Higher Education Quality Standards in University Colleges

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Contributor: Anas A. Makki , Ammar Y. Alqahtani , Reda M. S. Abdulaal , Ayman I. Madbouly

Universities worldwide strive to achieve excellence in research, learning, teaching, and community services, which are the pillars of their strategic plans.

multi-criteria decision-making international ranking systems higher education

1. Introduction

A decent education performance through its management is critical to achieving effective educational outcomes. Colleges and universities worldwide strive to achieve excellence in research, learning, teaching, and community services [1][2][3]. Thus, the quality of service and education provided is very important as education institutions wish to bridge any intellectual gap in all sectors of the economy. Therefore, the educational institution's administration must be effective and efficient in all managerial aspects. In order to ensure that an educational institution remains competitive, attention and control must be given to its internal affairs. One of the most critical factors to ensure the continuity of performance excellence in educational institutions is the development of measurable standards, and the indicators should be measured periodically [4].

Performance indicators have become of great importance in educational institutions. However, the difference between the scope of education, research, and composition of study programs in educational institutions makes developing quality indicators challenging [5]. Quality measures should ideally have a clear causal explanation. For instance, if the educational quality of student outcomes is measured within an educational institution, the performance indicators should reflect the performance of students with different characteristics across that educational institution and its programs of study. In the case of measuring the quality of departments within educational institutions, the performance indicators that reflect the quality performance of those departments must be considered. Generally, one of the most challenging aspects of quality measurement is obtaining quantitative data. Therefore, survey data and questionnaires are generally required to collect opinions from relevant experts [6]. Likewise, one of the essential tools that many institutions might apply to evaluate their performance in various aspects of their institutions is the Balanced Scorecard (BSC). The concept of a BSC has evolved beyond the simple use of perspectives, and it is now a holistic system for managing strategy. A key benefit of a disciplined framework is that it allows organizations to connect the dots between the various components of strategic planning and management [7].

Another important tool many institutions use to evaluate performance is Multi-criteria Decision Making (MCDM). The MCDM approach analyzes various alternatives and selects the optimal one [8]. Because of management's role in ensuring quality performance, the MCDM approach remains important across the education sector and other fields [9][10][11][12][13][14]. The MCDM is built based on the insight of solving planning and structural problems and challenges using multiple criteria [15]. The main objective of this research is to rank university colleges according to their educational quality. Evaluation criteria will be determined based on common international university ranking systems as well as other criteria derived from the university strategic plan's BSC perspectives. Combining these two separate criteria is suggested as a novel strategy for evaluating university colleges' educational quality.

Education institutions face a wide range of challenges, such as providing high-quality education, achieving top world rankings, reducing costs, or increasing self-funding. Due to the rapid growth of education models, evaluation models are gradually becoming the focus of scholars' attention [16][17]. Several factors contribute to the challenges facing educational institutions. Therefore, the educational institution must be evaluated at all levels to be successful. For this reason, it is important to develop quality performance indicators for assessing educational departments. This will allow decision-makers to make informed decisions that contribute to the organization's success.

2. Higher Education Quality Standards in University Colleges

Educational Institutions may establish programs or assessment processes to discover and encourage practical management approaches. Previous studies have explored various quality evaluation and performance appraisal aspects across multiple service sectors, including education, healthcare, hospitality, tourism, and the public or private sectors [6]. In the education sector, university colleges are evaluated based on their quality performance, which requires the management to implement appropriate measures and balances to ensure quality [18][19][20][21].

The BSC is one of the most extensively utilized tools in gauging and improving quality in higher education institutions. A study performed such research to ascertain the efficacy of such a tool in German and Austrian educational institutions [22]. It analyzes the substantive similarities and differences between the BSC of four universities in Germany and Austria: Johannes Gutenberg University Mainz, Munster University of Applied Sciences, Cologne University of Applied Sciences, and Montan University Leoben. It was suggested that the BSC gives a holistic perspective of the method used by a higher education institution by comparing the BSC utilized by four distinct educational establishments [22]. It guarantees a comprehensive and sophisticated framework for executing and regulating the strategy and establishes a foundation for future learning in the strategy formulation of the higher educational institution following the scheme "plan-do-check-act". The BSC has also been proven effective in the United States. Similar research was performed in another study to establish the tool's efficacy in gauging quality within higher education institutions to demonstrate that the BSC may be an effective instrument for assessing the accomplishments of educational institutions, namely, universities [23]. Furthermore, a possible implication of utilizing the BSC was established to improve the quality of instruction in higher education colleges by determining how effective the BSC model is in improving the overall performance of prospective private institutions where performance was the dependent variable [24], In the BSC, the customer dimension, financial dimension,

internal business process dimension, and the outlook of the growth procedure and acquiring knowledge are considered independent variables [25][26][27][28][29]. In that study [24], a sample size of one hundred individuals was used, representing more than half of the undergraduates currently enrolled as active students at the University of WR Supratman Surabaya. The findings indicate that while the approach effectively gauges performance, combining it with other approaches is necessary to evaluate the more nuanced performance and quality improvement aspects [24].

Performance and quality improvement approaches have also been adopted following a bottom-up approach. This was applied at the University of Minho to build the university's vision and achieve its sustainability with a comprehensive and all-encompassing view, illustrating the participation of the academic community and the top management in the process [30].

The primary focus of most of the research on assessing quality in higher education has been private institutions. However, only a few studies have adopted a different approach by choosing public institutions that are not focused primarily on the profit dimension [31]. The researchers examined current research published in reputable publications that applied the BSC Framework to higher education institutions using contextual analysis and highlighted the pertinent viewpoints for higher education institutions. When implemented, it will be possible to monitor their performance and provide them with the ability to adapt to new difficulties that arise as a direct consequence of putting essential strategies into action. The conclusion drawn from this finding is that private institutions utilized contemporary BSC viewpoints. However, public establishments used conventional perspectives with minor adjustments to the titles and the orders of the perspectives. For instance, the stakeholder viewpoint was employed in certain studies instead of the customer perspective. The available data demonstrate that the BSC has been used in a wide range of settings within the framework of higher education institutions, producing observable effects.

MCDM is another crucial approach used in making decisions in higher education institutions. For instance, it was used to evaluate the tool's implications at the Teaching Hospitals of Yazd University of Medical Sciences [32]. Literature research and qualitative techniques were utilized to gather expert opinions on the quality characteristics of hospital and education services. Following that, the views of three hundred patients on the quality of the provided services were acquired via a questionnaire that was created. The Fuzzy Analytic Hierarchy Process (FAHP) approach was used to assign weights to each quality parameter, and the Technique for Order of Preference by Similarity to the Ideal Solution (TOPSIS) method was utilized to rank hospital wards. According to the results, MCDM approaches effectively prioritize the aspects that influence the quality of education and health services [33][34][35]. As a result, decision-makers in government may use them to prepare for and enhance the provision of services in academic progress and health.

Departments offering engineering programs in a public university in the Middle East were evaluated using a combination of MCDM methodologies by representing the administration of the public institution assessed using fifteen criteria. The study suggested that low-performing departments should be encouraged to produce more research articles by offering various forms of incentives to their academic members [36].

An integrated MCDM approach to evaluate several lectures to determine whether e-learning technology can be evaluated in an industrial engineering department of a Turkish university. The study evaluated many factors using MCDM methods in e-learning applications [37][38].

Many BSC studies have successfully applied AHP because of its ability to aid organizations or firms in selecting alternative missions/visions, strategies, and resource allocations to implement organizational strategies and objectives [39][40][41][42][43][44][45][46].

AHP is a technique that considers both quantitative and qualitative factors while assessing a problem's viability. The BSC model's analytical framework was developed using AHP and Analytic Network Process (ANP), two multiple-criteria decision-making approaches. AHP is a decision-making framework created by Saaty that considers several factors [47]. Despite the AHP approach's presumption that the components provided in the hierarchical structure are independent, it may be unsuitable due to the influence of specific internal and external factors. Due to this, the ANP technique is required [48]. The BSC framework was created because of the limitations of the conventional financial approach to measuring business success. Of course, BSC is not perfect. The ANP technique compensates for these drawbacks by assigning importance weights to individual indicators. ANP generalizes the hierarchical relationship between criteria and options using a network perspective. Because of the interplay and dependency between higher and lower-level components, many decision issues defy traditional hierarchical organization [49]. Different performance metrics may be investigated using ANP.

The VIšekriterijumsko KOmpromisno Rangiranje (VIKOR) method may be used to rank each option according to how well it meets each criterion [50][51]. VIKOR is based on the compromise programming of MCDM, namely, comparing the "closeness" metric to the "ideal" alternative. In compromise programming, the Lp-metric is employed as an aggregating function, and from this, the multi-criteria measure for compromise ranking was constructed [52][53]. VIKOR and TOPSIS are well-known MCDM approaches. They both use the idea of compromise to solve the conflicting dilemma among the assessment criteria and then rate the order of the options [54]. TOPSIS technique has a blind spot that prevents it from being utilized for ranking purposes. Thus, it reveals where improvements may be made to the criteria to reach the desired/aspired level [51].

The Decision-Making Trial and Evaluation Laboratory (DEMATEL) technique is used to identify interdependencies and reciprocal influences among viewpoints [55]. One way to look at the work of creating a strategy map is as part of a more extensive, holistic group decision-making process. The DEMATEL technique uses group wisdom to identify and record the unintentional links between several strategic criteria [56]. The cause-and-effect analysis tool DEMATEL was employed to determine which BSC metrics are most telling [57].

A demonstration of how webometrics rankings could be measured using reliable quantitative information by applying TOPSIS and VIKOR methods to university websites was published [58]. In many universities worldwide, the measures have significantly changed their competitive nature. The VIKOR method is one of the better models that higher education stakeholders and researchers have identified to help provide better webometric data and

rankings for university sites. As a result of the approach, academic prestige and quality of education will be improved [59].

References

1. Syed Hassan, S.A.H.; Tan, S.C.; Yusof, K.M. MCDM for Engineering Education: Literature Review and Research Issues. In Proceedings of the Engineering Education for a Smart Society: World Engineering Education Forum & Global Engineering Deans Council 2016, Cham, Switzerland, 7 July 2017; pp. 204–214.
2. Jongbloed, B.; Vossensteyn, H.; Management. Keeping up performances: An international survey of performance-based funding in higher education. J. High. Educ. Policy 2001, 23, 127–145.
3. Buzzigoli, L.; Giusti, A.; Viviani, A. The evaluation of university departments. A case study for Firenze. Int. Adv. Econ. Res. 2010, 16, 24–38.
4. Nazari-Shirkouhi, S.; Mousakhani, S.; Tavakoli, M.; Dalvand, M.R.; Šaparauskas, J.; Antuchevičienė, J. Importance-performance analysis based balanced scorecard for performance evaluation in higher education institutions: An integrated fuzzy approach. J. Bus. Econ. Manag. 2020, 21, 647–678.
5. Falch, T.; Iversen, J.M.V.; Nyhus, O.H.; Strøm, B. Quality measures in higher education: Norwegian evidence. Econ. Educ. Rev. 2022, 87, 102235.
6. Mandinach, E.B.; Schildkamp, K. Misconceptions about data-based decision making in education: An exploration of the literature. Stud. Educ. Eval. 2021, 69, 100842.
7. Du, M. Balanced scorecard in university financial management. In Proceedings of the ICIMTECH 21: The Sixth International Conference on Information Management and Technology, Jakarta, Indonesia, 19–20 August 2021; pp. 1–5.
8. Ozsahin, D.U.; Denker, A.; Kibarer, A.G.; Kaba, S. Evaluation of stage IV brain cancer treatment techniques. In Applications of Multi-Criteria Decision-Making Theories in Healthcare and Biomedical Engineering; Elsevier: Amsterdam, The Netherlands, 2021; pp. 59–69.
9. Chen, C.-H. A New Multi-criteria Assessment Model Combining GRA Techniques with Intuitionistic Fuzzy Entropy-Based TOPSIS Method for Sustainable Building Materials Supplier Selection. Sustainability 2019, 11, 2265.
10. Ibrahim, A.; Surya, R. The implementation of simple additive weighting (SAW) method in decision support system for the best school selection in Jambi. In Proceedings of the Journal of Physics: Conference Series, The 2nd International Conference on Applied Sciences Mathematics and

Informatics, Bandar Lampung, Indonesia, 9–11 August 2018; IOP Publishing Ltd.: Bristol, UK, 2019; p. 012054.

11. Kraujalienė, L. Comparative Analysis of Multi-Criteria Decision-Making Methods Evaluating the Efficiency of Technology Transfer. Bus. Manag. Educ. 2019, 17, 72–93. Available online: https://www.ceeol.com/search/article-detail?id=80512 (accessed on 7 May 2023).
12. Kabassi, K. Comparing Multi-criteria Decision Making Models for Evaluating Environmental Education Programs. Sustainability 2021, 13, 11220.
13. Miç, P.; Antmen, Z.F. A Decision-Making Model Based on TOPSIS, WASPAS, and MULTIMOORA Methods for University Location Selection Problem. SAGE Open 2021, 11, 21582440211040115.
14. Thakkar, J.J. Multi-Criteria Decision Making; Springer: Berlin/Heidelberg, Germany, 2021; Volume 336.
15. Fofan, A.C.; Oliveira, L.A.B.d.; de Melo, F.J.C.; Jerônimo, T.d.B.; de Medeiros, D.D. An integrated methodology using PROMETHEE and Kano's Model to rank strategic decisions. Eng. Manag. J. 2019, 31, 270–283.
16. Su, W.; Zhang, L.; Zhang, C.; Zeng, S.; Liu, W. A Heterogeneous Information-Based Multi-Attribute Decision Making Framework for Teaching Model Evaluation in Economic Statistics. Systems 2022, 10, 86.
17. Abdulaal, R.; Bafail, O.A. Two New Approaches (RAMS-RATMI) in Multi-criteria Decision-Making Tactics. J. Math. 2022, 2022, 6725318.
18. Furqatovna, O.; Niyozovna, N.; Nutfulloyevna, A. Approaches Aimed at Ensuring a High Quality of Education in the Training of Economists. J. Ethics Divers. Int. Commun. 2022, 2, 78–83. Available online: http://journal.buxdu.uz/index.php/journals_buxdu/article/view/5082/3207 (accessed on 7 May 2023).
19. Muller, K.; Scalzo, K.A.; Pickett, A.M.; Dugan, L.; Dubuc, L.; Simiele, D.; McCabe, R.; Pelz, W. Ensuring Online Learning Quality: Perspectives from the State University of New York. Online Learn. 2020, 24, 254–268. Available online: https://files.eric.ed.gov/fulltext/EJ1260305.pdf (accessed on 7 May 2023).
20. Kibik, O.; Nikolaieva, L.; Khaiminova, I.; Bereza, V. The key factors in ensuring the quality of maritime education in Ukraine. In Proceedings of the 6th International Conference on Strategies, Models and Technologies of Economic Systems Management (SMTESM 2019), Khmelnytskyi, Ukraine, 4–6 October 2019; pp. 114–118.
21. Dewi, M.P.; Rahmatunnisa, M.; Sumaryana, A.; Kristiadi, J. Ensuring service quality in education for Indonesia's sustainable education. J. Soc. Stud. Educ. Res. 2018, 9, 65–81. Available online: https://dergipark.org.tr/en/download/article-file/661120 (accessed on 7 May 2023).

22. Hladchenko, M. Balanced Scorecard–a strategic management system of the higher education institution. Int. J. Educ. Manag. 2015, 29, 167–176.
23. Fijałkowska, J.; Oliveira, C. Balanced scorecard in universities. J. Intercult. Manag. 2018, 10, 57–83.
24. Gamal, A.; Soemantri, A.I. The effect of balanced scorecard on the private college performance (Case study at the University of WR Supratman Surabaya). Arch. Bus. Res. 2017, 5, 126–134.
25. Kiriri, P.N. Management of Performance in Higher Education Institutions: The Application of the Balanced Scorecard (BSC). Eur. J. Educ. 2022, 5, 144–158. Available online: https://files.eric.ed.gov/fulltext/EJ1348803.pdf (accessed on 7 May 2023).
26. Llach, J.; Bagur, L.; Perramon, J.; Marimon, F. Creating value through the balanced scorecard: How does it work? Manag. Decis. 2017, 55, 2181–2199.
27. Camilleri, M.A. Using the balanced scorecard as a performance management tool in higher education. Manag. Educ. 2021, 35, 10–21.
28. Wijayanti, N.; Setiawan, W.; Sukamto, R. Performance assessment of IT governance with balanced score card and COBIT 4.1 of Universitas Pendidikan Indonesia. In Proceedings of the Journal of Physics: Conference Series, International Seminar on Mathematics, Science, and Computer Science Education (MSCEIS 2016), Bandung, Indonesia, 15 October 2016; IOP Publishing Ltd.: Bristol, UK, 2017; p. 012072.
29. Chimtengo, S.; Mkandawire, K.; Hanif, R. An evaluation of performance using the balanced scorecard model for the university of Malawis polytechnic. Afr. J. Bus. Manag. 2017, 11, 84–93.
30. Ramísio, P.J.; Pinto, L.M.C.; Gouveia, N.; Costa, H.; Arezes, D. Sustainability Strategy in Higher Education Institutions: Lessons learned from a nine-year case study. J. Clean. Prod. 2019, 222, 300–309.
31. Al-Hosaini, F.F.; Sofian, S. A review of balanced scorecard framework in higher education institution (HEIs). Int. Rev. Manag. Mark. 2015, 5, 26–35. Available online: https://dergipark.org.tr/en/download/article-file/366698 (accessed on 7 May 2023).
32. Shafii, M.; Rafiei, S.; Abooee, F.; Bahrami, M.A.; Nouhi, M.; Lotfi, F.; Khanjankhani, K. Assessment of Service Quality in Teaching Hospitals of Yazd University of Medical Sciences: Using Multi-criteria Decision Making Techniques. Osong Public Health Res. Perspect. 2016, 7, 239–247.
33. Castro-Lopez, A.; Cervero, A.; Galve-González, C.; Puente, J.; Bernardo, A.B. Evaluating critical success factors in the permanence in Higher Education using multi-criteria decision-making. High. Educ. Res. Dev. 2022, 41, 628–646.

34. Abbasi, B. Identifying and Ranking of University Strategic Human Resources Management Criteria Based on Multi-criteria Decision Making Methods. Public Adm. Perspaective 2020, 11, 127–147. Available online: https://jpap.sbu.ac.ir/article_96738.html?lang=en (accessed on 7 May 2023).
35. Keshavarz-Ghorabaee, M. Assessment of distribution center locations using a multi-expert subjective–objective decision-making approach. Sci. Rep. 2021, 11, 19461.
36. Bafail, O.A.; Abdulaal, R.M.S.; Kabli, M.R. AHP-RAPS Approach for Evaluating the Productivity of Engineering Departments at a Public University. Systems 2022, 10, 107.
37. Tuan, N.; Hue, T.; Lien, L.; Thao, T.; Quyet, N.; Van, L.; Anh, L. A new integrated MCDM approach for lecturers' research productivity evaluation. Decis. Sci. Lett. 2020, 9, 355–364.
38. Turan, H. Assessment factors affecting e-learning using fuzzy analytic hierarchy process and SWARA. Int. J. Eng. Educ. 2018, 34, 915–923.
39. Huang, H.C. Designing a knowledge-based system for strategic planning: A balanced scorecard perspective. Expert Syst. Appl. 2009, 36, 209–218.
40. Kim, H.-S.; Kim, Y.-G. A CRM performance measurement framework: Its development process and application. Ind. Mark. Manag. 2009, 38, 477–489.
41. Varma, S.; Wadhwa, S.; Deshmukh, S. Evaluating petroleum supply chain performance: Application of analytical hierarchy process to balanced scorecard. Asia Pac. J. Mark. Logist. 2008, 20, 343–356.
42. Chan, Y.C.L. An analytic hierarchy framework for evaluating balanced scorecards of healthcare organizations. Can. J. Adm. Sci./Rev. Can. Sci. L'administration 2006, 23, 85–104.
43. Leung, L.C.; Lam, K.C.; Cao, D. Implementing the balanced scorecard using the analytic hierarchy process & the analytic network process. J. Oper. Res. Soc. 2006, 57, 682–691.
44. Fletcher, H.; Smith, D.B. Managing for value: Developing a performance measurement system integrating economic value added and the balanced scorecard in strategic planning. J. Bus. Strateg. 2004, 21, 1–18.
45. Reisinger, H.; Cravens, K.S.; Tell, N. Prioritizing performance measures within the balanced scorecard framework. MIR Manag. Int. Rev. 2003, 43, 429–437.
46. Stewart, R.A.; Mohamed, S. Utilizing the balanced scorecard for IT/IS performance evaluation in construction. Constr. Innov. 2001, 1, 147–163.
47. Saaty, R.W. Decision Making in Complex Environment: The Analytic Hierarchy Process (AHP) for Decision Making and the Analytic Network Process (ANP) for Decision Making with Dependence and Feedback; Super Decisions: Pittsburgh, PA, USA, 2003.

48. Lee, M.C.; Wang, H.W.; Wang, H.Y. A method of performance evaluation by using the analytic network process and balanced score car. In Proceedings of the 2007 International Conference on Convergence Information Technology (ICCIT 2007), Gwangju, Republic of Korea, 21–23 November 2007; pp. 235–240.
49. Saaty, T.L.; Vargas, L.G.; Saaty, T.L.; Vargas, L.G. The Analytic Network Process; Springer: Boston, MA, USA, 2013; Volume 195, pp. 1–40.
50. Opricovic, S. Multi-Criteria Optimization of Civil Engineering Systems. Ph.D. Thesis, Faculty of Civil Engineering, Belgrade, Serbia, 1998. (In Serbian).
51. Opricovic, S.; Tzeng, G.-H. Extended VIKOR method in comparison with outranking methods. Eur. J. Oper. Res. 2007, 178, 514–529.
52. Yu, P.L. A class of solutions for group decision problems. Manag. Sci. 1973, 19, 936–946.
53. Zeleny, M. Multiple criteria decision making: Eight concepts of optimality. Hum. Syst. Manag. 1998, 17, 97–107.
54. Opricovic, S.; Tzeng, G.-H. Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS. Eur. J. Oper. Res. 2004, 156, 445–455.
55. Wu, H.-Y.; Lin, Y.-K.; Chang, C.-H. Performance evaluation of extension education centers in universities based on the balanced scorecard. Eval. Program Plan. 2011, 34, 37–50.
56. Jassbi, J.; Mohamadnejad, F.; Nasrollahzadeh, H. A Fuzzy DEMATEL framework for modeling cause and effect relationships of strategy map. Expert Syst. Appl. 2011, 38, 5967–5973.
57. Ghadikolaei, A.S.; Chen, I.-S.; Akbarzadeh, S.H.Z.Z. Using DEMATEL method for cause and effect relations of BSC in universities of Iran. In Proceedings of the BALCOR 2011, Thessaloniki, Greece, 22–24 September 2011; pp. 333–340.
58. Shekhovtsov, A.; Sałabun, W. A comparative case study of the VIKOR and TOPSIS rankings similarity. Procedia Comput. Sci. 2020, 176, 3730–3740.
59. Perdana, A.; Budiman, A. College Ranking Analysis Using VIKOR Method. J. Comput. Netw. Archit. High Perform. Comput. 2021, 3, 241–248.