

Optimization of Higher Education Internal Quality Audits Based on Artificial Intelligence

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Abstract

Internal Quality Audit is an independent and documented systematic testing process to ensure that the implementation of activities in higher education is in accordance with the procedures and the results are in accordance with the standards to achieve the goals of the institution. Quality can be guaranteed by ensuring that each individual has the skills he needs to do the job properly. Quality orientation in development life in Indonesia is something that is very urgent, must be supported and developed in order to respond to the trend of global competition. There are significant differences in the accreditation and quality assurance system with the previous version, it is necessary to develop a strategy by building an artificial intelligence-based system. The method used is to build an online system by involving experts and assessors to develop concepts in accordance with the points of the 9 criteria accreditation forms, to build a digital quality audit form for matching and the level of conformity between the implementation of higher education standards and the standards set, the benefit is to help universities implement digital and intelligent based internal quality audits, know the tri dharma standards of higher education that must be improved, maintained and deviated.

Keywords: *Optimitation, artificial, intelligence, internal quality audit*

1. Introduction

The high unemployment rate for college graduates is currently a serious problem for the Indonesian nation. Every year millions of college graduates add to the number of unemployed in Indonesia [1]. Unemployment clearly has an impact on the welfare of society. In general, there are several causes of unemployment in Indonesia, including the imbalance in the growth of the workforce with job opportunities, limited job opportunities that are affected by economic growth and the Covid-19 pandemic, the quality of the workforce is still low, and there is a gap in the supply of labor with the need for labor that is not suitable and the motivation and entrepreneurial spirit to create new jobs are still low. The lack of quality possessed by university graduates is also influenced by many things, one of which is the inability of universities to produce quality graduates in accordance with the competencies needed in the world of work. There are 19.10 million people (9.30 percent of the working age population) affected by Covid-19. Consists of unemployment due to Covid-19 (1.62 million people), Non-Workforce due to Covid-19 (0.65 million people), temporarily not working due to Covid-19 (1.11 million people), and working population experiencing reduced working hours due to Covid-19 (15.72 million people)[2]. Accreditation of tertiary institutions with an A rating or superior is still insufficient to create quality graduates, based on the 2019 Higher Education Database of 4,680 universities in Indonesia, there are universities with an A rating of 96 accreditation, a C rating of 1283 and an unaccredited 2421. Meanwhile for study programs from 28,517 study programs there are tertiary institutions with accreditation of study programs ranked A for 3710, C for 5021 and not accredited for 7240[3].

Along with the current high unemployment rate, especially during the COVID-19 pandemic which has an impact on the welfare of the community, which is triggered by various things and the lack of quality, skills, creativity and innovation possessed by graduates. This is because universities have not optimally produced quality graduates due to the uneven implementation of internal quality assurance in universities so that they do not produce quality graduates in a sustainable manner. Competent human resources are one of the targets that must be achieved in national development, especially in the context of reducing unemployment. Efforts need to be made to prepare a skilled, competent and professional workforce that leads to qualification standards for workers who have competent knowledge, skills and attitudes as well as skills, universities must make quality improvements by referring to the internal quality assurance system, conduct internal quality audits that aims to obtain room for improvement in the aspects specified as the scope of the audit, as well as fulfillment or improvement of the quality system in accordance with the improvement space obtained in periodic quality audits to create a quality institution. Quality is a very important thing in human life, both individually, in groups, and in society. Quality can be guaranteed by ensuring that each individual has the skills he needs to do the job properly. Quality orientation in development life in Indonesia is something that is very urgent, must be supported and developed in order to respond to the trend of global competition[4]. The era of globalization requires all parties in various sectors to increase competence in the face of quality or quality competition. Therefore, improving the

quality of education is very important to be carried out continuously in building the nation's character[5]. Law Number 12 of 2012 concerning Higher Education Article 52 states that Higher Education Quality Assurance is a systemic activity to improve the quality of higher education in a planned and sustainable manner, quality assurance as referred to in paragraph 1 is carried out through the establishment, implementation, evaluation, control, and improvement of education standards[6]. In accordance with Permenristekdikti No 62 of 2016 article 3 paragraph 2 that the implementation of the Internal Quality Assurance System is planned, implemented, evaluated, controlled and developed by universities in accordance with the cycle of Determination, Implementation, Evaluation, Control, Improvement[7]

2. Methodology

Higher education management, should be based on the quality standards that have been set. The quality standards that have been set are the minimum standards that must be achieved or fulfilled, this means that universities have to prepare and have the quality standards to be achieved. The quality standard is a reflection of the conditions of the expectations of the relevant stakeholders, especially the users of the relevant university graduates. The main tasks of universities, better known as the Tri Dharma of Higher Education, are: education, research, and community service[8]. Quality is the main thing, quality can be achieved by implementing an internal quality assurance system with the hope of ensuring the quality of institutions and study programs, increasing institutional accreditation, superior study programs and seeking opportunities for improving the internal quality of institutions and each study program. This is for the achievement of quality in accordance with the expectations of all stakeholders of higher education in accordance with Law No. 12 of 2012 concerning higher education, especially Article 52, paragraph 2 "Quality assurance as referred to in paragraph (1) is carried out through the establishment, implementation, evaluation, control of , and the improvement of higher education standards.", and the evaluation as referred to in Article 52 paragraph 2 of the Higher Education Law can be carried out by means of an internal quality audit. Then the problem-solving strategy that is used is

1. Build an online artificial intelligence-based university internal quality audit system
2. Build a digital quality audit form for matching and the level of conformity between the implementation of higher education standards and the established standards
3. Build a digital and intelligent quality audit knowledge base
4. Build a digital document audit system based on artificial intelligence

Artificial intelligence is the development of computer systems that are increasing very quickly in generating and collecting data, as well as the ability of hardware to store data with large capacities. A collection of databases generated from various sources in business management and administration and the implementation of various other applications. With the rapid development of database size, it can affect the performance and ability of the database system to make decisions[9]

3. Results And Discussion

The proposed artificial intelligence-based internal quality audit algorithm framework is

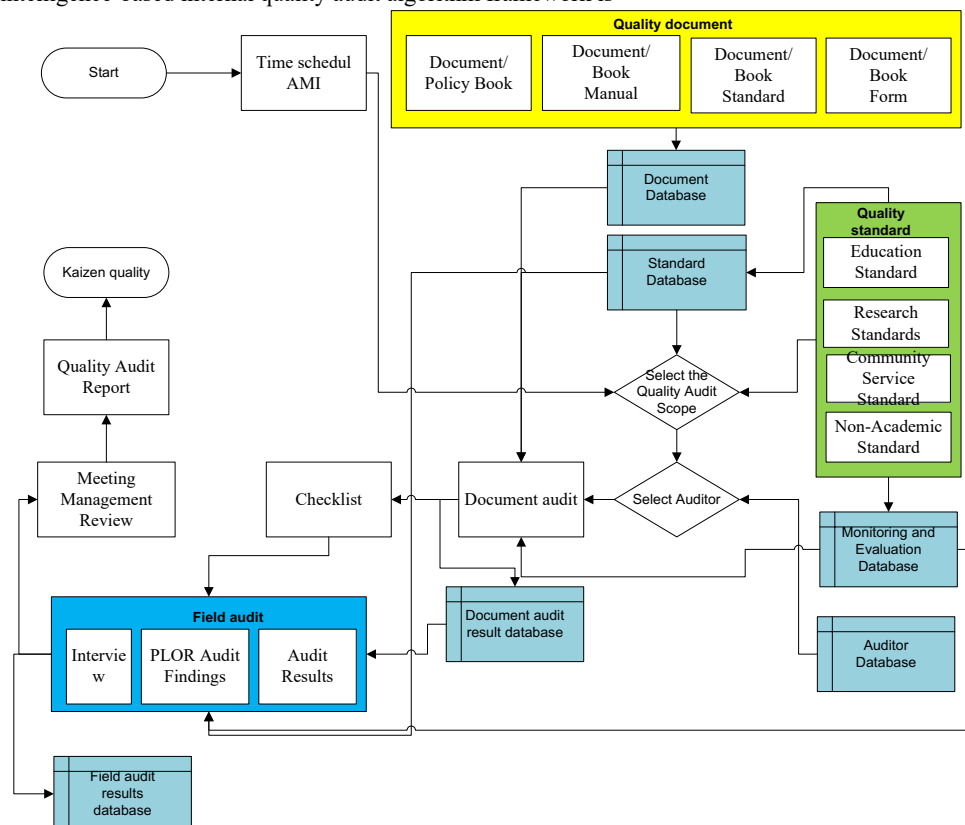


Fig 1. Artificial intelligence-based internal quality audit framework

The artificial intelligence-based internal quality audit system generally consists of 6 major parts, namely internal quality assurance system documents, standard documents, monitoring and evaluation, document audits, field audits and management reviews. Each part is digitally systematized and integrated between parts into a single unit in a quality audit system. Internal quality assurance system documents are stored in a database consisting of policies, manuals, standards and forms of internal quality assurance systems that have been determined by universities. Each document has a different type and amount according to the needs of the college. The second part is a standard document, this document is stored in a standard database which is a derivative of the internal quality assurance system document. The standard document consists of 4 major parts, namely educational standards, research standards, service standards and non-educational standards and each standard has sub or derivatives according to the needs of the standards that have been set. The third part is the monitoring and evaluation database, this database stores recordings of activities and results of monitoring the implementation of education, research, service and non-academic standards every semester. Monitoring and evaluation is carried out by the quality assurance unit in universities according to the level in each university. In carrying out an internal quality audit, the head of the university or the auditee determines the scope of the quality audit, in this case the standard to be audited has been predetermined. The auditor team leader assigns the auditor to access and execute audit orders in accordance with the scope determined by the auditee. The audit team is stored in the database of auditors who qualify as auditors. The fourth part is the document audit, the auditor conducts a document audit using a system that has been integrated with the internal quality assurance system document database, the standard database and the monitoring and evaluation results database, each auditor conducts an audit in accordance with the specified access rights. The audit results of each auditor are stored in the document audit result database. Based on the results of the document audit, the auditor compiles a checklist to assist during the field audit. The fifth part is the field audit. Field audits were carried out to verify and validate data based on the checklist in the document audit. The results of the field audit verification and factual validation are stored in the database of field audit results. Based on the results of the field audit by the auditor team, audit conclusions are generated and become recommendations whether they have exceeded, achieved, not achieved or deviated from the standard. These results will then be discussed at the management review meeting. The sixth section is the management review meeting. The management review meeting discusses the results of the internal audit and the follow-up to the internal quality audit. If the results exceed the standard is increased, if the results are achieved then the standard is maintained, if the results have not been achieved or deviate then corrective action is needed. In general, how is the knowledge base search process in the implementation of artificial intelligence-based internal quality audits to carry out continuous quality improvement, the results will be clustered according to the results obtained, Cluster as part of segmentation is used to identify natural groups of cases based on a group attributes, grouping data that have similar attributes[10], presented in the following figure.

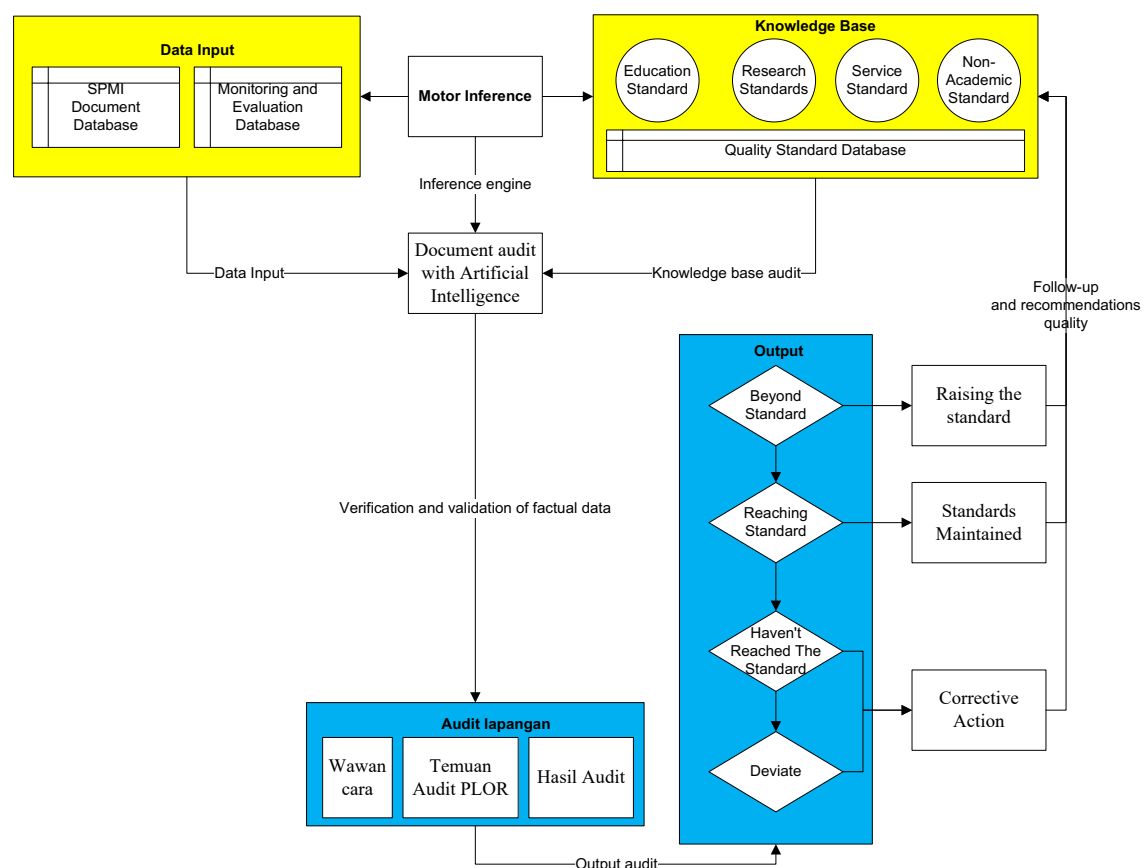


Fig 2. Internal quality audit knowledge base search

In general, artificial intelligence-based internal quality audit consists of input, process and output. Input consists of internal quality assurance system documents and monitoring and evaluation results. In the process, the inference engine will work to trace the data of all standards recorded in the knowledge base, calculate the weight achievements of all standards and compare them with the target values and weights that have been set in the internal quality assurance system document. The comparison result signal is sent and stored in the quality audit database to be validated and verified by the auditor through a field audit which will produce an output in the form of recommendations during the management review meeting. Internal quality assurance system documents stored in the internal quality assurance system database as a benchmark for achieving the implementation of the tri dharma of higher education, all achievement targets are stored in the database. The results of standard recommendations based on previous quality audits are accumulated in it. The internal qual-

ity assurance system document consists of several cells that become inputs in the quality audit, namely policies, manuals, standards and forms. The quality policy contains applicable laws, statutes, regulations and policy statements. The quality manual consists of all standard implementation procedures contained in universities. Quality standards consist of educational, research, service and non-academic achievements while the form is a form for implementing all standards in higher education. All documents are digitally stored in a document database that has been approved by the university. In the knowledge base, recordings of the implementation of educational, research, service and non-academic standards are stored, this database accommodates all activities, processes and outputs of the implementation of all standards which are digitally systematized and integrated between standards. Educational standards include Graduate Competency Standards, Learning Content Standards, Learning Process Standards, Learning Assessment Standards, Lecturers and Education Personnel Standards, Learning Facilities and Infrastructure Standards, Learning Management Standards and Learning Financing Standards.

4. Conclusion

The conclusions of the artificial intelligence-based internal quality audit are:

1. The creation of an online artificial intelligence-based internal quality audit system
2. Carrying out internal quality audits based on artificial intelligence will greatly help institutions and study programs to improve the quality of higher education graduates
3. The quality of graduates is very much needed in order to produce qualified workers who have competent knowledge, skills and attitudes as well as social skills to reduce the number of unemployed in Indonesia.

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