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REVOLUTIONIZING OBE WITH CO-AIMS

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ABSTRACT

The advancement of Outcome-Based Education (OBE) in higher education calls for dynamic and sustainable systems that can effectively assess, monitor, and enhance student performance and lifelong learning outcomes. In response to this educational imperative, the College of Engineering Academic Information Management System (CO-AIMS) was developed by the Faculty of Electrical Engineering, UiTM Johor branch, Pasir Gudang campus to provide a comprehensive digital platform aligned with the goals of sustainable and innovative education. CO-AIMS integrates advanced computing technologies and utilizes the Rapid Application Development (RAD) model to address limitations in traditional tracking methods, such as fragmented data, manual reporting, and lack of real-time analytics. The system empowers academic advisors and curriculum managers to assess Program Outcome (PO) achievements at individual, course, and cohort levels through interactive dashboards, automated reports, and trend analytics. This data-driven approach not only promotes Continuous Quality Improvement (CQI) in curriculum delivery but also enhances institutional decision-making and transparency. Uniquely designed for scalability and adaptability, CO-AIMS ensures secure, cloud-based access and role-specific functions for stakeholders, supporting its implementation across faculties and campuses. Its innovation lies in transforming static assessment practices into a responsive, tech-enabled ecosystem that fosters sustainable education through empowerment, inclusivity, and lifelong learning principles. CO-AIMS is directly transforming education and advancing innovation by bridging critical gaps in academic data management and enabling a future-ready academic environment that supports both educators and learners. This initiative shows how technology can be effectively leveraged to create resilient and intelligent academic ecosystems for an empowered world.

Keywords: Outcome-Based Education (OBE), Continuous Quality Improvement (CQI), Program Outcomes (PO)

INTRODUCTION

Outcome-Based Education (OBE) has emerged as a transformative framework in the modern educational landscape, particularly in engineering programs where the focus is on aligning learning outcomes with industry-driven competencies. Unlike traditional models that emphasize content delivery, OBE centers on the measurable demonstration of knowledge, skills, and attitudes acquired by students upon program completion (Latha & Mohanamani, 2022). Within this paradigm, teaching strategies, assessment methods, and curriculum development are all tailored to ensure learners attain clearly defined Program Outcomes (POs).

As emphasized by (Pradhan, 2021), OBE encourages continuous and meaningful progress in student learning, demanding systems that can not only assess student achievement but also inform academic planning and continuous quality improvement (CQI). This is particularly critical in knowledge-based engineering education, where graduates are expected to meet rigorous accreditation standards.

(Othman et al., 2022) underscore the necessity of robust systems for tracking and evaluating PO attainment in order to uphold the integrity of OBE implementation. These systems offer valuable insights into student performance, curriculum effectiveness, and instructional impact, enabling educators to make informed adjustments that enhance the overall quality of education.

This paper introduces CO-AIMS (College of Engineering Academic Information Management System) a web-based platform developed by the Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM) Pasir Gudang. CO-AIMS is designed to support the effective implementation of OBE by providing real-time tracking, analytics, and reporting of student PO achievement.

METHODS

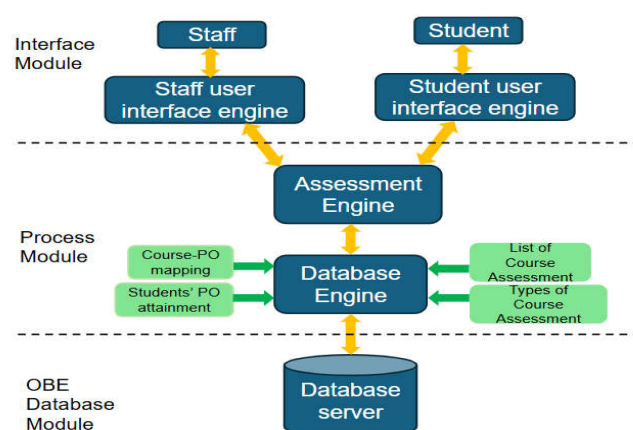


Figure 1.: Block diagram of CO-AIMS

CO-AIMS is designed with a modular architecture and developed using the Rapid Application Development (RAD) model to enable iterative prototyping and prompt user feedback. The system comprises three interconnected components: the Interface Module, the Process Module, and the OBE

Database Module as in Figure 1 above. The Interface Module offers two engines — one for staff (lecturers, advisors, and administrators) and one for students — so each group can interact with the system via dedicated dashboards: staff can input, map, and analyze data, while students can view their own PO achievement and advisory feedback. The core of the system is the Process Module, which includes an Assessment Engine linked to a Database Engine (Safiudin et al., 2020). This combination handles critical tasks such as mapping Course Outcomes (COs) to POs, calculating student PO attainment, and managing various assessment types. All processing is underpinned by the Database Module: a relational database server storing CO–PO mapping matrices, assessment records, and policy metadata. This enables real-time data validation, storage, retrieval, and reporting — essential for CQI. The modular design ensures that each component can operate independently while facilitating future integration, ensuring scalability and adaptability to evolving educational needs.

To evaluate the system's effectiveness, this system was carried out at the Faculty of Electrical Engineering, UiTM Pasir Gudang. User experience, system usability, and functional performance were observed during a full academic semester with academic staff utilizing CO-AIMS for PO tracking, report generation, and CQI processes.

RESULTS AND DISCUSSION

The implementation of CO-AIMS at the Faculty of Electrical Engineering, UiTM Pasir Gudang, showed positive outcomes in both usability and academic impact. Academic advisors reported that the system significantly reduced the time and effort required to compile, analyze, and report PO data. The automated report generation and visual dashboards enabled more efficient academic planning and streamlined audit processes.

In terms of system performance, CO-AIMS was found to be user-friendly, reliable, and adaptable for broader faculty use. It supported Continuous Quality Improvement (CQI) efforts by identifying underperforming areas and enabling evidence-based interventions. Overall, the system helped bridge the gap between teaching, assessment and outcome monitoring, making it a practical and scalable solution for sustainable OBE implementation.



Figure 2.: Features of My PA-PO Attainment with listed subjects and accumulated PO attainment

Figure 2 illustrates the 'MY PA-PO Attainment' interface, which presents a comprehensive overview of the subjects a student is currently taking in the ongoing semester. It also displays the cumulative PO attainment from semester 1 up to the present. The student's achievement for each PO is visually represented, with blue highlighting indicating that the faculty's Key Performance Indicators (KPIs) have been successfully met. The data in Figure 2 plays a vital role within the OBE framework, as it enables continuous monitoring and evaluation of a student's progress in achieving the targeted program outcomes throughout their academic journey.

Students also became more aware of their PO achievement, as advisors were able to explain performance trends using clear visual analytics. This improved the quality of academic consultations and encouraged students to take greater ownership of their learning progress. Figure 3 presents a radar chart that visually illustrates students' overall performance across all POs with each axis representing a specific PO. Higher values indicate stronger attainment, highlighting PO8 as the highest at 100%, and PO11 as the lowest at 50%. This chart is a valuable tool for quickly identifying both areas of strength and those requiring further improvement. Complementing this, a formal declaration of accuracy by both the PA and the student has been developed. It verifies that a discussion has taken place regarding the student's PO attainment and its alignment with the program's defined outcomes. This verification process ensures that the student is fully informed of their current performance and understands which areas need further development, reinforcing accountability and continuous improvement within the OBE framework.

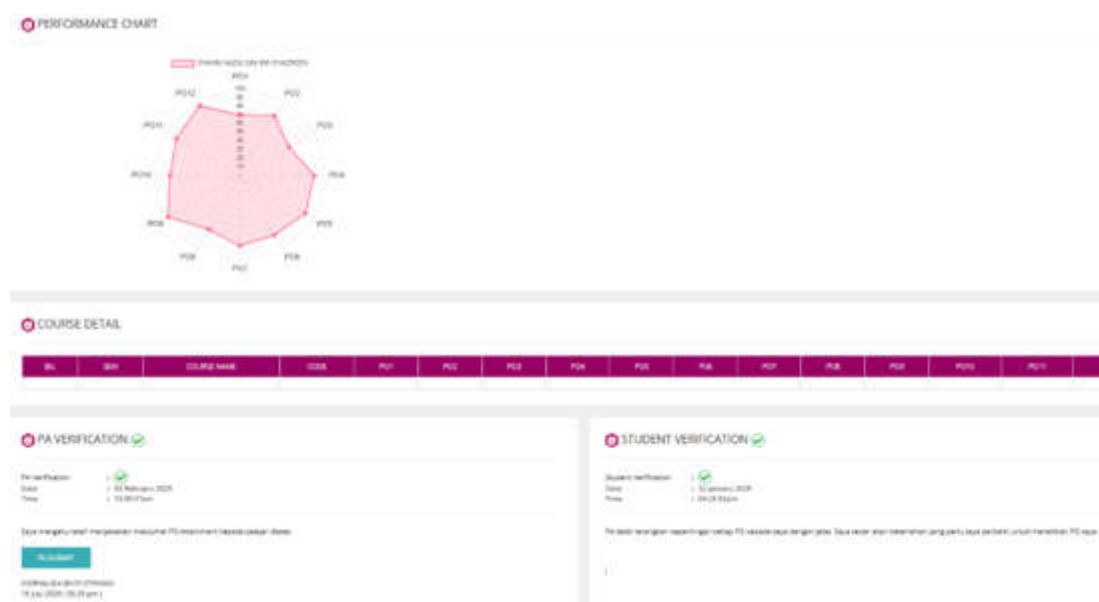


Figure 3. Features of performance chart, PA and student verification

CONCLUSION

In conclusion, the development of the CO-AIMS represents a significant leap forward in aligning higher education practices with the core principles of OBE and sustainable innovation. By addressing the shortcomings of traditional performance tracking, CO-AIMS provides a robust, data-driven platform that empowers educators, academic advisors, and curriculum managers to make informed decisions at every level of academic engagement. Its integration of advanced computing technologies and use of the Rapid Application Development (RAD) model ensures agility, scalability, and user-centered functionality, making it adaptable across faculties and campuses. The system’s interactive dashboards, automated reporting, and trend analysis tools foster transparency and facilitate CQI, directly enhancing student learning outcomes and institutional performance. Beyond its technical capabilities, CO-AIMS embodies a transformative approach to academic management that supports lifelong learning, promotes inclusivity, and prepares institutions for the demands of a future-ready education landscape. As such, CO-AIMS stands as a model for how intelligent digital systems can be strategically implemented to drive educational excellence and sustainability in higher learning environments.

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REFERENCES

- Latha, A., & Mohanamani, P. (2022). Measuring Course Attainment through Competencies and Performance Indicators: A case of Computer Lab Based Course. *Proceedings - 2022 International Conference on Recent Trends in Microelectronics, Automation, Computing and Communications Systems, ICMACC 2022*, 494–498. <https://doi.org/10.1109/ICMACC54824.2022.10093487>
- Othman, N. binti, Khairul Anuar, N. H. binti, Mat Saat, E. H. bin, Abdul Rahman, N. H. binti, Muhamad, N. A. binti, & Abdul Majid, M. bin. (2022). OBE POA Management Tools for Measuring Electrical Engineering Students' Individual PO Attainment. *International Journal of Academic Research in Progressive Education and Development*, 11(3). <https://doi.org/10.6007/ijarped/v11-i3/14773>
- Pradhan, Devasis. (2021). Effectiveness of Outcome Based Education (OBE) toward Empowering the Students Performance in an Engineering Course. *Journal of Advances in Education and Philosophy*, 5(2), 58–65. <https://doi.org/10.36348/jaep.2021.v05i02.003>
- Safiudin, A., S., Sulistyo, M. E., Pramono, S., & Ramelan, A. (2020). The Development Of Web-based Outcome Based Education Information System. *Journal of Electrical, Electronic, Information, and Communication Technology*, 2(2), 61. <https://doi.org/10.20961/jeeict.2.2.45291>