

Quality management application and educational performance in higher education institutions: A bibliometric analysis

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ABSTRACT

Article history:

Received March 10, 2023

Received in revised format June 12, 2023

Accepted July 6 2023

Available online

July 6 2023

Keywords:

Quality management

Bibliometric

Determinants

Publication dynamics

Quality management has become inevitable and ubiquitous in higher education, especially given the increasing competition in both industry and professional orientation. To date, there has been no broad consensus about the trends and determinants in this field despite research existing for several decades now. Experts disagree on the use and impact of quality management systems in higher education, and there is a considerable geographical disparity in terms of the progress made in the field. In this article, a bibliometric analysis consisting of data from 966 articles from the Web of Science database (scanned extant literature) was to identify the most pertinent papers, sources, authors, countries, publication dynamics, and themes. It reveals a comprehensive quality management assessment in higher education. It also revealed the most prominent role of service-quality leadership in current research and quality culture, training, performance, and improvement techniques as the areas relevant for future research. Several countries need to refocus their effort on improvement in quality training and the impact of quality management in the higher education context.

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1. Introduction

Quality enhancements of the educational system, teaching and student's academic performance have been recognized in educational institutions at a significantly higher learning rate (Reith & Seyfried, 2019). The increasing competition between industry and professional orientation has made it inevitable for such Institutions to produce improved results in terms of 'student-learning experience' and their 'professional readiness' (Contreras et al., 2015). Quality Management System (QMSs) is advantageous and beneficial to higher institutions in enhancing their student achievement and academic outcomes by maintaining a certain level of quality in the rendition of the educational concepts to the students (Seyfried & Reith, 2019). This helps them attract and retain enough students and enough funds for them to run their Institutions (Contreras et al., 2015). The demand for a highly skilled and well-trained workforce from the industrial sector drives the need for improved quality standards and outcomes in the institutions of higher learning (Tetteh, 2015, 2016).

QMS is increasingly being used in educational institutions. However, their use has become a subject of some disagreement among experts (Grant et al., 2002). Some experts have questioned the ability of these systems to improve the quality of education. Moreover, there exists an inconsistency and an apparent disparateness. This inconsistency has to do with the

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geographical variability in the level of application and resultant outcomes and the irregular and unsystematic way the quality management systems have been applied over the period they have been around (Grant et al., 2002). Different countries are at different stages and levels of adoption and application of QMS in their higher education institution (Gamage et al., 2020). Although the USA is one of the pioneers in the quality movement in industrial and academic circles, there is still some scope for improvement when it comes to the application of quality management in higher education (Gamage et al., 2020; Seyfried et al., 2019).

A preliminary review of literature on the topic revealed that the research in the area somewhat mirrors this inconsistency (Grant et al., 2002). Despite the plethora of research articles, books and conference papers on the overall topic, there seems to be a lack of primary or empirical research on the adoption and outcomes of QMS in higher learning. Much of the said research is qualitative and exploratory, indicating that the topical area may not yet have arrived at the much-needed maturity in terms of research coherence as a separate research discipline in academic and industrial terms. As pointed out (Sadler, 2017), part of the problem is that much of the application of quality systems in higher education is taken for granted. Importantly, the rich body of literature may need an aggregatory, detailed and extensive research approach to summarize and extract the appropriate research directions in the field (Seyfried & Ansmann, 2018). Such an approach may help fuel further meaningful research in the field. Notably, the said lack of topical and thematic coherence and maturity in this area, when seen in the light of the large body of otherwise meaningful (though scattered) research, shows that this is a growing research field. Especially in the US, which is one of the most significant higher education infrastructures globally, there are many insights to be addressed and applications concerning the adoption and effects of quality management concepts in higher education. Despite a large body of literature, little is known about the general trends and research in this area. Therefore, it is fundamental and crucial for developing the body of knowledge and facilitation of empirical and theoretical research in the field to conduct a bibliometric analysis of the application of quality management concepts and systems.

The purpose of this bibliometric study is to investigate the extant quality management literature on application, adoption, and effects of the same on the academic and institutional performance of higher learning institutions. Additionally, the study aims to provide insights on the practical application and implementation of best practices, concepts, and ideas that may have worked in certain countries. Such insights may be helpful in countries which have a vast and advanced education system but still lack the systemic and systematic application of quality management concepts and systems to improve their institutional and academic outcomes.

2. Literature Review

While 'quality improvement' as a concept has always been a part of higher education, it has traditionally been restricted to formal examination systems and overly focused on improving the students' performance. In the process, it has been largely detached from the overall institutional performance. In the past, however, a systemic and institutional view of quality was facilitated by adopting various quality management systems. Such systems, though developed in academic environments, had been quite successful in industrial terms (Contreras et al., 2015).

2.1 Quality Management System (QMS)

QMS is increasingly being applied in educational institutions. However, their use has become a subject of some disagreement among experts. The experts have questioned the ability of these systems to improve the quality of education and performance of schools. Grant et al. (2002) used a quality management framework to analyze quality management approaches that had been used in higher education in the USA. The framework used three parameters, namely: quality of design, quality of conformance, and performance. Among the nine articles examined, only one studied the problems concerning performance quality. As per Contreras et al. (2015) several businesses, organizations, and institutions began to employ QMS in an expanding global market and increased customer expectations. QMSs are advantageous to HEIs in several different ways.

Competence of the learning institutions is becoming increasingly important for them to fund, run and grow the Institutions by attracting and retaining more and more students. An essential aspect of such competence is a certain level of quality in the students' learning outcomes and academic results to keep up with the competition. The increasing need for a highly skilled and knowledgeable workforce calls for a constant supply of the same. QMS can certainly ensure that. This in turn ensures that the student learning is at par with the industry and personnel market expectations (Pires et al., 2014).

2.2 Quality Assurance

Quality assurance processes have been applied to many different aspects of higher education such as teaching, learning, and assessment. Sadler (2017) pointed out that the problem with applying QMS in higher education is that it is taken as self-evident in most parts. They emphasized that quality assurance should be grounded in authoritative, well-structured, and recorded academic performance standards applicable to student performance. With the increase in competition in higher education, the path to improving academic and student performance outcomes has gained increasing importance. Many HMIIs have made significant efforts to set up a feedback mechanism to track and measure the results and effects of their teaching

systems. Yu and Ueng in (2012) examined the application of six-sigma methodology to implement a stepwise feedback system and improve the outcomes. They proposed several tools and instruments to help improve the higher education feedback system for better academic results.

Shapland and Nulty (2012) proposed and developed a multi-level model of consensus moderation to support quality assurance and academic standards. They further described the steps taken by Griffith University to implement a model of assessment as part of its strategic quality assurance to the Education stakeholders. Gamage et al. (2020) observed that the design of higher education systems in various countries is influenced by higher education values and respective traditions, culture, and social backgrounds in the given country. It is vital to identify and define the relationships of responsibility, rights, and interests between the various higher education stakeholders in the respective countries. The importance of a quality code as a reference point for improving educational outcomes cannot be emphasized enough.

The state of quality assurance in higher education for improving educational outcomes is at different stages of development. For example, in the UK, the quality agenda is under transition wherein the Quality Assurance Agency (QAA) has modified its focus and moved towards quality enhancement, with a thrust on institutional audit and institutional responsibility for a quality audit. In Sri Lanka, the focus is on the structural aspects of the quality framework since the quality assurance, and accreditation systems are relatively recent phenomena. The main components of the Sri Lankan quality assurance and management system are its qualification framework, subject Benchmarking, code of practice, external and internal quality. On the other hand, the Chinese system comprises critical metrics evaluation, mission, staff, equipment, programs formulation, management, learning environment, and outcomes, which are inspected on a 5-year rolling cycle. There is no student opinion in the Chinese higher education QA Strategies context. In New Zealand, the focus is on quality cycles, whereas in Australia, it comprises internal quality management systems, quality audits, government monitoring, and performance-based funding.

In the US, even though some Universities started adopting and applying quality management principles in higher education in the late 1980s, the approach to the same has remained largely scattered and incomplete as on date (Grant et al., 2002). The first University to apply a Comprehensive Quality System, with some success, was the Rochester Institute of Technology (RIT), Rochester, US, which gave rise to the development of a Total Quality Management (TQM) system. Even though accreditation and performance measurement systems have widely been adopted in University Education, the application of quality management and quality assurance principles as a specialized discipline has remained surprisingly low. In the US, a performance-based quality assurance system for Higher Education Institutions (HEIs) was introduced as part of the government policy. However, even before these efforts began, some institutions had already started to create voluntary accountability and quality Assurance systems focused primarily on outcomes (Gamage et al., 2020; Mansour et al., 2021).

2.3 Six Sigma - DMAIC

With an ever-increasing market competition in higher education, the improvement in quality gained significance. Many Higher Educational Institutions (HEIs) are striving to set up a feedback system to assess and gain from evaluating the 'Teaching Methodologies'. (Yu & Ueng, 2012) described the use of DMAIC (Define, Measure, Analyze, Improve, and Control) processes for a stepwise implementation of a Quality feedback system in higher education. The authors presented several valuable tools for the same, which the HEIs could use to establish an effective quality assessment system. In international terms, the development of clear standards for evaluating educational quality has increased momentum in the last decade. The purpose has been to extract the standards in articulate terms. An important objective has been to make the standards understandable and comprehensible by the assessors, students, program directors, employers, and quality assurance. Mazumder (2014) noted that several models had been presented to improve how Six-Sigma could improve higher education. Six-Sigma principles have been seen to be closely aligned with the mission of the HEIs, which include principles such as 'waste reduction' and 'continuous improvement'. They collected data over time to measure the process's relevant input and output variables. Upon identifying the variables, the ones lying outside the pre-defined limits could be tweaked through suitable corrective actions. This step in the quality management process is critical to student success and academic achievement. The continuous improvement tools of Six-Sigma can be further used to achieve more outstanding higher education standards.

University academics, especially those in the humanities and commercial faculties, face a challenge developing the knowledge-based economy. The significance and related challenges of teacher motivation and engagement in the assurance of learning (AOL) process are well recognized in the extant literature. (Martínez León, 2019) showed how Institutions could pursue their AOL goals by enhancing need-based and teacher-led initiatives. They examined the same through a case study of such initiatives by the faculty to explore and show how 'Lean Six-Sigma', a vital process quality enhancement strategy, could improve AOL practices. They examined how a student's approach to learning as conditioned by the teacher's traits had a significant learning outcome. In higher or tertiary education, the application of Six-Sigma is centered on the students and their teachers, parents, and families. Anastasiadou and Taraza (2019, 2020) presented the application of six sigma methodologies and their application in tertiary education. They also found that six sigma methodologies can help attain ongoing improvement in tertiary education.

2.4 Total Quality Management

Quality management systems have been extensively employed in various universities around the world. Psomas and Antony (2017) examined the main Total Quality Management (TQM) elements adopted and resultant performance attained by HEIs in Greece. They studied 15 Greek HEIs and found that the Greek Institutions most prominently adopted TQM elements concerned student focus, leadership and top management commitment, strategic quality planning, process management, teaching staff, and employee involvement. Todorut (2013) theoretically conceptualized TQM in Higher Education towards evaluating the quality of teaching in higher academic institutions. The author predicted that the application of TQM could go a long way in revolutionizing the higher education system. He stressed that success in TQM application in university education could be achieved through long-term effort, planning, building, and applying annual term plans for its implementation in higher education. The most significant results attained by the sample HEIs include quality performance improvement, teaching staff and employee satisfaction, operational performance improvement, and positive societal impact.

Studies have outlined the application of the quality management concepts to areas like improvement in student engagement. For example, based on the central premise that HEIs can improve teaching quality via increased student engagement, (Muller & Braun, 2020) developed a scale to measure student engagement in German institutions. An essential aspect of Higher Education improvement is the set of competencies that allows understanding the complex processes and the insights for improvement in Higher Education outcomes. Stanciu and Stanciu, (2011) presented a methodological guide based on competency-based improvements in higher education. This guide was meant for the Central Institutions and Universities to acquire quality management for the higher education processes. As a prerequisite, modernization of the university professors' beginning and ongoing training processes was suggested. These features of the improvement process could improve and encourage the development of the pedagogical structures of the Romanian education system (Sweis et al., 2019).

Quality improvement in Higher Educational Institutions has been attempted not just through systemic changes but also by furnishing modern learning tools to the students and accounting for its effects on the student outcomes in a systematic manner. Farnoaga et al. (2010) proposed a course module through multimedia facilities for students of Visual Arts. The module was a systematic and structured tool to improve the students' e-learning experience and thereby improve their learning outcomes. Similarly, Borza et al. (2010) emphasized the benefits of multimedia tutorials in the Higher Educational processes. Despite their trivial role in classical and online educational processes, they stressed the importance of multimedia tutorials. The authors stressed its linkage to distributed learning, employing modern communication techniques between students and teachers (Sweis et al., 2020).

3. Research Methodology

Consistent with the purpose of this paper, bibliometric analysis methods have been employed herein to gain insights about current and future research directions on the applicability and adoption of quality management concepts and systems in Higher Education. Bibliometric analysis is a sophisticated technique to gain an effective knowledge and understanding of the dynamics and thematic structure of a field through the insightful use of certain metrics and visualization tools (Fosso Wamba & Queiroz, 2021). The metrics have been extracted and visualized from bibliometric data through specific techniques enabled by statistical and analytical software. This form of analysis gives a more detailed and elaborate view of a growing yet thematically underdeveloped or nascent field of study and gives a definitive idea of how a field of knowledge is structured. Thus, bibliometric analysis was employed to answer the research questions of this study.

Owing to its reliable, frequently updated, high quality, and high impact Education and Management Research Publications database, this study employed the Clarivate Analytics Web of Science (WOS) database search to ensure a rich and smooth search and collection of the relevant publications for this study. The design and protocol for this bibliometric study is summarized in Fig. 1 and elaborated in this paper's discussion of methods. The first step was to set out a search query, which could cast a wide net over the literature in Quality Management in Higher Education. It was evident from the preliminary review of literature that the search query had to be as general and inclusive as possible without losing out on the necessary granularity. Thus, the process of arriving at the final search query was iterative and necessitated considerable fine-tuning. The starting point for the search was the research problem, as outlined in the introduction section.

The key aspect of the problem is the disparate nature of research and practice of Quality Management as applicable to Higher Educational Institutions. While the problem with applying Quality Management could be identified, the initial search results did not yield papers with any definitive focus on the student performance outcomes. For example, the keyword search with specific search variants of phrases 'Quality Management' and 'Higher Education' yielded 1885 relevant results. The same results, when filtered by 'Student Achievement', were reduced to just 7 in number. Moreover, a closer look at these seven results showed that most had no performance focus related to quality management concepts. Before embarking on the actual research, this preliminary finding suggested a possible lack of stress on definitive academic outcomes instead of the procedural bias of the Quality Management adoption in Higher Education practice. A corresponding lack of focus on student achievement through Quality Management application in Educational and Quality Improvement Research must be investigated, consistent with the research objectives.

Keywords	TOPIC=("quality management" OR "quality management systems" OR "Quality management systems" OR "Quality Management Systems" OR "Total Quality Management" OR "total quality management" or "TQM" OR "Six sigma" OR "SIX Sigma" OR "six sigma") AND TOPIC=("higher education" OR "college education" or "university education" OR "university-level education" OR "University Learning" OR "university learning" OR "University learning" OR "Graduate School" OR "graduate school" OR "higher learning" OR "Tertiary Education" OR "tertiary education" OR "post-secondary education")
WOS Collection	WOS Core Collection
Fields	Title, Abstract, Keywords, Body text and Cited References
Inclusion Criteria	<ul style="list-style-type: none"> • Papers published in WOS database • Complete bibliographic information about the paper's data
Exclusion Criteria	<ul style="list-style-type: none"> • Non-English Language Articles • Incomplete information pertaining to the article

Fig. 1. Research Protocol

4. Results and Findings

4.1 Descriptive Statistics

The search query arrived as per the iterative method followed, and as represented in Fig. 1, 1885 articles were extracted initially. Since many of these results were not optimal, further study was required to refine the search. Upon filtration by WOS categories of Education and Educational Research, 1002 articles were obtained. Finally, after filtering the search for ‘English-only’ articles, 966 articles were retrieved for analysis. 812 of these were conference or academic event proceeding papers, followed by 118 research articles. This finding indicates the need for more collaborative ideas and research as an evolving area. However, 244 (25.26%) of the 966 documents had a single author. A considerable number of these documents indicate a stream of independent and specialist research in the area.

4.1.1 Document frequency over the years

As shown in Fig. 2, the publication frequency of the documents in the collection peaked in the year 2010. From 1992 to 2003, only 30 articles on the selected topic were published.

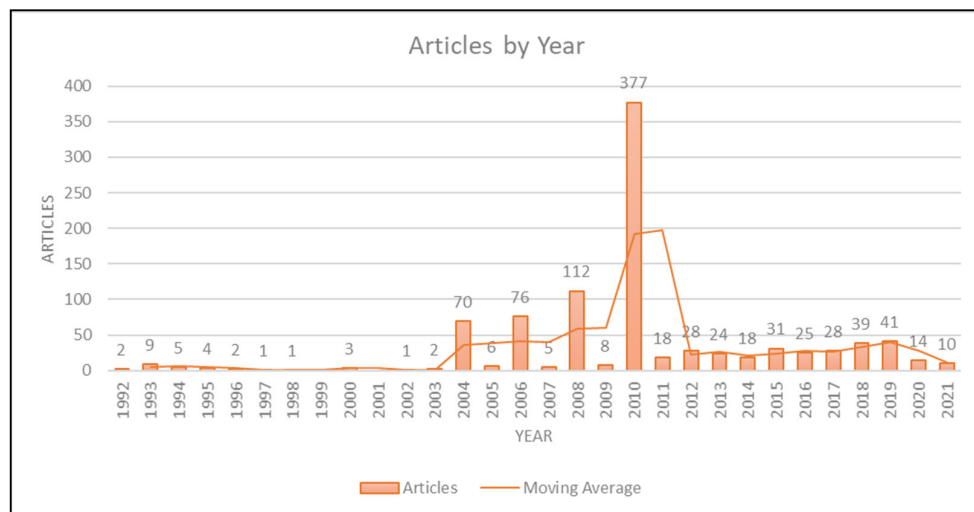


Fig. 2. Annual Publication Frequency

The frequency then increased from the year 2004 onwards, with intermittent declines. After the 2010 peak, there was a sudden slide in the number of publications on the topic. Post 2010, there was a sudden decrease in interest in the theme, and since then, a varying low number of publications show some selective stagnation in the field in the past decade. Despite this comparative stagnation, there has been a slow but steady incremental trend in publications. The slow and steady growth trend is apparent for the said period except for 2020 and 2021, which may be due to the uncertainty in Research and Academia, especially in the Higher Education field owing to the COVID-19 pandemic. In contrast, however, the average number of citations in 2010 was comparatively low, while the number of citations peaked in the last couple of years, which shows a renewed research interest in the field, even though most research is likely to be secondary or exploratory.

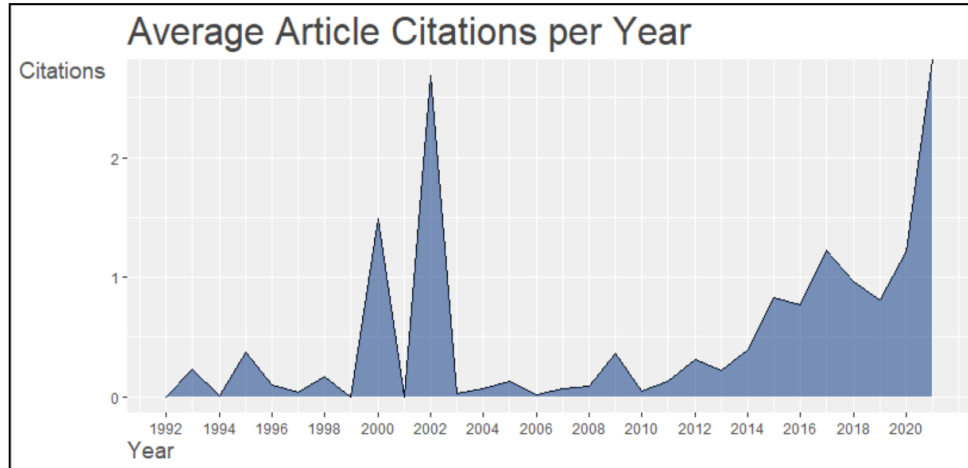


Fig. 3. Average Annual Citations

4.1.2 Linkages between Keywords, Sources, and Cited Sources

As shown in Fig. 4, a three-field plot was used to visualize the linkages between the keywords, sources, and cited sources for the research in Quality Management in Higher Education. The bibliometric elements of the collection of documents in the field were represented as rectangular blocks of different colors and shades. The height of each block was proportional to the aggregation of the relations or linkages arising from the element it represented. In this case, the said elements were keywords, sources, or cited sources. Thus, the higher the rectangle representing an element, the more relations or linkages it represents. For example, higher education was a pertinent keyword phrase that frequently appeared in the top-cited peer-reviewed journals such as Quality Assurance in Education, Quality Management in Higher Education, and conferences such as the 11th International Conference of Education, Research, and Innovation (ICERI, 2018), and was also cited by papers in other top journals such as itself, Total Quality Management in Business, and Quality in Higher Education and several others. These clusters give a high-level view of what has been researched and discussed in the literature.

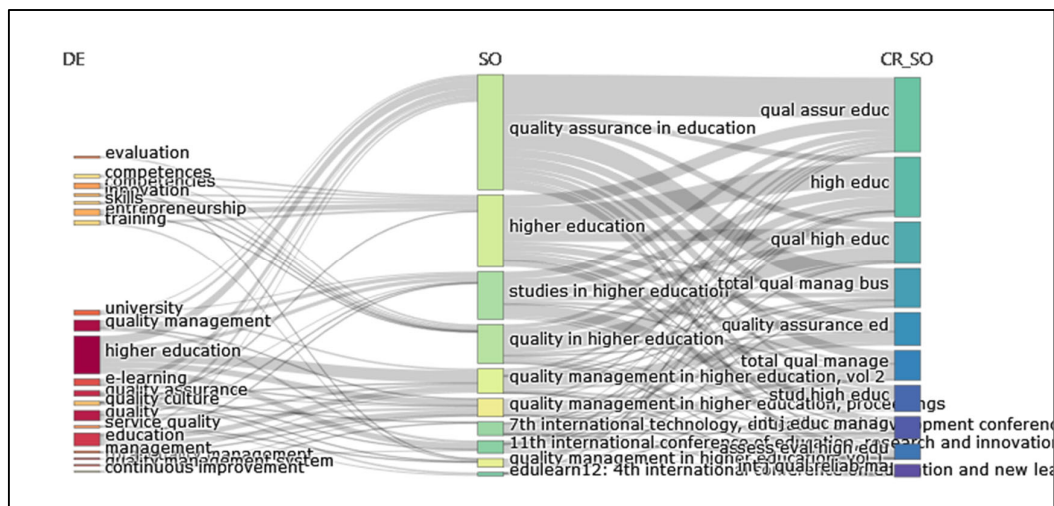


Fig. 4. Keywords vs. Sources

4.1.3 Author-Keyword-Sources Classification

Fig.5 shows a three-field plot for author-keyword-sources relationships. As shown in the plot, the top ten authors using the most pertinent keywords show the linkages between the authors and the thematic structure of their work on one hand, and the sources that were cited via these keywords showing the prominent aspect of the intellectual structure of the sources of these keywords used by the leading authors in the field. Examples by the top authors like Oprean C. and Rusu B determine the research trends in the field. Both used well-known keyword phrases like 'Higher Education', 'Quality Management' and 'Quality Management System'; all of which appeared in the prominent conference sources like 'Quality Management in Higher Education' - Vol. 1 and Vol. 2, and top peer-reviewed journals such as 'Quality Assurance in Education'.

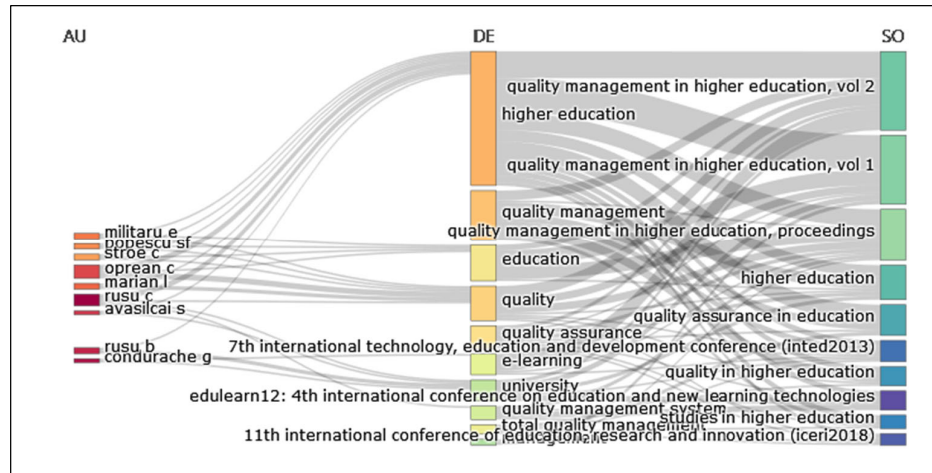


Fig. 4. Author-Keyword-Sources Classification

4.1.4 Cluster Classification

Fig. 5 shows the cluster classification which was performed based on the most general keywords. Seven primary research thematic clusters emerged as represented through the seven color-coded patterns within the keyword cluster diagram. It is identified and interpreted as:

- 1) Red: Quality Training and Evaluation systems.
- 2) Yellow: Stakeholder satisfaction and student motivation.
- 3) Purple: Quality practices and culture.
- 4) Green: Institutional and organizational performance.
- 5) Brown: Systemic and technical quality improvement techniques in Higher Education.
- 6) Blue: Motivation for improvement.
- 7) Pink: Quality Assurance.

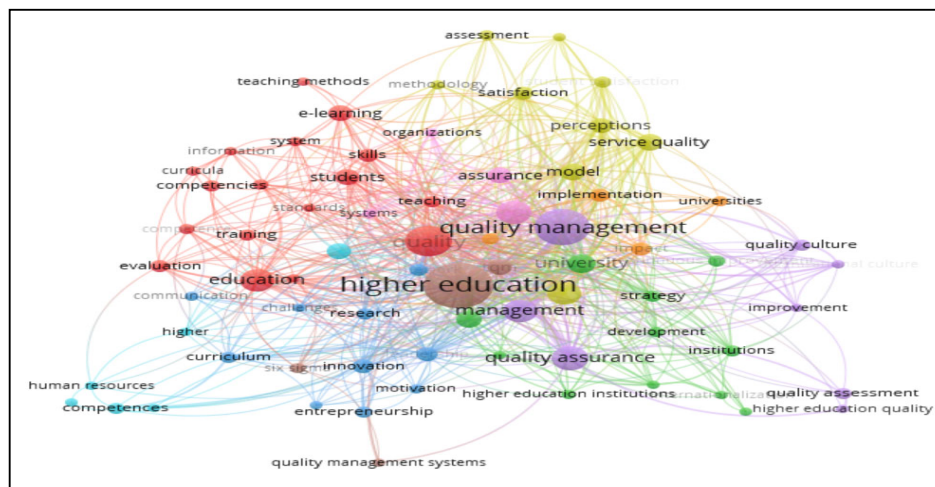


Fig. 5. Keyword Cluster Diagram

5. Conclusion and Limitations

Quality enhancement and adoption of the Quality Management systems in Higher Learning Institutions is a growing field in most aspects, yet stagnant in others, including problems such as an overly macroscopic focus and Isomorphism. This finding is consistent with Sadler (2017), who asserted that much of the adoption of Quality Systems in Higher Education is taken for granted and reaffirms the much-needed theoretical and empirical advances in the research in this area. This paper aimed to identify the bibliographic and thematic research trends concerning adopting Quality Management Systems in Higher Education. Additionally, the study identified the best practices and concepts represented by the most industry-ready and applicable research trends critical for a rejuvenation of the Quality Management momentum in the US. The significant research-worthy and relevant themes that emerged from the research include quality assurance, training and evaluation, practices, performance, and improvement techniques in Higher Education. In the same category, though on a more established research plane, the themes include determinants of QM, its service quality, identification and removal of barriers, and establishment of frameworks for innovation and quality-driven culture.

The challenges in the way of development of both research and practice in this field include adoption challenges in terms of resistance to change, stagnation of themes around implementation issues, and challenges they pose to the intrinsic value system of an institution. Overall, the industry-ready and relevant themes for countries like the US are - focused on teaching, learning training methods and experience, latest QA trends, dimensions, and impact of the TQM model. As discussed in the previous section, other trends are more niche and emerging, such as satisfaction and motivation of students and specific stakeholders, design challenges and antecedents, and consequences of the QM concept in Higher Education.

There are constraints in case studies. Firstly, the study relied on a single database (WOS) for the English language literature, and this may have caused us to inadvertently lose out on specific essential works and, accordingly, literary insights and themes on the topic. Notably, a large chunk of the literature is from European countries, and many of the non-English papers were left out, which may bias the study's findings. Also, there were no restrictions on the type of papers, which may have increased the inclusive scope of findings; the focus on peer-reviewed research may have slightly been lost at the cost of conference papers. Such restrictions may also affect the results or trends identified for future research.

References

- Anastasiadou, S., & Taraza, E. (2019). Total quality management: implementation of the six sigma methodology for improving quality in higher education. In *ICERI2019 Proceedings* (pp. 9533-9537). IATED.
- Anastasiadou, S., & Taraza, E. (2020). Six Sigma in Tertiary Education: A Win of Change regarding Quality Improvement in Education. In *INTED2020 Proceedings* (pp. 9595-9601). IATED.
- Borza, S. O. R. I. N., Bondrea, I. O. A. N., & Simion, C. A. R. M. E. N. (2010). Create tutorials with multimedia elements, used in the education process in higher education. In *Proceeding of the 6th International Seminar on the Quality Management in Higher Education-QMHE* (pp. 535-538).
- Contreras, S., Torres, J., Palominos, P., & Lippi, L. (2015). Quality management systems in educational contexts: A literature review. *ICERI2015 Proceedings*, 1790-1796.
- Fosso Wamba, S., & Queiroz, M. M. (2021). Responsible artificial intelligence as a secret ingredient for digital health: Bibliometric analysis, insights, and research directions. *Information Systems Frontiers*, 1-16.
- Gamage, K. A., Pradeep, R. R., Najdanovic-Visak, V., & Gunawardhana, N. (2020). Academic standards and quality assurance: The impact of COVID-19 on university degree programs. *Sustainability*, 12(23), 10032.
- Grant, D., Mergen, E., & Widrick, S. (2002). Quality management in US higher education. *Total Quality Management*, 13(2), 207-215.
- Mansour, A., Rowlands, H., Al-Gasawneh, J. A., Al-Qudah, S., Shrouf, H., & Al-smadi, L. A. (2021). The mediation effect of employees' affective organizational commitment: the impact of employees' perceptions of the social support for training programs on enhancing their organizational citizenship behavior in Jordanian hotels sector. *Academy of Strategic Management Journal*, 20, 1-23.
- Martínez León, H. C. (2019). Bridging theory and practice with Lean Six Sigma capstone design projects. *Quality assurance in education*, 27(1), 41-55.
- Mazumder, Q. H. (2014, June). Applying six sigma in higher education quality improvement. In *2014 ASEE Annual Conference & Exposition* (pp. 24-191).
- Pires, A. R., Saraiva, M., & Gonçalves, H. (2014). Implementation of quality management systems in HEI: The approach of the Polytechnic Institute of Setubal (Portugal). In *INTED2014 Proceedings* (pp. 3207-3216). IATED.
- Psomas, E., & Antony, J. (2017). Total quality management elements and results in higher education institutions: The Greek case. *Quality Assurance in Education*, 25(2), 206-223.
- Reith, F., & Seyfried, M. (2019). Balancing the moods: Quality managers' perceptions and actions against resistance. *Higher Education Policy*, 32, 71-91.
- Sadler, D. R. (2017). Academic achievement standards and quality assurance. *Quality in Higher Education*, 23(2), 81-99.
- Sciarelli, M., Gheith, M. H., & Tani, M. (2020). The relationship between quality management practices, organizational innovation, and technical innovation in higher education. *Quality Assurance in Education*, 28(3), 137-150.

- Seyfried, M., & Ansmann, M. (2018). Unfreezing higher education institutions? Understanding the introduction of quality management in teaching and learning in Germany. *Higher Education, 75*, 1061-1076.
- Seyfried, M., & Reith, F. (2019). The seven deadly sins of quality management: trade-offs and implications for further research. *Quality in Higher Education, 25*(3), 289-303.
- Seyfried, M., Ansmann, M., & Pohlenz, P. (2019). Institutional isomorphism, entrepreneurship and effectiveness: the adoption and implementation of quality management in teaching and learning in Germany. *Tertiary education and management, 25*, 115-129.
- Shapland, N., & Nulty, D. (2012). Using a multilevel model of consensus moderation for quality assurance of academic standards. in *iceri2012 proceedings* (pp. 6128-6134). IATED.
- Stanciu, M., & Stanciu, D. (2011). systemico-holistic paradigm for the reform of the university curriculum centred on competences. in *edulearn11 Proceedings* (pp. 6614-6623). IATED.
- Sweis, R. J., Asma'a, S. I., Amayreh, I., & Al-Sayyed, N. (2019). The relationship Between Total Quality Management (TQM) implementation and organisation performance: evidence from the airlines companies in UAE. *International Journal of Information, Business and Management, 11*(1), 58.
- Sweis, R., Abualsondos, A., Magableh, M., Alamayreh, E., Sukkari, L., & Alawneh, A. (2020). The effect of total quality management practices on the academic performance of ISO: 9001 certified private schools: the case of Jordan. *International Journal of Information, Business and Management, 12*(1), 113-140.
- Tetteh, G. A. (2015). Improving learning outcome using Six Sigma methodology. *Journal of International Education in Business, 8*(1), 18-36.
- Tetteh, G. A. (2016). Effects of business school student's study time on the learning process. *Journal of International Education in Business, 9*(2), 90-110.
- Todorut, A. V. (2013). The need of total quality management in higher education. *Procedia-Social and Behavioral Sciences, 83*, 1105-1110.
- Yu, K. T., & Ueng, R. G. (2012). Enhancing teaching effectiveness by using the Six-Sigma DMAIC model. *Assessment & Evaluation in Higher Education, 37*(8), 949-961.



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