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Higher Education Quality Assurance System Based Artificial Intelligence

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ABSTRACT

Of the 4,680 universities in Indonesia, there are still many accredited universities with a C rank of 1283, A rank is still low, namely 96 and 2421 not accredited. Higher education has difficulty and is very burdened with the accreditation process because the entire process is done manually and problems in quantitative forms are very often encountered. In line with the current problems faced by universities in Indonesia, the concept of an artificial intelligence-based internal quality assurance system is proposed. The results of digital data recordings from the internal quality assurance system and the information system center are carried out by a clustering process using the K-Means algorithm and calculating the weight of each criterion using template matching for the process of matching the weighting results to the target. With this system, all academic and non-academic elements in higher education can be improved, evaluated periodically.

Keywords : Artificial Intelligence Higher Education Quality, Education Quality Assurance System

I. INTRODUCTION

Higher education quality assurance is the process of planning, fulfilling, controlling, and developing higher education standards consistently and continuously, so that internal and external stakeholders of higher education, namely students, lecturers, employees, the community, the business world, professional associations, the government can get satisfaction with college performance and output. This quality assurance activity is a manifestation of the accountability and transparency of higher education management. The internal quality assurance system is an independent higher education activity designed, implemented and controlled by the university itself without interference from the government. The government makes guidelines in the implementation of the internal quality assurance system which aims to provide inspiration on various aspects that are generally contained in the internal quality assurance system in a university. This is done because each university has different specifications,

in terms of history, vision and mission, organizational culture, organizational size, structure, resources, and leadership patterns. In order for higher education to be able to meet the demands of the growing needs of stakeholders, the internal quality assurance system must also be adapted to continuous development[1]. Study program accreditation is an assessment activity to determine the feasibility of a study program and university accreditation is an assessment activity to determine university eligibility. Accreditation is an external quality assurance system as part of the higher education quality assurance system which aims to determine the eligibility of study programs and university accreditation based on criteria that refer to national higher education standards and ensure the quality of study programs and tertiary institutions externally both in the academic and non-academic fields. protect the interests of students and society. The Minister of Education and Culture said that there were three problems in the higher education accreditation system. First, related to accreditation with a manual system, which he calls an administrative burden for lecturers and chancellors. So that it gets out of its main focus, namely improving the quality of learning within the university. Second, accreditation is discriminatory. Many universities require accreditation but do not get it. Meanwhile, there are universities that do not want to be accredited and do not feel the need, but are forced to re-accredit. Third, tertiary institutions that have pursued the international accreditation target must repeat the process at the national level, because it is not sufficiently recognized. Three problems related to higher education accreditation prompted the Minister of Education and Culture to roll out policy changes in the accreditation of study programs and universities. In addition, it is hoped that changes in policies in accreditation that make it easier for study programs and universities will not make the government complacent.

So the current problem in Indonesia, from a total of 4,680 universities in Indonesia, there are still many accredited universities with a C rank, namely 1283 universities, only a few rank A, namely 96 universities and 2421 universities not accredited. Of a number of study programs recorded in Indonesia in 2019, namely 28,517, there are still many accreditation of study programs with a C rank, namely 5021 study programs, rank A is still small, namely 3710 study programs and not accredited for 7240 study programs. Higher education institutions have difficulty and are very burdened with the accreditation process because the entire process is done manually. Problems in quantitative forms that are very often encountered, one of which is the unsynchronized data from study programs and faculties.

II. PREVIOUS RESEARCH

In general, universities have made efforts to develop internal quality assurance structures and quality assurance policies, however weaknesses and challenges remain, namely that quality assurance documents cannot be copied from other agencies but must choose quality assurance practices that are relevant to the institutional context. alone. Self-evaluation should be an integral part of the institution which should not be treated as an exercise solely to meet the requirements for accreditation or examination but the institution will be responsible for upgrading its own institution. To improve the examination system, the institution must implement the steps to be taken to ensure that lecturers and departments meet the specified standards. Quality has become the main focus of institutions and governments in the field of higher education. Most countries, including Indonesia, have established quality assurance systems and procedures in higher education, this is done because there is a concern that there is a potential decline in academic standards. In view of[2], quality in higher education is important because higher education institutions are responsible to society, employers, students and each other[3].

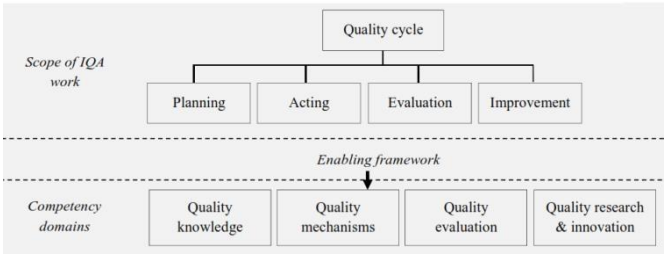

Figure 1. Higher Education Internal Quality Assurance Competency Framework.

The quality assurance system in higher education plays an important role in supporting and improving the quality of educational services provided by tertiary institutions. One of the most prominent developments in higher education is quality assurance institutions or units and it has become a global reform trend in higher education[4]. In general, tertiary institutions have built an internal quality assurance system, but it is necessary to consider competence and professional analysis in carrying it out. To produce good quality assurance, it is necessary to build a knowledge framework to contribute to a theoretical framework that supports the professional development of quality assurance practitioners in higher education, namely establishing a regulatory framework, evaluating, auditing, reviewing and facilitating improvement. This framework has nine domains which include; knowledge, communication, managerial, analytical, digital, research, interpersonal, personal skills and attitudes. Talking about professional development on quality assurance does not avoid debates about the use of the term competency [5]. The term competency is used to refer to the knowledge, skills and attitudes associated with a profession [6][7]. This is a term commonly used in professional development discourse. Professional competence is a behavioral characteristic required for quality assurance practitioners to carry out quality assurance efficiently, as well as the ability to maintain a competitive advantage[8]. Internal quality assurance refers to the institutional arrangements for quality management [9]. The main function of internal quality assurance in higher education is to manage the quality cycle related to teaching, research, community service and infrastructure support functions. The quality cycle consists of planning, acting, evaluating and improving higher education performance. A study by[4] involving 311 institutions from 94 countries around the world provides useful insights into the objectives of internal quality assurance. According to his research the most important objectives of internal quality assurance include improvement of academic activities, compliance with external standards and accountability to government and society. Thus, a professional development framework for internal quality assurance practitioners should develop competencies that allow for the realization of internal quality assurance objectives. Each of the major objectives in internal quality assurance requires specific competencies that must be addressed by a professional development framework. The quality assurance cycle provides an operational framework for implementing the internal quality assurance function. Thus, a competency framework must build the capacity to manage the quality assurance cycle. To achieve internal quality assurance objectives, universities use various quality assurance systems. Several models of quality assurance systems are used in higher education including Total Quality Management (TQM), ISO 9000 series, European Foundation for Quality Management Excellence Model (EFQM), Balanced Scorecard (BSC), Malcolm Baldridge award, and SERVQUAL amongst others[10][11][12] .

Each university produces two types of products, namely educational program services and graduate quality. Stakeholders demanded problems in teaching and learning programs in a systematic way through quality assurance of education in tertiary institutions. Quality of education is usually understood as a balanced educational compliance (outcome, process, environment) with identified needs, goals,

requirements, norms and standards. One of the effective mechanisms for assessing the quality of higher education is accreditation of public professions including accreditation according to international guidelines and regulations carried out by several accreditation bodies. The methodology for measuring higher education quality assurance using stakeholder satisfaction assessment measures by gathering feedback from customers and providing information for decision-making about the quality of education service improvements. Sources of feedback were obtained from students during the study, alumni and employers. The method used is PDCA (Plan - Do - Check - Act), with the following cycle:[13].

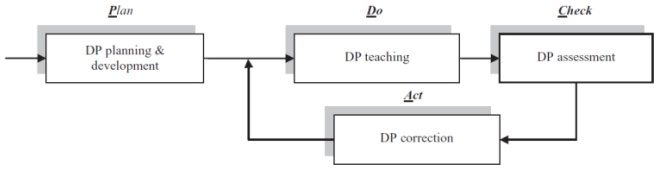

Figure 2. PDCA cycle.

Feedback on assessments of satisfaction with study outcomes should be collected from a target group of students, girls, young alumni and employers. Monitoring student satisfaction with the study process must be carried out during the study, satisfaction assessment must be carried out at the end of each study semester. Satisfaction with study outcomes should be assessed for both graduates who have recently completed college studies and alumni who have 2 or 3 years of work experience after graduating from college and who are able to assess the level of compliance between the knowledge and skills they acquired after completing the study[13]. The institutions have understood that the education system applied in higher education is still inadequate in terms of quality. Therefore, it is hoped that universities will be the biggest contributors in the education sector to function for quality education. Quality improvement issues have led to changes in administration in higher education institutions and it is understood that higher education institutions should try different models in the administrative system. It is also understood that quality can not only be achieved by the decision of a higher education institution, it will be more precise with the quality to be achieved with various kinds of government-supported institutions and foundations with higher sanction power. [14]

One of the analyzes to evaluate universities is the Rasch model which aims to evaluate higher education institutions based on quality assurance standards that have been developed to evaluate each member, including teachers and staff at universities. The instrument has been developed to conduct experiments in providing raw data samples to perform practicum analysis using the Rasch model. Analysis of the Rasch model will help universities improve and develop quality assurance into better universities. The Rasch model aims to test how well the data to be observed matches the expectations of the measurement model. The model assumes that the probability of a particular respondent confirming an item is a logistical function of the relative distance between the item's location and the respondent's location on a linear scale.[15]

III. RESEARCH METHODS

In accordance with the purpose of this study, namely to create a quality internal quality assurance system so as to increase the value of accreditation which in fact will also improve the quality of college graduates, the proposed system involves several stakeholders including government, universities, students and society integrated in an internal quality assurance system. To achieve a good internal quality assurance system in improving the quality of higher education, it is necessary to build a quality assurance framework and concept in accordance with the development of the digital-based industrial era 4.0. In accordance with the problems faced by universities in Indonesia

today, the concept of an artificial intelligence-based internal quality assurance system is proposed as follows:

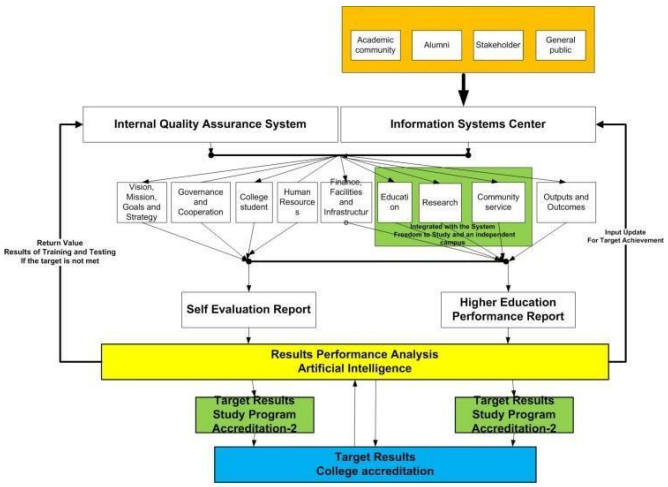

Figure 3. Internal quality assurance system framework based on artificial intelligence

IV. DISCUSSION

Accreditation is an external quality assurance system as part of the higher education quality assurance system. The cycle begins with the monitoring and evaluation stage of the internal quality assurance system and the digital data center of the information system which is the result of recording academic and non-academic data of students, alumni, graduate users and other data recordings. All data collected is then clustered according to their respective sections, namely Vision, Mission, Goals and Strategy, Governance, Governance and Cooperation, Students, Human Resources, Finance, Facilities and Infrastructure, Education, Research, Community Service and Outputs and Outcomes. In particular, higher education outcomes, namely education, research and community service are integrated with an independent learning system and an independent campus, where the weighting of student semester credit units is allowed to take 3 semesters of education outside campus or study programs with various forms of predetermined activities. From the results of the data recording, self-evaluation reports and higher education performance reports will be formed. These 2 elements are very important and influence the accreditation process. How these 2 elements can be integrated with artificial intelligence is presented in the following framework

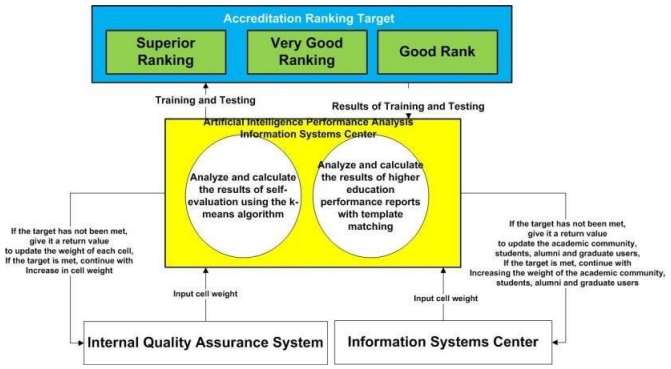

Figure 4. The training process and system weight testing

V. CONCLUSION

Looking at the complexity of the problems experienced by higher education institutions in increasing the accreditation ranking as evidenced by the high accreditation rate of C or good and the lack of A or superior accreditation ratings for both tertiary institutions and study programs, an artificial intelligentia-based internal quality assurance system was built. The results of digital data recordings from the internal quality assurance system and the information system center with the implementation of an independent campus at Tri Dharma Perguruan Tinggi are carried out by a clustering process using the K-Means algorithm and calculating the weight of each criterion using template matching for the process of matching the weighting results to the target. With this system, all academic and non-academic elements in higher education can be improved, evaluated periodically according to the desired target so that the weight of each element in the internal quality assurance system increases with an artificial intelligence-based surveillance system.

VI. RECOMMENDATIONS

To realize an independent campus internal quality assurance system based on artificial intelligence in the era of an independent campus, an online system integrated with Android was built so that all stakeholders can run it and produce big data to be monitored, evaluated, analyzed and followed up continuously.

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