

Evaluation of Higher Education Curriculum in The Era of The Industrial Revolution 4.0. at The State Institute of Islamic Studies of Purwokerto

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Abstract. Realizing era has caused a lot of changes in almost all aspects of human life. Industrial Revolution 4.0 has become a challenge as well as a threat for a higher-education institution. Facing this kind of condition, a curriculum evaluation in higher education institution is a really necessary to adapt and survive to meet the need of this technological era. Graduate Program of IAIN Purwokerto need to evaluate its curriculum in facing the era of Industrial Revolution 4.0 in order to meet the demand for technology-based education. This is a field research applying qualitative approach. The data of this research were collected through curriculum-document study and unstructured in-depth interviews to some key informants. Research findings show that formative curriculum evaluation begins with evaluating the the framework of learning device, consisting of course outline and assessment system. In addition, summative evaluation is performed comprehensively by National Accreditation Board of Higher Education every 4 years. All curriculum evaluation activities are intended to achieve customers' and stakeholders' satisfaction and further to make them able to meet the job markets in this industrial revolution era. The other policy of this higher education curriculum evaluation is the obligation for academic publication, i.e. every student must have published an article in academic journal before he/she gets his/her, and they have also to achieve TOEFL score of 450 for graduate/master degree and of 500 for doctoral degree.

Keywords: Evaluation, curriculum, Industrial revolution 4.0 era

1 Introduction

The era of industrial revolution 4.0 is characterized by the use of digital technology, which has driven many changes in all aspects of human life. Education is one of the aspects that is really affected and the need for adjustment for this changes is a must to meet the demand of its users [2]. To face such a condition, an education institution have to do curriculum reform and development. This era is also characterized by a tight competition and dense information flow, and such a condition requires an ability to compete with other nations in this world [25]. In education, a curriculum, especially in Islamic Higher Education, presents a description of graduates competencies or outcomes which is expected by users in educational field [6]. In the society, the graduates of higher education tend to be materialistic and pragmatic, in stead of the fact that education should be built on an ideology and the values of ethics and humanism, and this shows a contradiction between the ideals and the reality. This pragmatism represents that education is not neutral; education is addressed to fulfill economic demand and eventually leaves moral and ethical values. To

anticipate this condition, a higher education should take a role to build a system that can form people who have high morality, strong national commitment, and patriotism [7].

Recently, the issue of universities disruption is actual. It questions the future of higher education in supplying employees of this world industries. Jim Clifton in "*Universities: Disruption is Coming*" [10] and Terry Eagleton in *The slow Death of University* [16] explain that everyone can work in any institution without having a degree. Terry implies that higher education, including master degree, is no longer appropriate and needed in employment. Having a certain skill is enough to be accepted in job vacancies. Facing such a condition, a higher education need to review the running system in order to equip the students with various skills needed by the present and future job market.

A Higher Education have to adjust its curriculum to meet the need of this era, especially to improve students' skill on data of information technology (IT), operational technology (OT), internet of think (IoT) and big data analysis, integrating physical object, digital object and human being to produce higher education graduates who are competitive and skillful in *data literacy* dan *humam literacy* to meet the expectation of users in this industrial revolution 4.0. [17]. This is in line with research conducted by Lesi, et al. In his research, he stated that this industrial revolution was a significant difference mainly because of the encouragement of information technology (IT). Therefore, the ability to become human literate who is literate with information technology is a much-needed ability [9].

Given the demands of the era, curriculum review is a necessity, both in terms of objectives, content, strategies and evaluation systems. Judging from its objectives, curriculum review is more oriented to the absorption or acceptability of its outputs and outcomes, while in terms of content, curriculum review is intended to accommodate a series of subject matter that contains study materials that support and are supported by the role of technology. The curriculum strategy must change the thinking paradigm from the conventional paradigm to the critical thinking paradigm through discovery and inquiry approaches with blended learning strategies. Finally, in relation to the evaluation system, it should emphasize the performance of students so that the results are more accurate. Regarding curriculum evaluation, experts say that curriculum evaluation is still a topic that is widely discussed in the world of education [11]. The dynamics of curriculum changes above require higher education, including the Postgraduate IAIN Purwokerto, to improve themselves in evaluating the objectives, content, strategies and evaluation of the curriculum, so that the Graduate alumni of IAIN Purwokerto can adapt to the conditions of the times and can be accepted in the field of work in accordance with the Industrial Revolution Era 4.0. in other words, curriculum evaluation must pay attention to both achievement and grades.-10]

This is a field research using a qualitative research approach. The qualitative approach was chosen because it is very relevant to get in-depth data and has a very important meaning in the context of evaluating the Postgraduate curriculum of IAIN Purwokerto in the Industrial Revolution Era 4.0. This study aims to produce evaluation results regarding the suitability of the Postgraduate curriculum of IAIN Purwokerto with the development of the Industrial Revolution Era 4.0.

The subjects of this study were Leaders, lecturers, and tudents of Postgraduate Program of IAIN Purwokerto, and Leaders of Educational Institutions in the Banyumas area. These components are expected to be able to provide information/data related to the research focus, namely the evaluation of the Postgraduate Curriculum of IAIN Purwokerto in the Industrial Revolution Era 4.0. The data collection method used in this research is curriculum document studies and interviews with a number of key informants using unstructured in-depth interviews [22]. Document studies were used to look at various things related to the curriculum such as curriculum objectives, curriculum materials, curriculum activities

and curriculum evaluation. Meanwhile, unstructured in-depth interviews were used to explore the opinions of the stakeholders of IAIN Purwokerto Postgraduate Program, Postgraduate lecturers and users in the Banyumas area regarding the suitability of the Postgraduate curriculum with the Industrial Revolution Era 4.0.

After the data were collected, organizing and processing the data was carried out through the stages offered by Miles and Huberman, which includes three phases of activity, namely; data reduction, data display and conclusion drawing/verification [18][13].

3 Discussion And Conclusion

3.1. Evaluation of Postgraduate Curriculum in the Era of the Industrial Revolution 4.0

Along with Indonesia's National Qualifications Framework (KKNI) [24] which is the reference for Higher Education through Regulation of the Minister of Research, Technology and Higher Education No 044, 2015 concerning National Higher Education Standards, the graduates of master program are expected to have knowledge, skills, and attitudes in academic qualifications at levels 8 and 9 [14]. Learning outcomes at this level reflect the ability of graduates to develop knowledge and technology through theoretical and philosophical studies and research methods in the field of education. It aims to enable graduates to produce creative works to contribute intelligently in overcoming educational problems with a multi, trans, and interdisciplinary approach.

In order to meet the demands of the development of science and technology, the Postgraduate IAIN Purwokerto needs to reconstruct the curriculum according to the demands of 21st century learning developments, namely the industrial revolution 4.0 and to fulfill the Merdeka Belajar-Independence Curriculum (MBKM) [23]. The concept developed by the Directorate General of Learning and Student Affairs in preparing the curriculum begins with establishing a graduate profile which is detailed into the formulation of graduate learning outcomes. In accordance with the demands of the industrial revolution 4.0 era, graduates are expected, apart from having superior competencies, also have new literacy, which includes data literacy, technological literacy, and human literacy with noble character based on understanding religious beliefs which are challenges for higher education in curriculum development in the revolutionary era. industry 4.0. With this argument, universities need to reorient curriculum development that is able to answer these challenges. The formulation of abilities in the KKNI descriptor is named learning outcomes, in which competencies are included or part of learning outcomes. The use of the term competence is found in the SN-Dikti in article 5, paragraph (1), which states that the graduate competency standard (SKL) is the minimum criterion regarding the qualifications of graduates' abilities which includes attitudes, knowledge, and skills stated in the formulation of graduate learning (CPL) [17].

Curriculum evaluation aims to make continuous improvements in curriculum implementation. The evaluation was carried out in two stages, namely the formative stage and the summative stage. Formative evaluation is carried out by taking into account the achievement of CPL. The achievement of CPL is carried out through the achievement of CPMK and Sub-CPMK, which are determined at the beginning of the semester by the lecturer/lecturer team and the Study Program. Evaluation is also carried out on the form of learning, learning methods, assessment methods, course outlines and supporting learning tools. Summative evaluation is carried out regularly every 4-5 years, involving internal and external stakeholders, and reviewed by experts in the field of study programs, industry, associations, and according to the development of science and technology and user needs. Controlling the implementation of the curriculum is carried out every semester with indicators of CPL achievement. Curriculum control is carried out by the Study Program and is monitored and assisted by the higher education quality assurance unit/institution. Thus, it is very

urgent to evaluate the Higher Education curriculum for the continuity of the program held so that it has relevance, quality and efficiency of program implementation.

3.2. Curriculum Evaluation Foundation

In conducting curriculum reconstruction, the mechanism of evaluation results is based on the following provisions:

- a. Law Number 12 of 2012 Article 35 paragraph 2 states that the Higher Education Curriculum is developed by each Tertiary Education Institution with reference to the National Higher Education Standards for each Study Program, which includes the development of intellectual intelligence, noble character, and skills.
- b. The Higher Education Curriculum determines the direction of the institution that must be constantly updated in accordance with the development of needs and science and technology as outlined in the learning outcomes which will be formulated in the IQF qualification level.
- c. To increase the guidance of the relevance of higher education graduates to the world of business and industry, as well as a future that is rapidly changing, in early 2020 the Ministry of Education and Culture enacted a policy in the field of higher education through the "Merdeka Belajar - Kampus Merdeka" (MBKM) program. The MBKM program is expected to provide opportunities for students to gain wider learning experiences in building their competencies, so that graduates are ready to face the increasingly complex challenges of life in the 21st century.
- d. Regulation of the Minister of Education and Culture Number 3 of 2020, concerning SN-DIKTI (National Standards for Higher Education) Article 5 Paragraph 1 states that the Graduate Competency Standards (SKL) stipulates the minimum criteria regarding the qualifications of graduates' abilities which include attitudes, knowledge, and skills stated in the formula Graduate Learning Outcomes (CPL).
- e. The description of achievements in the IQF contains four elements, namely the attitude element of the value system, the work ability element, the scientific mastery element, and the authority and responsibility element.
- f. Description / Formulation of CPL at SN-DIKTI is included in one of the standards, namely the graduate competency standard (SKL). SN-DIKTI CPL contains elements of attitude, general skills, which are formulated in detail in the achievements of SN-DIKTI, while special skills and knowledge are formulated by similar study program forums which are the characteristics of graduates of the Study Program. The input and assessment of alumni and users that they provide through tracking graduates is an important part in developing the study program curriculum.

3.3. Formative and Summative Evaluation of the Postgraduate Curriculum of IAIN Purwokerto

Evaluation has a meaning as a systematic process and has a relationship to provide analysis, provide interpretation of information about the process and learning outcomes in achieving goals and provide instructional decisions based on certain criteria and considerations [20][8]. Formative evaluation is an activity carried out by educators with the intention of monitoring learning progress as feedback from improving learning programs [19][12][4]. Feedback is an important element in formative assessment [3]. While the summative assessment is an evaluation that produces a value or number which is then used as a matter for providing an assessment[1].

As stated in SN Dikti about Higher Education curriculum [5], every implementation of the curriculum must be evaluated periodically, both through formative evaluation and summative evaluation. In the formative evaluation, a search will be carried out on the linkages and learning

outcomes including course learning outcomes (CPMK) and subject learning sub-achievements, learning forms or learning models used, learning assessment systems and Semester Learning Plans that are used as operational guidelines for lecturers.

3.4. Course Learning Outcomes

Learning achievement The postgraduate course at IAIN Purwokerto refers to the formulation of graduate learning outcomes (SKL) in accordance with SN Dikti No. 44 Year 2015 -7] and amendment to the Regulation of the Minister of Research Technology and Higher Education of the Indonesian Republic No. 50 Years 2018. Article 7 explains that the formulation of Graduate Learning Outcomes contains elements of attitude, knowledge, special skills, and general skills. The attitude element is listed in the attachment of Permenristekdikti 44 of 2015. Meanwhile, the Learning Outcomes of Graduates of the Postgraduate Study Program are listed in the attachment of PMA 38 of 2017 concerning Amendments to PMA Number 33 of 2016 concerning Academic Degrees and the Decree of the Director General of Education No. 6165 Year 2018. Meanwhile, elements of special knowledge and skills are arranged by forums of similar study programs or by certain study programs if they do not have the study program family. Finally, elements of general skills can be seen in the attachment to the Regulation of the Minister of Research, Technology and Higher Education No. 44 of 2015 and Learning Outcomes of Graduates of Postgraduate Study Programs based on the attachment of Minister of Religion Regulation 38 of 2017 concerning Amendments to Regulation of the Minister of Religion Number 33 of 2016 concerning Academic Degrees and Decree of the Director General of Islamic Education No. 6165 Year 2018. The Competency Standards of the graduates are broken down into Subject Learning Outcomes. The content of standard learning outcomes for courses includes: a) learning content standards, which are the minimum criteria for the depth and breadth of learning materials, b) depth and breadth of learning materials, which refer to graduate learning outcomes, c) depth and breadth of master's learning materials and doctor, that is obliged to take advantage of the results of research and the results of community service.

3.5. Learning Form

Learning at the Postgraduate IAIN Purwokerto uses a learning paradigm pattern, according to SN Dikti it is explained that the learning paradigm is done by changing the learning mind set from teaching to learning.

The following is a pattern of learning paradigm shifts in Higher Education.

Old Paradigm	Components	New Paradigm
Competence focuses on knowledge	Competency	Competence focuses on knowledge, skills and changes in students' behavior and attitudes
Passive learning, as a process of receiving knowledge (active lecturers, passive students)	Process	Active learning as a process of seeking and forming knowledge (lecturers and students are active in learning)
Lecturers carry out learning instructions that have been designed	Lecturer	Implement various strategies that help students achieve competence
Single learning media	Media	Various media that support competence
Learning and assessment are carried out separately	Assessment	Continuous and integrated learning and assessment

The above paradigm results in the following shifts.

Old Paradigm	Component	New Paradigm
Package model learning management	Manajement	Flexible learning management according to student learning interests
Lack of an academic community	Academic Society	The formation of an academic community through scientific forums among student lecturers
No collaboration between lecturers and students in academic activities	Collaboration	The existence of harmonious collaboration between lecturers and students during the academic activities
Competence is only obtained from intracurricular activities	Academic Activities	Competence is obtained from intra-curricular, co-curricular and extracurricular activities
Incentive for lecturers is given based on determined lecturing schedule	Incentive	Incentive is given to team teaching

3.6. Learning Strategi

Considering the paradigm of learning in Postgraduate Program of IAIN Purwokerto, the strategies used in the learning process are holistic interactive, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered.

Meanwhile, the methods used in the learning process are as follows [15].

- a. Group discussion,
- b. Simulation,
- c. Case study,
- d. Collaborative learning,
- e. Cooperative learning,
- f. Project-based learning, atau
- g. etc.

These methods are used to facilitate the graduate learning achievement. Each subject may use one or more learning to deliver one session of learning. The forms of learning are as follows.

- a. Lecturing
- b. Response and tutorial;
- c. Seminar; and
- d. Practicum, studio practice, garage practice, or praktik lapangan;
- e. Research, planning, or development;

- f. Social work.

3.7. Assessment System

Standard of learning assessment is the minimum criteria on assessment process and students' learning result in achieving the graduate learning achievement. The scope of learning process and achievement includes assessment principles, assessment techniques and instruments, assessment mechanisms and procedures, assessment implementation, report, and graduation of students. In addition, assessment principles includes the following principles: educative, authentic, objective, accountable, transparent and integrated, while assessment techniques include observation, participation, performance, written tests, lectures and questionnaires.

Assessment Mechanisms and Procedures:

- a. Develop, deliver, agree on stages, techniques, instruments, criteria, indicators, and weights of assessment between assessors and those who are assessed according to the lesson plan;
- b. Carry out the assessment process in accordance with the stages, techniques, instruments, criteria, indicators, and assessment weights that contain the principles of assessment;
- c. Provide feedback and opportunities to question the results of the assessment to students; and
- d. Documenting the assessment of student learning processes and outcomes in an accountable and transparent manner.

The assessment procedure includes the planning stage, the activity of giving assignments or questions, observing performance, returning the results of observations, and giving the final score. The assessment procedure at the planning stage can be carried out through a gradual assessment and/or re-assessment.

The implementation of the assessment is carried out in accordance with the learning plan. Implementation of the assessment can be done by:

- a. Lecturer or team of lecturers;
- b. Lecturer or team of lecturers with student's participation; and
- c. The implementation of the assessment is carried out in accordance with the learning plan. Implementation of the assessment can be done by lecturer or team of lecturer with relevant stake holders participation.

Assessment Report		
Huruf	Angka	Kategori
A	4	Very Good
B	3	Good
C	2	Enough
D	1	Not Sufficient
E	0	Failed

Colleges may use between letters and intermediate numbers for grades in the range 0 (null) to 4 (four).

Result of Assessment

- a. Results of assessment are announced to students after one stage of learning according to the lesson plan.
- b. The results of the graduate learning assessment (CP) in each semester are stated by semester performance index (IPS).
- c. The results of the graduate CP assessment at the end of the study program are expressed by a cumulative achievement index (IPK).

3.8. Semester Lesson Plan (RPS)

Lesson plan in each semester at the Postgraduate IAIN Purwokerto refers to the following format:

- a. Study program identity
- b. Graduate learning outcomes (CPL) according to the Minister of Research, Technology and Higher Education and the Decree of the Director General
- c. Study program learning achievement (CPL-Prodi)
- d. Learning Outcomes of Courses (CPMK)
- e. Course Description
- f. Learning Outcomes Courses, core topics and student assignments
- g. The learning method/strategy used
- h. Scoring system
- i. References used are both main and supporting references -16].

Meanwhile the summative evaluation is carried out periodically every five years in the form of study program accreditation, and an internal quality audit conducted by the LPM IAIN Purwokerto. Study program accreditation is evaluated thoroughly using 7 standards or 9 criteria set by the National Accreditation Board for Higher Education. In its implementation, the evaluation is carried out by assessors who come from representatives of the National Accreditation Board for Higher Education, so that the assessment process is carried out in accordance with the criteria standardized by the National Higher Education quality guarantor. The aspects that are evaluated include aspects of the vision and mission, goals and objectives of the study program, management, human resources, curriculum, students, facilities and infrastructure, financing and output of study program graduates.

4. Postgraduate Curriculum Evaluation Analysis

Postgraduate IAIN Purwokerto in carrying out academic programs has referred to several regulatory rules, both regulations of the minister of research and technology, decisions of the director general of education, and decisions of the leadership of IAIN Purwokerto.

Curriculum evaluation should ideally be carried out at least once every 4 or 5 years, especially if there is a change in the regulations of the government/ministry/directorate general of Higher Education/Directorate General of Education. Postgraduate IAIN Purwokerto must adjust policies and curriculum quality standards to be applied. Development of curriculum quality standards must adhere to principles that exceed national standards in accordance with internal strength support. It is intended that graduates of IAIN Purwokerto Postgraduate have certain advantages compared to other IAIN Postgraduates, so that they have high competitiveness to get jobs and get recognition in their work environment.

Furthermore, adjustments to curriculum development with the vision and mission of the Postgraduate IAIN Purwokerto are carried out periodically every time the short-term strategic plan is drafted. The adjustment to the vision and mission aims to make curriculum development in line with and support the educational attainment targets as set out in the Strategic Plan. In addition, adjustments in curriculum development to the needs of the community/graduate users can be made at any time, depending on changes in labor market behavior.

Changes in the behavior of the highly dynamic job market in the global era need to be anticipated with adjustments to curriculum development. The existence of development and at the same time evaluation of

the curriculum is intended to make the graduates of Postgraduate Program of IAIN Purwokerto able to compete in the global world. In revising/developing the curriculum of study programs, the most important mechanism to do is self-evaluation of all components of education, including input, process and output as well as the impact of the previously implemented curriculum. Evaluation of each of these components must be mapped in the form of a SWOT (strengths, weaknesses, opportunities, threats) analysis. Internal strengths must be used as the advantages of input components and processes in curriculum development. Opportunities for the graduates need to be achieved through the determination of graduate competencies/learning outcomes that will determine the profile of the graduates. Meanwhile, weaknesses need to be corrected so that educational programs can run effectively, and external threats must be anticipated with the strengths they have, so that these threats can be changed.

The implemented curriculum of IAIN Purwokerto Postgraduate Program needs to be analyzed before being revised/developed in accordance with the industrial revolution 4.0 era. The analysis includes:

1. Conformity with the vision, mission and objectives of the study program;
2. Eligibility with a profile with graduate learning competencies/ achievements;
3. Conformity between learning outcomes and learning content/study materials;
4. Conformity between learning content/study materials and courses;
5. The appropriateness of the strategy/method of the learning process with learning outcomes; and
6. The appropriateness of the assessment system to measure learning achievement.

The curriculum must contain graduate competency standards as stated in learning outcomes to support the achievement of goals, implementation of the mission, and the realization of the vision of the study program. Learning outcomes that are in accordance with the vision and mission are formulated in study materials that are included in the framework of improving the quality of education in the era of the industrial revolution 4.0.

It is important to analyze the vision, mission and objectives of Postgraduate Program of IAIN Purwokerto accurately. This is because it will determine the specificity or excellence of each study programs in this institution compared to study programs in other institutions. This is different from the core scientific analysis which is analyzed and subsequently agreed upon by the consortium or the head of the study program in the Postgraduate of IAIN Purwokerto.

The considerations for compiling the graduate profile of the Postgraduate Program of IAIN Purwokerto are the policy of the institution, SWOT analysis of study programs, needs assessment, market signals, tracer studies, stake holders, input from associations, and agreements with similar study programs. The profile of graduates must be determined based on the learning outcomes of graduates of a study program, which include: (1) attitudes and values, (2) elements of work ability, (3) elements of scientific mastery, and (4) elements of rights/authorities and responsibilities. To support learning outcomes, graduates must be carefully analyzed in relation to the content of learning/study materials to form courses, which will be distributed in the core scientific groups, supporting and complementary courses, which are developed, for the future of Postgraduate IAIN Purwokerto.

Furthermore, an analysis was done to know the accuracy of the strategy/method of the learning process to the learning outcomes, and the accuracy of the assessment system to the measurement of learning outcomes. The curriculum implementation is not static, but dynamic, in accordance with the times. The rapid development of science and technology in the era of the industrial revolution 4.0 has an impact on the changes in the depth and breadth of learning content standards and their coherence. Therefore, the curriculum that will always change is the content of learning in each course. However, there is still a gap

between the rule of learning strategy development and assessment systems in certain subjects. Therefore, study programs need to pay attention to the dynamics in learning subjects in accordance with the latest developments in science and technology. Each point of the change must be written in the Semester Lesson Plan as evidence of the plan that is being carried out. This is a proof of the implementation of operational leadership by the Head of Study Program, which means being able to execute the vision, mission and goals of education in the form of curriculum development.

The curriculum in Islamic Higher Education is a description of the competence of graduates or outcomes of education institution. The phenomenon that appears in society is that graduates of an institution are still very materialistic and pragmatic, in spite of the fact that education should be built on ideological and humanistic ethical values, which seem to contradict pragmatic values. These pragmatic values are a form of educational dishonesty; education is led by conditions to meet economic demands and slowly abandon moral and ethical values. This can be found from several findings on the motivation of prospective new postgraduate students of IAIN Purwokerto, the majority of prospective motivations are to fulfill career positions in their workplace environment. On the other hand, the Industrial Revolution Era was noticed by the emergence of intense competition and the rapid flow of information in all sectors that require all parties to have strong competitiveness in order to be able to align themselves with other nations. The era of the Industrial Revolution 4.0 has changed the world with the influence of digital technology forcing the world of education to adapt itself in order not to be left behind by the interests of the business world or users. One way to face such a condition is that educational institutions must make changes and development of educational curricula to match user expectations.

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