



DIRECT EVALUATION OF OBE CURRICULUM IMPLEMENTATION IN UNDERGRADUATE PROGRAM STUDY OF NUTRITION UNIVERSITAS NEGERI SURABAYA

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Abstract

Program Learning Outcomes (PLO) assessment is an important part of Outcome Based Education curriculum. This present study aims to directly measure the PLOs' achievement in the bachelor program of Nutrition, Universitas Negeri Surabaya. The PLOs of the program study consist of three domain aspects namely knowledge, skill, and attitude. The direct measurement was derived from students' performances in a total of 16 courses taught in even semesters (semesters 2, 4, 6, and, 8) of the program study. The students' performances were assessed based on their performances in quizzes, classroom participation, mid-semester test, and final semester test by using a rubric of measurement. From the total of 9 PLOs, only 7 PLOs are assessed because in the even semesters, there was no course containing PLO 4 and 9 for their objective. Overall, the PLO mean score was ranging from 73.8 to 82.2. The domain of knowledge has the lowest score compared to the domain of skill and the domain of attitude although the gap difference is very small.

Keywords: *curriculum, nutrition, program study, OBE, PLO, Universitas Negeri Surabaya*

Abstrak

Penilaian Capaian Pembelajaran (CPL) merupakan bagian penting dari kurikulum Pendidikan Berbasis Hasil. Studi ini bertujuan untuk mengukur pencapaian CPL secara langsung pada program sarjana Gizi, Universitas Negeri Surabaya. CPL dari program studi ini terdiri dari tiga aspek domain, yaitu pengetahuan, keterampilan, dan sikap. Pengukuran langsung diambil dari kinerja mahasiswa pada total 16 mata kuliah yang diajarkan di semester genap (semester 2, 4, 6, dan 8) dari program studi tersebut. Kinerja mahasiswa dinilai berdasarkan prestasi mereka dalam kuis, partisipasi di kelas, ujian tengah semester, dan ujian akhir semester dengan menggunakan rubrik penilaian. Dari total 9 CPL, hanya 7 CPL yang dinilai karena pada semester genap tidak terdapat mata kuliah yang mengandung CPL 4 dan 9 untuk tujuan mereka. Secara keseluruhan, nilai rata-rata CPL berkisar antara 73,8 hingga 82,2. Domain pengetahuan memiliki skor terendah dibandingkan dengan domain keterampilan dan domain sikap, meskipun perbedaan gapnya sangat kecil.

Kata kunci: *Capaian Pembelajaran (CPL), kurikulum, OBE, prodi gizi, Universitas Negeri Surabaya*

INTRODUCTION

In recent years, the evaluation of Program Learning Outcomes (PLO) has become a critical component of quality assurance in higher education, especially in the context of Outcome-Based Education (OBE). PLO assessments serve not only as indicators of students' academic achievement but also as tools to inform continuous improvement in curriculum design and instructional methods. Despite the increasing emphasis on PLO implementation, many higher education institutions in Indonesia still face challenges in effectively measuring and utilizing PLO data to enhance educational outcomes. One major gap lies in the limited documentation and analysis of how direct PLO assessments are applied at the program level and how they reflect the alignment with national accreditation standards and stakeholder expectations (El Marsafawy et al., 2022).

The evaluation of PLO consists of two methods namely direct and indirect measurement. The direct measurement of PLO is carried out based on students' work performances in courses involving knowledge and skills tests, portfolios, participation activities, and quizzes. Meanwhile, the indirect measurement is based on alumni, exit students, and alumni user interviews or surveys (El Marsafawy et al., 2022; Tahir et al., 2013).

In Indonesia, the Ministry of Education, Culture, Research, and Technology has mandated the adoption of the OBE curriculum across all higher education institutions. This curriculum requires clear articulation of learning outcomes across cognitive (knowledge), psychomotor (skills), and affective (attitudes) domains (Khanna & Mehrotra, 2019). However, the transition from traditional input-based education to OBE models presents significant challenges, particularly in ensuring that assessments that can accurately capture the competencies students are expected to demonstrate upon graduation.

To address this issue, the present study aims to describe the implementation of direct PLO measurements in the Nutrition Study Program at Universitas Negeri Surabaya (Unesa). The Nutrition program at Unesa has developed its PLOs based on the Program Educational Objectives (PEO), which align with four graduate profiles: service providers, educators, researchers, and entrepreneurs in the nutrition field, as outlined in the AIPGI National Curriculum Framework (AIPGI, 2016). By documenting the current practices of direct PLO assessment, this study seeks to contribute practical insights into how higher education programs can better evaluate learning outcomes in alignment with the OBE framework and national education goals.

METHODS

This study analyzed the achievement of Program Learning Outcomes (PLOs) across major courses offered in the even semesters (i.e., semesters 2, 4, 6, and 8) of the 2021/2022 academic year in the Nutrition Program at Universitas Negeri Surabaya. A total of 16 courses were included in the analysis.

The evaluation of PLO achievement was conducted using a Microsoft Excel-based tool developed internally by the university (Figure 1). This tool is designed to quantify PLO scores based on course-level assessments and includes the following components:

- 1) Assessment Aspects, which reflects to key assessment components used in each course, including participation, assignments, mid-semester tests, and final semester tests.
- 2) Assessment Weight, which is the percentage contribution of each assessment aspect to the overall course grade.
- 3) PLO Mapping. Each assessment component was mapped to one or more PLOs, with assigned weights based on relevance.
- 4) PLO Scoring Output. The tool automatically calculates a weighted score for each PLO based on the student's performance and the predefined mapping.

Standard weightings were used as a guideline: participation (20%), assignments (30%), mid-semester test (20%), and final semester test (30%). However, the actual weights for each PLO could vary depending on the nature of the course and its intended learning outcomes, provided that the total weight for all assessments equaled 100%.

In practice, lecturers input students' raw scores for each assessment aspect into the spreadsheet. The tool then applied the assessment and PLO weights to compute a PLO-specific score for each student. These individual scores were aggregated to obtain the average PLO score

per course (see red-highlighted section in Figure 2). Subsequently, PLO scores from all 16 courses were compiled and averaged to determine the overall PLO achievement per domain (knowledge, skills, and attitude) across the program.

This approach allowed for a standardized yet flexible method to assess how well each course contributes to achieving the intended learning outcomes across the Nutrition Program.

FINDINGS AND DISCUSSION

Despite has been implemented for a century in the global education world, the Outcome Based Education (OBE) is considered the most recent developed curriculum that might improve the quality of education (Sikander et al., 2017). In OBE curriculum, the study program is encouraged to focus on the program learning outcomes (PLO). The PLO is designed to what extent the knowledge, skill, and attitude the students are expected to acquire when graduate (University of California, 2013). The PLO commonly cover several particular domains, namely the knowledge domain, specific skill domain, general skill domain, and affective domain. These four domains are integrated into the current curriculum of the bachelor program of nutrition, Universitas Negeri Surabaya (Thirumoorthy, 2021).

The general psychomotoric and affective PLO formulation in the program study of Nutriron, Universitas Negeri Surabaya was according to Indonesia National Standard Ministry of Education, Culture, Research, and Technology (SN-Dikti). Meanwhile, the specific psychomotoric and cognitive PLO was formulated based on AIPGI (Association of Nutrition Higher Educations of Indonesia) guidelines.

There were 9 PLOs provided in our program study and 7 of them were directly evaluated in this present study. The curriculum in the Program Study of Nutrition, Universitas Negeri Surabaya consisted of nine Program Learning Outcomes (PLOs). Those nine PLOs consider the three learning domains, namely the domain of knowledge (reflected in PLO 1, 2, and 3), the domain of specific skill (reflected in PLO 4, 5, and 6), the domain of attitude (reflected in PLO 7 and 8), and the domain of general skill (reflected in PLO 9). The description of the PLOs is presented in Table 1.

Table 1. The description of the PLOs in Undergraduate Program of Nutrition Universitas Negeri Surabaya

PLO	Description	Domain
1	Able to master fundamental theories in food science, biomedicine, humanity, management, public health, and science and technology related to community nutrition	Knowledge
2	Able to master fundamental theories in food science, humanity, management, and science technology related to food service	Knowledge
3	Able to master fundamental theories in dietetics, science and technology in nutrition field, and other theories related to clinical nutrition	Knowledge
4	Able to design and manage nutrition education, using proper method and media suitable with the target characteristics to solve nutrition problem in the individual, group, and community settings.	Specific Skill
5	Able to design and manage food service in institution by implementing nutrition and management concepts.	Specific skill
6	Able to implement nutritional care process independently aiming for solving nutrition problems in clinical setting	Specific skill

7	Able to communicate effectively in counseling, nutrition Attitude education, and dietetics to solve nutrition problems in individuals, group, and community suitable with prescribed codes of ethics.	
8	Able to demonstrate responsibility and discipline at their work, Attitude both in individually or in a group.	
9	Able to solve nutrition-related problems by implementing scientific-thinking concepts and current approaches through research, scientific literature, and publication	General Skill

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					

Figure 1 – The Ms Excel tool appearance of several sections to analyze PLO achievement

DESKRIPSI CAPAIAN, NILAI, DAN TANGGAPAN																	
PLO		DISKRIPSI CAPAIAN			NILAI			Grafik Capaian per PLO per Nilai									
1	Mampu menguasai teori dasar ilmu pangan, biomedik, humaniora, manajemen dan kesehatan masyarakat, serta iptek gizi terkait keterampilan gizi masyarakat				Capaian			PLO 1									
	Diciptakan 25 mahasiswa capaian PLO 1 adalah Distinction, dengan rata-rata nilai 78.636523509811	Level	Jumlah					<table><tr><td>High Distinction</td><td>27</td></tr><tr><td>Distinction</td><td>47</td></tr><tr><td>Credit</td><td>1</td></tr><tr><td>Fail</td><td>0</td></tr></table>		High Distinction	27	Distinction	47	Credit	1	Fail	0
High Distinction	27																
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		Distinction	47.00														
		Credit	1.00														
		Fail	0.00														
		Jumlah	75.00														
		Rerata	78.6														
2	Mampu menguasai teori dasar ilmu pangan, biomedik, humaniora, dan manajemen, serta iptek gizi keterampilan gizi penyelenggaraan makanan				Capaian			PLO 2									
	#DIV/0!	Level	Jumlah					<table><tr><td>High Distinction</td><td>0</td></tr><tr><td>Distinction</td><td>0</td></tr><tr><td>Credit</td><td>0</td></tr><tr><td>Fail</td><td>1</td></tr></table>		High Distinction	0	Distinction	0	Credit	0	Fail	1
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Fail	1																
		High Distinction	0.00														
		Distinction	0.00														
		Credit	0.00														
3	Mampu menguasai teori dasar dietetik, iptek gizi serta ilmu lainnya terkait keterampilan gizi klinik				Capaian			PLO 3									
	Diciptakan 25 mahasiswa capaian PLO 3 adalah Distinction, dengan rata-rata nilai 78.636523509811	Level	Jumlah					<table><tr><td>High Distinction</td><td>27</td></tr><tr><td>Distinction</td><td>47</td></tr><tr><td>Credit</td><td>1</td></tr><tr><td>Fail</td><td>0</td></tr></table>		High Distinction	27	Distinction	47	Credit	1	Fail	0
High Distinction	27																
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	Distinction sejumlah 47 Level tingkat Credit sejumlah 1 Level tingkat Fail sejumlah 0 mahasiswa	High Distinction	27.00														
		Distinction	47.00														
		Credit	1.00														
		Fail	0.00														
		Jumlah	75.00														

Figure 2 – PLO mean score calculation

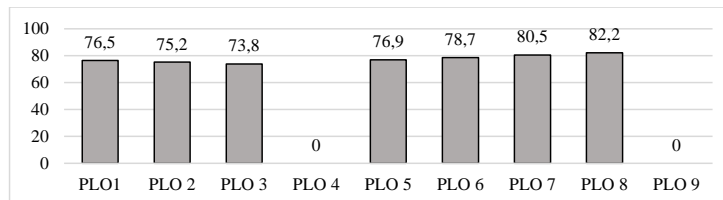


Diagram 1 – The mean score of PLO from the course

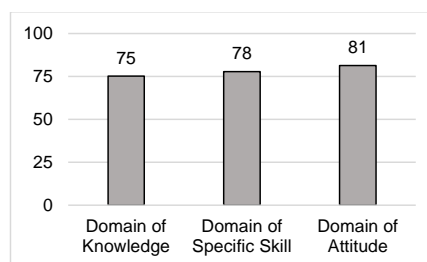


Diagram 2 – The mean score of learning domain

Next, we analyzed the mean score of each PLO that derived from the courses offered in even semesters (2, 4, 6, and 8). The analyses were based on the students' participation in classroom activities, assignment and quiz, mid and final semester tests score. The result is depicted in Diagram 1.

As depicted in Diagram 1, the mean score of the PLOs were ranging from 73.8 (the lowest) which was achieved by PLO 3 (Able to master fundamental theories in dietetics, science and technology in nutrition field, and other theories related to clinical nutrition) into 82.2 (the highest score) which was PLO 8 (Able to demonstrate responsibility and discipline at their work, both in individually or in a group). The PLOs order according to the highest score into the lowest score were as follow: PLO 8, PLO 7, PLO 6, PLO 5, PLO 1, PLO 2, and PLO 3. The PLO 8 in the program study of nutrition, Universitas Negeri Surabaya was embodied in almost all courses. While PLO 3 which achieved the lowest score was charged in several courses namely: Nutritional Assessment, Micronutrient Metabolism, Nutritional Physiology, Pathophysiology of Noninfectious Disease, and Nutrition through the Life Cycle.

We showed that the mean score of PLOs in the program study of Nutrition, Universitas Negeri Surabaya did not extensively vary. The lowest achievement score was at PLO 3 (scored an average of 73.8). PLO 3 refers to students' ability to master fundamental theories in dietetics, science, and technology in the nutrition field and other theories related to clinical nutrition. Moreover, PLO 2, which refers to theories in food service, has the second lowest, followed by PLO 1. PLO 1 refers to mastery theories in community nutrition. These three PLOs, which achieved the lowest mean score among others, were cognitive-based PLO. This finding suggests that overall, the domain of knowledge/ cognition has the least score in our study program.

We also interested to evaluate the PLO domains achievement of the program study. As seen from Diagram 2, the mean score was the highest in the attitude domain (scored 81). This score was not much different from the specific skill domain, which scored 78. The knowledge domain has the lowest score compared to all. It must be noted that we did not include the domain of

general skill in the analysis since it was only charged to the student's undergraduate thesis course and might not reflect the student's performance in nutrition courses.

When it comes to the assessment in the domain group, the result was in line with the above statement. The domain of knowledge/ cognition achieved the lowest score compared to others. The affective domain ranked the highest, with a score of 81. The domain of knowledge is a cognition-based domain and mainly characterized by Bloom's taxonomy of six levels of thinking, varying from low to high order namely: remembering, understanding, applying, analyzing, evaluating, and creating (Asim et al., 2021).

In accordance with AIPGI and SN-Dikti guidelines, the PLOs in the cognitive domain of our program study were designed to apply Higher Order Thinking (HOT). HOT is a term that broadly used in education practice which provoke a critical thinking as the learning objectives among student. It commonly use Bloom's Taxonomy of learning objective as a hierarchy. Bloom's taxonomy consists of six level of thinking, namely remembering (level 1), understanding (level 2), applying (level 3), analyzing (level 4), evaluating (level 5), and creating (level 6). Bloom's taxonomy level 4-6 is considered HOT (Richland & Simms, 2015; Sagala & Andriani, 2019; Thirumoorthy, 2021).

Based on our analysis, students' cognitive performance especially in clinical nutrition courses was the lowest. This result was relevant to another case study evaluating the nutrition and dietetics curriculum in an undergraduate program study in Pakistan. The study suggested that among the three domains, the cognitive domain in the program study was lacking with a mean score of <3.0 out of 10.0. Moreover, this study confirmed that "Nutrition through the Life Cycle" was the course in the program study that the students performed poorest (Alam et al., 2017) and this was in line with our finding.

Our student achievement in cognitive PLO, which attained the lowest among all domain, could possibly caused by improper learning method or model to facilitate HOT or critical thinking. Some of the courses in our program study still implemented conventional model of learning such as lecture and class discussion technique. These techniques are more likely to implemented when the learning objective adopts Lower Order Thinking (Bloom's taxonomy level 1-3). It is notably proposed that learning techniques based on Student Centered Learning (SCL) model such as case-based learning, problem-based learning, and project-based learning are more appropriate to enhance students critical thinking or HOT ability (Nkhoma et al., 2017).

Based on the result above, a curriculum restructuring is warranted for the program study to foster students' knowledge in nutrition science courses, especially in the field of clinical nutrition and cognitive domain. One of the strategies that can be proposed is by implementing the SCL model in the courses. This model is effective to improve students' content retention and critical thinking (Bailey et al., 2020). Several strategies of active learning implementation include project-based learning, case-based study, classroom debates, and demonstration. This method has been evaluated and suggested a beneficial outcome in nutrition students' academic performance (Bavishi et al., 2022).

It is also notable that during the PLO assessment, our students experienced a COVID-19 pandemic situation and therefore mostly the courses were taught using online methods and students were likely to learn passively. This condition might explain the unsatisfactory result of students' current academic performance as described beforehand. Several studies already reported that the Covid-19 pandemic had a negative impact on student's performance, including medical education students. Underlying factors that contributed might be due to the less interaction between students, peers, and lecturers; inadequate learning resources available; lack of access to the internet as the barrier for the students to get learning resources; and limited access to conduct laboratory practical skill for several clinical courses (Istadi et al., 2022; Putra et al., 2020).

This present study used the direct measurement method as an evaluation of PLO achievement. This evaluation is important to determine the effectiveness of the current learning method to meet the PLO (Patel et al., 2009). To allow the quantitative evaluation, we used the rubric of assessment as a tool. This tool is commonly used to measure students' performance for an assignment or work (Thirumoorthy, 2021). In this study, we involved students' quiz scores, classroom participation, and mid- and final semester tests in the rubric of assessment.

To the best of our knowledge, this paper is the first study investigating the PLO achievement in the bachelor program of Nutrition in Indonesia. Rarely do the research explore the PLO achievement in health and medical programs. This result might provide a basic information to design OBE curriculum in other undergraduated nutrition program.

CONCLUSION

The results of this study indicate that the achievement of Program Learning Outcomes (PLO) in the Bachelor of Nutrition Program at Universitas Negeri Surabaya is generally satisfactory, with average scores ranging from 73.8 to 82.2. Among the three domains, the affective (attitude) domain demonstrated the highest level of achievement, while the cognitive (knowledge) and psychomotor (skill) domains showed areas for improvement, particularly in clinical nutrition courses. These findings suggest that while the current curriculum is capable of fostering positive attitudes among students, enhancements in teaching and assessment strategies are needed to better support knowledge and skills development.

Importantly, this study also highlights the relevance and utility of direct PLO measurement as an essential component of Outcome-Based Education (OBE) implementation. The insights gained from evaluating PLO achievements can inform curriculum refinement and pedagogical approaches to ensure alignment with national accreditation standards and graduate competency expectations. Future efforts should focus on strengthening the integration between PLO assessment and OBE principles, particularly in translating curriculum design into measurable learning outcomes across all domains of competence.

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Commented [Rev1]: This conclusion talks about PLO nor the evaluation of OBE curriculum implementation. So, it is doesn't match with the title.

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