Top Administrators' Perceptions of the Quality in E-learning

Mohammed Al Awadh, and Gamal Weheba
Department of Industrial and Manufacturing Engineering, Wichita State University
Wichita, KS 67260
gamal.weheba@wichita.edu

Abstract

E-learning has grown quickly and resulted in broad implementations. It has become an essential component of higher education as a non-traditional instructional method. Quality has always been and continues to be the primary issue in education. This study was aimed at identifying the perceptions of quality in e-learning from the standpoint of university administrators. These perceptions are likely to affect the way e-learning programs are designed and delivered. In achieving this objective, the study included 100 top-ranked e-learning programs in the U.S. Statements by administrators from these programs were analyzed for content. The analysis reviled that administrators' perceptions are dominated by *features* and *performance* constructs. Factor analysis suggests that constructs reflecting *engagement* and *trust* are used to distinguish between different programs.

Introduction

The world is facing swift changes due to forward momentum in the technology of information and communication transmission. With the emergence of computers and internet communication, information becomes easy to access. Information and communication are considered the essential powers for change in all sections of human life during the last few years (Kattoua, Al-Lozi, and Alrowwad, 2016). Many educational institutions around the world have adopted e-learning programs. The success of these programs depends on the availability of supporting technologies and the efficiency by which they are utilized. Digital, computer-based, virtual, technology-enhanced, and computer-assisted are multiple terms that have been used to describe what is referred to as e-learning.

This research attempts to identify administrators' perceptions of quality in e-learning by examining a sample of top-ranked e-learning programs in the U.S. As was pointed out by Parasuraman (1985), differences between administrator's perceptions and stakeholder's expectations result in one of the four gaps associated with the design, marketing, and delivery of services. The following section presents a review of the literature about definitions of e-learning, quality in higher education, and quality in e-learning. This is followed by a presentation of the data collected and the statistical analysis performed. Conclusions with suggestions for future research are presented in the last section.

Literature Review:

Earlier forms of indirect contact between instructors and students were referred to as *distance learning*. Distance learning involved communication through mail, radio, and television from 1920-1980. Satellite and network communication made their contributions during the 1980s (Reiser, 2001a, 2001b; Simonson, Smaldino, and Zvacek, 2012). In 1985, the internet played its rightful role in communication technology. This made it possible to deliver open courses in support of education on the internet. This offered access to individuals attracted to learn via the World Wide Web (Hill, 2014, and Simonson et al., 2012). In recent years, different terms,

including web-based learning, virtual learning, and technology-based training, have been used as synonyms of the term e-learning (Paulsen, 2002). There are a plethora of definitions with a focus on the different technologies and tools utilized (Shopova, 2012). Mayadas and Miller (2014) provided a list of definitions that are used in higher education to help both faculty and students understand the different kinds of e-learning systems. These definitions have two characteristics; one includes definitions at both the course level and the program level, while the second incorporates the instructional delivery mode, time, and flexibility as three key parameters.

Between the years of 2002 and 2010, enrollment for e-learning in the US grew at a rate of 18.3 %, while overall student enrollment across higher education increased by just over 2 %. According to Allen and Seaman (2014), more than 1 out of every 3 students in higher education had enrolled in at least one e-learning class. Such widespread adoption of e-learning has been attributed to student-related and institution-related factors (Clinefelter and Aslanian, 2012). Student-related factors included convenience and flexibility. Whereas, institution-related factors included the ability to meet the demand for a greater number of courses. The evolution of newer generations of e-learning tools such as Web 2.0 (collectively, blogs, social networking sites, wikis, and podcasts), promoted a variety of collaborations with the ability to create content for students (Simonson et al., 2012).

Studies on e-learning have shown increased concerns for the quality of instructions, learning, and participant interaction (Hathaway, 2009 and Ward, Peters, and Shelley, 2010). Quality has been defined in numerous ways by different authors over the years. Examples of such authors include Juarn (1974), Crosby (1979) and Feigenbaum (1983) to name a few. These definitions have been classified into five approaches: transcendent, product-based, user-based, manufacturing-based, and value-based approaches (Garvin, 1987). In 1974, Nelson suggested a two-way classification system in which quality of goods and services may include search and experience properties. He suggested that the former includes properties that can be determined before purchase, while the latter includes properties that can only be evaluated after purchase (Nelson, 1974).

Grönroos (1982) developed a model for service quality that incorporated two variables: customer expectations in terms of the outcome, and their perceptions of the results. He later classified quality dimensions into three groups under technical, functional, and corporate image (Grönroos, 1990). Garvin (1987) proposed eight dimensions that could be used to evaluate quality. These are performance, reliability, serviceability, features, durability, conformance, aesthetics, and perceived quality. Garvin indicated that these dimensions might be used to assess the quality of products and services. Parasuraman, Zeithaml, and Berry (1985) suggested that the ability of an organization to satisfy consumers could be measured by the difference between consumer perceptions of a product or service before and after purchase. Further research by Parasuraman, Zeithaml, and Berry (1988) resulted in reducing the number of dimensions to five, providing the foundation for developing the SERVQUAL. This survey instrument has been widely used to measure the gap between consumer expectations and perceptions of services.

Diversity of the stakeholders, acceptance requirements, the variability of offerings, and the extended duration of delivery made higher education a special type of service. Aspects of quality in higher education have been addressed by a number of authors. Owlia and Aspinwall (1996)

proposed a framework for measuring quality in post-secondary education. This framework modeled quality in the classroom as a product of six factors. These are tangibles, competence, attitude, content, delivery, and reliability. Leblanc and Nguyen (1997) examined service quality in higher education and proposed seven dimensions. These are reputation, administrative personnel, faculty, curriculum, responsiveness, physical evidence, and access to facilities. Abdullah (2006) noted the positive relationship between quality standards and such aspects as increased profitability, customer satisfaction, customer loyalty, customer retention, customer attraction, and positive word of mouth. Based on this insight, he proposed a scale for assessing quality known as Higher Education Performance (HEdPERF). Similarly, Mahapatra and Khan (2007) conducted a questionnaire survey based on the SERVQUAL instrument. Responses from 1,024 participants resulted in the development of the EduQual instrument.

Annamdevula and Bellamkonda (2012) developed the HiEdQUAL instrument for measuring service quality in higher education based on SERVQUAL. Their study involved five focus groups including senior students and expert opinion groups. Utilizing factor analysis, they identified teaching and course content, administrative services, academic facilities, campus infrastructure, and support services as key factors in evaluating quality in higher education.

Alotaibi, Weheba, and Toy (2016) conducted a study to determine perceptions of quality from the perspectives of top administrators. The research utilized a sample of presidents' letters from the top 100 universities in the US, reflecting their views on quality. A special coding scheme was developed based on thirteen dimensions and was validated by a panel of experts (Table 1). This coding scheme was then used in computer-aided text analysis to determine the frequency of occurrence of each dimension and its codes. They concluded that perceptions of top administrators are dominated by experience properties. The principal component analysis suggested that empathy, attitude, safety, and reputation are the four meta-dimensions emphasized by administrators in their communication to the public.

Research Methodology

This research was aimed at identifying perceptions of top administrators of quality in e-learning programs. The research methodology followed closely that described by Alotaibi et al., (2016). Initial constructs with their definitions, shown in Table 1, were used except for the construct *tangibles*. This construct was omitted as it represents physical aspects such as laboratories, classrooms, and libraries. These are not relevant to e-learning programs. The research adopted the same coding scheme for the remaining 12 constructs as that in Alotaibi (2016). A list of the codes used is shown in Appendix A. In determining administrator perceptions of quality in e-learning, a sample of the statements made by administrators in the top 100 programs in the USA was used. These statements are typically posted on the institution's website as public announcements. Typically, they reflect the administrators' views on quality in e-learning. It is also likely that these statements are prepared with input from the marketing department to boost enrollment. Programs were identified based on the U.S. News and World Report's rankings (2018) and are listed in Appendix B. The statements posted by the administrator or coordinator of each e-learning program were downloaded from the university website. The full text of the statements was converted to the portable file format (PDF) and used as the units of analysis. Textual analysis of these files was performed using the NVivo software (QSR International Pty Ltd. Version 10. 3.2, 2016, Melbourne, Australia).

Table 1. Initial Constructs Defined

Construct	Definition
Reliability	Consistency of performance and dependability; means performing the service right the first time and that the institution honors its promises.
Responsiveness	Willingness and readiness of faculty and staff to provide service.
Competence	Possession of required skills and knowledge to perform the service.
Access	Approachability and ease of contact.
Courtesy	Politeness, respect, consideration, and friendliness of contact person.
Communication	Keeping stakeholders informed and listening to them.
Credibility	Trustworthiness, believability, and honesty.
Security	Freedom from danger, risk, or doubt.
Understanding	Making an effort to understand stakeholders' needs.
Tangibles	Physical evidence of service.
Performance	Primary operating functions of the institution.
Conformance	The extent to which the institution meets pre-established standards (both internal and external).
Features	Supplemental characteristics offered by the institution.

Source: Adapted from Alotaibi et al. (2016)

To compare our findings to those reported by Alotaibi et al., (2016), factor analysis (FA) was performed to identify the top factors that can be used to explain the total variability. According to Hair et al. (2010), FA is a multivariate statistical analysis technique used for data reduction purposes. The basic objective is to represent a set of constructs by a smaller number of factors. These factors can be thought of as meta-dimensions that cannot be modeled by a single construct. Constructs used in factor analysis should be at least moderately correlated to each other, otherwise, the number of factors will be almost the same as the number of original constructs. The results are presented in the following section.

Analysis and Results

Textual analysis indicated the frequency of occurrence of each construct and its codes. The frequency of occurrence is assumed to reflect the importance of each construct from the viewpoint of administrators. The analysis resulted in 23,256 occurrences for all 12 constructs and their codes. The results are depicted in the Pareto chart shown in Figure 1. As can be seen, features, performance, competence, access, communication, understanding, and conformance appear to be the top constructs used by the administrators. These constructs accounted for 85 % of the total count. *Features* (18%) is the construct used the most by administrators, followed by *performance* (14%). These two constructs are used to describe the supplemental characteristics and operating functions offered by the program. On the other hand, responsiveness, reliability,

security, and credibility contributed less than 15 % of the total count. These appear to have much lower importance from the administrators' point of view. Both security and courtesy contributed about 3% each to the total count. Whereas credibility was the least observed count, contributing only 1% of the total.

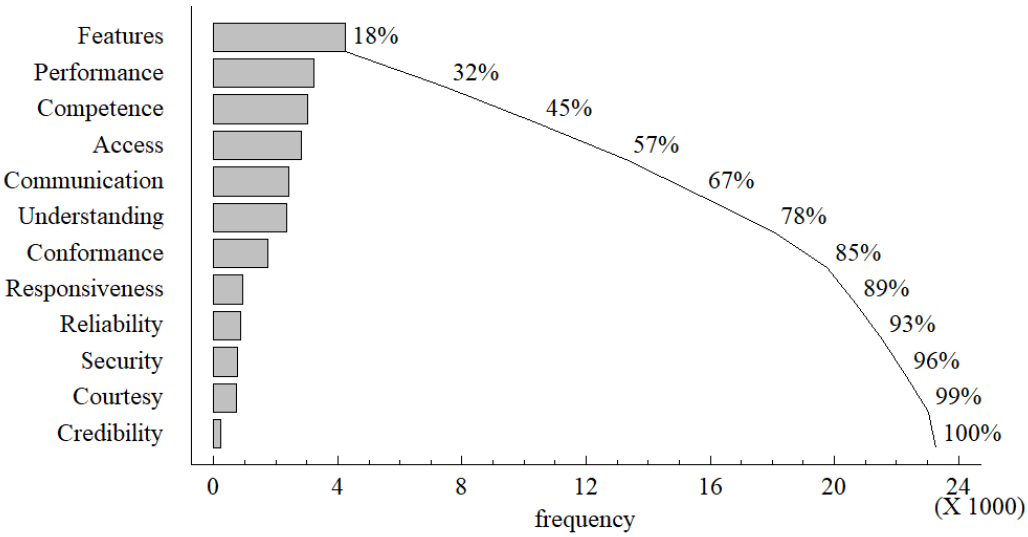

Figure 1: Results of the textual analysis

Factor analysis (FA) was applied in an attempt to reduce the dimensionality of the data into four uncorrelated factors as was reported by Alotaibi et al., (2016). FA uses the frequencies obtained from textual analysis to identify strong patterns in the data and possibly decrease the total number of constructs (Brown, T. A. , 2014). The frequency data were used to construct a 100 by 12 matrix. The rows represent the programs and the columns represent the constructs. The analysis was performed using the Statgraphics software (Statpoint Technologies Inc., Centurion version 17.2, 2016). A Kaiser-Meyer-Olsen (KMO) measure of 0.904 was obtained, suggesting that some common factors can be extracted. Results of the factor analysis are shown in Table 2. The analysis utilized the Kaiser-Guttman stopping rule which is the most popular criterion in factor analysis (Kaiser, 1960). Accordingly, factors linked to eigenvalues greater than 1.0 are considered nontrivial.

As shown in Table 2, two uncorrelated factors can be extracted from the data. These are nontrivial factors accounting for 82% of the total variation. They appear to be used by administrators to distinguish their own programs from others within the sample. Table 3 illustrates the eigenvector coefficient (weight) of each of the 12 constructs relative to each factor.

The results in Table 3 indicate that *access*, *communication*, *competence, understanding, and responsiveness* made significant contributions to the first factor. This factor contributes 69% of the total variability and suggests *engagement* as a distinguishing factor. Engagement refers to the program's ability to maintain communication, identify student needs, and address these needs. This is especially important in e-learning where attrition rates are higher than in the face-to-face setting, as was noted by Allen and Seaman (2015) and Boston and Ice (2011). *Engagement* can

be assessed during or after program completion and may be classified as an experience property, as was proposed by Nelson (1974).

Table 2: Factor Analysis

Factor Number	***Eigenvalue***	***Percent of Variance***	***Cumulative Percentage***
1	**8.315**	**69.29**	**69.29**
2	**1.606**	**13.39**	**82.68**
3	0.570	4.75	87.43
4	0.482	4.03	91.46
5	0.266	2.21	93.67
6	0.163	1.36	95.03
7	0.147	1.23	96.26
8	0.124	1.03	97.29
9	0.106	0.88	98.17
10	0.092	0.76	98.93
11	0.077	0.65	99.58
12	0.049	0.42	100

Table 3: Factor Score Coefficients

Construct	***Factor 1***	***Factor 2***
Access	**0.90**	0.17
Communication	**0.65**	0.59
Features	0.57	0.18
Performance	0.63	0.30
Competence	**0.81**	0.39
Understanding	**0.82**	0.17
Conformance	0.27	**0.71**
Responsiveness	**0.86**	0.28
Reliability	0.30	**0.86**
Security	0.23	**0.81**
Courtesy	0.39	0.24
Credibility	0.16	**0.94**

The second distinguishing factor includes *conformance*, *reliability*, *security*, and *credibility*. This factor is shown to contribute 13% of the total variability and can be referred to as *trust*. In this context, *trust* relates to the environment and the ability to protect students' information consistently.

Discussion and Comparison

This study examined the administrators' views on quality in the top 100 e-learning programs within the US. It is of interest to identify differences in administrators' perceptions of quality in higher education and e-learning programs. These differences may highlight what they perceive

as discriminating aspects between the two offerings. In this section, we compare our research findings with those reported in Alotaibi et al. (2016). Results of the textual analysis from Alotaibi's research were obtained and analyzed. A Pareto chart of the reported frequencies is shown in Figure 2. As shown, Alotaibi's textual analysis identified *communication* and *tangibles* as the top two most used constructs. They also included both features (14%) and performance (10%), in the third and fourth place. Within the context of e-learning, it appears that program administrators do not emphasize physical evidence of service, as was expected. However, communication remains relevant in e-learning, but not emphasized as much as in traditional face-to-face programs. Also, there appears to be an agreement that reliability, security, and courtesy are the least used constructs in both samples.

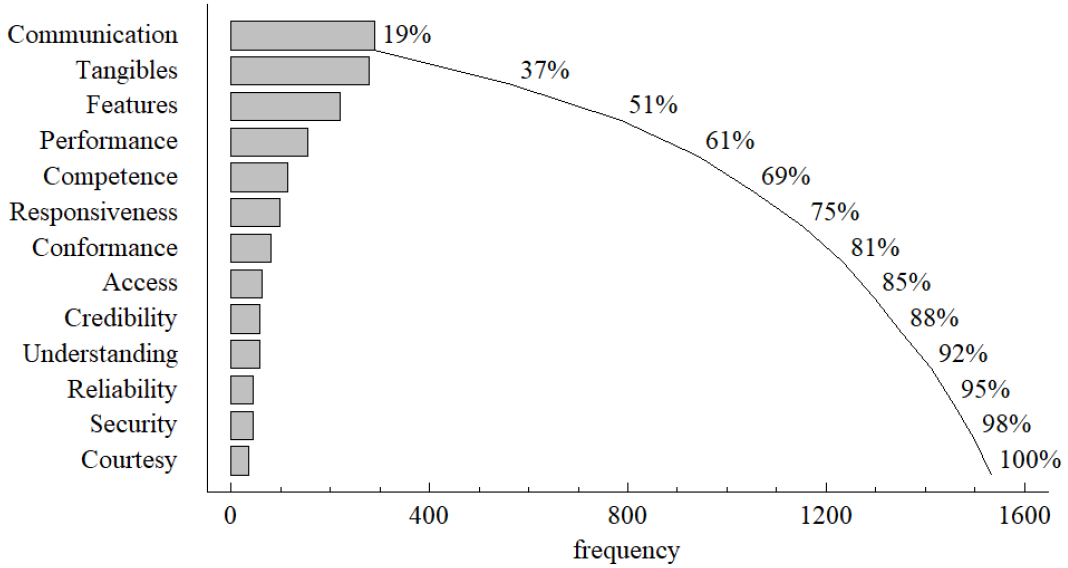

Figure 2: Results of textual analysis from Alotaibi (2016)

Table 4. Principal components with constructs from Alotaibi et al., (2016)

PC1	***PC2***	***PC3***	***PC4***
Communication	Courtesy	Security	Credibility
Performance	Responsiveness	Reliability	Competence
Understanding	Conformance		Features
Access			Tangibles

Results from the principal component analysis (Alotaibi et al., 2016) are reproduced in Table 4. The first principal component (*PC1*) included three of the constructs identified under Factor 1 in Table 3. *Communication*, *understanding*, and *access* appear to have significant contributions to the total variability in both samples. Engaging students by maintaining contact, identifying student needs, and addressing these needs appear to be the factors driving the competition from the administrators' point of view. Performance as a construct under PC1 in Table 4 was replaced by

responsiveness and *competence* under Factor 1 in Table 3. *Trust*, Factor 2 in Table 3, included four of the constructs identified under PC2, PC3, and PC4 in Table 4.

Conclusions

This research examined perceptions of quality in e-learning programs. In their communication to the public, administrators tend to stress *features*, *performance*, *competence*, *access, communication, understanding, and conformance*. These constructs have a relatively high frequency of occurrence (85%) within the sample of the top 100 programs in the US. While these constructs are not comprehensive, they provide a static picture of current perceptions of administrators and possibly their marketing teams. As compared to the perceptions reported by (Alotaibi et al., 2016), both *features* and *performance* appear to dominate perceptions of quality in e-learning. Also, the results of the factor analysis suggest that the administrators use two factors to market their respective programs. These factors made significant contributions (82%) to the total variability in the sample and were termed *engagement* and *trust*. While no attempts were made to consider cost nor pedagogical-related factors, this research suggests that administrators consider engagement and trust as decisive factors in achieving quality in e-learning. It is also of interest to identify the perceptions of e-learners and instructors as major stakeholders. These authors are currently designing appropriate instruments that can be used to identify the perceptions of these two important groups. This would help determine perception gaps and direct efforts for quality improvement.

References

Abdullah, F. (2006). "The development of HEdPERF: a new measuring instrument of service quality for the higher education sector." *International Journal of Consumer Studies, 30*(6), 569-581.

Allen, I. E., and Seaman, J. (2015). "Grade Level: Tracking Online Education in the United States." Babson Survey Research Group. Babson College, MA

Allen, I. E., and Seaman, J. (2014). "Opening the Curriculum: Open Educational Resources in US Higher Education." Babson Survey Research Group. Babson College, MA

Alotaibi, F., Weheba, G., and Toy, S. (2016). "Quality in Higher Education: Perceptions of Top Administrators." *Journal of Management and Engineering Integration, 9*(2), 51-60.

Annamdevula, S., and Bellamkonda, R. S. (2012). "Development of HiEdQUAL for Measuring ServiceQuality in Indian Higher Education Sector." *International Journal of Innovation, Management, and Technology, 3*(4), DOI: 10.7763/IJIMT.2012.V3.265

Clinefelter, D. L., & Aslanian, C. B. (2015). Online college students 2015: Comprehensive data on demands and preferences. Louisville, KY: The Learning House, Inc.

Boston, W. E., and Ice, P. (2011). "Assessing retention in online learning: An administrative perspective. *Online Journal of Distance Learning Administration." 14*(2).

Brown, T. A. (2014). Confirmatory factor analysis for applied research. Guilford Publications. Chicago

Crosby, P. B. (1979). Quality is free: The art of making quality certain. McGraw-Hill, NY.

Feigenbaum, A. V. (1983). Total quality control (3rd ed.). McGraw-Hill, NY.

Garvin, D. A. (1987). “What does “product quality” really mean?” *Sloan Management Review*, 25–43

Grönroos, C. (1982). "An applied service marketing theory." *European journal of marketing, 16*(7), 30-41.

Grönroos, C. (1990). Service management and marketing: Managing the moments of truth in service competition. Jossey-Bass.
Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis*. Upper Saddle River, NJ: Pearson Prentice Hall.
Hathaway, D. M. (2009). Assessing quality dimensions and elements of online learning enacted in a higher education setting. George Mason University.
Hill, P. (2014). "WWW-based online education turns 20 this summer." 〈http://mfeldstein.com/internet-based-online-educationturns-20-summer〉(April 17, 2019).
Juran J. M. (1974). Quality control handbook. 3rd ed. McGraw-Hill, NY.
Kaiser, H. F. (1960). "The application of electronic computers to factor analysis." *Educational psychological measurement, 20*(1), 141-151.
Kattoua, T., Al-Lozi, M., and Alrowwad, A. (2016). "A review of literature on E-learning systems in higher education." *International Journal of Business Management and Economic Research, 7*(5), 754-762.
Leblanc, G., & Nguyen, N. (1997). Searching for excellence in business education: an exploratory study of customer impressions of service quality. International Journal of Educational Management, 11(2), 72-79.
Mahapatra, S. S., & Khan, M. S. (2007). Assessment of quality in technical education: An exploratory study. Journal of Services Research, 7(1), 81–100.
Mayadas, F., and Miller, G. (2014). Updated E-learning definitions. *Online Learning Consortium,* 〈https://onlinelearningconsortium.org/updated-e-learning-definitions〉 (April 25, 2019).
Nelson, P. (1974). "Advertising as information." *Journal of political economy, 82*(4), 729-754.
Owlia, M. S., and Aspinwall, E. M. (1996). "A framework for the dimensions of quality in higher education." *4*(2), 12-20.
Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1985). "A conceptual model of service quality and its implications for future research". *Journal of marketing, 49*(4), 41-50.
Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1988). "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality." Journal of Retailing, 64(1), 12–40.
Reiser, R. A. (2001a). A history of instructional design and technology: Part I: A history of instructional media. Educational Technology Research and Development, 49(1), 53-64. doi:10.1007/BF02504506
Reiser, R. A. (2001b). A history of instructional design and technology: Part II: A history of instructional design. Educational Technology Research and Development, 49(2), 57-67. doi:10.1007/BF02504928
Shopova, T. (2012). "E-learning in higher educational environment.″ International Conference on the Future of Education, Bulgaria.
Simonson, M., Smaldino, S., and Zvacek, S. M. (2012). Teaching and learning at a distance: Foundations of distance education. 5th Edition. Person Education, Boston.
Ward, M. E., Peters, G., and Shelley, K. (2010). "Student and faculty perceptions of the quality of online learning experiences." *The International Review of Research in Open and Distributed Learning, 11*(3), 57-77.
U.S. News and World Report Education (2018)."National universities rankings." 〈 https://www.usnews.com/education/online-education〉 (Feb. 21, 2019).

APPENDIX A
List of codes
Source: Alotaibi et al., (2016)

Construct	Code
Reliability	Accuracy Completeness Confidence Consistency Stability
Responsiveness	Flexibility Diversity Readiness Willingness Preparedness
Competence	Capability Experience Knowledge Skill Qualification
Access	Advising Affordability Approachability Availability Capacity
Courtesy	Accommodating Consideration Friendliness Politeness Respect
Communication	Contact Inform Interact Listen Participate

Construct	Code
Security	Assurance Confidentiality Protection Safeguard Safety
Understanding	Accept Assist Appreciate Cooperate Recognize
Performance	Developing Evaluating Improving Measuring Training
Conformance	Accredit Achieve Review Satisfy Update
Features	Curricula Degree Offerings Opportunities Program
Credibility	Believability Ethical Honesty Integrity Trustworthiness

APPENDIX B

Top-ranked E-learning Programs in the U.S.

Source: us news and world report education (2018)

1. Embry-Riddle Aeronautical University Worldwide
2. Arizona State University
3. Ohio State University Columbus
4. Oregon State University
5. Pennsylvania State University World Campus
6. University of Florida
7. University of Illinois Chicago
8. Colorado State University Global Campus
9. University at Buffalo SUNY
10. University of North Carolina Wilmington
11. University of Oklahoma
12. Loyola University of Chicago
13. University of Alabama Birmingham
14. University of Central Florida
15. CUNY School of Professional Studies
16. Utah State University
17. Western Kentucky University
18. University of Arkansas
19. West Texas A & M University
20. Colorado State University
21. George Washington University
22. Indiana University Online
23. University of Massachusetts Amherst
24. Washington State University
25. Ball State University
26. Charleston Southern University
27. University of Georgia
28. University of Massachusetts Lowell
29. Siena Heights University
30. University of Arizona
31. The University of Missouri St. Louis
32. University of Northern Colorado
33. City University of Seattle
34. Creighton University
35. Daytona State College
36. University of Illinois Springfield
37. Pace University
38. Rutgers University Camden
39. Texas A & M University-Commerce
40. University of North Carolina Charlotte
41. University of North Florida
42. California Baptist University
43. Lee University
44. Maranatha Baptist University
45. Regent University
46. University of Nebraska Lincoln
47. University of Wisconsin Whitewater
48. Marist College
49. New England Institute of Technology
50. Robert Morris University
51. University of Massachusetts Boston
52. University of Nebraska Omaha
53. University of Wisconsin Milwaukee
54. Utica College
55. Westfield State University
56. Bowling Green State University
57. Clarion University of Pennsylvania
58. Florida International University
59. Illinois State University
60. McKendree University
61. North Carolina State University Raleigh
62. Northern Arizona University
63. SUNY College of Technology Delhi
64. Sacred Heart University
65. University of Memphis
66. Western Carolina University
67. Concordia University of Chicago
68. Saint Leo University
69. University of Cincinnati
70. University of North Dakota
71. University of North Texas
72. Old Dominion University
73. Savannah College of Art and Design
74. Granite State College
75. Missouri State University
76. Sam Houston State University
77. University of Denver
78. Anderson University
79. Brandman University
80. Cornerstone University
81. Drexel University
82. Eastern Kentucky University
83. Southeast Missouri State University
84. Texas Tech University
85. Union Institute and University
86. Dakota Wesleyan University
87. Herzing University
88. New England College of Business and Finance
89. SUNY College of Technology Canton
90. University of Houston Downtown
91. University of Southern Mississippi
92. Berkeley College
93. Bluefield College
94. Central Michigan University
95. Central Washington University
96. Florida Institute of Technology
97. Kansas State University
98. Lindenwood University
99. Southwestern Oklahoma State University
100. Arkansas State University

Biographical Information

Mr. Mohammed Al Awadh is a PhD candidate at the Department of Industrial Systems and Manufacturing Engineering at Wichita State University. He received BS degree in Industrial Engineering from King Fahd University of Petroleum and Minerals in (2008). He received MS degree in Industrial Engineering from Wichita State University in 2011. He is currently performing research on quality management in higher education.

Address: 120 Engineering Building, Wichita State University, Wichita, KS 67260-0035,
E-mail: maalawadh@shockers.wichita.edu

Dr. Gamal Weheba is a professor at the Department of Industrial Systems and Manufacturing Engineering at Wichita State University. He received a Ph.D. in Industrial Engineering and Management Systems from the University of Central Florida. Since 2000, he has taught courses on industrial engineering and manufacturing-related subjects at Wichita State University. Dr. Weheba has performed research in the areas of quality management, statistical process control, reliability engineering, and product design optimization. Dr. Weheba is serving as the president of the IEMS Conference since 2018. He is a fellow of ASQ and a senior member of SME.

Address: 120-B Engineering Building, Wichita State University, Wichita, KS 67260-0035
E-mail: Gamal.weheba@wichita.edu