Proceeding of 2nd International Conference on Education, Society and Humanity
e-ISSN : 2986-5832
p-ISSN : 2986-6979
Vol. 04 No. 0 1 (2026)
Available online at https://ejournal.unuja.ac.id/index.php/icesh

AI-DRIVEN OUTCOME-BASED EDUCATION: AN ADAPTIVE CURRICULUM DEVELOPMENT MODEL TO PRODUCE GLOBALLY COMPETITIVE GRADUATES IN THE SOCIETY 5.0 ERA

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Abstract:

This study aims to develop a conceptual model of Artificial Intelligence driven Outcome Based Education (AI-Driven Adaptive OBE) as a strategy for curriculum transformation in higher education to produce graduates who are competent, adaptive, and globally competitive in the Society 5.0 era. The research employs a qualitative approach combining systematic literature review and design science research (DSR), synthesizing findings from fifteen peer-reviewed studies, institutional reports, and policy documents published between 2020 and 2025 on artificial intelligence in education, outcome-based education, and Society 5.0. Data were analyzed through thematic content analysis to identify recurring patterns in AI applications for curriculum design, learning outcome mapping, and labor market alignment. The findings reveal five interrelated components that should be integrated into an adaptive curriculum model: (1) AI based labor market competency needs analysis, (2) dynamic AI based mapping and evaluation of graduate learning outcomes (CPL), (3) a continuously updated adaptive curriculum mechanism, (4) AI based learning analytics as an academic decision support system, and (5) integration of global competencies such as AI literacy, digital literacy, sustainability awareness, and twenty first century soft skills. The proposed model repositions curriculum development from a static, periodic process into a continuous, data driven, and evidence based cycle in which human academic authority remains the final decision maker. The study concludes that AI-Driven Adaptive OBE offers a viable pathway for higher education institutions, particularly in Indonesia, to close the persistent gap between curriculum output and industry expectations, while safeguarding pedagogical quality and academic integrity.

Keywords: *Artificial Intelligence; Outcome Based Education; Adaptive Curriculum; Society 5.0; Graduate Competitiveness.*

INTRODUCTION

The transformation of higher education in this decade is no longer driven solely by the development of digital technology, but rather by a paradigm shift in society itself toward what is known as Society 5.0, a system that deeply integrates cyberspace and physical space to address social issues while simultaneously creating new economic value (Carayannis & Morawska-Jancelewicz, 2022). This concept demands that universities not only act as knowledge producers but also as epicenters for the creation of human resources capable of collaborating with intelligent systems, solving complex cross-disciplinary problems, and adapting to changes that occur much more rapidly than conventional curriculum cycles.

Ironically, the majority of universities, including those in Indonesia, still manage their curriculum through a four- to five-yearly periodic review mechanism, a rhythm that lags behind the pace of labor market disruption, which, according to the World Economic Forum, will change nearly a quarter of the global employment structure in a much shorter timeframe (World Economic Forum, 2023). A follow-up report released two years later even confirmed that this transformation was further accelerated by the introduction of generative and agentic artificial intelligence into organizational workflows, so that nearly four out of ten core worker skills were expected to change significantly by the end of the decade (World Economic Forum, 2025).

At the same time, Outcome-Based Education (OBE) has become the dominant paradigm in global higher education curriculum design, including its formal adoption by Indonesian higher education regulations through the Graduate Learning Outcomes (CPL) framework, which must align with the Indonesian National Qualifications Framework (KKNI) and the National Higher Education Standards. OBE places learning outcomes as the starting point for designing all curriculum components, from learning outcomes and learning strategies to assessment systems (Muzakir, 2023). This approach philosophically aligns with the needs of Society 5.0 because it is oriented towards tangible competencies that can be measured and accounted for. However, the implementation of OBE in practice still faces serious structural challenges. A study of OBE implementation in Indonesian universities shows that many lecturers perceive OBE merely as an administrative obligation in the preparation of curriculum documents, rather than as a learning philosophy that must be reflected in daily classroom practice, and institutional support for teachers to fully implement OBE remains limited (Mufanti et al., 2024). The CPL achievement evaluation system is generally still carried out manually and retrospectively, so that feedback on the effectiveness of the curriculum is only known after a full learning cycle has passed, often even after students have graduated (Ishaq et al., 2023; Setiono et al., 2023).

This is where artificial intelligence (AI) offers transformative opportunities that have not been widely explored in an integrated manner. A systematic review of 138 research articles on AI in higher education from 2016–2022 revealed that the use of AI is mostly focused on automated assessment, student performance prediction, intelligent tutoring systems, and learning management, while its use to directly support curriculum design remains an underdeveloped area (Crompton & Burke, 2023). Yet, AI's capacity to process large-scale data, including job openings, industry trends, student learning outcomes, and stakeholder feedback, has the potential to bridge the gap that has been a weakness of conventional OBE, namely the slow process of curriculum updates to meet changing workplace needs. Studies on learning analytics and AI in education emphasize that the interaction between learning analytics, artificial intelligence, and human learning processes should be viewed as a complementary hybrid ecosystem, not simply administrative automation (Cukurova, 2025).

In addition to the issue of curriculum alignment with industry needs, another challenge facing university graduates in the Society 5.0 era is the demand for new, cross-domain competencies: AI literacy, digital literacy, sustainability awareness, and generic 21st-century skills such as critical thinking, collaboration, and complex problem-solving. Digital literacy in Society 5.0 is no longer simply understood as the ability to operate technological devices, but rather encompasses evaluative and ethical capacities in interacting with intelligent systems (Sá et al., 2021). Similarly, AI literacy, defined as a set of competencies that enable one to understand, use, evaluate, and co-create AI-based systems

responsibly (Long & Magerko, 2020), is now a generic competency ideally embedded in all study programs, not just information technology-based ones. Studies on the role of universities in developing soft skills in Society 5.0 society confirm that these generic skills can no longer be positioned as supplementary competencies, but rather as core to graduates' work-readiness (Sá & Serpa, 2022).

Based on this gap, this article aims to develop a conceptual model that the author calls AI-Driven Adaptive Outcome-Based Education, namely an adaptive curriculum development model that integrates artificial intelligence into the entire OBE cycle starting from competency needs analysis, CPL design and mapping, the learning process, to continuous curriculum evaluation and updating. The novelty offered lies in the integration of five components simultaneously within a coherent framework: (1) competency needs analysis based on labor market data using AI; (2) dynamic mapping and evaluation of CPL achievement; (3) a continuously updated adaptive curriculum mechanism; (4) learning analytics as an academic decision support system; and (5) explicit integration of global competencies into curriculum design. In contrast to previous studies that tend to discuss the application of AI and OBE as two separate issues, this study seeks to formulate an integrative model that can serve as a conceptual and practical reference for study program managers. The problem formulations to be answered include: (a) what challenges are faced by higher education in responding to Society 5.0; (b) how can AI be systemically integrated into the OBE approach; (c) how to design an AI-based adaptive curriculum model that can be applied to study programs; and (d) to what extent the model has the potential to increase the global competitiveness of graduates. This article is the author's original work, compiled based on a critical synthesis of the latest scientific literature, and has not been published in other journals or scientific media.

Outcome-Based Education as a Curriculum Paradigm

OBE places learning outcomes as the starting point for designing all curriculum components and is based on four core questions: what competencies graduates are expected to achieve, why these competencies are important, how the learning process is designed to achieve them, and how their achievement is measured. In the context of Indonesian higher education, OBE is realized through the formulation of CPL that refers to the KKNI level and is systematically broken down into Course Learning Outcomes (CPMK) and Sub-CPMK. Studies on the implementation of OBE in the higher education system in the Industrial Revolution 4.0 era confirm that the success of OBE depends heavily on the consistent linkage (constructive alignment) between CPL, learning strategies, and assessment instruments (Muzakir, 2023). When one of these links is broken, for example, an assessment that does not truly measure the formulated CPL, OBE risks becoming a formal document with no real impact on graduate competency.

A study based on the development of the PROBE (Program Penilaian Outcome-Based Education) application showed that the manual process of mapping CPL achievement by lecturers faced challenges in accuracy and time efficiency, necessitating an information systems-based approach and artificial intelligence to expedite the evaluation process (Ishaq et al., 2023). Similar findings were presented in a study of the implementation of an OBE-based assessment system, which identified that assessment instruments in many study programs were not fully designed to comprehensively measure learning outcomes in higher-order cognitive, affective, and psychomotor domains (Setiono et al., 2023).

Artificial Intelligence in Higher Education

The use of AI in higher education has grown rapidly since the early 2020s, marked by a two- to three-fold increase in the number of scientific publications in 2021 and 2022 compared to previous years (Crompton & Burke, 2023). The study identified five main categories of AI utilization in higher education: automated assessment and evaluation, student performance prediction, AI assistants, intelligent tutoring systems, and student learning management, which includes learning analytics, curriculum sequencing, and student grouping based on learning characteristics. Of these five categories, the function of AI in directly supporting curriculum development and updating has been relatively rare in research, thus addressing this research gap that the model proposed in this article seeks to fill.

The concept of hybrid intelligence, put forward in recent studies on the relationship between learning analytics, AI, and human learning, offers an important perspective for the development of AI-Driven OBE models. Rather than positioning AI as a substitute for pedagogical decision-making by lecturers and program managers, hybrid intelligence emphasizes that AI should function as a cognitive partner that expands human analytical capacity, while the final decision remains the domain of academic authorities (Cukurova, 2025). This perspective is crucial to avoid the common misconception in educational AI discourse that tends to reduce AI's role to merely an administrative automation tool, when in fact its greatest potential lies in its ability to detect hidden patterns in large-scale learning data that are impossible for humans to analyze manually in a short time.

Society 5.0 and New Competency Demands

Society 5.0 is a concept that evolved from the idea of integrating cyberspace and physical space to create a human-centered and technology-based society, with the goal of balancing economic progress and solving social problems (Carayannis & Morawska-Jancelewicz, 2022). This concept has direct implications for the fourth mission of higher education, which is no longer limited to teaching, research, and community service, but extends to contributing to the quality of life of the community through knowledge co-creation with various stakeholders. Within this framework, digital literacy is understood more broadly than just the technical skills of operating applications, but also includes evaluative, ethical, and reflective capacities in interacting with intelligent systems that are increasingly integrated into everyday life (Sá et al., 2021).

Studies on the role of higher education as a promoter of soft skills confirm that generic skills such as communication, cross-cultural collaboration, critical thinking, and sustainability awareness are foundational to job readiness, as important as technical competencies (hard skills) (Sá & Serpa, 2022). Data from the World Economic Forum supports this argument by showing that analytical thinking, creativity, and the ability to work with artificial intelligence technologies consistently rank among the top global skills needs (World Economic Forum, 2023), while a recent report confirmed that nearly four out of ten core worker competencies will undergo significant changes by 2030 as agentic AI enters organizational workflows (World Economic Forum, 2025).

AI Literacy as a Generic Competency

AI literacy is defined as a set of competencies that enable individuals to critically evaluate AI technologies, communicate and collaborate effectively with AI systems, and utilize AI as a tool in both online and offline contexts (Long & Magerko, 2020). This definition emphasizes that AI literacy is not merely a

technical programming competency, but encompasses cognitive, ethical, and social dimensions relevant to graduates from all disciplines, not just information technology study programs. Consequently, AI-based adaptive curriculum design needs to incorporate AI literacy as an embedded competency, not simply as a stand-alone elective.

Regulatory Framework for Indonesian Higher Education

At the policy level, the Indonesian government has established several regulations supporting the flexibility of achievement-based curriculum development, including the establishment of key performance indicators for state universities that encourage student engagement in off-campus learning and align the curriculum with the needs of the workplace (Ministry of Education and Culture, 2020). This policy was further strengthened through further regulations that provide universities with the flexibility to develop graduate competency standards in accordance with the characteristics of their study programs and the dynamics of industry needs (Directorate of Higher Education, 2023). This regulatory framework essentially opens up ample policy space for the integration of AI into the curriculum development cycle, although technically, concrete implementation guidelines are not yet widely available. This situation indicates the need for a conceptual model that can bridge the spirit of the regulation with practical implementation at the study program level, as identified in a study on student learning needs analysis in OBE-based learning, which emphasized the importance of a valid needs database as a starting point for curriculum design (Padli, 2022).

RESEARCH METHODS

This research uses a qualitative approach with a design science research (DSR) strategy combined with a systematic literature review. The selection of DSR is based on the characteristics of the research objective which is not merely to describe a phenomenon, but rather to design and propose a conceptual artifact in this case in the form of a curriculum development model that can be applied and further tested in real contexts. The scope of the research is focused on designing an AI integration model into the OBE approach for higher education, with an emphasis on five operational focuses: competency needs analysis based on labor market data, AI-based CPL mapping and evaluation, adaptive curriculum mechanisms, learning analytics as a decision support system, and global competency integration.

The operational definitions of the variables in this study are explained as follows. First, AI-Driven Adaptive OBE is defined as a curriculum development approach based on learning outcomes that utilizes artificial intelligence technology at every stage of its cycle, from needs analysis to evaluation and updating. Second, an adaptive curriculum is defined as a curriculum designed with a continuous update mechanism based on empirical data, not just periodic reviews. Third, global competitiveness of graduates is defined as the graduate's capacity to meet the competency standards demanded by the cross-country job market, including technical competencies (hard skills), 21st-century generic competencies (soft skills), digital literacy, and AI literacy.

This research does not use a population and sample in the sense of quantitative research or field studies, but rather uses a corpus of scientific literature as the primary data source. Literature inclusion criteria include: (1) reputable indexed journal articles, international agency reports, or official regulatory documents; (2) published between 2020 and 2025; (3) thematically relevant to one of the four study domains, namely AI in higher education, Outcome-Based Education, Society 5.0, and 21st-century competencies/digital literacy-AI. The literature search process was conducted through academic databases and scientific search engines with keyword combinations such as "artificial intelligence" AND "outcome-based education", "adaptive curriculum" AND "higher education", "Society 5.0" AND "higher education competitiveness", and "AI literacy" AND "curriculum design". From this search process, a final corpus of fifteen primary sources was obtained that met the inclusion criteria and

was used as the basis for synthesis in this study.

The research instrument was a thematic analysis matrix compiled by the author to categorize the findings from each source into the five components of the proposed model. Data collection techniques were conducted through a documentary study, namely searching, critical reading, and extracting relevant findings from each literature source. The data analysis technique used thematic content analysis with the following stages: data reduction by grouping findings into thematic categories; data presentation in the form of comparative matrices and tables; and drawing conclusions through a conceptual triangulation process between sources to ensure consistency of findings. Furthermore, the results of this thematic analysis were used as the basis for formulating model artifacts through the DSR stages which include problem identification, definition of solution objectives, model design (design and development), and conceptual evaluation through comparison with theoretical frameworks and previous empirical findings. The model evaluation in this article is conceptual-argumentative in nature, considering that the research has not yet reached the field trial stage; therefore, empirical validation through further implementation studies is recommended as a future research agenda.

RESULTS AND DISCUSSION

Challenges of Higher Education in the Era of Society 5.0

The literature synthesis confirms that higher education faces at least three layers of structural challenges in responding to Society 5.0. The first layer is the speed gap between the curriculum update cycle and the rate of change in competency requirements. As long as curricula are reviewed through the four-yearly mechanism common to many study programs, while job market skills requirements shift significantly within two to three years (World Economic Forum, 2023, 2025), graduates are at risk of experiencing a competency mismatch at a time when they are most competitive, early in their careers. The second layer is the gap between the philosophy and practice of OBE. As found in a study of OBE implementation in Indonesian universities, many lecturers interpret OBE as merely an administrative obligation to prepare curriculum documents without any fundamental changes in classroom learning and assessment strategies (Mufanti et al., 2024). This situation is exacerbated by limited institutional support in the form of training, incentives, and information systems that facilitate lecturers' real-time monitoring of CPL achievement. The third layer is the demand for new competencies that are cross-domain and have not been explicitly accommodated in many curriculum documents, namely AI literacy, advanced digital literacy, sustainability awareness, and generic 21st-century skills (Long & Magerko, 2020; Sá & Serpa, 2022; Sá et al., 2021).

These three layers of challenges are closely interconnected. Curriculums that are slow to update tend to be unable to accommodate new competencies in a timely manner, while the understanding of OBE, which is still administrative in nature, causes the curriculum update process to be carried out formally without being based on empirical data on student competency achievement. A critical argument that can be put forward here is that the root of the problem lies not in the OBE philosophy itself, which is conceptually results-oriented and relevant to the needs of Society 5.0, but in the lack of data infrastructure and feedback mechanisms that allow OBE to work dynamically. It is at this point that artificial intelligence finds its strategic relevance: not as an add-on technology, but as a data and analytics infrastructure that allows OBE to truly function as its original philosophy was designed.

Integration of Artificial Intelligence in Outcome-Based Education

The integration of AI into OBE can be mapped to three stages of the curriculum cycle: planning (input), implementation (process), and evaluation (output/outcome), with AI acting as an analytical layer connecting the three in a cyclical, rather than linear, manner. In the planning stage, AI can be used to data mine thousands of job openings, competency descriptions from professional associations, and industry research trends to identify the most in-demand and

fastest-growing competencies, as documented globally through surveys of over a thousand employers across industries (World Economic Forum, 2023, 2025). This analytical capacity far exceeds the capabilities of program curriculum teams, which typically rely solely on alumni surveys and focus group discussions with limited industry partners.

At the implementation stage, studies on the use of AI in higher education have identified the function of intelligent tutoring systems and adaptive learning assistants that can adjust the material and pace of learning based on each student's ability profile (Crompton & Burke, 2023). This function is directly relevant to the OBE principle, which demands individual competency achievement, not simply collective completion of material within a uniform timeframe. At the evaluation stage, AI can be used to automatically map CPL achievement from assessment data, as pioneered by the development of systems such as PROBE, specifically designed to evaluate student learning outcomes in the OBE curriculum (Ishaq et al., 2023). However, it is important to emphasize that the effectiveness of such systems is highly dependent on the quality of the assessment instruments used; if the assessment instruments are not fully aligned with the CPL formulation, as found to be a common problem in OBE implementation (Setiono et al., 2023), then no matter how sophisticated the AI system used, the mapping results will still be invalid. These findings confirm an important principle: AI is not a silver bullet for OBE's weaknesses, but rather a force multiplier whose effectiveness depends on the quality of the underlying pedagogical design.

The hybrid intelligence perspective provides an appropriate conceptual framework for understanding how AI should be positioned within the OBE cycle, namely as an analytical partner for lecturers and program managers, not a replacement for their pedagogical authority (Cukurova, 2025). Consequently, any AI analytical output, whether in the form of recommendations for new competencies, detection of students at risk of not achieving CPL, or proposals for material updates, still requires review and final decision by the curriculum team and the program's academic senate.

AI-Based Adaptive Curriculum Development Model

Based on the above synthesis, this study proposes an AI-Driven Adaptive OBE model consisting of five core components that work in a continuous cycle, as presented in Table 1.

Table 1. Components of the AI-Driven Adaptive OBE Model

No	Component	Main Function	Supporting AI Technology	External
1	Job Market-Based Competency Needs Analysis	Identifying the technical and generic competencies that are most needed by industry on an ongoing basis	Natural Language Processing (NLP), job vacancy text mining, big data trend analysis	Priority competency map per scientific field
2	Dynamic CPL Mapping and Evaluation	Mapping the achievement of CPL/CPMK on an ongoing basis based on assessment data	Machine learning classification, automatic rubrics, analytical dashboards	Periodic CPL achievement reports
3	Adaptive Curriculum Mechanism	Updating the content and structure of the curriculum based on the results of the analysis of components 1 and 2	Recommender system, a predictive model of technology trends	Proposed revision of RPS and course structure
4	Learning Analytics as a	Detecting at-risk students, learning patterns, and the	Predictive analytics, dashboard learning analytics	Academic intervention recommendations

	Decision Support System	effectiveness of teaching methods		
5	Integration of Global Competencies	Embedding AI literacy, digital literacy, sustainability, and 21st-century soft skills into CPL across study programs	AI-based competency tagging, adaptive learning module	Integrated cross-disciplinary additional CPL

Table 2. Comparison of Conventional OBE and AI-Driven Adaptive OBE

Aspect	Conventional OBE	AI-Driven Adaptive OBE
Curriculum update cycle	Periodic (3–5 years)	Continuous (continuous, data-driven)
Competency needs data sources	Limited alumni survey & FGD	Job market big data, global industry trends, multi-stakeholder feedback
Evaluation of CPL achievement	Manual, retrospective	Automated, dynamic, dashboard-based analytics
Detection of student academic risk	Reactive (after the value is out)	Predictive (since mid-semester)
Personalization of learning	Limited, tends to be uniform	Adaptive according to individual competency profile
The role of lecturers	Sole designer & implementer	Joint decision-making partner AI (hybrid intelligence) system

This model philosophically maintains the core principle of OBE, which is oriented towards measurable learning outcomes, but changes its working mechanism from a periodic linear cycle to a circular cycle (loop) that is continuously updated based on data. This circular character is important to emphasize as a key element of novelty, because previous literature on OBE, including studies on OBE implementation in the Industrial Revolution 4.0 era (Muzakir, 2023) and studies on OBE-based assessment systems (Setiono et al., 2023), generally still view the curriculum evaluation cycle as a process separate from the daily learning process. The AI-Driven Adaptive OBE model integrates both into a single data stream.

A critical argument against this model is the potential risk of over-reliance on algorithmic recommendations and data bias. If the job vacancy data analyzed by AI tends to be dominated by certain sectors or regions, such as large companies in urban areas, then the resulting competency recommendations are potentially biased and underrepresent the actual needs in those regions or the informal sector. Therefore, this model deliberately places the curriculum team and academic senate as the final decision-makers (humans in the loop), in line with the principle of hybrid intelligence, which emphasizes that AI should expand, not replace, educators' professional judgment (Cukurova, 2025).

Implementation of AI-Driven OBE in Study Programs

Implementation of this model at the study program level should ideally be carried out through four stages, as presented in Table 3. The first stage is a readiness assessment, which maps the availability of data infrastructure such as an integrated academic information system, the availability of historical grade and assessment data, and the readiness of human resources in data literacy. The second stage is the development of an integrated database that connects student academic data, curriculum documents (RPS, CPL, CPMK), and external data in the form of job vacancy trends and feedback from alumni and industry partners. The third stage is the development and testing of an analytical model on a limited scale, for example, on one or two core courses as a pilot, before being expanded to the study program level as a whole. The fourth stage is institutionalization, namely the integration of AI analytical results into the formal mechanisms of curriculum review meetings and study program evaluations, so that the system's recommendations truly become part of academic decision-making, not simply

additional reports that are not followed up on.

Table 3. Stages of Implementation of AI-Driven Adaptive OBE in Study Programs

Stage	Activity Focus	Success Indicators
1. Readiness Assessment	Audit of data infrastructure, HR, and academic governance	Availability of digital readiness maps of study programs
2. Database Integration	Integration of internal academic data and external labor market data	Integrated and accessible database for curriculum teams
3. Limited Trial (Pilot)	Application of analytical models in pilot courses/course clusters	Pilot evaluation report and improvement recommendations
4. Institutionalization	Integration of analytical results into formal curriculum review meetings	Updated curriculum documents based on data-driven recommendations

Experience implementing OBE-based evaluation systems like PROBE demonstrates that a limited pilot phase is crucial for identifying technical issues and organizational cultural resistance before the system is fully implemented (Ishaq et al., 2023). Similarly, a study of OBE-based student learning needs analysis confirms that successful implementation depends heavily on the validity of the needs data used as the system's initial input; unrepresentative data will result in erroneous curriculum recommendations, even when processed with sophisticated AI technology (Padli, 2022). These findings reinforce the argument that the success of AI-Driven Adaptive OBE is not solely about technological sophistication, but also about data governance and institutional commitment to following up on analytical results.

At the policy level, the implementation space for this model has been opened up by regulations that provide flexibility for universities to develop graduate competency standards that align with the characteristics of study programs and industry dynamics (Directorate of Higher Education, 2023), as well as policies that encourage student engagement in cross-institutional learning and the workplace as one of the main performance indicators of universities (Ministry of Education and Culture, 2020). What remains to be done is translating the spirit of these regulations into operational technical guidelines at the study program level, a gap that is being addressed through the implementation stages proposed in Table 3.

Impact on Increasing Global Competitiveness of Graduates

The impact of the AI-Driven Adaptive OBE model on graduates' global competitiveness can be analyzed across three dimensions. The first dimension is competency alignment, which increases the alignment between the competencies provided by the curriculum and the actual competencies needed by the global job market. This is because the model utilizes continuous labor market data analysis as the basis for curriculum updates, rather than relying solely on periodic alumni surveys, which tend to be retrospective and limited in scope. The second dimension is the personalization of competency outcomes, where, through learning analytics, each student receives more precise feedback on areas of competency that need to be strengthened, rather than receiving a generic assessment at the end of the semester. The third dimension is the provision of cross-domain generic competencies, considering that this model explicitly integrates AI literacy, digital literacy, sustainability awareness, and 21st-century soft skills as additional CPLs embedded in all study programs, in line with the findings that these kinds of generic skills are important determinants of graduates' work readiness in the Society 5.0 era (Sá & Serpa, 2022) and that analytical-creative thinking skills and the ability to work with AI now top the global skills needs (World Economic Forum, 2023, 2025).

It is important to note that the global competitiveness of graduates is not solely determined by the sophistication of the curriculum system, but also by external factors such as macroeconomic conditions, job availability, and the digital infrastructure gap between regions in Indonesia. Therefore, the AI-Driven Adaptive OBE model should be understood as a necessary, but not sufficient,

condition for improving graduate competitiveness. This model can increase graduates' opportunities for global competitiveness by ensuring the suitability and quality of the competencies provided. However, ultimate success still depends on the broader employment ecosystem and the individual graduate's readiness for lifelong learning—a competency that, not coincidentally, is also consistently cited as one of the fastest-growing skills in demand in global employment reports (World Economic Forum, 2023).

CONCLUSION

This study concludes with several key findings in response to the proposed research problem. First, higher education in the Society 5.0 era faces three interrelated structural challenges: the gap between the speed of curriculum updates and changing competency needs, the gap between the philosophy and practice of OBE implementation, and the lack of explicit accommodation of cross-domain competencies such as AI literacy, digital literacy, and sustainability in many curriculum documents. Second, artificial intelligence can be systematically integrated into the OBE cycle at three stages: planning, implementation, and evaluation, functioning as an analytical layer that continuously connects the three, rather than as a stand-alone technology. Third, this study formulates an AI-Driven Adaptive OBE model consisting of five core components: competency needs analysis based on labor market data, dynamic CPL mapping and evaluation, a continuous adaptive curriculum mechanism, learning analytics as an academic decision support system, and the integration of global competencies into CPL across study programs. This model repositions curriculum development from a periodic, linear process to a continuously updated, data-driven, circular cycle, while still placing lecturers and the academic senate as the final decision-makers in accordance with the principles of hybrid intelligence. Fourth, this model has the potential to increase the global competitiveness of graduates through three channels, namely increasing the suitability of competencies to job market needs, personalizing individual competency achievements, and providing cross-domain generic competencies, although its success still depends on external factors beyond the control of the curriculum system alone.

Based on these conclusions, this study recommends several follow-up steps. For study program managers, it is recommended to begin implementing this model gradually through limited trials in specific courses or subject groups, before expanding it to the entire study program level, to minimize technical risks and organizational resistance. For higher education policymakers, it is necessary to develop operational technical guidelines that translate existing regulatory flexibility into minimum standards for educational data governance that can be adopted across universities, including protection of student data privacy. For future researchers, this research is still conceptual and has not undergone empirical validation in the field; therefore, further research is needed in the form of implementation studies (action research) or quasi-experimental trials in specific study programs to empirically test the effectiveness of this model, including measuring its impact on objective indicators such as graduate absorption rates, job suitability, and graduate user satisfaction (industry). Particular attention should also be paid to potential algorithmic bias and regional digital infrastructure disparities, so that the implementation of AI in the curriculum does not widen, rather than narrow, the gap in the quality of higher education in Indonesia.

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