The Role of IT in Quality of Higher Education Infrastructures an Exploratory Study in Administration and Economics College/University of Mosul

Lecturer Dr. Rabee Ali Zaker
College of Administration and Economics
University of AL-Hamdaniya

Assist. Lecturer: Qusay Salim Jameel
College of Administration and Economics
University of AL-Hamdaniya

Assist. Prof. Dr. Mohammad Mostafa Hussien
College of Administration and Economics
University of Mosul

Abstract:

The research aims to study is to reveal the relationship between information technology as a tool towards improving the quality of the higher education infrastructure in the College of Administration and Economics, Mosul University, Iraq. Faculty members were the samples for this work. standard questionnaire has been prepared for the purpose of data collection. A questionnaire has been distributed amongst the respondents electronically through google drive application. 127 responses have been received and analyzed using SPSS software package-20. In conclusion, it has been drawn that IT represents the key success which is empowering and enabling the selected faculty towards achieving the wanted quality in the higher education.

Keywords: Information Technology, Information Technology Infrastructure, Quality, Higher Education.

دور تقنيات المعلومات في جودة البنية التحتية للتعليم العالي دراسة استطلاعية في كلية الإدارة والاقتصاد/جامعة الموصل

أ.م.د. محمد مصطفى حسين
كلية الإدارة والاقتصاد
جامعة الموصل
asha.mustafa@yahoo.com

م.م. قصي سالم جميل
كلية الإدارة والاقتصاد
جامعة الحمدانية
qusaysalim@gmail.com

م.د. ربيع علي زكر
كلية الإدارة والاقتصاد
جامعة الحمدانية
rabee@uohamdaniya.edu.iq

المستخلص:

يهدف البحث إلى الكشف عن العلاقة بين تقنية المعلومات كأداة نحو تحسين جودة البنية التحتية للتعليم العالي في كلية الإدارة والاقتصاد، جامعة الموصل، العراق. تمثلت عينة البحث بأعضاء الهيئة التدريسية. تم إعداد استبيان معياري لغرض جمع البيانات، وقد تم توزيع استمارة الاستبانة على المبحوثين إلكترونياً من خلال تطبيق Google drive. تم استلام ١٢٧ إجابة وتحليلها باستخدام حزمة برامج SPSS-20. في الختام، كان من بين أهم الاستنتاجات أن تكنولوجيا المعلومات تمثل النجاح الرئيسي الذي يمكّن أعضاء هيئة التدريس المختارين ويمكّنهم من تحقيق الجودة المطلوبة في التعليم العالي.

الكلمات المفتاحية: تقانة المعلومات، البنية التحتية لتقانة المعلومات، الجودة، التعليم العالي.

1. Introduction:

Various institutions, whether productive or service, are trying to achieve their goals in a very smart way and getting first ranks compared to the leading institutions in the field; Especially as the economy shifts from an economy industrial to a purely informational economy based on information and how to best exploit it according to circumstances suitable for this by providing appropriate human, financial or material resources. Recently, in last few decades everything in life has been changed due to the widespread and huge involvement of Information Technology (IT). With the reality of unprogressive and development without adopting IT, a vary vital role for IT has been diagnosed in the universities and especially in learning, research, and educational activities. The truth is that the effectiveness gathering and transforming of knowledge and information became more touchable under IT empowerment (Hamidi et al, 2011, 370).

On the other hand, a huge concentrated has been given to the quality notion which refers to fulfillments of consumer's needs, desire and expectations about different organizational products and services (Moore and Brown, 2006, 12). Six Sigma perspective has expanded the quality vision to include economic value and scientific usage. In this context, the role of IT on the quality in all kinds of organizations has become more enmeshed. A Quality has become the true criterion for the reputation of institutions as well as the demand of customers for their goods and services in the work environment. It is well known to anyone the complexity of the service delivery environment in the 21st century, especially in light of the technological renaissance in data processing and information production. The possession of educational institutions with a rich infrastructure of information and communication technology has become crucial for the continuity of education and learning under the health restrictions imposed after the outbreak of the Corona-19 epidemic. Consequently, educational institutions that possess appropriate technology to perform their activities are able to continue practicing educational activity remotely. The purpose of this work is to reveal the relationship between information technology as a tool towards improving the quality of higher education infrastructure in the College of Administration and Economics, Mosul University, Iraq. Several works attempts have highlighted the implications of IT in the enhancing the quality of learning activities. (Moosavi et al, 2019, 128-129)

introduced a survey work to relies the quality of educational services giving to the nursing students at Dezful University of Medical Sciences in southwest of Iran. The work has concluded that there is a gap in the dimensions of the quality education services. The gap included emotional, touchable, and reliability of quality education services given. As such the educational services are not aligning with the expectation of the student's needs. (Hanh, 2019, 524-525) introduced a study about the relationship between quality assurance and quality accreditation of higher education in Vietnam. The study concluded that the education system needs to be supported thought Spreading the culture of total quality in depth and on a large scale among all leaders and employees of higher education institutions through training and retraining in total quality management programs. (Deranek et al, 2020, 22) presented a research paper to explore whether wearable devices can be used as an alternative to the social presence of others and to examine whether the technology enhances exercise-related activities and possibly motivates participants. The sample were the students of secondary school, students of university, and old citizens. The work concluded that the data storage and collection as well as data privacy, data security and data discrimination need to be investigated. The privacy rights of individuals must be observed when using wearable devices to assess users' health. This work is keen to clarify the role of IT in the higher education infrastructure in the Faculty of Administration and Economics in Mosul University, Iraq.

2. Literature Review:

2.1 Information Technology: In the past years, the global economy has moved towards the so-called knowledge economy that revolves around the use of knowledge and its use to add value to the organization. The new economy has been accompanied by a great development in the field of information systems and its technologies, as organizations have become dependent on this technology in light of this economy in order to obtain information, knowledge efficiently, and quality.This will ensure the success of the organization. IT represents a strategic tool to manage the resources of organizations, and promotes the completion of activities efficiently and effectively to achieve the goals of the organization, and affects the addition of market value to the organization (Benitez and Walczuch, 2012, 666). (Weill and Woodham, 2002, 2-12) refer that organizations are investing in

the IT almost 50% of the total Annual budget. IT is a means of electronic nature that perform three main functions: information storage, and processing it, and transferring it from one place to another, regardless of distance, it includes three main parts: the physical part, the software part, and the part   Informational.

2.2 Quality in Higher Education: The concept of quality appeared associated with obtaining the ISO certification after the International Organization for Standardization was developed. The ISO standard Several international standards concerned with quality and classified under the word ISO, and it became a foundation. The educational implementation of the requirements to meet these standards is one of the entrances to achieving quality. As universities get longer ISO 9001 certification, 2000 issuance in education, is an important step for the implementation of Total Quality Management. Thus, improving university outcomes and increasing the degree of reliability; From the premise that ISO 9001 is Requirements for quality management systems. It is based on the operations approach that focuses on four main elements represented with a quality management system, management responsibility, resource management with product or service achievement, measurement and analysis and improvement (Señal et al, 2008, 9-11). Quality concept has gained vast important around the world. Due to its competitive and economic advantages, it has been the loyalty for executive managers, analysts, and academics. It is essential to highlight the concept of "quality" before introducing the concept of "higher education quality". It refers to the present and future response to consumer's need (Su et al, 2014, 2-3). (Yousapronpaiboon, 2014, 1089) highlighted that the meaning of the quality in the services organizations is the organizational ability towards customer expectations meeting. As such it refers to Comparison between consumes expectation and what he is getting in reality. The attempts of consideration the quality concept in the higher education have been started in the last decade from the last century. These attempts have dependent on the successful application of the quality strategies in the industry. First adoption of quality philosophy in the higher education were in the managerial functions. The result was highly visible from different functional sides like customer satisfaction, team works, employee empowerment, and cultural changing (Anninos, 2008, 307-308). (O'Nell and Palmer, 2004, 40) defines the higher education quality through the vision of the students about the expected educational services and what

they are gaining in reality. (Whereas Jones, 2003, 223-224) emphasize that the higher education quality represents the required pushup power in order to achieve its goals and mission towards the society. Achieving quality education requires directing the efforts of human and financial resources, infrastructure, policies, processes and curricula in order to provide conditions conducive to innovation and creativity, and in meeting the educational product that ensures that the student reaches the educational level that everyone seeks to. It's possible to get ideas from the term of "zero defects" which has been giving by Philip Crosby in his book "absolutes of quality management". Higher education can take advantage of the (Crosby) philosophy in the field of education and prepare teachers with the need to sensitize them and train them on quality to improve their expected performance, and to transmit enthusiasm and seriousness in them. The quality of higher education represents all the efforts from the education employees by applying a set of educational standards and specifications necessary for that. The process of applying quality in educational organizations is a process characterized by high professionalism, which works to make the successful application of quality that affected not only teachers, but also affected learners and other stakeholders, as the developed application has led to building knowledge, skills and directions for stakeholders in higher education organizations (Ehlers, 2009, 343-346).

2.3 The Infrastructure of Higher Education: There are many opinions about the dimensions that can be adopted in measuring the quality of a university education. The reason for this is that the university education institutions are constantly evolving and changing, and the university education has become of great importance and has witnessed clear transformations throughout the world over the past decades, as it came in Recent OECD reports for university education policies (Henard and Leprince, 2008, 4). The following dimensions or foundations can be adopted, as they cover most of the core areas of education quality:

2.3.1 Teaching and support staff: In general, the teaching and support staff are assigned the main role in providing educational services at the universities, where the teaching staff has a fundamental involvement in the success of educational process through many roles through which academic integrity is achieved, by giving lectures at the specified time, and covering the scheduled study material. Developing the teaching staff must be through the method used to give lectures, and to communicate information

to students and others. the most important requirements for this axis, they are listed as follows:

- Existence of appropriate policies for selecting, attracting and appointing teams in terms of quantity and quality.
- They should be of academic competence in their field of specialization.
- Existence of clear programs and plans for their professional development.
- Existence of technical support services programs.
- Provide a guide that includes the duties and responsibilities of the teaching and support staff.

Empowering the teaching staff at the university has a special importance in achieving the quality of education, especially if the focus is on enabling the requirements above, by creating the appropriate conditions to free up the potentials they have (Houston and Paewai,2010, 263).

2.3.2 The Students Affairs: The universities must pay sufficient attention to the scientific, intellectual, ethical, cultural and social development of students, and to enable them in order to achieve the universities goals as well as the student's goals.

The teaching staff must turn towards motivating students to engage in critical thinking and analysis and bypassing memory by heart, although students may encounter difficulty in it, but this process contributes to enabling them and giving them self-confidence. This will ensure that the graduating student will has the ability and ability to meet reality. Another benefit is that the student's opportunities will increase to get a job and will improve their experiences. The most important requirements of this section can be listed as follows: (Fukahori, 2014, 49-50)

- It should be there a clear policy for admission, registration, and transfer of students.
- Universities should adopt a system for academic guidance.
- The university's commitment to implement the academic regulations and exams.
- Supporting student activities.
- programs to follow up with graduate students.

2.3.3 The Educational Programs: Since the main goal of universities is to provide excellent educational services as a part of its mission, judging from its role in the formation of students and build their personality and provide them with the skills and knowledge of scientific and academic abilities, so

it should take this based adequate attention through the consistency of scientific curriculums.

This also need to depend on modern teaching methods, as well to provide appropriate educational environment. Furthermore, the approved scientific methods in the teaching of students at the university should be adopting by relying on the advanced and international universities curricula. This dimension could be divided into two parts; undergraduate and graduate educational programs. The most important requirements of this section can be listed as follows: (Ruso et al, 2017, 17-18)

- Clarification the goals of educational programs in undergraduate and graduate educational programs
- Adapting the academic programs with the market needs.
- Quality assurance of educational processes.
- Evaluating and developing the educational programs.
- Ensuring the quality of the educational process outputs.
- Integration between different programs and specialties.

The empowerment of this dimension is highly depending on the use of information technology in the learning processes. This, because the most of the learning process is recently require the use of IT which is the main key towards the empowerment and success. Also, this means that the Iraqi Universities must vastly invest in IT resources.

2.3.4 The Scientific Research: Universities have to encourage the academic staff towards implement more scientific researches. This has been chosen to be the only way for growth and development nations. However, this step needs to be added in the strategic and learning processes. The most important requirements of this section can be listed as follows: (Williamson, 2018, 12)

- Clear policy for the scientific research.
- The availability of scientific research foundation resources.
- The availability of scientific research requirements like scientific resources, labs, and raw materials.

2.3.5 Learning Support Services: The learning support services represents the important background of learning activities success and enrichment. This step is focusing on library services, workshops, and scientific labs. The most important requirements of this section can be listed as follows: (Khodayari and Khodayari, 2011, 39-40)

- Good planning of the different services.

- Providing the necessary resources (financial, human) to gain a benefit from these services.
- Continuous improvement and development of these services.

3. The Methodology of the study:

In the latest decades, education has become a human investment. It has its goals, inputs, processes, and outputs. The new technologies are deeply engaging in the said investment because it became an organized approach for the learning process. This work has been done in the faculty of administration and economics, Mosul University, Iraq. The questionnaires distributed amongst faculty staff using google drive form application. The questionnaire consists of three parts, the first was about the demographic characteristics of the sample, the second was about the IT, and the third part was about the quality of higher education infrastructure. The academic staff were the sample of this work. The SPSS-20 has been depended for the data analysis. The questionnaire has been uploaded the to the selected faculty social media which all the staff are participated in. 127 respond filled the questionnaire and sent it to the authors google drive. conceptual model has been prepared in order to reflex the hypothetical relation between the independent variable and dependent variable as it shown in.
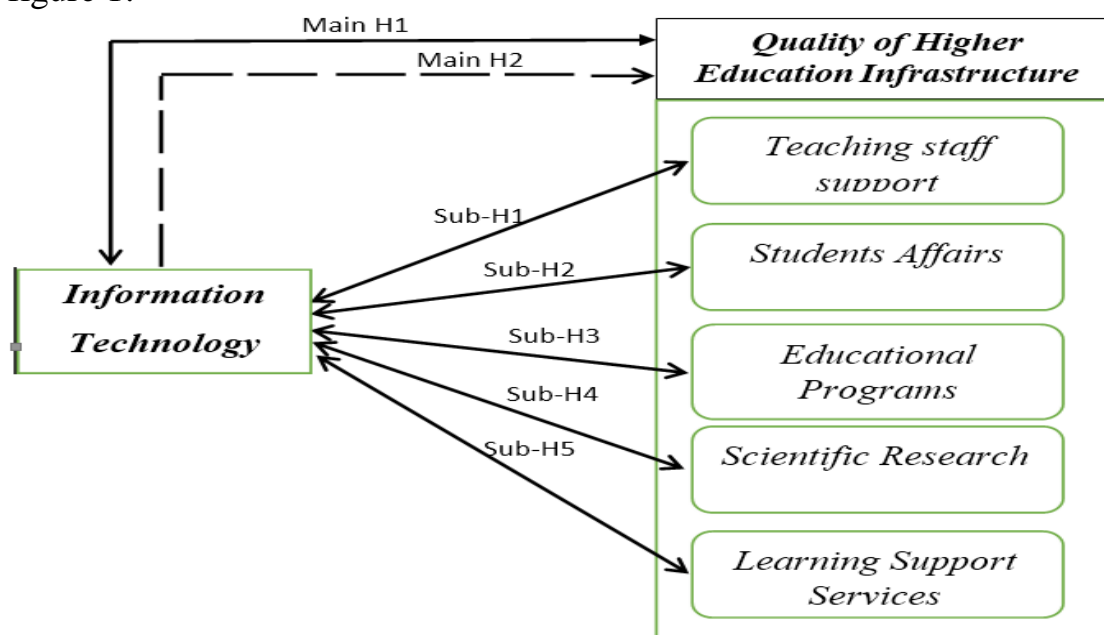
figure 1:

Figure (1): Research Conceptual Framework

Source: Elaborated by Authors

3.1 Research problem: With no doubt, the educational system has to be in high quality level. This will be most essential requested in the current circumstances under covid-19 separate around the world. Research problem could be formulated through asking the questions below:

A. What are the involvement areas that IT is participating in the faculty of Administration and Economics in Mosul University?

B. Dose the faculty of Administration and Economics in Mosul University has enough and appropriate IT infrastructure to meet the education quality?

C. Dose the IT supporting the quality of education in the faculty of Administration and Economics in Mosul University?

3.2 Research Importance: The importance of the current research is to identify the quality of the educational process through information technology applications, especially in light of the outbreak of the Corona pandemic, as a consequence the Universities have turned to electronic education, which requires adoption of an adequate infrastructure for information technology to ensure the achievement of quality in the educational process.

3.3 Research Objectives: Research objectives can be determined through the following points:

- Presenting and analyzing IT and its role in the Quality of higher Education Infrastructures Administration and Economics College – University of Mosul.

- Determine the relationship and influence between IT and the Quality of Higher Education Infrastructures in the said domain.

3.4 Hypothesis: The questions posed in the research problem can be answered through the coming hypothesis:

Main H1: There is a significant relation between IT and higher education quality infrastructure in the faculty of Administration and Economics in Mosul University.

From the Main H1, several Sub-Hypothesis could be release as follows:

H1-1: There is a significant relation between IT and teaching support staff in the faculty of Administration and Economics in Mosul University.

H1-2: There is a significant relation between IT and students affaires in the faculty of Administration and Economics in Mosul University.

H1-3: There is a significant relation between IT and educational programs in the faculty of Administration and Economics in Mosul University.

H1-4: There is a significant relation between IT and scientific research in the faculty of Administration and Economics in Mosul University.

H1-5: There is a significant relation between IT and learning support services in the faculty of Administration and Economics in Mosul University.

Main-H2: There is a significant influence of IT on the higher education quality infrastructure in the faculty of Administration and Economics in Mosul University.

4. Data Analysis and Result Discussion:

4.1 Sample Characteristics Analysis: Table (1) is viewing the respondents characteristics demography of the samples.

Table (1): Demography Characteristics

Gender							
Male				Female			
Frequency		%		Frequency		%	
89		70.08		38		29.92	
Age							
Below 30		30-40		40-50		Above 50	
Frequency	%	Frequency	%	Frequency	%	Frequency	%
16	12.59	41	32.28	52	40.96	18	14.17
Education							
Master				PhD			
Frequency		%		Frequency		%	
63		49.60		64		50.40	
Period of Service							
5-8 years		9-15 years		16-20		Above 21	
Frequency	%	Frequency	%	Frequency	%	Frequency	%
24	18.89	44	34.65	36	28.34	23	18.12

Source: Elaborated by authors.

- **Gender:** Out of 127 distributed questionnaires, it has been observed that male was 70.08% n=89 of the total number of the samples, while females were 29.92% n=38. This means that males formed the large number of the proportion registering 70.08%.
- **Age:** Out of 127 respondents, the age falls between (40-50) were the highest representation with 40.96% (n=52) whereas the least representation category was the age below 30 with 12.59% (n=16).

- **Education:** Out of 127 respondents, the doctorate holders were the dominated with 50.40% (n=64) while master holders have registered 49.60% (n=63).
- **Period of Service:** The highest academic services of the staff fall between 19-15 years with 34.65% (n=44), whereas the least representation category was above 21 years with 18.12% (n=23)

4.2 Reliability Analysis: For the internal consistency testing, Cronbach's Alpha has been used as it's shown in the table below.

Table (2): Reliability Statistics

Reliability	Cronbach's Alpha
	0.93

Source: SPSS Results.

The "Cronbach's Alpha" calculated in the table (2), was 0.93. This indicates that the items have comparatively high internal consistency. Therefore, it would be considered this rate is convenient for the work done.

4.3 Hypothesis testing

- **Main hypothesis one testing:** In order to verify the main hypothesis one, authors implemented correlation test. Main hypothesis one states that "there is a significant relationship between Information technology and the quality of higher education in faculty of Administration and Economics in Mosul University". The table (3) shows that there is a correlation between the two variables, as the value of r = .77. Depending on that the Main H1 has been accepted.

Table (3): correlation between IT and the quality of higher education

Dependent Variable / Independent Variable	Quality of Higher Education
Information Technology	0.773**

** Correlation is significant at 0.01 level N= 127

Source: SPSS Results.

Table (4) shows that there is a significant relation between IT and each dimension of higher education quality. The highest relation was with the educational programs (0.706). This means that the selected college is directing the investment of IT to the different programs in the learning and research purposes in order to enhance scientific curriculums. As this will definitely improve the student's ability to gain wide knowledge. The

second contribution from IT to the higher education quality has appeared through scientific research dimension with the correlate rate (0.691) which clearly refers to the increasing of scientific research capability of the teaching staff of the faculty especially in the research paper publication. Moreover, the IT has a significant relation with teaching staff support with correlate rate (0.686). This means that there is a big effort by giving lectures at the specified time, and covering the scheduled study material. Whereas the correlation between IT and students' affairs has registered 0.606. This approved that the selected faculty giving sufficient attention to the scientific, intellectual, ethical, cultural and social development of students. Finally, the lowest correlation has been found with the learning support services with the rate of (0.402). However, this is still explaining the efforts which is available in the selected college focusing on library services, workshops, and scientific labs. Depending on that Sub-Hypothesis have been accepted.

Table (4): correlation between IT and Sub-variables

Dependent variables / Independent variable	Teaching staff support	Students Affairs	Educational Programs	Scientific Research	Learning Support Services
Information Technology	0.686^{**}	0.606^{**}	0.706^{**}	0.691^{**}	0.402^{**}

Source: SPSS analysis.

- **Main hypothesis two testing:**

Table (5): Model Summary of Regression analysis between IT and higher education quality

Independent variable / Dependent variable	**Information Technology**				
	R^2	F		β	t
		Founded	Scheduled		
Quality of Higher Education	0. 598	186.165	16.26	0.773	13.644

*P< 0.05   N=127

Source: SPSS analysis.

Table (5) showing that IT has a significant influence on higher education quality infrastructure. As β = 0.773 which is significant at the level of 0.05 supported by the value of t-test (t = 13.644) which is biggest than the scheduled t-value (1.65) and degree of freedom (df) was (1,125). Also, the significant influence has been supported by the F value (186.165)

which is greater than its scheduled value (16.26) and which has been improved with R Square (0.589). Depending on that the Main H2 has been accepted.

5. Discussion:

The evolution of Information Technology has affected everything of the current life including learning area. This involvement has defiantly increased the quality of products and services. Without adopting IT in all activities will make a big quality gap in terms of accomplish and producing goods and services. Accordingly, IT has contributed in the managing and organizing of the conceptual product. This work has introduced a methodology to combine Information Technology with five dimensions of Higher Education Quality Infrastructure. The results have indicated that IT has a significant correlation with the higher education quality infrastructure in the faculty of Administration and economics, Mosul University, Iraq. Also, the results have shown that IT has a significant influence on the higher education quality infrastructure in the faculty of Administration and economics, Mosul University, Iraq. This will allow the main hypothesis 1 and 2 to be accepted, which is also agreed with what has been given by (Hanh, 2019). Regarding the test of Sub-Hypothesis, results have been shown that IT has a good relation with each infrastructure separately. However, the correlation with the learning support services variable has registered the lowest rate amongst other variables. This has not been agreed with the presented work of (Moosavi et al., 2019) as they approved that the emotional and reliability dimensions should be included in the infrastructure of IT in order to achieve better education quality .In general, the practical part of this work has shown that the faculty of Administration and Economics, Mosul University preparing will engage teaching staff to be able to adopt the new society knowledge which totally depending on the IT. This will be the first step towards preparing the students as well for this new era. The results have been referred that IT is participating in the implementation process of the educational activities in the faculty of Administration and Economics in Mosul University.

Research Limitations:

The research in this paper is a survey and it did not attempt to include other faculties in the selected university, and it did not try to investigate the relationship between the variables in other industries.

Novelty:

This work has a significant originality as there is no researches in the selected university has measured the quality of the educational services using IT especially in this hard time during the spread of COVID-19. Also, the work has contributed to the literature of the IT and the quality of higher education infrastructure.

References:

1. Anninos, L. N., (2008, February), The archetype of excellence in universities and TQM, In 10th QMOD Conference, Quality Management and Organiqatinal Development, Our Dreams of Excellence; 18-20 June; 2007 in Helsingborg; Sweden (No. 026), Linköping University Electronic Press.

2. Benitez-Amado, J., & Walczuch, R. M., (2012), Information technology, the organizational capability of proactive corporate environmental strategy and firm performance: a resource-based analysis, European Journal of Information Systems, 21(6), 664-679.

3. Deranek, K., Hewitt, B., Gudi, A., & McLeod, A., (2020), The impact of exercise motives on adolescents' sustained use of wearable technology, Behaviour & Information Technology, 1-15.

4. Ehlers, U.D., (2009), Understanding quality culture, Quality Assurance in Education, Vol. 17, No. 4, 343-363.

5. Fukahori, S., (2014), Competence-based quality assurance of university education lessons learnt from the OECD-AHELO feasibility study, Educational Studies in Japan, 8, 49-61.

6. Hamidi, F., Meshkat, M., Rezaee, M., & Jafari, M., (2011), Information technology in education, Procedia Computer Science, 3, 369-373.

7. Hanh, N. D., (2019), Review Some Issues of Quality Assurance, Quality Accreditation for Higher Education Institutions and Reality of Vietnam. American Journal of Educational Research, 7(7), 524-529.

8. Henard, F., & Leprince-Ringuet, S., (2008), The path to quality teaching in higher education. París: OCDE. Recuperado de https://www1.oecd.org/edu/imhe/44150246.pdf.

9. Houston, D., & Paewai, S., (2013), Knowledge, power and meanings shaping quality assurance in higher education: a systemic critique, Quality in Higher Education, 19(3), 261-282.

10. Jones, S., (2003), Measuring the quality of higher education: Linking teaching quality measures at the delivery level to administrative measures at the university level, Quality in Higher Education, 9(3), 223-229.

11. Khodayari, F., & Khodayari, B., (2011), Service quality in higher education, interdisciplinary Journal of Research in Business, 1(9), 38-46.

12. Moore, D., Shannon, C., Brown, D. J., Voelker, G. M., & Savage, S., (2006), Inferring internet denial-of-service activity, ACM Transactions on Computer Systems (TOCS), 24(2), 115-139.

13. Moosavi, A., Gilavand, A., & Gilavand, S., (2019), Evaluating the Quality of Educational Services of Nursing Students of Dezful University of Medical Sciences in Southwest of Iran According to SERVQUAL Model, Journal of Research in Medical and Dental Science, 7(1), 121-126.

14. O'Neill, M. A., & Palmer, A., (2004), Importance-performance analysis: a useful tool for directing continuous quality improvement in higher education, Quality assurance in education.

15. Ruso, J., Filipović, J., & Pejović, G., (2017), The role of higher education in national quality infrastructure policy-making. Management: Journal of Sustainable Business and Management Solutions in Emerging Economies, 22(1), 15-24.

16. Señal, N. C., González, C. R., Fischer, F. P., Hansen, S. P., & Ponds, H., (2008), Internal Quality Assurance and the European Standards and Guidelines, In ENQA Workshop report (No. 7).

17. Su, H. C., Linderman, K., Schroeder, R. G., & Van de Ven, A. H., (2014), A comparative case study of sustaining quality as a competitive advantage, Journal of Operations Management, 32(7-8), 429-445.

18. Weill, P. Woodham, (2002), Don't just lead: govern: implementing effective IT governance (Vol. 326), MIT Sloan CISSR working paper.

19. Williamson, B., (2018), The hidden architecture of higher education: building a big data infrastructure for the 'smarter university', International Journal of Educational Technology in Higher Education, 15(1), 1-26.

20. Yousapronpaiboon, K., (2014), SERVQUAL: Measuring higher education service quality in Thailand. Procedia-Social and Behavioral Sciences, 116, 1088-1095.