Implementation of Innovation in Integrated Evaluation and Learning System using Outcome-Based Education Ecosystem

I Gede Susrama Mas Diyasa*[1], I Nyoman Dita Pahang Putra[2], Ni Made Ika Marini Mandenni[1], Mohammad Rafka Mahendra A[1], Rangga Laksana A[1]

[1]Department of Data Science, UPN "Veteran" East Java, Surabaya 60294, Indonesia

[2] Department of Civil Engineering, Udayana University, Bali 80361, Indonesia

*Corresponding Author: igsusrama.if@upnjatim.ac.id

ABSTRACT

Purpose: Outcome-Based Education is a learning method that focuses on the output which is learning achievements. Identification and determination of the achievements is a critical point for OBE due to the methods which will affect the learning and assessment planning. The main reason for this research is to give an innovation on this system which will be implemented.

Design/methodology/approach: The implementation is done by integrating three processes; curriculum design, assessment, and learning methods.

Findings: OBE utilizes knowledge aspects, skills, and attitudes based on the situation of the social, economic, and academic culture. This system also synergizes four types of users Admin, Curriculum Team, Lecturer, and Students. By adopting the methods and outcome-based learning, the system achieved simplicity for the users and improved the student's knowledge of its subjects.

Paper type: Research paper

Keyword: Assessment, Education, Integrated System, Learning, OBE, Outcome

I. INTRODUCTION

In OBE, output or achievements of learning are identified and then formulated as a learning method and assessment. It's then customized with the preferred result of achievements. This is in contrast with the conventional learning methods where the lecturer formulates manually while the results are needed only for scores and archives. This research is intended to develop OBE from various previous research. OBE integrates systems such as curriculum design, assessment, and learning methods (Pusparini, 2020). This system aids lecturers in determining students' achievement, or in the Indonesian language it is called LO (Learning Outcome) there are various types of LO such as knowledge, skills, and academic culture (Muluk et al., 2016). The LO can be calculated by observing students' assignments exams, presentations, quizzes, homework, projects, and portfolio. Most learning's implemented in Universities around Indonesia use teacher-centered methods. This teaching method puts much pressure on the process of the lecture. If the lecturer elaborates their materials properly then the method works (Sari & Astuti, 2018). But most of the time, this is not the case. Lecturers struggle to meet the expected result from this method as it weighs heavily on the lecturers. Students' achievements may not reflect the achievements needed in each subject. Based on those reasons, this research is proposed in hopes of improving the quality of education in the Data Science Study Program at Pembangunan Nasional "Veteran" East Java University.

In this Implementation of Innovation in Integrated Evaluation and Learning System using Outcome-Based Education Ecosystem research, a few referenced by previous studies have inspired the author on the arrangement of this research. These are the previous studies conducted that have become a major inspiration for this research.

Implementation of Innovation in Integrated Evaluation and Learning System using Outcome-Based Education Ecosystem

Page | 78

I Gede Susrama Mas Diyasa*[1], I Nyoman Dita Pahang Putra[2], Ni Made Ika Marini Mandenni[1], Mohammad Rafka Mahendra A[1], Rangga Laksana A[1]

The first research was proposed by Shaheen (2019), entitled Theoretical Perspective and Current Challenges of OBE Framework. OBE might be a solution for most of the current problems in education but it has its challenges which it is discussed in this paper. The center of this paper revolves around the philosophical and theoretical underpinnings of OBE and elaborates on the challenges in the implementation of OBE.

The second research was conducted by Thirumoorthy (2021), entitled Outcome-Based Education (OBE) in Need of The Hour. The paper explains thoroughly why OBE is required based on the authors' location, India, where India needs holistic development as the enrollment percentage has increased significantly.

The third research was done by Safiudin et al. (2020), entitled The Development of Web-based Outcome Based Education Information System. The paper explores the solutions for academic problems regarding achievements with the solution being OBE. The research explains how OBE can become an education solution and is implemented at Sebelas Maret University. The paper uses the MVC method where the system programming is separated based on the components

A. Literature Review
1. Outcome-Based Education

Outcome-Based Education (OBE), the main idea is in the outcome which may be called achievement (Yusoff et al., 2014). The outcomes are derived from classes, tests, assignments, projects, etc. Lecturers must also adapt to the roles required to reach the expected outcome from the students (Zhang & Fan, 2020). Based on Spady (1994), learning outcomes are the considerable work of what was learned. They are the self-evident learning consequences that we proposed our learners to do or exhibit after the learning movement. Aforementioned by Spady, when mentors and instructors keep the genuine outcomes in the center and pay attention to them, they are constrained to pay consideration to what learners learn 'during' the learning encounters, to 'after' the learning encounters, from disconnected pieces of performances to the last utilization of past learning practices and encounters. Outcome-Based Instruction (OBE) is a student-centric education and learning strategy in which the course conveyance and assessment are arranged to attain indicated destinations and results. Outcome-based instruction demands to teach and learning responsibility, incorporating general educational modules OBE, subject-based OBE, course-based OBE, and Programme-based OBE (Thirumoorthy, 2021). After the instructive encounter experience encounter involvement, each understudy would have accomplished the objective as a result of instructive targets. OBE is massively recognized from the conventional and routine instruction strategy of the Teacher-Centered to Learner center by the way it joins three components: hypothesis of instruction, a precise structure for instruction, and a particular approach to guidelines hone and encounter. The outcome-based instruction (OBE) or the students' centered instruction accomplishes the instructive objective in terms of person, competency bunch, guidelines, benchmarks, and achievement stipulated targets (Thirumoorthy, 2021).

2. Integrated System

An integrated system that empowers anybody to coordinate and arrange forms. Characterization can be found by a hoisted degree of integration to meet coordinates data needs. A coordinates framework or coordinates framework could be a set that physically and practically interfaces numerous frameworks. This framework combines subsystems into one framework, permitting each work to act as a unit of the system (Lahlouhi, 2014). Joining systems into subsystems may be a challenge in program improvement. Program advancement ought to continuously allude to a reliable framework. The challenge, of course, is to plan a framework that integrates these systems with negligible exertion. Indeed on the off chance that unused framework advancement or redevelopment isn't required.

II. METHODS

This research will be carried out at the Data Science Study Program at the Pembangunan Nasional "Veteran" University, East Java, specifically for the Undergraduate level for one year. The stages of this system are built based on the assessment points contained in the accreditation form. These assessment points will later be used by the study program as a benchmark for the quality of existing resources. The trick is to compare the raw data contained in the accreditation form with the formulas contained in the assessment of the accreditation form. The study program will use the results of this comparison to see the performance of existing resources in one year. This system is web-based and developed with the PHP programming language and uses the MySQL database management system and other studies that support this research, as seen in the fishbone diagram of the Integrated System of Learning Evaluation Research in the OBE, as shown in Figure 1.
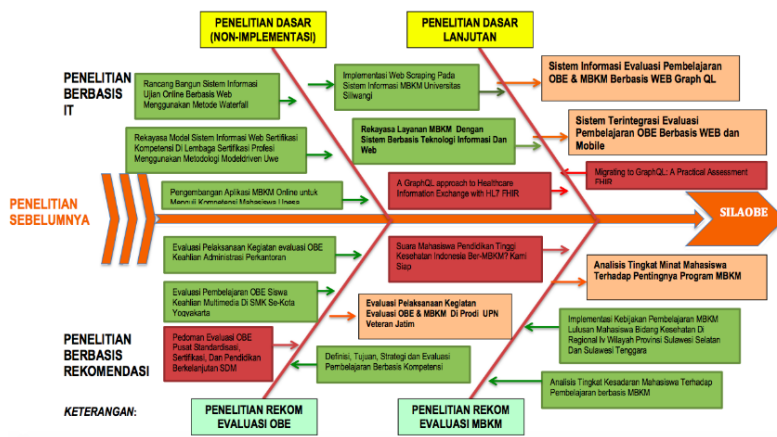
I Gede Susrama Mas Diyasa[*1], I Nyoman Dita Pahang Putra[2], Ni Made Ika Marini Mandenni[1], Mohammad Rafka Mahendra A[1], Rangga Laksana A[1]

Figure 1 Fishbone Diagram of The Integrated System of Learning Evaluation Research in the OBE

This research was carried out twice, the first was primary research, and the second was follow-up research. Primary research was done in the form of making a competency test (SITUK), SIOBEL (Integrated Belanegara Online Outbound System), and others. After both of the research were done, advanced information technology-based research was carried out in which this proposal proposed an integrated system of learning evaluation in the web-based OBE ecosystem for freshmen year. An integrated system of OBE and MBKM ecosystems web, which was entitled an integrated system of learning evaluation in the OBE ecosystem and MBKM Conversion (SILAOBE-V1), as well as recommendation-based research, each of which is the output of this study can be seen in Figure 2.
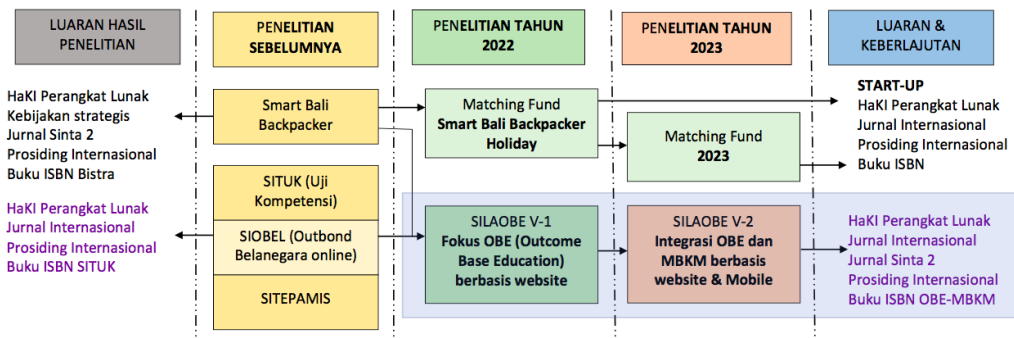

Figure 2 Research Roadmap on Evaluation of OBE and MBKM Learning

The next step to do is to make a flow of design and manufacture of the system so that the work on the application or system can run according to the procedure or method used. This chapter describes the design and planning of the system which is an overview of the SILAOBE-V1 system which is made along with a detailed discussion of the system and a flow in the process of working on the system, as shown in Figure 3.
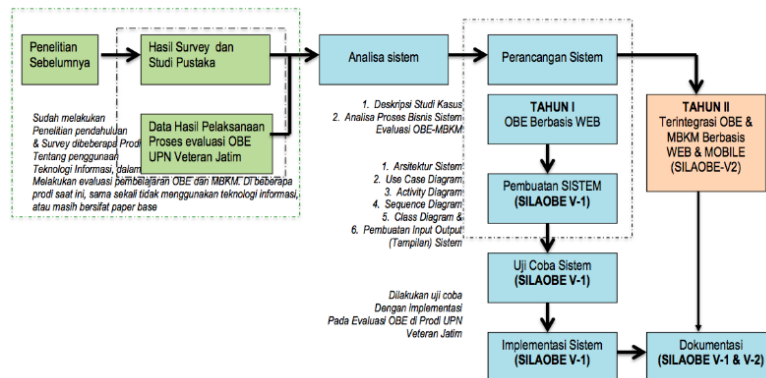

Figure 3 SITUK-V1 Design and Manufacture Flowchart

Implementation of Innovation in Integrated Evaluation and Learning System using Outcome-Based Education Ecosystem
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III. RESULT AND DISCUSSION

This chapter will explain the processes that have been carried out previously in the context of developing the SILAOBE system. The approach used in the SILAOBE system is an output approach system in which all processes are carried out starting from the formation of courses, learning methods, and analysis of learning outcomes.

A. Curriculum Development

The preparation of the tertiary curriculum is prepared comprehensively, involving all elements inside and outside the tertiary institution. The vision and mission of the university occupy the highest to the lowest positions at the subject level. The flow of preparing the curriculum can be seen in Figure 4.
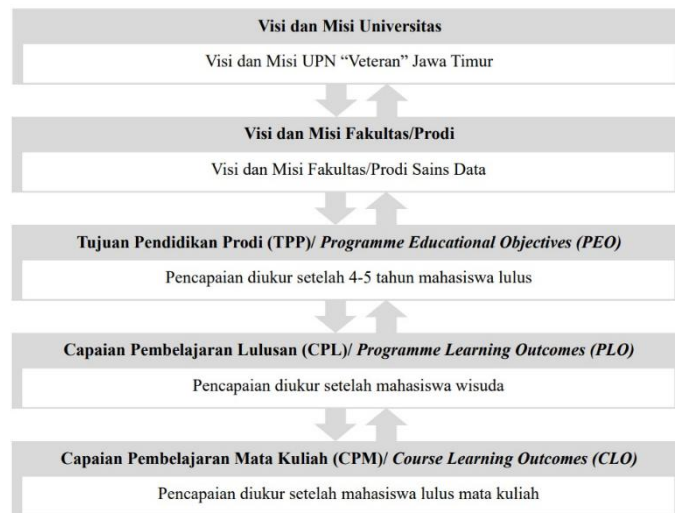

Figure 4 Curriculum Development Flow

Figure 4 shows the process flow of curriculum development and implementation of the learning system. In compiling the curriculum, all existing elements must be interrelated, all elements involved must-have criteria, and their achievements must be measurable.

B. Educational Objectives Program (EOP)

Educational Objectives Program (EOP) are the results or achievements expected of graduate students at the study program level. This achievement can be measured 4-5 years after students graduate. This Educational Objectives Program was developed from various sources including accreditation bodies, the Association of Computer Science Higher Education curriculum, company needs, stakeholders, and various other sources. The following are the Learning Outcomes of the Pembangunan Nasional "Veteran" University East Java Data Science Study Program:

1. Able to be pious, independent, responsible, cooperative, respect cultural diversity and have national insight with the values of defending the country.
2. Mastering the concept of knowledge regarding the transformation of data into information, insight, and knowledge using statistical methods, probability applications, machine learning, and theoretical concepts specific to the field of knowledge in depth, and able to formulate procedural problem-solving.
3. Able to apply their field of expertise and utilize science, technology, and/or art including Data Science Mathematics, algorithms, Programming, Statistics, Big data, elements of Artificial Intelligence, Data Science Project Planning in solving problems, and being able to adapt to the situation at hand.
4. Able to make the right decisions based on data and intelligent systems, and able to guide in choosing various methods independently and in groups.
5. Able to implement, compare and integrate expertise, solutions, and ideas in the form of scientific descriptions.
6. Be able to analyze, integrate, and evaluate data, information, and values of state defense institutionally.
7. Able to creatively and innovatively formulate problem-solving by utilizing Big Data and intelligent system technology based on relevant concepts and by utilizing appropriate modeling tools.

I Gede Susrama Mas Diyasa[*1], **I Nyoman Dita Pahang Putra**[2], **Ni Made Ika Marini Mandenni**[1], **Mohammad Rafka Mahendra A**[1], **Rangga Laksana A**[1]

8. Able to build data science programming to design data structures, perform modeling, apply machine learning, and visualize the results.
9. Able to work together in teams to design, build and analyze software or information systems based on medium/large scale intelligent systems by implementing/adopting appropriate/appropriate Big Data or Machine Learning concepts.

C. Learning Outcomes Program (LOP)

Learning Outcomes Program (LOP) can be measured after students complete their studies/graduate studies in the Study Program (Graduation). Important measurements that can be seen from the results of Learning Outcomes (LO) are in terms of knowledge (cognitive), skills (psychomotor), and attitude (affective). In preparing this LO, it must be adjusted to the Educational Objectives Program (EOP).

D. Course Learning Outcomes (CLO)

Course Learning Outcomes are prepared based on the Learning Outcomes Program (LOP) and are specific for each course in the existing Study Program. LOP achievement measure is determined by whether students pass or fail the course.

E. OBE Implementation

The initial stage of OBE implementation was carried out by socializing the SILAOBE system and providing debriefing to all lecturers in charge of subjects in the study program. All subject lecturers in the study program must understand the OBE method well so that the results or outcomes of each course can be achieved so that the implementation of the OBE system can run well.

At the study program level, the syllabus and Semester Learning Plan are one of the documents that must be prepared to support the OBE system. This syllabus contains descriptions of the courses, learning methods, types of assessment, and the relationship between the objectives of the study program and the course. While the Semester Learning Plan contains the learning plans made by the supporting lecturers for one semester. Then each lecturer can carry out the teaching and learning process by using the syllabus as a reference and the Semester Learning Plan as a predetermined lesson plan.

IV. CONCLUSION

The implementation of the output-oriented learning method (OBE) will be carried out in the Pembangunan Nasional "Veteran" East Java University Data Science study program. The learning system through the OBE approach will focus on the learning course outcome based on the learning activities results that have been carried out by lecturers and students.

The implementation of this output-oriented learning system (OBE) has been applied to the SILAOBE V-1 system on the web-based SIOBEL (Outbound Bela Negara Online). OBE system will also be applied to learning courses in Data Science study programs and also the university.

A. Acknowledgment

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Implementation of Innovation in Integrated Evaluation and Learning System using
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Page | 82

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I Gede Susrama Mas Diyasa[*1]**, I Nyoman Dita Pahang Putra**[2]**, Ni Made Ika Marini Mandenni**[1]**, Mohammad Rafka Mahendra A**[1]**, Rangga Laksana A**[1]