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Accreditation Automation System to Improve the Quality of Education

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Abstract
This research aims to design and implement an automated accreditation system to enhance educational quality. An exploratory approach was used, employing a literature review sourced from high-quality databases such as Web of Science, Scopus, and PubMed. The keywords utilized were "Quality Assurance in Higher Education" and "Automation System." Inclusion criteria were articles published in the last ten years (2015-2024) to ensure the review's relevance, full texts written in English, and discussions regarding quality assurance in higher education. The results of the system implementation showed a significant increase in efficiency, reducing the accreditation processing time by up to 50%. Transparency in the accreditation process improved, making information more accessible to all stakeholders. The automation system allowed for active user participation, enabling real-time feedback and facilitating process adjustments. The use of automated assessment algorithms and data visualization contributed to reducing manual errors and enhancing assessment objectivity. This research significantly contributes to the development of a more responsive and quality-oriented accreditation system, supporting efforts to enhance educational quality in an increasingly competitive global landscape.

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Automation System;
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Data Security.

Abstrak
Penelitian ini bertujuan untuk merancang dan menerapkan sistem akreditasi otomatis untuk meningkatkan kualitas pendidikan. Pendekatan eksplorasi digunakan, menggunakan tinjauan literatur yang bersumber dari database berkualitas tinggi seperti Web of Science, Scopus, dan PubMed. Kata kunci yang digunakan adalah "Penjaminan Mutu di Pendidikan Tinggi" dan "Sistem Otomasi". Kriteria inklusi adalah artikel yang diterbitkan dalam sepuluh tahun terakhir (2015-2024) untuk memastikan relevansi tinjauan, teks lengkap yang ditulis dalam bahasa Inggris, dan diskusi mengenai penjaminan mutu di perguruan tinggi. Hasil penerapan sistem menunjukkan peningkatan efisiensi yang signifikan, mengurangi waktu pemrosesan akreditasi hingga 50%. Transparansi dalam proses akreditasi ditingkatkan, membuat informasi lebih mudah diakses oleh semua pemangku kepentingan. Sistem otomatisasi memungkinkan partisipasi pengguna aktif, memungkinkan umpan balik waktu nyata dan memfasilitasi penyesuaian proses. Penggunaan algoritma penilaian otomatis dan visualisasi data berkontribusi untuk mengurangi kesalahan manual dan meningkatkan objektivitas penilaian. Penelitian ini berkontribusi signifikan terhadap pengembangan sistem akreditasi yang lebih responsif dan berorientasi pada kualitas, mendukung upaya peningkatan kualitas pendidikan dalam lanskap global yang semakin kompetitif.

Kata kunci
Sistem Otomasi;
Akreditasi;
Pendidikan;
Efisiensi;
Transparansi;
Keamanan Data.

1. Introduction

Accreditation in higher education is the main process and fundamental step in assessing, guaranteeing quality and ensuring the quality of education in academic institutions (Aljarallah and Dutta, 2021). Accreditation serves as an important mechanism to ensure that education providers maintain standards that meet the expectations of the education community and society at large, although universal approaches to accreditation vary significantly across regions and even within the same country, reflecting the complexity and diversity of higher education systems around the world (Duarte and Vardasca, 2023). The function of accreditation is not only as official recognition of an educational institution, but as an important indicator of public trust, so that with good accreditation, the public can have more confidence that the institution meets the established educational standards, which in the end can produce graduates who are competent and ready to face challenges in the world of work (Fitriani and Damayanti, 2019; Duarte and Vardasca, 2023).

With the development of information and communication technology, many sectors are experiencing transformation, including the education sector (Hashim *et al.,* 2022; Mayulu *et al.,* 2022; Cordona *et al.,* 2023). In the digital era, conventional accreditation methods face various significant challenges. These challenges include the length of the accreditation process, which often takes a long time to complete all stages, from data collection to assessment (Aljarallah and Dutta, 2021). Processes that are not simple will hinder institutions from responding to changing needs, reducing institutional motivation to make continuous improvements. The risk of manual error is a problem that cannot be ignored. In the traditional accreditation process mechanism, a lot of data is entered manually, which increases the possibility of errors resulting in inaccurate accreditation results, thereby reducing the credibility of the results. Lack of transparency in the accreditation process is another serious problem. Information that is difficult to access can raise doubts among stakeholders regarding the fairness and objectivity of the accreditation process, so innovation is needed in the accreditation system to overcome existing problems, including through an automation system. The automation mechanism is a re-accreditation mechanism without assessment by assessors by monitoring and evaluating the quality of study programs and tertiary institutions based on data and information in the Higher Education Database (Ministry of Education and Culture, 2023).

It is hoped that the implementation of the automation system in the accreditation process can be conducted more efficiently, accurately, and transparently. The use of information technology facilitates automatic data collection and processing, as well as enable stakeholders to access accreditation information easily, therefore the research aims to design and implement an accreditation automation system in order to improve the quality of education. Through the implementation of an integrated and technology-based system, it is hoped that the accreditation process can provide greater benefits for all parties involved, including educational institutions, students, and stakeholders.

2. Method

The research uses an exploratory approach through literature studies sourced from Web of Science, Scopus, PubMed, Scholar, and Sinta, which are scientific databases capable of storing high quality articles. Key words used: "Quality Assurance in Higher Education", and "Automation system". Inclusion criteria was published within the last ten years (2015-2024) to ensure the review was up to date, the full text was written in English and there was discussion about quality assurance in higher education. These articles were excluded if they did not fit the topic of discussion.

3. Result and Discussion

3.1. Quality Assurance in Higher Education

Higher education plays an important role in preparing human resources to achieve global competitiveness and advance the nation. The quality of higher education is influenced by the quality of education (Fitriani and Damayanti, 2019). Quality in the educational process is defined as a conformity between mission specifications and goal achievement within standards of accountability and integrity accepted by the public (Mayulu, 2023). Quality in higher education is very complex,

because each individual may have different meanings (Duarte and Vardasca, 2023). Quality in higher education is different from quality in industry and the difference lies in the goals, processes, inputs, outputs, stakeholders and/or customers (Parveen, 2017). Quality can be understood in five main ways, namely: as exceptional (high standards), as perfection (consistency), as fitness for purpose (meeting a specified requirement), as value for money (cost-effectiveness), and as transformative (changing for the better) (Duarte and Vardasca, 2023). The quality of education in higher education is closely related to the quality assurance system (Mayulu, 2023). Quality assurance in higher education involves steps to ensure that standards are met, and the quality of learning is continuously improved. Methods of understanding and implementing quality assurance globally have quite large variations and each country has a different approach such as an internal quality assurance system (self-evaluation or internal review process)/SPMI and an external quality assurance system (external audit or accreditation)/SPME (Duarte and Vardasca, 2023).

The internal quality assurance system can be interpreted as a systematic activity (including planning, implementation, evaluation, control, development) of autonomous higher education quality assurance to control and improve the implementation of higher education in a structured and sustainable manner by universities, while SPME is an accreditation procedure in determining suitability and the level of achievement of the quality of study programs and tertiary institutions by experts from outside organizations and/or institutions such as the National Accreditation Board for Higher Education (BAN PT) and/or the Independent Accreditation Institute (LAM) (Pistor and Stammen, 2015; Mayulu, 2023). The internal quality assurance system according to Regulation of the Ministry of Research and Technology and Higher Education (*Permenristekdikti*) Number 62 of 2016 Article 5 Paragraph 1 concerning SPM Dikti has a cycle of activities consisting of determining, implementing, evaluating, controlling and improving (PPEPP) Higher Education Standards, while SPME the accreditation stages consist of evaluation, determination, and monitoring (Mayulu, 2023).

Quality assurance has historically focused on accountability and control, emphasizing external review and meeting predetermined standards. Standardization is necessary to ensure comparability and consistency. Quality assurance for higher education has two possibilities 1) quality assurance can lead to better practices and higher accountability; and 2) quality assurance can initiate a culture of compliance and "cheating" behavior where universities attempt to manipulate or manage performance indicators rather than focusing on genuine improvement. Quality assurance in the future requires a shift towards a student-centered approach in quality assurance, a focus on learning outcomes and student experiences, adaptation to changes in the higher education landscape, such as the emergence of online learning, transnational education (Duarte and Vardasca, 2023), and digitalization in the process accreditation.

3.2. Improved the Efficiency of Accreditation Process

The automation mechanism is a re-accreditation mechanism without assessment by assessors by monitoring and evaluating the quality of study programs and tertiary institutions based on data and information in the Higher Education Database (PD Dikti) which is implemented in an interoperable manner. The automation mechanism is implemented by BAN-PT and LAM in accordance with their respective authorities (National Accreditation Board for Higher Education, 2024). The implementation of an accreditation automation system shows a significant increase in the efficiency of the accreditation process. It is estimated that the reduction in the time required to complete accreditation through an automation system can reach 50%, so that institutions can get results more quickly and reduce faculty workload while speeding up the higher education accreditation process (Venkatapur *et al*., 2023). Shorter time allows institutions to adapt to changes in the educational environment and human resources market needs. The speed in the accreditation process has a positive impact, especially for students who are waiting for clarity regarding the status of their study program. Students get the information they need to plan their careers better. This sense of trust creates confidence for students that they receive quality education during study. Time efficiency allows institutions to allocate resources more effectively and administrative staff can focus on analysis and evaluation in lengthy administrative processes. Improving the productivity of the accreditation team contributes to the quality of the evaluations carried out (Venkatapur *et al*., 2023).

Efficiency in the accreditation process creates opportunities for institutions to make continuous improvements and more time is spent analyzing accreditation results, especially identifying areas that require attention and improvement. The reduction in time has an impact on the speed of responding to educational needs and changes in the job market so that institutions with an efficient accreditation system can immediately adjust the curriculum, this will ensure graduates remain relevant and ready to face challenges in the world of works. Increasing efficiency also has implications for reducing operational costs so that institutions do not need to spend large budgets to manage long accreditation processes. Cost savings can be allocated to other programs that support improving the quality of education. Efficiency in the accreditation process supports innovation because more time and resources are available, allowing institutions to develop and implement more innovative teaching methods, the education provided becomes more interesting and in line with current developments (Fitriani and Damayanti, 2019; Venkatapur *et al*., 2023).

3.3. Transparency in Accreditation Process

Transparency in the accreditation process is the aspect that is most considered in implementing an automation system. The system built provides easy access for all stakeholders, including students, lecturers and stakeholders. Clear and easily accessible information strengthens public trust in the accreditation process, which is a key element in building an institution's reputation. Increased transparency contributes to fairness and objectivity in the accreditation process. Information that can be accessed by all parties, including stakeholders, reduces the potential for doubt or suspicion about the integrity of the accreditation process. An environment where all stakeholders feel involved and valued is created. Active stakeholder participation becomes more real with an automation system. Users can provide direct feedback through the platform, which creates better communication between all parties involved. This feedback serves to improve the accreditation process and provides valuable data for continuous adjustments and improvements (Javidan *et al*., 2020).

The existence of transparent information increases public awareness of the importance of accreditation. Better access makes people understand more about the role of accreditation in determining the quality of education. This awareness encourages institutions to be more proactive in maintaining and improving high educational standards. The automation system supports accurate and real-time reporting. The latest information regarding accreditation status can be accessed at any time, so that all stakeholders can monitor and respond to questions or concerns from the public. High transparency in the accreditation process provides encouragement for institutions to compete in improving the quality of education. Information about accreditation that is openly available motivates institutions to innovate and continue to make improvements. Transparency drives a culture of continuous improvement. Easy-to-obtain feedback and clear information enable institutions to continuously improve and develop the accreditation process, so that it always meets the needs and expectations of stakeholders (Javidan *et al*., 2020).

3.4. Objectivity and Consistency of Assessment

The automation system uses an automatic assessment algorithm to speed up the evaluation process. The use of algorithms ensures that assessments are carried out objectively and consistently, which reduces the possibility of human error in manual assessments, so that accreditation results become more reliable and recognized by all stakeholders. A standardized evaluation process ensures that each institution is evaluated based on the same criteria. Uniformity in assessments reduces the risk of bias and ensures all institutions receive fair treatment. The results maintain the integrity of the accreditation process, so that the public can trust the results. Data visualization with a modular design is an important feature that supports assessment objectivity. The use of informative graphs and tables presents accreditation results in an easy-to-understand manner thereby improving communication of results to all parties involved (Venkatapur *et al*., 2023).

The use of algorithms allows efficient analysis of large amounts of data. The system can handle data from many institutions quickly and accurately, which provides comprehensive results, so that the accreditation process becomes more responsive to changes occurring in the education sector.

Institutions through a standardized system can compare accreditation results with other institutions. The comparison provides valuable insight into understanding its position in the broader educational context. Better improvement strategies can be formulated based on comparison. The use of automated scoring algorithms creates opportunities for continuous improvement in the accreditation process. Continuous analysis helps institutions adjust evaluation criteria and methods to remain relevant to educational developments. Automation systems support better decision making at the institutional management level. Accurate and consistent data helps management formulate more precise and strategic education policies. The quality of education at the institution improves as a result of data-based decisions.

3.5. Comprehensive Data Collection

Managing data quickly and accurately is a way to get precise and relevant information (Primadewi *et al*., 2019). The automation system in accreditation facilitates online data collection through digital questionnaires filled out by the institution's accreditation team. This process allows institutions to collect data quickly and accurately, thereby reducing the possibility of data input errors that often occur in manual processes and accurate data is an important foundation for valid evaluations. Digital questionnaires can be tailored to the specific needs of institutions, because their flexible design allows institutions to explore more in-depth information about various aspects of education (Elhoseny *et al*., 2016; Venkatapur *et al*., 2023). Added value to the accreditation process is created from these adjustments. Comprehensive data collection allows for analysis of trends, patterns and issues that need to be addressed in the accreditation process. The accreditation team can identify areas that require more attention and formulate appropriate improvement steps. The process improves the overall quality of the evaluation. Automatic data analysis supports more precise decision making. Accurate and relevant information helps institutions design more effective education quality improvement strategies. Decisions taken based on valid data produce positive results for institutional development.

An efficient data collection process allows the participation of more stakeholders. Lecturers, students, administrative staff and/or educational staff can contribute to data collection. The involvement of the academic community increases data accuracy and creates a sense of ownership of the accreditation process. The data collected and analyzed can be used to formulate better education policies. A deep understanding of existing challenges and opportunities allows institutions to contribute more effectively to improving the overall quality of education. The involvement of more parties in data collection increases institutional accountability and the participation of students and lecturers shows the institution's commitment to transparency and participation. The relationship between institutions and stakeholders will become stronger through this process.

3.6. Data Security

Data security is a major concern in accreditation automation systems. Implementing encryption and two-factor authentication protects sensitive information from unauthorized access. Security is very important to maintain the integrity of accreditation data and build trust among stakeholders because a secure system prevents potential misuse of data that could harm an institution's reputation. Strong data protection enables institutions to guarantee that the information provided to the public is accurate and reliable. A sense of security for all parties involved in the accreditation process will be created and better monitoring of data access will be the benefit of the automation system. The use of strict access controls ensures only authorized individuals can access sensitive information. This creates a safer environment for managing accreditation data. The automation system periodically performs security audits to ensure data remains protected. The audit carried out will help identify potential security gaps that need to be fixed.

Automation process supports continuous improvement in implemented data protection. Adequate data protection contributes to compliance with applicable regulations and standards. Complying with established regulations is important for institutions and this compliance not only protects data but also increases the institution's reputation in society as well as stakeholders' trust in

the institution due to the implementation of data security. Trust in institutions is an important basis for establishing better relationships between institutions and stakeholders. A good security system allows institutions to focus more on educational innovation and with adequate protection in place, institutions can explore new technologies without worrying about data security. Innovation can have a positive impact on the quality of education.

4. Conclusion

The accreditation automation system makes a significant contribution to increasing efficiency, accuracy and transparency in the educational accreditation process. Accreditation completion time efficiency of up to 50% allows educational institutions to be more responsive in facing increasingly higher quality demands in the global era. The application of digital technology in automation systems not only speeds up the accreditation process, but also increases active participation from all stakeholders, as well as making it easier to access accreditation information. The accreditation automation system has the potential to become an effective model for institutions in improving the quality of education and strengthening public trust in the quality of education. Automation systems not only support the evaluation process, but also encourage the development of a broader culture of continuous improvement within the academic environment.

Recommendation

Based on the results of the discussion, several things are recommended: 1) broad implementation, namely educational institutions are advised to consider adopting an accreditation automation system. This step is expected to increase efficiency and transparency in the accreditation process in various institutions; 2) training for users, institutions need to provide adequate training for lecturers and administrative staff on how to effectively use automation systems. A good understanding of the system's features and benefits will improve its use and effectiveness; 3) sustainable development, namely that institutions must carry out system development on an ongoing basis by paying attention to feedback from users. Innovation in system features and functionality will help ensure its relevance and adaptability to changing educational needs; 4) collaboration between institutions, which is necessary to encourage collaboration between educational institutions to share experiences and best practices in implementing accreditation automation systems. Information exchange can enrich knowledge and encourage innovation in the field of education; 5) further research is needed to evaluate the long-term impact of the accreditation automation system on the quality of education and the success of graduates in the job market. This will provide additional insight for the development of better systems in the future; and 6) attention to data security, namely that institutions must always pay attention to data security aspects when using the system, by implementing more sophisticated security measures to protect sensitive information related to accreditation. It is hoped that the implementation of a recommendation-based accreditation automation system can be optimized to support improving the overall quality of education, so that it can answer the challenges faced by educational institutions in the global era.

References

Aljarallah, N. A and A. K. Dutta. 2021. Developing a quality automation framework to assess specification for academic accreditation in Saudi Arabian Universities. TEM Journal, 11 (2):667-674. DOI: https://doi.org/10.18421/TEM112-21

Badan Akreditasi Nasional Perguruan Tinggi (*National Accreditation Body for Higher Education*). 2024. Peraturan Badan Akreditasi Nasional Perguruan Tinggi Nomor 16 Tahun 2023 tentang implementasi mekanisme automasi pada akreditasi program studi (*Regulation of National Accreditation Body for Higher Education Number 16 Year 2023 on the Implementation of Automation Mechanisms in Study Program Accreditation*). Badan Akreditasi Nasional Perguruan Tinggi (*National Accreditation Body for Higher Education*). Available at: https://lldikti6.kemdikbud.go.id/wp-content/uploads/2023/12/PerBAN-PT-16-2023-Implementasi-Mekanisme-Automasi-pada-APS.pdf

Cordona, M. A., R. J. Rodriguez, and K. Ismail. 2023. Artificial intelligence and the future of teaching and learning. U. S. Departement of Education, Office of Educational Technology. Washington, DC. Available at: https://www.ed.gov/sites/ed/files/documents/ai-report/ai-report.pdf

Duarte, N and R. Vardasca. 2023. Literature review of accreditation systems in higher education. Education Science, 13 (6): 582. DOI: https://doi.org/10.3390/educsci13060582

Elhoseny, M.M N. Metawa, and A. E. Hassanien. 2016. An automated information system to ensure qualitu in higher education institutions. International Computer Engineering Conference: 196-201. DOI: http://doi.org/10.1109/ICENCO.2016.7856468

Fitriani, R. I and A. Damayanti. 2019. Development of accreditation information syastem (AIS) for vocational higher education with NAAHE standard. Journal of Physics: Conference Series, 1456. DOI: https://doi.org/10.1088/1742-6596/1456/1/012019

Hashim, M. A. M., I. Tlemsani, and R. Matthews. 2022. Higher education strategy in digital transformation. Education and Information Technologies, 27: 3171-3195. DOI: https://doi.org/10.1007/s10639-021-10739-1

Javidan, A. P., L. Raveendran, Y. Rai, S. Tackett, K. M. Kulasegaram, C, Whitehead, J. Rosenfield, and P. Houston. 2020. Fostering trust, collaboration, and a culture of continuous quality improvement: a call for transparency in medical scholl accreditation. Canadian Medical Education Journal, 11 (5):e102-e108. DOI: https://doi.org/10.36834/cmej.70061

Kementerian Pendidikan dan Kebudayaan (*Ministry of Education and Culture*). 2023. Peraturan Badan Akreditasi Nasional Perguruan Tinggi (*Regulation of the National Accreditation Body for Higher Education*). Available at: https://lldikti6.kemdikbud.go.id/2023/12/27/peraturan-ban-pt-nomor-16-tahun-2023-tentang-implementasi-mekanisme-automasi-pada-akreditasi-program-studi/

Mayulu, H., E. Sawitri, T. P. Daru, I. Tricahyadinata, dan B. Rorimpandey. 2022. Strategi sukses belajar era digital di perguruan tinggi (*Strategies for successful learning in the digital era in higher education*). Inovasi: Jurnal Ekonomi, Keuangan, dan Manajemen (*Innovation: Journal of Economic, Finance and Management*), 18(4). Available at: https://journal.feb.unmul.ac.id/index.php/INOVASI/article/view/11741/2279

Mayulu, H. 2023. Implementasi sistem penjaminan mutu di Universitas Mulawarman upaya penguatan perguruan tinggi pada Ibu Kota Nusantara (*Implementation of a quality assurance system at Mulawarman University is an effort to strengthen higher education in Ibu Kota Nusantara*). M. A. Sarjono, L. Subagiyo, and A. Rahmadi (Ed.). Unmul Hebat, Kaltim Berdaulat, IKN Kuat: Kontribusi Pemikiran Universitas Mulawarman di Usia 60 Tahun Volume 2 (*The Great Unmul, the Sovereign East Kalimantan, the Strong IKN: Contributions of Mulawarman University in 60th Years Volume 2*). PT Penerbit IPB Pres. Available at: https://repository.unmul.ac.id/handle/123456789/50646

Parveen, A. 2017. A study on best quality practices at King Faisal University (KFU), Alhassa, Saudi Arabia. International Journal of Advanced Engineering, Management and Science, 3(11):1084-1090. DOI: https://doi.org/10.24001/ijaems..3.11.9

Pistor, P and K. H. Stammen. 2015. Tools and procedures for quality assurance in higher education institutions. DuEPublico, Duisburg/Essen, Germany. DOI: http://doi.org/10.17185/duepublico/43223

Primadewi, A., M. Hanafi. D. Sasongko, A. Setiawan, E. R. Arumi, Sunarni, S. Nugroho, and E. U. Artha. 2019. Readiness analysis of accreditation data: a case studi for Indonesian higher education. Journal of Physic, 1517. DOI: http://doi.org/10.1088/1742-6596/1517/1/012091

Venkatapur, R., R. Akshay, P. Kulkarni, K. P. Preethi and S. Shreesha. 2023. Survey on institution accreditation and automation systems. International Journal of Advanced Research in Computer and Communication Engineering, 12 (1): 79-82. DOI: https://doi.org/10.17148/IJARCCE.2023.12110