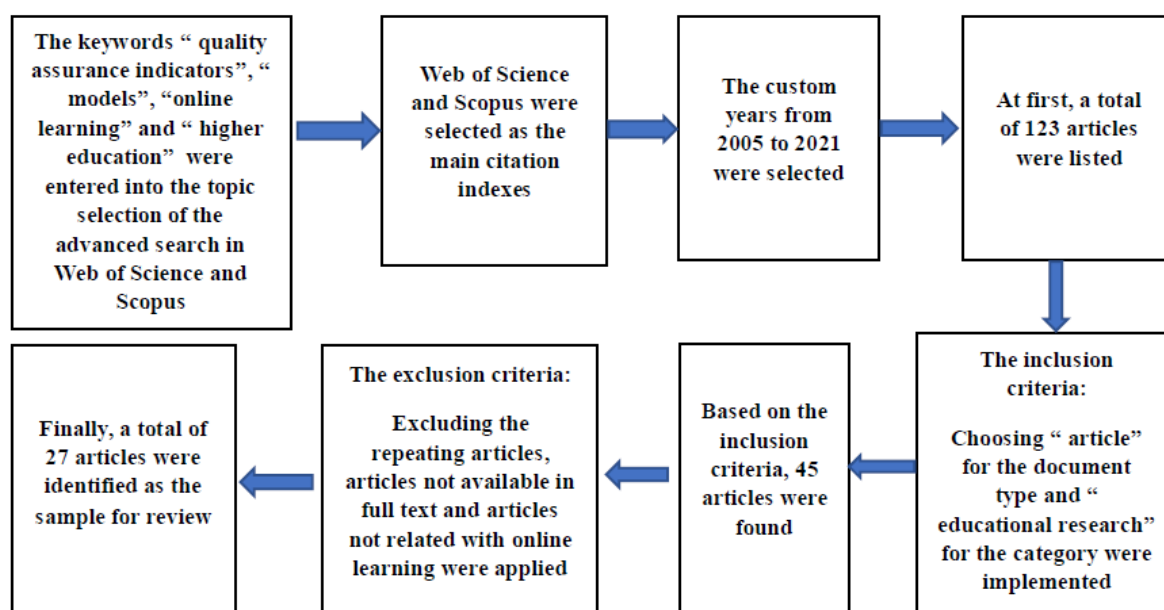


Figure 1: The Article Selection Procedure

3. Results

3.1 Meaning of Quality in Higher Education

To maximize the consistency of online learning services in practice and science, one must essentially understand what is the meaning of quality in higher education and how it is evaluated. The task of determining quality in higher education is fraught with difficulties. First, quality is a nebulous concept that can be interpreted in a number of ways based on the perspectives of various stakeholders (Mantravadi and Snider, 2017). When determining quality in higher education, there are four classes of stakeholders to consider: providers (funding agencies and the general public), students who are product consumers, output users (employers), and employees in the industry (administrators and academics). Each community has a unique viewpoint on the quality of higher education (Badia, Garcia and Meneses, 2018). For example, learners equate quality with the college they attend, the curriculum they participate in, and the course contents they complete. Managers, on the other hand, are concerned about the finished product's efficiency, which can be illustrated by a skilled employee pool. Therefore, all shareholders must be active in dialogue in order to guarantee that diverse viewpoints and requirements are taken into account when defining quality and attempting to create the values of quality in higher educational institutions (Welch et al., 2015). Another issue is that quality is a multifaceted term. As a result, restricting the term to a single sentence description is difficult. Such meanings may be lack context, one-dimensional and detailed, or be broad to operationalize in certain cases (Salman, 2017). A third issue is that quality is a complex, ever-changing quest for distinction that could be viewed in sense of a broader economic, educational, political, and social environment (Brenton, 2015). The classifications of quality in Higher education are shown in table 1.

Table 1: Classifications of the Meaning of Quality

Sr. No	Classifications	Definitions
1	Purposeful	Educational institutions' goods and facilities are compliant with a given vision or mission, as well as a group of criteria, necessities, or values, which may include those established by authorizing or governing bodies (Donnelli-Sallee, 2018).
2	Exceptional	Products and services for educational institutions achieve differentiation and exclusivity by adhering to strict guidelines (Wingo, Ivankova and Moss, 2017).
3	Transformative	Positive changes in learners' performance, as well as individual and professional ability, are influenced by educational institutional products and services (McCabe and Gonzalez-Flores, 2017).
4	Accountable	Educational organizations are held responsible to shareholders for making the best utilization of resources and delivering high-quality educational goods and services (Sharoff, 2019).

Identifying unique indicators that represent desired inputs (attentive faculty and staff) and outputs is one of the strategies for determining quality (employment of graduates). This strategy is reflected in a number of recent publications and quality assurance models (Crews and Wilkinson, 2015). The Quality Assurance Matters Rubric, for example, does not comprise a general description of the term quality, but rather precise criteria that express quality measures (Schultz and Pecheone, 2015). In the literature, there were over 50 different quality indicators. We divided the measures into four groups after analyzing them all: administrative, learner support, instructional, and learner success indicators as shown in table 2. The initial three categories are mainly concerned with the required outputs, such as educational opportunities for learners. The final category, learner success, is more concerned with results, such as learning gains, and represents current trends in evaluating learner's outcomes to ensure quality matters (Prieto-Rodriguez, Gore and Holmes, 2016).

Table 2: Quality Indicators Categories

Sr. No	Categories	Definitions
1	Organizational Indicators	A collection of quality measures that relate to an organization's administrative works, such as generating a relevant vision and mission, creating institutional reliability, meeting internal and external goals and expectations and acquiring capitals for optimal official functioning (Zineldin, Akdag and Vasicheva, 2011).
2	Learner Support Indicators	A collection of quality measures that relate to the readiness and awareness of learner support services such as how well student complaints are handled (Wong, 2012).
3	Instructional type Indicators	A collection of quality indicators that relate to the relevance of instructional content and the instructor's capability (Tam, 2014).
4	Learner Performance Indicators	A collection of quality measures that relate to learner involvement with curriculum, teachers, and academic staff, as well as improvements in awareness, skills, and capabilities that contribute to useful jobs (Iacovidou, et al., 2009).

3.2 Quality Assurance Indicators of Online Learning in Higher Education

3.2.1 Existing Frameworks of Online Learning in Higher Education

In connection to the design, distribution, operation, and assessment of online learning in higher education, (Khan's, 2005) octagonal structure presented 8 dimensions: pedagogical, technical, interface design, assessment, managing, capitals support, ethical and institutional. Pedagogy, according to his octagonal framework, discusses the teaching and learning requirements of online pupils, particularly the connection among course contents and suitable methods of delivery of instructions to permit pupils to attain the learning purposes. Technology support refers to technical setup, hardware, and software, as well as learning atmosphere and distribution of technological tools. Interface design incorporates aspects like the page and web design, navigation, accessibility, and content design however, this feature could be deemed too narrow in sense of institutional evolutions to improve online learning. Evaluation is the term used in North America for assessing learners, which we can classify as pedagogy. Management is concerned with staff, processes, and products, specifically the management team, online learning content transfer management, and online learning situation. resource support resource to account for the various types of services (both offline and online) that are accessible to learners. Communal and cultural diversity, the digital divide, and propriety are all topics that fall under the pre-view of ethics. Institution refers to the organization's readiness in perspectives of organizational and academic relationships, such as organization and transition, faculty, policy, academic staff support, and learner's services.

The eLPF (e-Learning Planning Framework) is a different online working tool that allows institutions and instructors to assess their online learning capabilities and recognize group involvement in digital learning. The framework defines 5 dimensions that essentially operate in tandem for an institution's online learning capability growth to be sustained over time. The vision of the institution, online learning leadership, and strategic planning are all examples of leadership and strategic direction. Curriculum, learning areas, digital citizenship, pedagogy, and evaluation are all part of learning and teaching. Learning communities and online learning inquiry are examples of professional learning. Tools and technologies, administrative assistance, and procurement are all part of the technologies and facilities. Beyond the classroom is the fifth dimension, which examines how institutions can collaborate with the local community to promote digital learning (Akyol, 2011).

A similarly significant aspect of high-quality online course content design and instructions delivery is guaranteeing that learners understand the criteria for good results. According to the Principles of High Expectations, reliable instruction should provide continuing and thorough descriptions of the associations among course contents learning objectives, and requirements required for representing expert levels of success. When presentation goals are articulated explicitly, learners not only have a greater level of understanding the of requirements needed for a good work conclusion, but they also attain insights into the anticipated skills required for real-world problem solving (Veeramani, 2010).

3.3 Guidelines to Evaluate Quality of Online Learning in Higher Education

According to the findings of research on international benchmarking on online learning in higher educational institutions, quality in online learning must be esteemed holistically and, to a greater degree, from the perspectives of learners and learning dimensions (Suárez-Perdomo, Byrne and Rodrigo, 2018). Benchmarking was emphasized in these projects as an influential tactical tool to support decision-makers in enhancing the efficiency and usefulness of organizational processes and, as a result, achieving the status of the best international learner in the higher education arena (Pentaraki and Burkholder, 2017). Online learning environments have grown in popularity among students, faculty, and administrators in higher education. Some learners may be attracted to online classes, while others may choose to participate in them (Money and Dean, 2019). Today, educators can create a variety of learning environments by combining a variety of resources to promote student learning and meet student interests or needs, as well as individual differences (Dziuban et al., 2018). The list of quality assurance indicators in online learning has been discussed in the following lines:

3.3.1 Interaction between Students and Teachers

In online learning, there are several types of interaction, including learner-learner interaction, learner-contents interactions, instructors-contents interactions, instructor-instructor interactions, content-content interaction, and pupil-instructor interaction (Amemado and Manca, 2017). While all of these types of interactions play a vital role in the online learning environment, student-teacher interaction was the most frequently quoted as a quality measure in the literature review (Wright, D'Alba and Jones, 2016). Interactions between students and teachers are particularly important in processes of health education and advancement. In personal health classes, for example, student-teacher engagement offers a platform for students to explore their health habits and the consequences of such behaviors with a health professional (Blaine, 2019).

3.3.2 Active Learning Techniques

Active learning strategies include engaging students in social activities that can result in improved “eagerness for online learning as well as attainment beside the course content expectations.” Strategies for active participation in online learning are mainly relevant to health-related learning and promotion. In order to foster safe online learning and decision-making capabilities, health instructors essentially find innovative means to enable pupils or groups of interested learners to evaluate their individual health-related behaviors. Many constructive learning approaches can be integrated into online courses or health education services (Hyun, Ediger and Lee, 2017).

3.3.3 Prompt Feedback

The vast majority of individuals favor instant knowledge of outcomes over delayed knowledge. This strategy is also adopted different for online programs; so that, timely feedback of pupils is an important quality measure of online learning programs. “communications from staff members that directly engage learners and provide timely feedback can provide to exchange ideas between learners and instructors and learners' consequent achievement in the course content.” Prompt feedback from learners is critical for reducing instructors' often recorded lack of presence in online or distance learning courses. In this digital era, students can measure prompt feedback in minutes and in hours, while instructors can calculate it in days. It is significant to provide input time in the course contents outline (Davis et al., 2019).

3.3.4 Learners Support Services

To encounter the cognitive, affective, and administrative requirements of the learner, learner's support services such as admissions, library admittance, and services, financial assistance, and deliberation are provided and these are key to any online learning program's success (Russo-Gleicher, 2013). It's critical to make learner support services accessible to online learning students, and it's a key quality indicator for the effectiveness of online learning. Since the organization controls and maintains several online learning-related support services, the program manager should look for ways to offer equitable student support services (Fedynich et al., 2015).

Faculty support benchmarks were created by the Institute for Higher Education Policy in 2011, and they include the following: the required technical assistance for the development of a course, Written tools to resolve any issues with students accessing electronic course data, ongoing teacher training opportunities and adequate support in the transition from conventional to online instructional approaches are all available. Providing sufficient support materials and preparation to faculty would aid in improving the standard of online learning instruction (Arasaratnam-Smith and Northcote, 2017).

3.4 Evaluation and Assessment of Programs in Higher Education

In order to improve and ensure quality in higher education, it is important to evaluate and analyze the programs of online learning in higher education (Jirgensons and Kapenieks, 2018).

3.4.1 Process of Evaluation of online programs in Higher Education

Online or Distance Learning in Higher Education

Many terms have been found, both in research and practice, to refer to teaching and learning over the Internet. These include distance education and online education. Moore, (2003) defined distance education as all forms of education in which all or most of the teaching is conducted in a different space than the learning, with the effect that all or most of the communication between teachers and learners is through communication technology. Distance education, under this definition, then includes non-Internet technologies such as video or correspondence learning. Since the three evaluation levels being discussed (i.e., programs, courses, and student learning) are all Internet-based, the term online education will be used.

4. Evaluation

There have been many arguments about the correct use of the term evaluation versus the term assessment. One position is that evaluation is different from assessment. Some researchers, especially in North America, use the term evaluation to refer to studies implemented to examine and report on the strengths and weaknesses of programs, policies, organizations, and the like to improve their effectiveness (American Evaluation Association, 1999); Assessment, on the other hand, is used to refer to the formation of value judgments to determine the significance, the importance, the value of learning and knowing, and using a variety of procedures to obtain information about individual's learning (Delandshere and Arens, 2003). Another position regards assessment as a subset of evaluation and a valuable tool in the larger evaluation activity (Thompson and Irele, 2003). As Thompson and Irele, 2003 argued, Assessment asks 'How much?' whereas evaluation asks Is it good enough? and If not why not? In this paper, we used evaluation as a generic term to include evaluation done at the program level, the course level, and the student learning level.

4.1 Macro-level evaluation

Macro-level evaluation refers to the evaluation of the entire online education program. Macro-level evaluation helps ensure the accountability and quality of a program (Fitzpatrick, Sanders and Worthen, 2004). Such evaluation is important for an online education program for several over-arching purposes which include: (a) justifying the investment of resources, (b) measuring progress toward program objectives, (c) measuring issues of quality and effectiveness, (d) providing a basis for improvement, and (e) informing institutional strategic planning and decision making (Thompson & Irele, 2003).

4.2 Meso-level evaluation

Meso-level evaluation refers to the evaluation of individual online education courses. Central to this level of evaluation is the question of what criteria should be used to evaluate the online courses and instruction.

4.3 Micro-level evaluation

The focus of the micro-level evaluation is on the individual online learner. A review of the relevant literature suggests that evaluation of the individual learner typically falls into one or more of the following three categories: (a) the learner's perception of online learning, (b) the learner's process of online learning, (c) the learner's product from online learning, (d) Clear Audience Analysis and (e) tools and media that are appropriate.

4.4 Learner's Perception

When learners enroll in an online course, they enter into an educational experience very different from the usual classroom-based face-to-face environment. Current online education courses are usually mostly or entirely text-based, asynchronous, and have multiple discussion threads. As such, course administrators and instructors are

usually interested to know how their learners “feel” about the course experience. Because of the difficulty of reaching online learners who are often separated by space or time, evaluation of learners’ perceptions typically involves questionnaire surveys. Some of the common evaluation questions pertinent to this purpose include: Does the learner enjoy the whole course?

What attitudes do the learners have towards online learning before, during, and after the whole course?

4.5 Learner’s Process

While the learner’s perception of online learning can be helpful and useful information, it is usually not sufficient to end just there. Most instructors would also want to know about their learners’ engagement in online learning through many different processes such as collaboration, cognition, problem solving and others. One common method of determining such processes is through a content analysis of the learners’ online discussion transcripts. Table 3 lists some of the content analysis models for evaluating these processes.

Table 3: Content Analysis Models for Evaluating Student Processes in Online Higher Education

Sr. No	Processes	Content analysis models
1	Cognitive processes	Newman, Johnson, Webb and Cochrane (1997)
2	Meta-cognitive processes	Henri, (1992)
3	The social construction of knowledge	Gunawardena, Lowe and Anderson (1997)
4	Collaboration processes	Murphy, (2004)
5	Problem-solving processes	Murphy, (2004)

4.6 Learner’s Product

Typically, the evaluation of the learner’s product of online learning is used to determine how much knowledge or skills he or she has acquired at the conclusion of the course. This is typically administered in traditional ways such as end-of-course tests, final papers, and final projects. Alternative methods include portfolios and performances (Hew, et al., 2004).

4.7 Clear Audience Analysis

The audience's needs (including those of the institution, teachers, and learners) should be defined before developing a high-quality online course. The learner's characteristics, geographic location, accessible technology, and priorities, as well as the missions and goals of the learning organization, the budgets that must be recovered, the charges of distribution, the political climate for the learning organization at the time, academic faculty compensation and market competition, must all be defined. In the design, implementation, and assessment of online course contents, a holistic approach to identifying requirements and evaluating the envisioned audience would guarantee that the requirements of all stakeholders concerned are discussed and fulfilled (Holland, 2019).

4.8 Tools and Media that are Appropriate

The collection and utilization of suitable resources and media are needed for the creation of high-quality online learning. The most suitable medium for providing instruction to students through online learning does not always imply the most up-to-date, most expensive technology. There are a number of variables to consider, including learner’s autonomy, forms of interactions, and media charge. Finally, technical resources and media should be selected based on how it helps or does not enable other essentials of course contents to behave in a system context where all the essentials or variables interact. To determine what is suitable for the quality of online learning, the instructor must first evaluate the audience's needs to determine what best suits those needs, and then look at previous technology and how these forms of media offered admittance while encouraging learner autonomy, engagement and cost usefulness (Panigrahi, Srivastava and Sharma, 2018). The summary of the quality assurance indicators for online learning is illustrated in table 3.

Table. 3: Summary of Quality Assurance Indicators for Online Learning in Higher Education

Sr. No	Indicators
1	Learners Perspectives
2	Learner–Instructor interaction
3	Prompt feedback
4	Learner support services
5	Evaluation and Assessment of Programmes

Sr. No	Indicators
6	Clear Analysis of Audience
7	Quality assurance is ensured by a documented technology strategy.
8	Institutional infrastructure and institutional support
9	Guidelines for Course Layout
10	Active Learning Strategies
11	Respect for various modes of learning
12	A compelling case for online learning that is related to the institution's mission
13	Tools and media that are Appropriate for Learning
14	Reliability of Technology
15	Guidelines for course development are being implemented, and instructional materials are being reviewed.

4.9 Models for Quality Assurance in Online Learning

Some of the models used for the assessment and evaluation of quality assurance in online learning have been illustrated in table 4.

Table 4: Models for Quality Assurance in Online Learning

Model Name	Reference	Characteristics of Model	Dimensions for Assessment
eMM (E-Learning Maturity Model)	Marshall, 2006	This model serves as the foundation for improving the quality of online learning courses. It was created to assist organizations in determining their online learning capabilities and assessing the efficiency of their e-learning.	Learning Development Support Evaluation Organisation
CAPEODL Model	Khan, 2004	This model emphasizes crucial modification of online learning products and facilities by gathering academic data on all facets of e-learning programs from their inception to completion.	Educational Technical Assessment Administration Resource Assistance Ethical Institutional
Evaluation and Assessment Logic Model	Price, Alkema, and Frank, 2009	This model supports in planning, implementation, evaluation, and communication of the program to all stakeholders. Five acts are proposed in online learning programs.	Entrances Outputs Supposition Exterior Factors
A conceptual model for determining the quality assurance of online learning	Raeesi, Qorbani and Akhgar, 2010	This model provides a set of indicators for evaluating the information-sharing process in online learning courses. These indicators are distributed into 2 categories: (1) indicators of online learning quality assessment in terms of information sharing (2) indicators of information sharing that have a direct influence on the e-learning process.	Each set of indicators is evaluated from three different perspectives: Individual Organizational Technical
PDPP model	Zhang and Cheng, 2012	The PDPP Model is constructed on the Stuffle-beam evaluation model as well as online software characteristics. It proposes four-dimensional and 24-indicators for evaluating the quality of these programs.	Planning Assessment Development Evaluation Process Evaluation Product Evaluation
A conceptual framework for quality assurance of online learning	Ossiannilsson and Landgren, 2012	The model's aim is to assist higher education institutions in developing, implementing, evaluating, and internalizing online learning in higher educational institutions.	Accessible Flexible Transparent Interactiveness Personalize Contribution Output
A conceptual model for online learning quality assessment	Giorgetti, Romero and Vera, 2013	This model suggests a set of parameters and dimensions for evaluating educational quality and improving it over time.	Institutional and administrative management Professional training Support for professional training

Model Name	Reference	Characteristics of Model	Dimensions for Assessment
A conceptual model for online learning quality assessment	Petkova and Radeva, 2014	The metrics for a general quantitative assessment and evaluation of the quality of online learning platforms are the subject of this model.	Interaction Institutional quality Staff support Institutional credibility Assurance mechanism Learner support

5. Discussion

Quality assurance of online learning in higher education is a major concern in Covid-19 conditions of many higher educational institutions operating only on traditional learning of face to face modes. . Due to the sudden outbreak of Covid-19, all the higher educational institutions have to change their modes of learning from face-to-face to online modes. Large-scale scale shifting of learning modes increased the challenges for most of the higher educational institutions having no pre-planned structure of online operating systems. One of the most important challenges was the assurance of quality education in online learning modes (Diep, Cocquyt, Zhu and Vanwing, 2017). In the framework of online learning in higher education, defining quality assurance remains to be a great challenge for most of the higher education institutional managers and stakeholders operating on face-to-face modes of learning. A review of related literature shows that there is yet no consent on defining the quality of higher education in the online learning environment, though there are melodies in how the quality of higher education in online learning is assessed and conceptualized in higher educational institutions (Husebø et al., 2018). The review of literature on the quality of education in online learning recommends that there are four comprehensive concepts of quality such as transformative, accountable, exceptional, and purposeful, and a group of quality indicators utilized to evaluate each comprehensive concept of quality in higher education (Ebner and Gegenfurtner, 2019).

In the current study, a review on defining the quality of higher education, quality assurance indicators for online learning in higher education, and different models used to improve and evaluate the quality of online learning in higher education has been done. The review of the literature indicated that quality is the set of standards that have to achieve for sustainable development. From an educational perspective, quality is the minimum required level for the learners that satisfies them and that is very important for sustainable development. In the present scenario of wide-spread COVID-19 pandemic disease, the higher educational institutions have shifted their modes of learning from face to face to online learning modes therefore, quality is most crucial concerns for higher educational institutions (Besser, Flett and Zeigler-Hill, 2020). Many researchers and instructors have indicated various quality assurance indicators for achieving quality education in online learning in higher educational institutions (Biasutti, 2017). These quality assurance indicators are very important to satisfy the requirement of the students in online learning. Some of the quality assurance indicators reviewed in this study are learners-instructor interaction, learner support services, assessment and evaluation of online programs, planned technology implementation policy for the quality assurance in online learning, and active learning strategies. Various models for online quality assurance in higher education have also been reviewed in this article. These models can be applied in different online learning environments to assess and evaluate quality assurance in higher educational institutions.

6. Conclusion

The quality assurance of higher education in online learning programs is the most critical discussion in many higher educational institutions operating face to face modes of learning before Covid-19 conditions due to the large-scale shifting of higher educational institutions from face-to-face learning modes to online learning modes. In the present study, the meaning of quality, quality assurance indicators, and some models used to assess and evaluate the quality of online learning have been discussed. Various indicators of quality assurance in online learning have been present to improve the quality of online learning. The main quality assurance indicators presented in the review are student-teacher interaction, documented plans for the implementation of technology in online learning, students' support center, and evaluation and assessment of quality in online learning programs. Some important models to assess and evaluate the quality of online learning are also presented in the current study to improve the efficiency of online learning. Further, such studies should be conducted to explore the ways to the assurance of online learning quality in the present pandemic conditions of Covid-19.

Conflict of Interest

The author/s did not declare any conflict of interest.

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References

- Ajmal, F. and Hafeez, M., 2021. Critical Review on Flipped Classroom Model Versus Traditional Lecture Method. *International Journal of Education and Practice*, 9(1), pp.128-140. DOI: 10.18488/journal.61.2021.91.128.140
- Akyol, Z., 2011. E-Learning in the 21st Century: A Framework for Research and Practice, DR Garrison, Routledge/Taylor and Francis, London. <https://doi.org/10.4324/9780203838761>
- Amemado, D. and Manca, S., 2017. Learning from decades of online distance education: MOOCs and the Community of Inquiry Framework. *Journal of e-learning and Knowledge Society*, 13(2). file:///C:/Users/Micro/Downloads/article_180225.pdf
- Arasaratnam-Smith, L.A. and Northcote, M., 2017. Community in Online Higher Education: Challenges and Opportunities. *Electronic Journal of e-Learning*, 15(2), pp.188-198. <http://www.ejel.org/>
- Badia, A., Garcia, C. and Meneses, J., 2018. Emotions in response to teaching online: Exploring the factors influencing teachers in a fully online university. *Innovations in Education and Teaching International*. <https://doi.org/10.1080/14703297.2018.1546608>
- Besser, A., Flett, G.L. and Zeigler-Hill, V., 2020. Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Scholarship of Teaching and Learning in Psychology*. <https://psycnet.apa.org/doi/10.1037/stl0000198>
- Biasutti, M., 2017. A comparative analysis of forums and wikis as tools for online collaborative learning. *Computers & Education*, 111, pp.158-171. <https://doi.org/10.1016/j.compedu.2017.04.006>
- Blaine, A.M., 2019. Interaction and presence in the virtual classroom: An analysis of the perceptions of students and teachers in online and blended Advanced Placement courses. *Computers & Education*, 132, pp.31-43. <https://doi.org/10.1016/j.compedu.2019.01.004>
- Brenton, S., 2014. Effective online teaching and learning. In *A handbook for teaching and learning in higher education* (pp. 161-173). Routledge.
- Crane, A., Matten, D., Glozer, S. and Spence, L., 2019. *Business ethics: Managing corporate citizenship and sustainability in the age of globalization*. Oxford University Press, USA.
- Crews, T.B. and Wilkinson, K., 2015. Online quality course design vs. quality teaching: Aligning quality matters standards to principles for good teaching. *The Journal of Research in Business Education*, 57(1), p.47.
- Davis, C., Greenaway, R., Moore, M. and Cooper, L., 2019. Online teaching in social work education: Understanding the challenges. *Australian Social Work*, 72(1), pp.34-46. <https://doi.org/10.1080/0312407X.2018.1524918>
- Delandshere, G. and Arens, S.A., 2003. Examining the quality of the evidence in preservice teacher portfolios. *Journal of Teacher Education*, 54(1), pp.57-73.
- Dhawan, S., 2020. Online learning: A panacea in the time of COVID-19 crisis. *Journal of educational technology systems*, 49(1), pp.5-22. <https://doi.org/10.1177%2F0047239520934018>
- Dias, S.B., Hadjileontiadou, S.J., Diniz, J. and Hadjileontiadis, L.J., 2020. DeepLMS: a deep learning predictive model for supporting online learning in the Covid-19 era. *Scientific reports*, 10(1), pp.1-17. <https://www.nature.com/articles/s41598-020-76740-9>
- Diep, N.A., Cocquyt, C., Zhu, C. and Vanwing, T., 2017. Online Interaction Quality among Adult Learners: The Role of Sense of Belonging and Perceived Learning Benefits. *Turkish Online Journal of Educational Technology-TOJET*, 16(2), pp.71-78. <https://files.eric.ed.gov/fulltext/EJ1137794.pdf>
- Donnelli-Sallee, E., 2018. Supporting online teaching effectiveness at scale: Achieving efficiency and effectiveness through peer review. *Journal of Educators Online*, 15(3), p.n3. <https://files.eric.ed.gov/fulltext/EJ1199112.pdf>
- Dziuban, C., Graham, C.R., Moskal, P.D., Norberg, A. and Sicilia, N., 2018. Blended learning: the new normal and emerging technologies. *International journal of educational technology in Higher education*, 15(1), pp.1-16. <https://link.springer.com/article/10.1186/s41239-017-0087-5>
- Ebner, C. and Gegenfurtner, A., 2019, September. Learning and satisfaction in webinar, online, and face-to-face instruction: a meta-analysis. In *Frontiers in Education* (Vol. 4, p. 92). Frontiers Media SA. <https://doi.org/10.3389/feduc.2019.00092>
- Fedynich, L., Bradley, K.S. and Bradley, J., 2015. Graduate Students' Perceptions of Online Learning. *Research in Higher Education Journal*, 27. <http://www.aabri.com/copyright.html>
- Fitzpatrick, J.L., Sanders, J.R. and Worthen, B.R., 2004. Evaluation's basic purpose, uses and conceptual distinctions. *Program Evaluation: Alternative Approaches and Practical Guidelines*, 3, pp.3-29.
- Giatman, M., Siswati, S. and Basri, I.Y., 2020. Online learning quality control in the pandemic Covid-19 era in Indonesia. *Journal of Nonformal Education*, 6(2), pp.168-175. <https://doi.org/10.15294/jne.v6i2.25594>

- Giorgetti, C.G., Romero, L. and Vera, M., 2013. Design of a specific quality assessment model for distance education. *International Journal of Educational Technology in Higher Education*, 10(2), pp.301-315. <http://dx.doi.org/10.7238/rusc.v10i2.1742>
- Gunawardena, C.N., Lowe, C.A. and Anderson, T., 1997. Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of educational computing research*, 17(4), pp.397-431. <https://doi.org/10.2190%2F7MQV-X9UJ-C7Q3-NRAG>
- Hafeez, M., Kazmi, Q.A., Tahira, F., Hussain, M.Z., Ahmad, S., Yasmeen, A., Iqbal, J. and Saqi, M.I., 2020. Impact of school enrolment size on student's achievements. *Indonesian Journal of Basic Education*, 3(1), pp.17-21. <https://doi.org/10.37728/ijobe.v3i1.302>
- Henri, F., 1992. Computer conferencing and content analysis. In *Collaborative learning through computer conferencing* (pp. 117-136). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-77684-7_8
- Hew, K.F., Liu, S., Martinez, R., Bonk, C. and Lee, J.Y., 2004. Online Education Evaluation: What Should We Evaluate?. *Association for Educational Communications and Technology*. <https://files.eric.ed.gov/fulltext/ED485142.pdf>
- Holland, A.A., 2019. Effective principles of informal online learning design: A theory-building metasynthesis of qualitative research. *Computers & Education*, 128, pp.214-226. <https://doi.org/10.1016/j.compedu.2018.09.026>
- Husebø, A.M.L., Storm, M., Våga, B.B., Rosenberg, A. and Akerjordet, K., 2018. Status of knowledge on student-learning environments in nursing homes: A mixed-method systematic review. *Journal of Clinical Nursing*, 27(7-8), pp.e1344-e1359. <http://wileyonlinelibrary.com/journal/JOCN>
- Hyun, J., Ediger, R. and Lee, D., 2017. Students' Satisfaction on Their Learning Process in Active Learning and Traditional Classrooms. *International Journal of Teaching and Learning in Higher Education*, 29(1), pp.108-118. <https://files.eric.ed.gov/fulltext/EJ1135821.pdf>
- Iacovidou, M., Gibbs, P. and Zopiatis, A., 2009. An exploratory use of the stakeholder approach to defining and measuring quality: The case of a Cypriot higher education institution. *Quality in higher education*, 15(2), pp.147-165. <https://doi.org/10.1080/13538320902995774>
- Jirgensons, M. and Kapenieks, J., 2018. Blockchain and the future of digital learning credential assessment and management. *Journal of teacher education for sustainability*, 20(1), pp.145-156. <https://files.eric.ed.gov/fulltext/EJ1218203.pdf>
- Kane, T., Kerr, K. and Pianta, R., 2014. *Designing teacher evaluation systems: New guidance from the measures of effective teaching project*. John Wiley & Sons.
- Khan, B.H., 2004. Comprehensive approach to program evaluation in open and distributed learning (CAPEODL) model. *Introduced in the Program Evaluation course*. George Washington University. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.462.4138&rep=rep1&type=pdf>
- Khan, B.H., 2005. *E-learning quick checklist*. IGI Global.
- Lynch, N.P., Lang, B., Angelov, S., McGarrigle, S.A., Boyle, T.J., Al-Azawi, D. and Connolly, E.M., 2017. Breast reconstruction post mastectomy-Let's Google it. Accessibility, readability and quality of online information. *The Breast*, 32, pp.126-129. <https://doi.org/10.1016/j.breast.2017.01.019>
- Mantravadi, S. and Snider, D., 2017. Online teaching overview and misconceptions: Two keys of sustainability in online courses and tools. *Journal of Higher Education Theory and Practice*, 17(7), pp.106-110. http://digitalcommons.www.na-businesspress.com/JHETP/MantravadiS_17_7.pdf
- Markova, T., Glazkova, I. and Zaborova, E., 2017. Quality issues of online distance learning. *Procedia-Social and Behavioral Sciences*, 237, pp.685-691. <https://doi.org/10.1016/j.sbspro.2017.02.043>
- Marshall, S.J., 2006. Development and evolution of an e-learning maturity model. In *Proceedings of the 12th International Conference on Technology Supported Learning and Training* (pp. 291-294). <http://www.cad.vuw.ac.nz/wiki/images/a/a9/2006EducaMarshallMMAbstract.pdf>
- Martin, F. and Bolliger, D.U., 2018. Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, 22(1), pp.205-222. <https://files.eric.ed.gov/fulltext/EJ1179659.pdf>
- McCabe, M.F. and Gonzalez-Flores, P., 2017. *Essentials of online teaching: A standards-based guide*. Taylor & Francis.
- Money, W.H. and Dean, B.P., 2019. Incorporating student population differences for effective online education: A content-based review and integrative model. *Computers & Education*, 138, pp.57-82. <https://doi.org/10.1016/j.compedu.2019.03.013>
- Moore, M.G., 2003. This book in brief: Overview. *Handbook of distance education*, pp.13-22.
- Murphy, G., 2004. *The big book of concepts*. MIT press.
- Newman, D.L., Scheirer, M.A., Shadish, W.R. and Wye, C., 1995. Guiding principles for evaluators. *New directions for program evaluation*, 1995(66), pp.19-26.
- Newman, D.R., Johnson, C., Webb, B. and Cochrane, C., 1997. Evaluating the quality of learning in computer supported co-operative learning. *Journal of the American Society for Information science*, 48(6), pp.484-495. [https://doi.org/10.1002/\(SICI\)1097-4571\(199706\)48:6%3C484::AID-ASI2%3E3.0.CO;2-Q](https://doi.org/10.1002/(SICI)1097-4571(199706)48:6%3C484::AID-ASI2%3E3.0.CO;2-Q)
- Ortagus, J.C. and Derreth, R.T., 2020. "Like having a tiger by the tail": A qualitative analysis of the provision of online education in higher education. *Teachers College Record*, 122(2), pp.1-32. <https://doi.org/10.1177%2F016146812012200207>

- Ossiannilsson, E. and Landgren, L., 2012. Quality in e-learning—a conceptual framework based on experiences from three international benchmarking projects. *Journal of Computer assisted learning*, 28(1), pp.42-51. <https://www.irit.fr/recherches/ICS/projects/twintide/upload/450.pdf>
- Panigrahi, R., Srivastava, P.R. and Sharma, D., 2018. Online learning: Adoption, continuance, and learning outcome—A review of literature. *International Journal of Information Management*, 43, pp.1-14. <https://doi.org/10.1016/j.ijinfomgt.2018.05.005>
- Pentarakis, A. and Burkholder, G.J., 2017. Emerging Evidence Regarding the Roles of Emotional, Behavioural, and Cognitive Aspects of Student Engagement in the Online Classroom. *European Journal of Open, Distance and E-Learning*, 20(1), pp.1-21. <https://files.eric.ed.gov/fulltext/EJ1187836.pdf>
- Petkova, Y. and Radeva, D., 2014. A model and an index for e-learning quality assessment. In *Proceedings of the International Conference on e-Learning* (pp. 176-181). <https://web.archive.org/web/20180410020826id/http://elearning-conf.eu/docs/cp14/paper-26.pdf>
- Price, R.M., Alkema, G.E. and Frank, J.C., 2009. California Geriatric Education Center logic model: an evaluation and communication tool. *Gerontology & geriatrics education*, 30(4), pp.317-331. <https://doi.org/10.1080/02701960903347691>
- Prieto-Rodríguez, E., Gore, J. and Holmes, K., 2016. Exploring quality teaching in the online environment using an evidence-based approach. *Australian Journal of Teacher Education (Online)*, 41(8), pp.22-39. <https://search.informit.org/doi/10.3316/ielapa.433904445915300>
- Raeesi, I., Qorbani, D. and Akhgar, B., 2010. A Conceptual Model for Measuring the Quality of e-learning through Knowledge Sharing Indicators. In *IKE* (pp. 383-387).
- Russo-Gleicher, R., 2013. Qualitative insights into faculty use of student support services with online students at risk: Implications for student retention. *Journal of Educators Online*, 10(1), pp.1-32. <https://www.learntechlib.org/p/114390/>
- Saira, N.Z., and Hafeez, M., 2021. A critical review on discussion and traditional teaching methods. *Psychology and Education Journal*, 58(1), pp.1871-1886. <https://doi.org/10.17762/pae.v58i1.1042>
- Salman, E.A., 2017. Teaching quality evaluation: online vs. manually, facts and myths. *Journal of Information Technology Education. Innovations in Practice*, 16, p.277. <https://www.learntechlib.org/p/181990/>
- Salvioni, D.M., Franzoni, S. and Cassano, R., 2017. Sustainability in the higher education system: An opportunity to improve quality and image. *Sustainability*, 9(6), p.914. <https://doi.org/10.3390/su9060914>
- Schultz, S.E. and Pecheone, R.L., 2015. Assessing quality teaching in science. *Designing teacher evaluation systems: New guidance from the measures of effective teaching project*, pp.444-492. <https://doi.org/10.1002/9781119210856.ch14>
- Sharoff, L., 2019. Creative and innovative online teaching strategies: Facilitation for active participation. *Journal of Educators Online*, 16(2), p.n2. <https://files.eric.ed.gov/fulltext/EJ1223934.pdf>
- Suárez-Perdomo, A., Byrne, S. and Rodrigo, M.J., 2018. Assessing the ethical and content quality of online parenting resources. *Comunicar. Media Education Research Journal*, 26(1). https://www.scipedia.com/public/Suarez-Perdomo_et_al_2018a
- Tam, M., 2014. Outcomes-based approach to quality assessment and curriculum improvement in higher education. *Quality Assurance in Education*, 22(2), pp. 158-168. <https://doi.org/10.1108/QAE-09-2011-0059>
- Thompson, M.M. and Irele, M.E., 2003. Evaluating distance education programs. *Handbook of distance education*, pp.567-584.
- Veeramani, M., 2010. E-learning: A conceptual framework. *International journal of educational research and technology*, 1(2), pp.20-24.
- Welch, A.G., Orso, D., Doolittle, J. and Areepattamannil, S., 2015. Matching student expectations with instructors' dispositions: Insight into quality of online teaching. *Journal of Effective Teaching*, 15(2), pp.5-19. <https://files.eric.ed.gov/fulltext/EJ1077242.pdf>
- Wingo, N.P., Ivankova, N.V. and Moss, J.A., 2017. Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning*, 21(1), pp.15-35. <https://files.eric.ed.gov/fulltext/EJ1140242.pdf>
- Wong, V.Y.Y., 2012. An alternative view of quality assurance and enhancement. *Management in education*, 26(1), pp.38-42. <https://doi.org/10.1177%2F0892020611424608>
- Wright, R.D., D'Alba, A. and Jones, G., 2016. Building rapport for online instructors. *Conference 2016 Proceedings*. <https://www.ideals.illinois.edu/bitstream/handle/2142/89419/Wright333.pdf?sequence=1>
- Zhang, W. and Cheng, Y.L., 2012. Quality assurance in e-learning: PDPP evaluation model and its application. *International Review of Research in Open and Distributed Learning*, 13(3), pp.66-82. <https://id.erudit.org/iderudit/1067225ar>
- Zineldin, M., Akdag, H.C. and Vasicheva, V., 2011. Assessing quality in higher education: New criteria for evaluating students' satisfaction. *Quality in higher education*, 17(2), pp.231-243. <https://doi.org/10.1080/13538322.2011.582796>