



Analysis of the Correlation Between Pedagogical, Professional, Social, and Personal Competencies of Engineering Lecturers in the Outcome-Based Education (OBE) Curriculum.

Helmi S. R. Pamungkas, Singgih I. T. Hadi, Janthy T. Hidayat, Heny Purwanti, Mochamad Yunus, Solihin, Novida Waskitaningsih, Rina M. Harahap and Achmad Munir

EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of EasyChair.

March 5, 2024

Analysis of the Correlation Between Pedagogical, Professional, Social, and Personal Competencies of Engineering Lecturers in the Outcome-Based Education (OBE) Curriculum.

Helmi Setia Ritma Pamungkas
Department of Geological Engineering,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
helmisetiariitma@unpak.ac.id

Heny Purwanti
Department of Civil Engineering,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
henypurwanti@unpak.ac.id

Novida Waskitaningsih
Department of urban and regional planning,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
novida.waskitaningsih@unpak.ac.id

Singgih Irianto Trisilo Hadi
Department of Geological Engineering,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
singgihirianto@unpak.ac.id

Mochamad Yunus
Department of Electrical Engineering,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
mochayunus@unpak.ac.id

Rina Muthia Harahap
Department of Geodetic Engineering,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
rinamuthiaharahap@unpak.ac.id

Janthy Trilusianthy Hidayat
Department of Urban and Regional Planning,
Faculty of Engineering,
University of Pakuan
Bogor, Indonesia
janthyhidayat@unpak.ac.id

Solihin
Department of Geological Engineering,
Faculty of Engineering,
University of Pakuan,
Bogor, Indonesia
solihin@unpak.ac.id

Achmad Munir
Radio Telecomm. and Microwave Lab. School
of Electrical Engineering & Informatics,
Institut Teknologi Bandung,
Bandung, Indonesia
munir@ieee.org

Abstract— This paper discussed about the rapid development of technology and innovative production is creating a significant gap between the fields of education and Industry 4.0. Therefore, there is a need for a curriculum that can align with this gap, and the approach chosen is Outcome-Based Education (OBE) to meet international standards. To achieve this, there is a requirement for lecturers' preparedness in implementing the OBE curriculum. The aim of this research is to assess the pedagogical, professional, social, and personal competencies of lecturers and analyze the relationships between pedagogical, professional, social, and personal aspects. The method used is a questionnaire and analyzed using the bivariate correlation Kendall Tau method using SPSS 23 software. The survey results indicate that, pedagogically, engineering lecturers received very positive responses (69.7%), good responses at 27.0%, sufficient at 2.2%, and insufficient at 1.1%. Professional competency received a good rating, with very good at 74.2%, responded well at 21.3%, responded sufficiently at 3.4%, and responded poorly at 1.1%. The assessment of the social life of engineering lecturers by their students indicates excellent social life at 82.0%, good at 15.7%, and sufficiently responded at 2.2%. The majority of engineering lecturers' personalities received very positive responses (70.8%), good responses at 22.5%, and the remaining sufficiently at 6.7%. Bivariate correlation statistical analysis results show a positive and significantly strong correlation between pedagogical, professional, social, and personality.

Keywords— competency, engineering lecturers, OBE curriculum

I. INTRODUCTION

The rapid development of technology and innovation in production has created a significant gap between education and Industry 4.0. The role of alumni and users of graduates has become crucial in providing feedback on curriculum that can align gaps. Therefore, universities need to evaluate their existing curriculum to determine whether it is still in accordance with current developments or not. It is necessary to develop curriculum that can align this gap, and the approach is Outcome-Based Education (OBE) to achieve international standards. To achieve this, lecturers need to be prepared in implementing the OBE curriculum.

Outcome-Based Education (OBE) was first introduced by Spady [1]. In his book, it is clearly stated that education revolves around the student. OBE is an educational method that focuses on outcomes [2]; [3]. Higher education began adopting OBE in 2015 [4]. In 2019, internationally recognized study programs (including international accreditation and AUN-QA assessment/certification) accounted for only 430 study programs (1.5%) out of 27,779 active study programs in Indonesia. Out of the 3,923 study programs accredited by BAN PT, only 11% received international recognition [5].

The transformation from non-OBE to OBE has proven that the new education system is focusing in student learning, material delivery, and teaching techniques [6]. During the Covid-19 pandemic, the implementation of OBE through online platforms [7] showed that preferred instructional materials were videos (80%), with a satisfaction rate among students of 93.4%. This means that even during the pandemic, content delivery can be effectively conducted through video teaching techniques. The Faculty of Engineering at Unpak also strives to provide online learning to students as effectively as possible. However, they encounter challenges such as lack of control over students during online classes, network disruptions, students' difficulty in understanding course materials, insufficient data quota, and even student apathy [8].

However, as time passed, Covid-19 had subsided in Indonesia by 2022. The transition from non-OBE to OBE in early 2023 became a new endeavor for the Faculty of Engineering at Universitas Pakuan. Thus, the effort was to adopt an OBE curriculum, with the stages of its development referring to the Directorate General of Higher Education (Dirjen Dikti) of the Ministry of Education and Culture's guidelines from 2020 [9], through an OBE curriculum approach.

The mechanism for developing this OBE curriculum is based on university and faculty policies, as well as SWOT analysis in the self-assessment evaluation of study programs in the accreditation form. The planning and arrangement of the curriculum as a curriculum cycle involve several stages starting from needs analysis, design, development, implementation, evaluation, and follow-up improvements conducted by the study program [10]. In conclusion, the Outcome-Based Education (OBE) approach in curriculum planning, implementation, and evaluation focuses on achieving Graduate Learning Outcomes (GLOs) and is essential for both national and international accreditation.

To meet market demands, feedback from alumni and users of graduates through tracer studies is necessary. Additionally, benchmarking with universities that implement the OBE curriculum is crucial. In the even semester of 2022/2023, the Faculty of Engineering implemented the OBE curriculum for the first time. At the end of the semester, a satisfaction survey was conducted regarding lecturers, assessed by the students, which included evaluating the competencies of pedagogy, professionalism, social skills, and personality traits.

II. OBJECTIVE

The objective of this research is to assess the pedagogical, professional, social, and personal competencies of lecturer and to analyze the relationship between these aspects: pedagogical, professional, social, and personality.

III. METHODOLOGY

The method used is descriptive analysis of closed-ended questionnaire results. This method is utilized to analyze data by describing or illustrating the data without intending to make general conclusions or generalizations [11]. The questionnaire was accessed by students from five engineering programs: Geodesy Engineering, Urban and Regional Planning, Civil Engineering, Electrical Engineering, and Geological Engineering. This assessment was conducted by students of the

Faculty of Engineering, University of Pakuan, regarding 26 lecturers, which represents 50% of the total 52 lecturer who implemented the OBE curriculum at the time of accessing their grades. There were 157 courses in the even semester, but only 28.67% or 45 courses applied the OBE curriculum. This assessment focuses on evaluating the lecturer competency in implementing the OBE curriculum.

Subsequently, the questionnaire results were analyzed using the bivariate correlation method, specifically Kendall Tau, using SPSS 23 software. The purpose of this method is to determine the relationship between the pedagogical, professional, social, and personal aspects of the lecturer as assessed by the students. The Kendall Tau bivariate correlation method is used for non-parametric data with two or more variables that have interval scales..

IV. RESULT

The monitoring and evaluation results from the Faculty of Engineering's quality assurance unit in September 2023 revealed that the percentage of lecturer implementing the OBE curriculum in the even semester of 2022/2023 at Faculty of Engineering was 50% out of 52 lecturers. Additionally, the number of OBE-based courses accounted for 28.67%, which is 45 courses out of 157 total courses. The instructional tools for OBE used by faculty members include semester lesson plans, student worksheets (such as case-based learning, problem-based learning, and project-based learning), student assessments, final grade summaries, and the analysis and follow-up of Achievement of Course Learning Outcomes (ACLO)/sub-ACLOs.

Assessment methods for engineering students include: mid-semester exams (including practical exams), end-of-semester exams (including practical exams), assignments/reports/presentations, oral assessments, attitude assessments, product/project assessments, and skills/performance assessments.

The feedback report on faculty performance evaluates pedagogical, personality, professional, and social competencies. These four competencies are assessed by students after both online and offline. A total of 74.2% of students rated the engineering lecturers received very positive responses, good responses at 21.6%, sufficient at 3.7%, and insufficient at 0.6%. For detailed information, please refer to Figure 1.

Competence of lecturers in the Engineering Faculty



Fig. 1. Assessment of the competency of Faculty of Engineering lecturers.

A. Pedagogic

Students' assessment of lecturer' competencies, especially in pedagogy, at the Faculty of Engineering received the following responses: very good (69.7%), good (27%), sufficient (2.2%), insufficient (1.1%). Figure 2 displays the percentage of students' assessments of the pedagogical abilities of Faculty of Engineering lecturer.

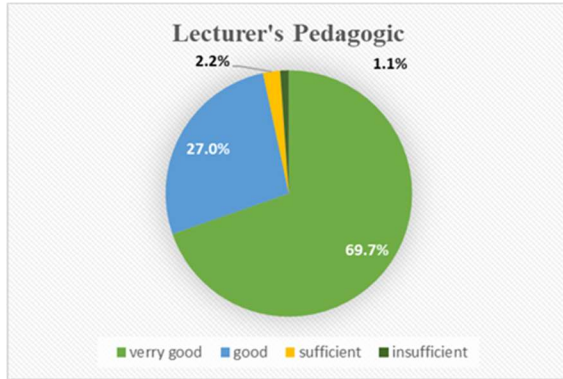


Fig. 2. The assessment of pedagogic competencies.

B. Personality

Students' assessment of the personality of Faculty of Engineering lecturer received very good responses (70.8%), with good responses accounting for 22.5%, and the remaining rated as sufficient at 6.7%. Figure 3 illustrates the percentage of students' assessments of the personality of Faculty of Engineering lecturers.

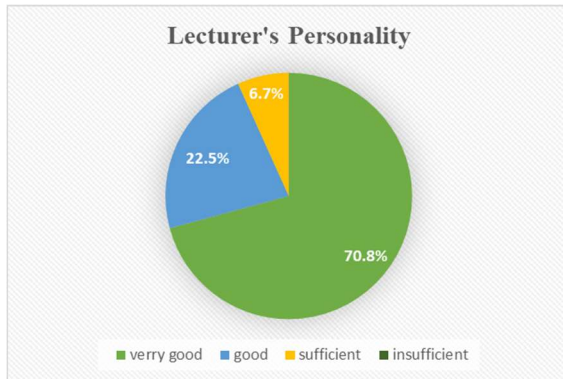


Fig. 3. The assessment of Personality competencies.

C. Professional

The professional competency received very good responses at 74.2% of respondents, good responses at 21.3%, sufficient responses at 3.4%, and insufficient responses at 1.1%. Figure 4 illustrates the professional competency of Faculty of Engineering lecturers.

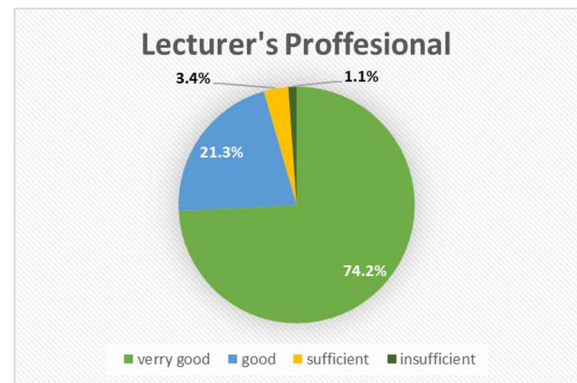


Fig. 4. The assessment of professional competencies.

D. Social

The assessment of the social life of lecturer at the Faculty of Engineering, as evaluated by their students, indicates that 82.0% have a very good social life, good respond at 15.7%, and sufficient 2.2%. Figure 5 illustrates the assessment of the social life of lecturer at the Faculty of Engineering.

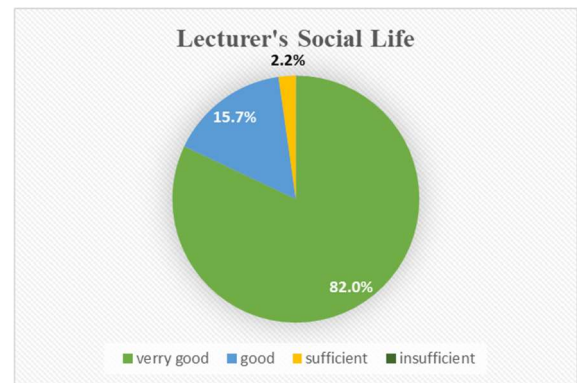


Fig. 5. The assessment of Personality competencies.

The correlation results indicate that personality has a strong relationship with social, professional, and pedagogic aspects, with correlation coefficients of 0.704, 0.701, and 0.751. According to Sugiyono's classification, these correlations included the category of strong and significant relationships (0.00) because their values are below 0.05. The correlation results between social and professional, as well as social and pedagogic, are also strong, with values of 0.715 and 0.682. The detailed correlation analysis can be seen in Table 1. The direction of the relationship for all four competencies is positive, meaning that if personality is very good, then social, professional, and pedagogic aspects will also be very good, and vice versa, if personality is not good, then social, professional, and pedagogic aspects will also be not good.

TABLE I. THE RESULTS OF THE CORRELATION ANALYSIS FOR PEDAGOGICAL, PROFESSIONAL, SOCIAL, AND PERSONALITY ASPECTS

		Correlations				
		Kepribadian	Sosial	Profesional	Pedagogik	
Kendall's tau_b	Kepribadian	Correlation Coefficient	1.000	.704**	.701**	.751**
		Sig. (2-tailed)	.	.000	.000	.000
		N	89	89	89	89
Sosial		Correlation Coefficient	.704**	1.000	.715**	.682**
		Sig. (2-tailed)	.000	.	.000	.000
		N	89	89	89	89
Profesional		Correlation Coefficient	.701**	.715**	1.000	.761**
		Sig. (2-tailed)	.000	.000	.	.000
		N	89	89	89	89
Pedagogik		Correlation Coefficient	.751**	.682**	.761**	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	89	89	89	89

** . Correlation is significant at the 0.01 level (2-tailed).

V. CONCLUSION

The role of education in aligning with the industrial revolution 4.0. It has become a necessity to produce graduates who are competitive on the international stage, by adopting an outcome-based education (OBE) curriculum that is in line with current developments. The OBE curriculum implemented by the Faculty of Engineering has not been fully implemented as can be seen from half of lecturers implementing the OBE curriculum and the number of courses created according to the OBE curriculum is only a quarter of the total number of courses in the even semester of 2022/2023. However, the results of the student assessment show that the majority are considered very good, meaning that the Faculty of Engineering lecturers are able to implement this curriculum. The relationship between pedagogical, professional, social and personality aspects has a strong and significant relationship. In reality, faculty members who implement the OBE curriculum are only hindered by the habit of managing student administration, but professionally, engineering lecturers are very qualified to implement the OBE curriculum. In the Odd Semester 2023/2024, it is expected that 100% of the Faculty of Engineering lecturers will implement the OBE curriculum, and the number of courses will be around 50%.

ACKNOWLEDGMENT

The author expresses sincere gratitude to the Faculty of Engineering at Pakuan University, Bogor, Indonesia and the School of Electrical Engineering and Informatics at Bandung

Institute of Technology, Indonesia, for their support in attending and presenting the paper at 12th International Conference on Information and Education Technology (ICIET 2024) In Yamaguchi, Japan.

REFERENCES

- [1] Spady, W. G. Outcome-Based Education: Critical Issues and Answers. American Association of School Administrators. 1994.
- [2] Purwaningsih, T. 2020. Implementation of Outcome-Based Education & Blended Learning to Enhance the Quality of Learning in Facing the Industry 4.0 Era in the Sampling Technique. Directorate of Academic Development UII. Reflection on Innovative Learning, Vol. 2, No. 1, 2020.
- [3] Dewi, K. R., Setiadi, D., & Merta, I. W. 2021. The Influence of Integrated Cooperative Online Learning and Outcome-Based Education with Local Wisdom on Critical Thinking Skills. Jurnal Pijar MIPA. 16(2): 151-156. 2021.
- [4] Fiandi, Arif. The Concept of Outcome-Based Education (OBE) in Educational Institutions. Vol. 1 No. 1 (2023): Oktober.
- [5] Arifin, Pepen. Outcome Base Education. Seminar on Curriculum Quality Re-Oriented Based on Outcomes, University of Padjadjaran, Saturday, November, 14th 2020.
- [6] Zamir, Muhammad Zunair; Abid, Muhammad Irfan; Fazal, Muhammad Rayyan; Qazi, Muhammad Ali Aqdas Rehman; Kamran, Muhammad. 2022. Switching to Outcome-Based Education (OBE) System, a Paradigm Shift in Engineering Education. IEEE Transactions on Education, v65 n4 p695-702 Nov 2022.
- [7] Pusparini, M. Dwi.. Pembelajaran Daring Berbasis Outcome Based Education(OBE) dengan Molta. Reflection on Innovative Learning, Directorate of Academic Development UII. Vol. 2, No. 2, 2020.
- [8] Yunus, M.; Tan, Yamato; Prasetyo, A. Dwi; Irianto, S. Hidayat, J.T.; Purwanti, Heny; Riyadi, B.B.; Waryani; and Munir, M.. Performance Analysis of Learner Behavior through Online Learning Using Learning Management System. IEEE Pujisawa. Japan, pp. 395-399, March 18-20th 2023.
- [9] Junaidi, Aris et.al. Guidelines for Developing Higher Education Curriculum in the Industrial Era 4.0 to Support Independent Learning - Independent Campus. Directorate General of Higher Education Ministry of Education and Culture. 2020
- [10] Omstein, A.C. and Hunkins, F.P. Curriculum: Foundations, Principles, and Issues. Pearson Education Ltd. Edinburgh Gate, Harlow, Essex CM20 2JE, England. Printed and bound in Vivar, Malaysia. ISBN13:978-1-978-292-16207-2. 2014.
- [11] Sugiyono. Research Methods of Quantitative, Qualitative, and R&D. ALFABETA. Bandung, Indonesia: 2017
- [12] Head of The Quality Assurance Unit, "Report of Lecturer Performances Feedback," Institute of Internal Quality Assurance, University of Pakuan, Bogor, Indonesia, Sept. 2023.