

Investigating the Factors Affecting Quality Assurance in E-Learning

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Abstract

Background: Universities and institutes of higher education are always regarded as centers for thinking and disseminating sciences. To improve the scientific quality of such centers, direct their intellectual, religious, and political movements, and ensure that they fulfill their responsibilities and maintain their dynamism, the programs pursued by such centers should undergo constant quality assurance. The major objectives of e-learning are reducing costs, increasing accessibility, and improving quality. The concept of quality, however, is still a challenging issue in electronic and virtual courses and requires lots of research. Despite numerous assessments of e-learning from different perspectives, many experts believe that no comprehensive study has focused on e-learning quality assessment. Thus, the current study was an attempt to conduct a systematic and scientific research with the aim of offering scientific and executive suggestions for improving quality assurance in e-learning in those centers that are implementing or have offered to implement this type of learning.

Method: This study adopted a comparative approach by studying papers through case-review. Then, the factors related to quality assurance were extracted, coded, summarized, and combined. Subsequently, using case analysis table, the main factors for e-learning quality assurance were identified.

Results: Overall, 27 factors that are related to e-learning were identified and were subsequently reduced to nine factors using case analysis table and summarization and categorization of factors with similar themes.

Conclusion: Establishing a proper structure to assess quality is one of the main factors leading to success in assuring quality in higher education. To this end, a suitable organizational structure should be created to assess and improve e-learning educational system. In this study we aimed to identify the main factors influencing e-learning quality assurance. At the end, nine factors were identified.

Keywords: E-LEARNING, QUALITY ASSURANCE, FACTORS

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Introduction

Universities and institutes of higher education are regarded as the supreme centers for thinking and

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science production. Scientists, researchers, and students working in such settings play a pivotal role in materializing scientific improvement and directing intellectual, religious, cultural, and political movements in the society. To properly fulfill their duties, maintain their dynamism, and be involved in continuous improvement, universities should be monitored to ensure the quality of their programs (1).

Scientists have proposed various definitions for e-learning. Khan uses the term e-learning to refer to open, flexible, and distributed learning. Designing and transferring teaching and apprenticeship in the internet requires experience, intellectual reasoning, and research combined with understanding internet potentials/resources and discovering appropriate procedures to utilize them for designing educational plans (2, 3). While drawing conclusions about e-learning, Asnafi defines the concept as the knowledge distributed through information technology based on electronic media as well as other media like satellite, television, smart phones, CDs, and various types of computer networks (4). The major objectives of implementing e-learning were reducing budget, increasing availability, and promoting quality. Out of these three, quality is still a challenging issue requiring a lot of research. Over the past two decades, quality assurance has become an important subject in universities and institutes of higher education. Various national assessment systems have been developed to evaluate university curricula and learning on. These systems have received due attention on an international scale, with stakeholders at both national and international domains demonstrating their willing toward improving the quality of education (5). In education, quality refers to those characteristics that systematically make maximum utilization of available resources to fulfill learners' and other educational stakeholders' explicit and implicit expectations (6). Quality assurance is a process through which purposes, structure, input, processes, and output of higher education systems are examined to propose plans for their quality maintenance and improvement. Quality assurance refers to passing regular judgment and planning about an institute or program to achieve acceptable standards in education, research, and organizational objectives. It is achieved through maintaining quality in the present time and promoting it in future. Quality assurance has to do with systematic management of assessment procedures and processes to control the performance of higher

education institutes. It encompasses indicators, objectives, performances, and processes that, because of their nature and application, ensure proper educational standards are maintained and improved (7).

Despite the fact that numerous assessments have been conducted on e-learning using different approaches, many researchers and experts have admitted that there is no systematic study on e-learning programs (8). The necessity for conducting such a comprehensive study becomes even more evident in the context of Iranian universities, where virtual courses have already begun. Some of the universities that have started these courses are Shiraz University (the pioneer university which launched in e-learning courses in 2005), Iran University of Science and Technology, Amir Kabir University, Khajeh Nasir Toosi University of Technology, Hadith College of Tehran, Isfahan University, ShahidBeheshti University, University of Tehran, Sahand University of Technology, etc. (9). E-learning is a new industry in the realm of educational technology and distance learning in Iran. It is necessary for educational centers of Iran, especially the universities, to develop e-learning environments based on international standards and a pattern that is suitable for the educational and cultural structure of the country (10).

Overall, quality assessment is of paramount importance in all organizations. It is even more critical in educational organizations, where quality is an abstract concept and has many beneficiaries. In this regard, e-learning institutes face more challenges since they are newly developed organizations which are trying to change the learning paradigm. On the other hand, given the vital role of e-learning in promoting performance quality in higher education, program developers, policy makers, and managers in institutes of higher education and universities should assess this type of learning with the aim of identifying its strengths and weaknesses. They should then try to solidify the strengths and address weaknesses to expand the dynamism of higher education in Iran.

Methods

The primary objective of this study was identifying the factors influencing quality assurance in e-learning. To this end, a comparative research method described by was adopted for data collection and analysis. This method is mainly used when the researchers focus on a relatively small number of cases (small-N technique) and have limited knowledge about each case (11). While examining the major reference in comparative method of research, which has focused on a number of social questions to develop into qualitative research, Munck says the number of cases should be increased in research plans, which are vague due to the limited number of cases (rule 12b).

To find the relevant cases of e-learning quality assurance we searched with different combination of the key words including e-learning quality, quality assurance, and virtual education. The retrieved documents were scanned by title to find the documents and cases of quality assurance practices in eLearning.

In the current study, the identified cases were thoroughly read and reviewed to identify the main factors of quality assurance in e-learning. Case-review analysis table was used in this study to record and categorize the factors (12). In other words, through studying research cases, the data related to quality assurance in e-learning were investigated. They were then recorded using the case-review approach. Then, the research done by people or organizations, such as experts, institutes, and universities, around the subject of virtual learning quality assurance from a process-based viewpoint was examined and, using comparative method, the findings were transcribed and summarized. This process continued until no new information was retrieved from identified sources, hence the notion of saturation. Then, the identified papers were reviewed to come up with the factors influencing quality assurance in e-learning.

Results

Stage One

In total, 22 papers and research studies were investigated in this applied piece of research (13-36).

Stage two: Extracting Factors from the Above-Mentioned Papers

In this stage, attempts were made to extract quality assurance factors from the retrieved papers. Examining the first paper (code 01) revealed four main factors, which are illustrated in columns 001 through 004 in the following table. Also, seven factors were extracted from the second paper (code 02), with three of them being similar to the factors extracted from the previous paper. Thus, these factors were categorized under similar categories of factors related to the paper 01. In the following table, the number of rows was equal to the number of papers. However, the number of columns depended on the number of extracted factors. Overall, 27 unique factors were extracted, hence having a 27×22 table.

Stage Three: Categorizing Retrieved Factors

In this stage, the factors were categorized and grouped according to their themes. For example, all the main factors in the column related to code 002 (student services, student support, student protection, student-related factors, learners' needs, and students' satisfaction) were grouped together.

Stage Four: Grouping Similar Factors

Since the factors mentioned in each row were related to a paper and were different from each other, they could be categorized under a shorter number of factors encompassing many processes. For example, in papers with the codes 002, 017, and 026, there are some processes that revolve around learners (including students or any other type of learners). Thus, these similar factors were grouped together, resulting in nine major

Code 001	Administrative services, financial services, resource allocation
Code 002	Student services, student support, student protection, student-related factors, learners' needs, students' satisfaction
Code 003	Resource services, resource protection, course content, information resources, production of educational content, comprehensive support resources, content, resource support services, online support services, library and information service, assessment of the effectiveness of educational content
Code 004	Professors' services, professors' support, training and service provision for professors, teaching-related factors, professor protection system, professors' toolkit, faculty members' satisfaction
Code 005	Organizational support, organization, organizational commitment, organizational factors, organizational strategy, leadership, institutional support, cost efficiency and organizational commitment
Code 006	Course development, course objectives, design and development, course establishment and development, development plans and budget, overall development, course objectives and design, internationalization, course design, plan
Code 007	Teaching/learning process, plan presentation, teaching/learning, educational design factors, educational design, education, educational aspects, learning and education, clear statement of objectives and expectations for learners, educational infrastructure
Code 008	Assessment and evaluation, evaluation, assessment and evaluation of students' learning, program evaluation, evaluation systems and progress assessment, student evaluation and assessment and course assessment, assessment and feedback processes, continuous assessment and immediate feedback, final assessment
Code 009	Technology, technological infrastructure, technological factors, technological support, use of technology, technical and organizational infrastructure, infrastructure, physical infrastructure and financial issues, proper technology
Code 010	Interface design, course environment design, web design, scientific website management, web browsing and design, presentation environment design, website design
Code 011	Management, notification, acceptance, and management, overall process, resource management, leadership, planning, and management
Code 012	Ethics, financial health, ethical and legal considerations, adaptability, justice
Code 013	Degree of interaction, interaction, provision of technical support and help for the system and users, relation, interaction, and cooperation, reaction, flexibility
Code 014	Consequences, learning consequences
Code 015	Legal requirements, copyright law, ethical and legal considerations
Code 016	Pedagogy, pedagogical factors, educational affairs, active learning, content applicability, opportunity to have access to the learning environment, learner centeredness
Code 017	Students' assessment and evaluation, learners' requirements
Code 018	21 st century skills, e-learning products and services, overall product, proper use of tools for remote controlling
Code 019	Teaching effectiveness, quality assurance criteria
Code 020	Learning effectiveness, quality assurance criteria
Code 021	Motivation techniques, overall design, provision of encouragement for active learning, students' motivation
Code 022	Personnel training, active personnel, personnel
Code 023	Supervising criteria
Code 024	Counseling
Code 025	External effects
Code 026	Providing guidance for professors and students on how to start the course
Code 027	Research

categories. At the end, new codes, ranging from 201 to 209 were developed for these broad categories.

Stage Five: Labelling Extracted Factors

The broad categories obtained in the previous stage were labelled in this stage; 201: administrative and financial services, 202: student support, 203: electronic content production, 204: professor support, 205: organizational support, 206: educational and research-based support, 207: research, assessment, and evaluation, 208: information technology, and 209: management.

Discussion

In this study, nine e-learning quality assurance processes were identified: administrative and financial services, student support, electronic content production, professor support, organizational support, educational and research-based support, research, assessment, and evaluation, information technology, and management.

Anarnejad and co-workers believe that management and evaluation are the main factors in assessing e-learning quality assurance (29). In the current study, these factors were materialized in organizational support, management, and research, assessment, and evaluation. In their study on management and leadership, Inglis and others identified three factors, which they introduced as independent factors: leadership, resource management, and evaluation (31). It is observed that in the present study these three factors were also emerged. McKinnon and others also reported leadership, programing, and management as an important factor (32). Consortium introduced another factor, namely cost efficiency and organizational commitment (14). Due to the financial independence of most institutes of e-learning, the financial and organizational domains were separated in this study and the financial domain was categorized under administrative and financial services. Anarnejad and co-workers also believed that

administrative affairs constituted an important e-learning quality assurance factor (29). Inglis and colleagues introduced administrative services as the ninth factor out of the ten factors they offered (31). McKinnon and others came up with nine factors, with the third one being financial and physical (infrastructure) affairs, which is in line with the factor known as administrative and financial services in this study (32).

Zhang and colleagues divided the main factors into four broad categories: programming assessment, development assessment, process assessment, and product assessment. They believed two types of support, namely technical and learning (educational) support, could be classified under process assessment. Thus, they argued that the entire executive operation of a virtual learning package could be categorized under assessment classes (26). In the present study, assessment was a separate issue categorized under management and leadership, which includes all virtual learning processes. It is a part of management and leadership responsibilities. To focus on student support, it was classified as a separate factor under education and research deputy. Anarnejad and co-workers proposed two major factors for student support: learner services' affairs and resource support services (29). It is observed that these two factors are encompassed within student support in this study. Chao and others proposed three major factors: basic standards, advanced standards, and expandable toolkit for faculty members. Therefore, they believe that all areas of virtual learning include basic standards, advanced standards, and expandable toolkits for faculty members (23). Inglis and co-workers proposed learners' needs as the tenth factor among their list of factors. They constrained it only to support for learners' needs and provided a brief description for it (31). McKinnon and others, who proposed nine factors, introduced learners' support as the fifth one. Based on their definition, this factor entails students' administrative services, students' services, and service effectiveness

(32). Since the current study adopted a process-based approach to virtual learning, it includes all forms of students' support from the beginning of their study to the way they can have access to information. The researchers believe a domain like service effectiveness, which is categorized under performance assessment and evaluation, covers all virtual learning performances and is under the supervision of management and leadership. The institute for policy making in higher education proposed seven factors, with the fifth one being student support (36). It seems that because of the wide scope and experimental nature of their study, the result of the current study is highlighting their findings. In their study, Chua and Lam proposed five factors for quality assurance: plan, content, professor, education, and educational platform. For student support, which was a subcategory of educational platform, they proposed three domains of access, performance, and support (33). It seems that in their study they paid some attention to students' support services. However, a weak aspect of their study is that this element has not been identified as an independent factor to attract experts' attention. Consortium also proposed five main factors (14), with the fifth one being students' satisfaction, which includes three domains of chat room, adaptability, and services. This factor is somehow similar to student support proposed in the current study. Further, the third factor in that study (i.e. opportunity to have access to the learning environment) has to do with the learners' access to the learning environment in all times. This factor has been introduced as access to the educational resources in this study. In its study, Illinois institute of technology proposed students' support in virtual learning and introduced five subdomains for it: support for education and quality learning, clarifying expectations for learners, motivating students, reduction of feeling of isolation, establishment of the feeling of presence in the learning community, learning assessment, and educational materials (19). It is observed that in the present study the researchers concentrated on students' support

because it is believed that students are the target of e-learning programs whose satisfaction will guarantee the quality assurance of virtual learning. Thus, they received specialized and extensive attention in this study. Zhang and colleagues considered the issue from the perspective of assessing the entire virtual learning process. They classified this concept in the electronic content and course resources under the category of development evaluation (26). In the current study, it is considered as a main factor. Anarinejad and co-workers who identified ten factors, considered environmental design as an important aspect of electronic content. This factor includes website and webpage design, content design, guidance, accessibility, and applicability test (29). In an interesting proposal, Chao and others simplified electronic content production so that they proposed expandable toolkit for faculty members as one of the three postulated factors (23). The Institute for Policy Making in Higher Education proposed self-assessment as the second factor among the seven proposed factors (36), which apparently received no attention in the present study. Given the mechanisms dominating faculties and processes in conducting research, this factor first emerged in the initial table. But it was subsumed under management and leadership through further analysis. Self-assessment was replaced by its synonym, i.e. holding periodical exams during the session. Chua and Lam also proposed content as one of their five-factor model (33).

Anarinejad and co-workers introduced educational affairs as the second factor, which includes policies, educational quality, professors' and staff's support, reward system, and class size. Furthermore, they proposed the following standards for this factor: "the presence of clear policies in e-learning, provision of high quality education as expected, provision of technical support for teachers during the course, presence of reward system to strengthen the teachers, and setting a limit for the number of learners in each class." It is observed that although professors, teaching method, and

their motivation are the central components of virtual learning, they were considered along with staff members in this study, i.e. professors' and staff's support. It is certain that lowering the kind of service professors should receive and lack of proposing them as an independent and specialized factor (and limiting their needs to technical support) will jeopardize quality assurance (29). The Institute for Policy Making in Higher Education (2000) proposed seven factors, with the sixth one being "support for professors" (33). Nonetheless, Consortium (2010) believed that support for professors means satisfying faculty members. This seems to be an interesting interpretation since no matter how one looks at quality assurance in virtual learning, it should eventually materialize in users' satisfaction (14). As mentioned, academic papers have frequently referred to support for professors.

Anarinejad and co-workers classified what in the current study is known as educational and research services under three titles: educational affairs, educational aspects, and ethical and legal considerations (29). McKinnon and others highlighted nine main factors, with the fourth and sixth factors being respectively related to educational and research services. They used the titles learning/teaching and research for these independent factors. It is clear that in their study research was an important concept, hence categorized it as an independent factor (32). However, the Institute for Policy Making in Higher Education (2000) combined education and research as a single factor named learning and education. It encompassed the relationship between students and professors, assignment feedback, and research methods.

Zhang and colleagues proposed two standards under the factor "development assessment": e-learning infrastructure and course website. For them, information technology was synonymous with e-learning infrastructure, which could include all technical issues (26). Anarinejad and co-workers also introduced technology as the fifth factor in their study. It encompassed hardware, infrastructure, and software (29).

Moreover, Inglis and colleagues proposed technical infrastructure as a factor that entailed management and maintenance of technical infrastructure (31). As mentioned in the realm of financial issues, McKinnon and others did not devote any separate factor to information technology and believed that it could be categorized under financial processes. They used the title "financial and physical (infrastructure) affairs" for this category (32). Electronic service management of information technology unit is also categorized under this factor.

Conclusion

E-learning faces a major challenge one of them is the development of quality learning (37). Quality assurance systems in higher education play a key role in supporting and improving the quality of educational services provided by Higher Education Institutions (HEIs) (38). However, concerns over quality continue to be an issue. A common response has been to implement quality assurance measures (39). Establishing a proper structure to assess quality is one of the main factors for success in higher education quality assurance. To this end, a suitable organizational structure should be created to assess and improve e-learning quality. In this study, attempts were made to identify factors that influence e-learning quality assurance. To this end, a comparative research method was followed, and an analysis table was utilized. At the end of the process, nine quality assurance factors emerged. The results of this study can be used to identify, extract, and collect areas that can be categorized under each of the factors.

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References

1. Khalifeh Gh, Razavi S. Arzeshyabi vatazmine keyfiyat dar yadgireye electronic ba estefade azmodele tahlile ahamiyyat-amalkard. *Interdisciplinary Journal of*

- Virtual Learning in Medical Sciences. 2012;3(1):1-12. (Article in Persian)
2. Khan B. Managing e-learning strategies: Design, delivery, implementation and evaluation. Hershey: IGI Global; 2005.
 3. Ritchie DC, Hoffman B. Incorporating instructional design principles with the World Wide Web. In: Khan BH. Web-based Instruction. Englewood Cliffs: Educational Technology Publications; 1997:135-8.
 4. Asnafi AR. What is e-learning and where is the place of virtual libraries in this process? National Studies on Librarianship and Information Organization. 2005;16:133-48. (Article in Persian)
 5. Bazargan Harandi A. Arzyabiye darooni daneshgahi va karborde an darbehboode mostamare keyfiyate amoozeshe aali. Quarterly Journal of Research and Planning in Higher Education. 1995;11-12:49-70. (Article in Persian)
 6. Bazargan A. Negahi be tajrobehaye beynolmelali va melli dar arzyabiye daruni va boruniye daneshgah'ha. The first conference of internal evaluation to improve academic quality. Tehran: Faculty of Management, University of Tehran; 2004. (Article in Persian)
 7. Lenn P. M. The World is Flat: Globalization of Professional and Specialized Accreditation: A Workshop. Center for Quality Assurance in International Education, National Center for Higher Education: Washington, DC. 2005.
 8. Nemati-Anaraki L, Nooshinfard F. Organizational culture and knowledge sharing among the faculty members of medical science universities and research centers. National Studies on Librarianship and Information Organization. 2015;25:129-43. (Article in Persian)
 9. Mahdiuon R, Ghahreman M, Ferasatkhah M, Abolghassemi M. Quality of learning and its effective factors within academic e-learning centers: A qualitative study. Journal of Academic librarianship and Information Research. 2011;45:77-100. (Article in Persian)
 10. Afrasiyabi Z, Shirdel M. Amoozeshaz rah door. 5th International Conference on Psychology and Social Sciences; Tehran: HamayeshgaranMehrEshragh; 2016. (Article in Persian)
 11. Della Porta D, Keating M, editors. Approaches and methodologies in the social sciences: A pluralist perspective. Cambridge University Press; 2008 Aug 28.12. Munck GL. Canons of research design in qualitative analysis. Studies in Comparative International Development. 1998;33(3):18-45.
 12. Stephenson LA. (Dissertation). A comparative study of cognitive and non-cognitive factors relationship to academic success for foreign master's students. College Park: University of Maryland; 2004.
 13. Aoki K, Pogroszewski D. Virtual university reference model: A guide to delivering education and support services to the distance learner. Journal of Distance Learning Administration Contents. 1998;1(3):1-15.
 14. Allen IE, Seaman J. Class differences: Online education in the United States, 2010 [Internet]. Newburyport, MA: Online Learning Consortium, Inc; c2010. Available from: <https://files.eric.ed.gov/fulltext/ED529952.pdf>
 15. Khan BH. A framework for e-learning [Internet]. LTI magazine; c2001. Available from: <http://lomo.kyberia.net/diplomovka/webdownload/partial/elearningmag.com/E-Learning%20-%20A%20Framework%20for%20E-learning.pdf>
 16. Sims R.C. From art to alchemy: Achieving success with online learning [Internet]. Available from: <http://it.coe.uga.edu/itforum/paper55/paper55.htm>
 17. Levy S, Beaulieu R. Online distance learning among the California Community Colleges: Looking at the planning and implementation. Am J Distance Educ. 2003;17:207-20. Doi: 10.1207/s15389286ajde1704_2
 18. Mayer RE. Multimedia learning. Psychol Learn Motiv. 2002;41:85-139. Doi: 10.1016/

- S0079-7421(02)80005-6
19. McGahan SJ, Jackson CM, Premer K. Online course quality assurance: Development of a quality checklist. *InSight: A Journal of Scholarly Teaching*. 2015;10:126-40.
 20. Fresen JW. (Dissertation). Quality assurance practice in online (web-supported) learning in higher education: An exploratory study. Pretoria: University of Pretoria; 2005.
 21. Pape L, Wicks M, the iNACOL Quality Standards for Online Programs Committee. National standards for quality online programs [Internet]. Vienna: International Association for K-12 Online Learning; c2009. Available from: <https://www.inacol.org/wp-content/uploads/2015/02/national-standards-for-quality-online-programs.pdf>
 22. Seok S, Meyen E, Aust R, Fitzpatrick M, Newberry B. Three dimensions of the online course evaluation instrument in postsecondary education. *Proceedings of Ninth IASTED International Conference, Computers and Advanced Technology in Education*; 2006 Oct 4-6; Lima, Peru; 2006. p. 363-9.
 23. Chao T, Saj T, Tessier F. Establishing a quality review for online courses. *Educause Quarterly*. 2006;29(3):32-9.
 24. Anarinejad A, Saketi P, Safavi AA. Tarahiye charchoobe mafhoomiye arzeshyabiye barnamehaye yadgirie eletronici dar mo'asesaate amoozesh aali Iran. *Fanavari Amoozesh*. 2010;4(3):191-201. (Article in Persian)
 25. Kidney G, Cummings L, Boehm A. Toward a quality assurance approach to e-learning courses. *International Journal on E-Learning*. 2007;6:17-30.
 26. Zhang W, Cheng YL. Quality assurance in e-learning: PDPP evaluation model and its application. *The International Review of Research in Open and Distributed Learning*. 2012;13(3):66-82.
 27. Safavi AA, Bavaghar M, Ghafari H. E-content criteria and standards from e-learning perspective. *Quarterly Journal of Research and Planning in Higher Education*. 2007;13(1):27-52. (Article in Persian)
 28. Sherman ME, Schiffman MH, Lorincz AT, Manos MM, Scott DR, Kuman RJ, et al. Toward objective quality assurance in cervical cytopathology. Correlation of cytopathologic diagnoses with detection of high-risk human papillomavirus types. *Am J ClinPathol*. 1994;102:182-7. Doi: 10.1093/ajcp/102.2.182
 29. Anarinejad A, Saketi P, Safavi AA. A conceptual framework development for e-learning programs evaluation at Iranian higher education institutions. *Journal of technology of education (journal of technology and education)*. 2010;4(3):191-201. (Article in Persian)
 30. Ireland J, Correia HM, Griffin TM. Developing quality in e-learning: A framework in three parts. *Quality assurance in education*. 2009;17(3):250-63. Doi: 10.1108/09684880910970650
 31. Inglis A. Approaches to the validation of quality frameworks for e-learning. *Quality Assurance in Education*. 2008;16:347-62. Doi: 10.1108/09684880810906490
 32. McKinnon KR, Walker SH, Davis D. *Benchmarking: A manual for Australian universities*. Canberra: Australian Higher Education Division; 2000.
 33. Chua A, Lam W. Quality assurance in online education: The Universitas 21 Global approach. *Br J Educ Technol*. 2007;38:133-52. Doi:10.1111/j.1467-8535.2006.00652.x
 34. Zarif Sanaee N. Barrasiye me'yarhaye keyfiyat va asarbakhshiye yadgiriye eletronici dar amoozeshe aali. *Interdisciplinary Virtual Learning in Medical Sciences*. 2011;1(3):24-32.
 35. Sims R, Dobbs G, Hand T. Proactive evaluation: New perspectives for ensuring quality in online learning applications. *Proceedings of the 18th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, Biomedical Multimedia Unit, The University of Melbourne, Melbourne*; 2001.
 36. Sims R, Dobbs G, Hand T. Enhancing quality in online learning: Scaffolding planning

- and design through proactive evaluation. *Distance Education*. 2002;23:135-48. Doi: 10.1080/0158791022000009169.
37. Naim A, Hussain MR, Naveed QN, Ahmad N, Qamar S, Khan N, et al. Ensuring interoperability of e-learning and quality development in education. 2019 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT). Amman, Jordan; 2019. Doi: 10.1109/JEEIT.2019.8717431
38. Kamusoko R, Jingura RM. A competency framework for internal quality assurance in higher education. *International Journal of Management in Education*. 2019;13(2):119-32. Doi: 10.1504/ijmie.2019.10018030
39. Andrade MS, Miller RM, Kunz MB, Ratliff JM. Online learning in schools of business: The impact of quality assurance measures. *Journal of Education for Business*. 2020;95:37-44. Doi: 10.1080/08832323.2019.1596871.