# Exploring the Alignment of Institutional, Program, and Course Learning Outcomes in a Master's Program in Digital Education: A Case Study of Arabian Gulf University

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***Abstract*—In higher education, outcomes-based education requires coherent alignment among Institutional Learning Outcomes (ILOs), Program Learning Outcomes (PLOs), and Course Learning Outcomes (CLOs). This case study examines the extent and effectiveness of this alignment within the Master of Science in Digital Education (MEDu) program at Arabian Gulf University (AGU), with particular attention to international professional standards, including the European Framework for the Digital Competence of Educators (DigCompEdu). Using qualitative document analysis of institutional strategic plans, program specifications, and course syllabi, supplemented by faculty consultation and student assessment data, the research maps connections across the three outcome levels and benchmarks them against global competency frameworks. Findings reveal strong intentional alignment in curricular design, with PLOs clearly derived from AGU's mission and CLOs effectively deconstructing PLOs into teachable components. However, the alignment remains largely implicit, lacking explicit curriculum mapping, systematic program-level assessment, and dynamic review processes responsive to the rapidly evolving digital education landscape. Critically, the analysis reveals that while the program substantively addresses many DigCompEdu competencies, this alignment is undocumented and unvalidated, potentially limiting graduate competitiveness in international markets. Identified gaps include curricular silos, underutilized assessment data, insufficient responsiveness to technological change, and the absence of external benchmarking. The study recommends developing a dynamic curriculum map explicitly aligned with DigCompEdu and ISTE standards, instituting a robust assessment cycle, establishing a standing curriculum review committee, and systematically benchmarking against external competency frameworks. These steps are essential to fully realize outcomes-based education, ensuring curricular coherence, demonstrable student achievement, sustained relevance, and enhanced graduate competitiveness in the global digital education marketplace.**

***Keywords*—learning outcomes, Institutional Learning Outcomes (ILOs), Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), curriculum alignment, digital education, DigCompEdu, international standards, graduate competitiveness, Arabian Gulf University, quality assurance**

## I. Introduction

The contemporary landscape of higher education is characterized by a shift in paradigm from instructor-centered to student-centered models of learning. This evolution has placed the definition and assessment of learning outcomes at the forefront of academic program design and quality assurance [1]. This approach, known as Outcomes-based Education (OBE), ensures that all components of an educational institution, from its broad mission to its individual classroom activities, are strategically aligned to produce graduates with specific, demonstrable attributes [2]. The efficacy of this model hinges on a coherent hierarchical structure of learning outcomes:

(1) Institutional Learning Outcomes (ILOs): These are broad, overarching statements that define the essential knowledge, skills, and values all graduates of an institution should possess, reflecting its core mission and strategic vision [3].
(2) Program Learning Outcomes (PLOs): Operating at the disciplinary level, PLOs define what students are expected to know and be able to do upon completing an academic program successfully. They must directly support and contribute to the achievement of the institution's ILOs [4].
(3) Course Learning Outcomes (CLOs): These are specific, measurable statements that describe the expected knowledge, skills, or behaviors students will demonstrate upon completion of a specific course. CLOs act as the fundamental building blocks that collectively achieve the broader PLOs [5].

The integrity of this chain from ILOs to PLOs to CLOs is vital for ensuring educational coherence, enabling effective assessment, and demonstrating program quality

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to stakeholders and accrediting bodies [6]. A disconnect at any level can lead to a fragmented student experience and an ambiguous degree value. Furthermore, in specialized fields such as digital education, alignment with international professional standards has become equally critical, as it ensures graduate competencies are recognized and valued in the global marketplace [7].

This paper aims to explore this critical connection theoretically before reflecting on its practical application within the Master of Science in Digital Education program at Arabian Gulf University. The central research question guiding this inquiry is: How are the ILOs of Arabian Gulf University translated into the PLOs of the Master of Science in Digital Education program, and how are these PLOs operationalized through its CLOs to ensure a coherent and effective learning experience? Additionally, this study examines the extent to which these outcomes align with international competency frameworks, particularly the European Framework for the Digital Competence of Educators (DigCompEdu), and the implications of such alignment for graduate competitiveness and professional recognition.

## II. AGU Master of Science in Digital Education

In an era defined by rapid technological advancement and transformative shifts in educational paradigms, the demand for advanced, strategically aligned graduate programs in digital education has never been more critical. The Master of Science in Digital Education (MEDu) [8] at Arabian Gulf University (AGU) is a forward-thinking, comprehensive program designed to equip educators, instructional designers, technologists, and educational leaders with the advanced competencies required to navigate, innovate, and lead within the complex landscape of technology-enhanced learning.

Aligned with the national and regional visions of the Gulf Cooperation Council (GCC) countries for digital transformation and a knowledge-based economy, the MEDu program addresses a pressing need for specialized professionals who can harness digital tools to solve educational challenges, enhance learning outcomes, and drive institutional change. The program is built upon a robust foundation of Outcomes-Based Education (OBE), ensuring a coherent cascade of learning objectives from AGU's institutional mission down to specific, measurable course-level outcomes. This intentional design guarantees that graduates develop not only technical proficiency but also critical higher-order skills in analysis, innovation, ethical leadership, and research.

### *A. Program Structure and Curriculum*

The MEDu is a two-year, 36-credit-hour program structured to provide both depth and breadth. Its curriculum is strategically divided into:

Core Courses (20 credits): Foundational subjects such as Digital Education Foundations and Theories, Managing Digital Transformation, Assessment in Digital Education, and research methodology courses ensure all graduates master essential theoretical and practical knowledge.

Elective Courses (9 credits): Specialized tracks allow learners to tailor their expertise in areas like Artificial Intelligence in Digital Education, Designing Digital Learning Environments, Innovation in Digital Education, and Digital Teaching Strategies for Special Needs.

Master's Thesis Project (9 credits): A capstone research experience that synthesizes program learning, enabling students to investigate real-world problems and contribute original knowledge to the field.

This structure ensures a balance between theoretical understanding, practical application, and scholarly inquiry, preparing graduates for diverse roles as digital learning specialists, instructional designers, education technology consultants, and policy advisors.

- Managing digital transformation, assessment in digital education, and research methodology courses ensure all graduates master essential theoretical and practical knowledge.
- Elective Courses (9 credits): Specialized tracks allow learners to tailor their expertise in areas such as Artificial Intelligence in Digital Education, Designing Digital Learning Environments, Innovation in Digital Education, and Digital Teaching Strategies for Special Needs.
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### *B. Comparative Positioning Among Global Leaders and International Standards*

A benchmark analysis reveals that the MEDu program at AGU holds competitive parity with renowned digital education programs offered by leading global universities. The program's curriculum is comprehensive and aligns closely with international standards, covering critical domains that are central to the discipline worldwide. However, a critical dimension of this benchmarking involves examining alignment with internationally recognized competency frameworks, particularly the European Framework for the Digital Competence of Educators (DigCompEdu) [9].

Table I provides a comparative analysis of the AGU MEDu program against leading international programs and their implicit or explicit alignment with the DigCompEdu framework's six core areas: (1) Professional Engagement, (2) Digital Resources, (3) Teaching and Learning, (4) Assessment, (5) Empowering Learners, and (6) Facilitating Learners' Digital Competence.

As illustrated above, the AGU MEDu program provides equivalent core coverage in fundamental and emerging areas of digital education when compared to prestigious international benchmarks. Its distinctive strength lies in its contextual relevance-the program is uniquely designed to address the specific educational challenges, cultural

nuances, and strategic digital transformation goals of the GCC and wider Middle Eastern region. However, unlike several European counterparts, the program lacks explicit documentation of its alignment with DigCompEdu or other international competency frameworks, potentially limiting graduate mobility and recognition in global academic and professional markets.

TABLE I. COMPARATIVE ANALYSIS OF AGU MEDU PROGRAM WITH INTERNATIONAL PROGRAMS AND DIGCOMPEDU ALIGNMENT

| Program/Institution | Core Curriculum Focus | Explicit DigCompEdu Alignment | Distinctive Features |
|---|---|---|---|
| AGU MEDu (Bahrain) | Digital education foundations, AI in education, digital transformation, assessment, research thesis | Implicit-covers all six areas but undocumented | Regional contextualization, GCC focus, Arabic/English bilingual capacity |
| UCL Knowledge Lab (UK) | Digital media, learning sciences, coding education, research methods | Explicit-aligned with DigCompEdu for educator preparation | Strong research orientation, European policy connections |
| Harvard GSE (USA) | Learning design, technology innovation, data analytics, leadership | Partial-focus on ISTE standards, limited DigCompEdu | Elite network, US-focused credentialing |
| University of Sydney (Australia) | Learning technologies, instructional design, educational data mining | Implicit-regional standards (AITSL) prioritized | Asia-Pacific focus, strong industry connections |
| Open University (Netherlands) | Open education, learning analytics, educational design | Explicit—full DigCompEdu integration with European focus | OER leadership, European policy influence |

### C. The Imperative for International Standards Alignment

The absence of explicit alignment with frameworks like DigCompEdu represents a significant opportunity for enhancement. As digital education becomes increasingly globalized, employers and academic institutions worldwide increasingly recognize standardized competency frameworks as indicators of graduate quality [10]. The DigCompEdu framework, in particular, has gained traction as a common language for describing educator digital competencies across Europe and beyond [11].

For AGU MEDu graduates seeking international careers or pursuing doctoral studies abroad, documented evidence of how their competencies map to these recognized standards could substantially enhance their competitiveness. This study, therefore, examines not only internal alignment among ILOs, PLOs, and CLOs, but also the external alignment of these outcomes with international professional standards.

## III. THEORETICAL FRAMEWORK

This research is grounded in several interconnected theoretical frameworks that underpin the development, alignment, and assessment of learning outcomes in higher education. These theories provide the lens through which the connection between ILOs, PLOs, and CLOs is analyzed, with particular attention to how international competency frameworks intersect with local curricular design.

### A. Outcomes-Based Education (OBE)

At its core, this study is founded on the principles of Outcomes-Based Education (OBE). OBE is an educational theory that organizes the entire educational system around clearly defined outcomes that all students are expected to demonstrate upon completion of their studies [12]. It represents a fundamental shift from a focus on inputs (e.g., curriculum content, teaching hours) and processes to a focus on the ultimate outcomes of the learning process. The hierarchy of ILOs, PLOs, and CLOs is the primary structural manifestation of OBE, ensuring that every level of the institution is directed toward achieving these demonstrable results. OBE emphasizes the importance of designing down from the ultimate outcomes, meaning that program and course outcomes are derived from the desired graduate attributes [13].

### B. Constructive Alignment

Building upon the foundation of OBE, the specific principle of constructive alignment, developed by Biggs [14, 15], provides the critical operational framework for this research. Constructive alignment is an integrated model that brings together two key concepts:

(1) Constructivism: The idea that students construct their own knowledge and meaning through learning activities.
(2) Alignment: The deliberate design of a curriculum where the learning outcomes, teaching and learning activities, and assessment tasks are all coherently integrated.

As Biggs and Tang [2] state, "The fundamental principle of constructive alignment is that the curriculum is designed so that the learning activities and assessment tasks are aligned with the learning outcomes that are intended in the course" (p. 8). In the context of this study, constructive alignment is not limited to the course level but is scaled up to ensure that course-level activities and assessments (CLOs) are aligned with program goals (PLOs), which in turn are aligned with the institution's mission (ILOs) and, critically, with external professional standards. A misalignment at any level-for example, assessing memorization when the outcome calls for critical evaluation-represents a failure of constructive alignment and undermines the entire OBE model.

### C. Bloom's Taxonomy of Educational Objectives

The practical task of writing effective, measurable, and hierarchically appropriate learning outcomes is guided by

Bloom's Taxonomy [16]. This framework classifies learning objectives into increasingly complex levels of cognitive demand, from basic knowledge and comprehension to synthesis and evaluation. ILOs often encompass higher-order thinking skills (e.g., "critique", "create", "evaluate"), which must then be broken down into the specific, assessable PLOs and CLOs that scaffold student progress toward these advanced capabilities. The taxonomy provides a common language and a structured approach for ensuring that outcomes across all levels target appropriate cognitive skills and are therefore assessable in valid ways.

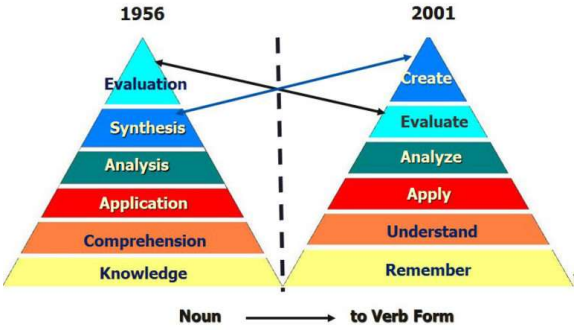



Fig. 1. Bloom's taxonomy revised.

### D. International Competency Frameworks: DigCompEdu

This study extends traditional OBE frameworks by incorporating international competency frameworks as an additional lens for analysis. The European Framework for the Digital Competence of Educators (DigCompEdu) [9] provides a comprehensive model describing what it means for educators to be digitally competent. It comprises six areas:

- **Area 1**: **Professional Engagement**: Using digital technologies for communication, collaboration, and professional development.
- **Area 2: Digital Resources:** Sourcing, creating, and sharing digital resources.
- **Area 3: Teaching and Learning:** Managing and orchestrating the use of digital technologies in teaching and learning.
- **Area 4: Assessment:** Using digital technologies and strategies to enhance assessment.
- **Area 5: Empowering Learners**: Using digital technologies to enhance inclusion, personalization, and learner engagement.
- **Area 6: Facilitating Learners' Digital Competence:** Enabling students to creatively and responsibly use digital technologies.

Each area contains multiple competencies with progression levels from foundational (A1) to pioneering (C2). For graduate programs in digital education, alignment with DigCompEdu serves multiple purposes: it provides external validation of curriculum relevance, ensures graduates develop professionally recognized competencies, and facilitates graduate mobility and employability in international markets [10].

### E. The Assessment Loop and Continuous Improvement

Finally, the study draws on theories of assessment for learning and continuous improvement [6, 17]. The purpose of defining and aligning outcomes is not merely for documentation but to enable meaningful assessment. This process is conceptualized as a cycle or "closing the loop":

(1) Define clear outcomes (ILOs/PLOs/CLOs) aligned with professional standards.
(2) Provide learning experiences aligned with those outcomes.
(3) Assess student performance on the outcomes.
(4) Use the resulting data to improve the curriculum, teaching methods, and learning experiences.

This theoretical model posits that assessment data from CLOs should be aggregated to inform the achievement of PLOs and ILOs, creating a feedback mechanism that drives curricular refinement and ensures the educational program remains effective and relevant [17]. The effectiveness of the alignment between outcomes is ultimately judged by the efficacy of this feedback loop and, increasingly, by the extent to which graduates meet externally validated professional standards.

### F. Synthesis of Theoretical Framework

These theoretical foundations form an integrated framework: OBE provides the overarching "why," constructive alignment provides the "how," Bloom's Taxonomy provides the tool for crafting precise outcomes, DigCompEdu provides the external validation benchmark, and the assessment cycle provides the mechanism for improvement. Together, they offer a robust basis for analyzing both the internal alignment within the MEDu program and its external alignment with international professional standards.

## IV. Literature Review

The effective alignment of Institutional Learning Outcomes (ILOs), Program Learning Outcomes (PLOs), and Course Learning Outcomes (CLOs) forms the structural backbone of Outcomes-based Education (OBE), a paradigm focused on demonstrable student achievement [2]. This section reviews the theoretical rationale for this hierarchical model, examines persistent implementation challenges, synthesizes best practices in digital education, and critically analyzes the role of international competency frameworks in enhancing graduate competitiveness.

### A. Theoretical Foundation and Rationale for Hierarchical Alignment

The OBE framework mandates a coherent cascade of learning objectives, moving from broad institutional aspirations to specific classroom activities. This structure provides pedagogical clarity, shifting focus from teaching inputs to learning products and ensuring all educational components are purposefully directed toward overarching

goals [3, 18]. The hierarchical model is not merely administrative but essential for curriculum design, as it allows for the systematic deconstruction of complex graduate attributes (e.g., critical innovation) into teachable and assessable components across a program, enabling progressive skill scaffolding for students [5]. The primary rationale is that this alignment ensures all educational activities are purposefully directed toward achieving the overarching goals of the institution and the program [18].

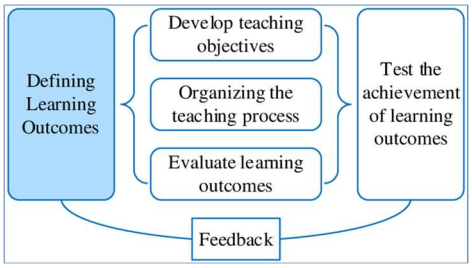



Fig. 2. Outcomes-based Education (OBE) diagram.

### B. Implementation Challenges in Graduate and Professional Programs

Despite its theoretical appeal, a significant "implementation gap" commonly undermines OBE in practice [6]. In graduate and professional programs, two challenges are particularly acute. First, curricular "siloing" often occurs, where courses are developed and delivered in isolation, obscuring their collective contribution to program-level goals and resulting in a fragmented student experience [19]. Second, there is a widespread failure to "close the assessment loop." While data is collected at the course level (CLOs), it is frequently not aggregated or analyzed to evaluate the achievement of higher-level PLOs and ILOs, thus missing opportunities for data-driven program improvement [17].

To bridge this gap, curriculum mapping is advocated as an indispensable tool for visualizing alignment, identifying gaps, and ensuring logical progression [20]. Successful mapping requires clear strategic aims, collaborative faculty engagement acting as a "boundary encounter" to break down silos and robust validation techniques [21, 22]. However, its effectiveness hinges on faculty perceiving its value for collaboration and planning, not merely as a compliance exercise [23].

### C. The Imperative for Dynamic Alignment in Digital Education

The need for robust, dynamic alignment is especially critical in fast-evolving, interdisciplinary fields like digital education. The rapid pace of technological and pedagogical change means that a static curriculum risks swift obsolescence, failing to equip graduates with relevant competencies [24]. This context transforms alignment from an administrative task into a strategic imperative for program relevance and graduate employability.

Recent case studies from digital and technology-focused graduate programs highlight effective strategies:

- Continuous and Responsive Review: Programs must institutionalize processes for regularly updating PLOs and CLOs in direct response to technological shifts and market feedback [25].
- External Alignment with Professional Frameworks: Anchoring PLOs to established competency frameworks (e.g., the European DigCompEdu, ISTE Standards for Educators) ensures that internal learning objectives are validated by external industry standards, enhancing the degree's credibility and graduates' career preparedness [7].
- Authentic, Practice-Based Pedagogy: Alignment is strengthened when CLOs and assessments mirror professional practice, such as incorporating agile methodologies or real-world project sprints into course design [26].

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Emerging trends highlight the future of alignment, including leveraging AI for automated mapping to reduce bias [24] and adopting holistic quality measures that include cultural responsiveness alongside technical alignment [25].

### F. The Role of International Competency Frameworks in Graduate Education

The growing importance of international competency frameworks in graduate education warrants focused attention. The DigCompEdu framework, developed by the European Commission's Joint Research Centre, has emerged as a leading reference for defining educators' digital competencies [9]. Research by Redecker [9] and subsequent validation studies [27] demonstrate that DigCompEdu provides a comprehensive, research-grounded model that transcends national boundaries while remaining adaptable to local contexts.

Several studies have examined the benefits of aligning graduate programs with DigCompEdu:

(1) Enhanced Graduate Mobility: Graduates from programs aligned with DigCompEdu demonstrate competencies recognizable across European and increasingly global contexts, facilitating international career mobility [10].
(2) Quality Assurance Alignment: DigCompEdu alignment provides external benchmarks for program review that complement internal OBE processes, strengthening accreditation outcomes [28].
(3) Professional Identity Development: Explicit engagement with professional frameworks helps students develop professional identities grounded in internationally recognized standards of practice [29].
(4) Curriculum Currency: Regular benchmarking against evolving frameworks like DigCompEdu ensures programs remain responsive to emerging competencies (e.g., AI literacy, data ethics) [30].

However, critics note challenges in framework adoption, including the risk of standardization overriding local contextual needs [31] and the significant faculty development required for meaningful implementation [32]. These tensions suggest that optimal approaches balance international alignment with contextual responsiveness—a consideration particularly relevant for programs serving distinct regional contexts like the GCC.

### G. Emerging Trends and Future Directions

Emerging trends point to the future of alignment, including leveraging AI for automated mapping to reduce bias [33], adopting holistic quality measures that include cultural responsiveness alongside technical alignment [34], and developing dynamic, living curricula that adapt in real-time to technological change [35].

### H. Synthesis and Identified Research Gap

While the literature firmly establishes the value of the OBE framework, curriculum mapping, and international competency alignment, a conspicuous gap remains. There is a scarcity of detailed, contextualized case studies that investigate the practical realities of this alignment within specialized, rapidly-evolving graduate programs in Digital Education, particularly in the Middle Eastern higher education context. Most studies focus on broader institutional levels or traditional disciplines, and few explicitly examine how programs in non-European contexts might strategically engage with frameworks like DigCompEdu to enhance graduate competitiveness while maintaining regional relevance.

This study addresses this gap by conducting an in-depth analysis of the MEDu program at AGU, moving beyond documenting intended internal alignment to critically examine its practical coherence and, crucially its external alignment with international professional standards as a mechanism for enhancing graduate competitiveness in the global digital education marketplace.

## V. Research Methodology

This study employed a qualitative case study design, supplemented by descriptive analysis of student assessment data and benchmarking analysis against the DigCompEdu framework, to explore the alignment of learning outcomes within the Master of Science in Digital Education (MEDu) program [36] at Arabian Gulf University (AGU). The methodology was designed to analyze both the intended curricular design and its initial implementation through the lens of faculty expertise, student performance, and international professional standards.

### A. Research Design

The research followed an intrinsic case study approach [36, 37], focusing on the MEDu program as a critical instance for understanding outcome alignment. To enhance validity, the study utilized triangulation by examining multiple data sources: official documents, expert faculty review, student assessment results, and external benchmarking against the DigCompEdu competency framework.

### B. Participants and Data Sources

Data were drawn from four primary sources:

(1) Program Documents: AGU's Strategic Plan [38], the MEDu Program Specification, and syllabi [39] from eight core courses taught in the 2024/2025 academic year.
(2) Faculty Expertise: Structured reviews and consultations were conducted with a committee of four faculty members from the Department of Instructional Technology and Distance Learning,

including the author (Full Professor), one Associate Professor, and two Assistant Professors. Their feedback focused on the accuracy and clarity of course descriptions, learning outcomes, and assessment reports.

(3) Student Assessment Data: Anonymous performance data from 14 students enrolled across the eight core courses were analyzed. This data included aggregate grades and performance metrics for key assignments mapped to specific Course Learning Outcomes (CLOs).

(4) International Competency Frameworks: The DigCompEdu framework [9] served as an external benchmark for analyzing the program's PLOs and CLOs, enabling assessment of the program's alignment with international professional standards.

### C. Data Collection and Analysis

A three-phase analytical process was used:

- Phase 1: Document & Internal Alignment Analysis: A qualitative content analysis [40] was performed on the program documents. This involved coding for ILO-PLO-CLO connections, which were then validated and refined through iterative discussions with the faculty committee.
- Phase 2: External Benchmarking Analysis: Program Learning Outcomes and representative Course Learning Outcomes were mapped against the six areas and 22 competencies of the DigCompEdu framework. This mapping was conducted collaboratively with the faculty committee to ensure accurate interpretation of both program outcomes and DigCompEdu competencies.
- Phase 3: Implementation Analysis: Student assessment data from the eight courses were descriptively analyzed to identify initial patterns of outcome achievement. This data was reviewed alongside faculty insights on course delivery to contextualize student performance within the designed curriculum framework.

### D. Ethical Considerations

The study received institutional approval. All student data were aggregated and anonymized to protect privacy. Faculty participation was voluntary, and their consultative feedback was incorporated with consent.

### E. Limitations

While incorporating faculty and student data strengthens the analysis beyond pure document review, this study remains a context-specific case. The findings are not statistically generalizable, though they offer transferable insights. Furthermore, the student assessment data provides a snapshot of performance but does not capture the full depth of the learning experience, which would require more extensive qualitative engagement with students. The external benchmarking against DigCompEdu, while rigorous, represents an initial mapping that would benefit from validation through graduate tracking studies.

## VI. Result and Discussion

The analysis reveals a well-structured, intentional alignment across the three tiers of learning outcomes in the MEDu program, creating a coherent educational pathway. However, this alignment remains largely implicit, documented in text rather than through explicit mapping tools, limiting its utility for assessment, continuous improvement, and demonstrating alignment with international professional standards.

### A. Documented Alignment

ILOs to PLOs: The program's 12 PLOs clearly derive from AGU's institutional mission pillars (e.g., discovery, integrity, collaboration). A mapping matrix confirms that each PLO supports multiple ILOs, particularly Knowledge Application, Critical Thinking, and Communication.

TABLE II. Matrix of Institutional Learning Outcomes (ILOs) and Program Learning Outcomes (PLOs)

| PLOs\ILOs | Knowledge Application | Critical Thinking | Communication Skills | Ethical Understanding | Collaboration and Teamwork |
|---|---|---|---|---|---|
| Explore digital education theories and practices | ✔ | ✔ | ✔ | ✔ | ✔ |
| Design effective and innovative digital learning environments | ✔ | ✔ | ✔ | ✔ | ✔ |
| Evaluate and assess digital education systems | ✔ | ✔ | ✔ | ✔ | – |
| Integrate technology for educational purposes | ✔ | ✔ | ✔ | ✔ | ✔ |
| Utilize data and learning analytics | ✔ | ✔ | ✔ | ✔ | – |
| Promote assessment for learning | ✔ | ✔ | ✔ | ✔ | ✔ |
| Develop competencies for digital learning | ✔ | ✔ | ✔ | ✔ | ✔ |
| Manage technological change | ✔ | ✔ | ✔ | ✔ | ✔ |
| Conduct research related to digital | ✔ | ✔ | ✔ | ✔ | – |
| Develop digital solutions for educational | ✔ | ✔ | ✔ | ✔ | – |
| Effectively manage digital education | ✔ | ✔ | ✔ | ✔ | |
| Foster a culture of innovation in | ✔ | ✔ | ✔ | ✔ | ✔ |

TABLE III. MATRIX OF PLOS AND CLOS WITH BLOOM'S TAXONOMY LEVELS

| Course code & No. | Program Learning Outcomes | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Knowledge and understanding | | | | | Skills | | | | | Values, Autonomy, and Responsibility | | | | |
| | K1 | K2 | K3 | K4 | K5 | S1 | S2 | S3 | S4 | S5 | V1 | V2 | V3 | V4 | V5 |
| DE600 | X | | X | X | X | X | X | X | X | X | X | X | X | X | X |
| DE601 | X | X | | | | X | X | | | | X | | | | |
| DE602 | X | X | | X | | X | X | | X | | | X | X | X | X |
| DE603 | X | | X | X | X | X | X | | | X | X | X | | | |
| DE604 | X | X | X | X | | X | | X | X | X | | X | X | X | |
| DE605 | X | X | X | | | X | | X | X | X | | X | X | X | X |
| DE606 | X | X | | X | X | X | X | X | X | | | X | X | X | X |
| DE607 | X | X | X | | | X | X | | | | X | X | | | |
| DE608 | X | X | X | | | X | X | | | | X | X | | | |
| DE610 | X | X | X | | | X | X | | | | X | X | | | |
| GSES520 | X | | | X | | | X | X | | | | | X | | |
| GSES621 | X | | | X | | X | | X | | | X | | | | X |
| Thesis (DE680 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

PLOs to CLOs: Core courses successfully deconstruct PLOs into specific, actionable CLOs. For example, Foundations of Digital Education supports theoretical PLOs, while Managing Digital Transformation aligns with change management PLOs. The Master Thesis Project acts as a capstone, synthesizing multiple PLOs.

### *B. External Alignment with DigCompEdu Framework*

A critical contribution of this study is the systematic mapping of MEDu PLOs against the DigCompEdu framework. Table IV presents this analysis, revealing substantial but undocumented alignment:

TABLE IV. MAPPING OF MEDU PROGRAM LEARNING OUTCOMES TO DIGCOMPEDU COMPETENCY AREAS

| DigCompEdu Area | DigCompEdu Competencies | MEDu PLOs Addressed | Coverage Assessment | Evidence from Curriculum |
|---|---|---|---|---|
| Area 1: Professional Engagement | Organizational communication, professional collaboration, reflective practice, digital CPD | PLO1, PLO8, PLO12 | Strong | DE600 (Foundations) addresses reflective practice; DE605 (Change Management) covers organizational communication |
| Area 2: Digital Resources | Selecting, creating, modifying, managing, protecting, sharing digital resources | PLO2, PLO4, PLO11 | Strong | DE602 (Digital Environments) focuses on resource creation; DE604 (Assessment) covers resource evaluation |
| Area 3: Teaching and Learning | Teaching, guidance, collaborative learning, self-regulated learning | PLO2, PLO3, PLO4, PLO7 | Strong | DE601 (Theories) addresses pedagogical approaches; DE603 (Strategies) covers teaching methods |
| Area 4: Assessment | Assessment strategies, analyzing evidence, feedback, planning | PLO3, PLO5, PLO6 | Strong | DE604 dedicated to Assessment in Digital Education |
| Area 5: Empowering Learners | Accessibility, differentiation, personalization, active engagement | PLO7, PLO9, PLO10 | Moderate | Addressed in DE603 and DE607 (Special Needs) but could be strengthened |
| Area 6: Facilitating Learners' Digital Competence | Information literacy, digital content creation, responsible use, problem-solving | PLO1, PLO2, PLO4, PLO10 | Moderate-Strong | Embedded across multiple courses; explicit in DE600, DE602, and thesis work |

TABLE V. SAMPLE CLO TO DIGCOMPEDU COMPETENCY MAPPING

| Course | Course Learning Outcome (CLO) | DigCompEdu Competency | Proficiency Level |
|---|---|---|---|
| DE600 | Analyze foundational theories of digital education and their implications for practice | 1.3 Reflective practice | B2 |
| DE602 | Design a digital learning environment using appropriate technologies and pedagogical approaches | 2.2 Creating/modifying digital resources; 3.1 Teaching | B2 |
| DE604 | Develop and implement assessment strategies utilizing digital tools and analytics | 4.1 Assessment strategies; 4.2 Analyzing evidence | B2–C1 |
| DE607 | Design inclusive digital learning experiences for learners with special needs | 5.1 Accessibility; 5.2 Differentiation | B2 |
| DE680 (Thesis) | Conduct original research contributing to knowledge in digital education | 6.4 Problem-solving; 1.3 Reflective practice | C1 |

Key findings from external benchmarking:

(1) Substantial Implicit Alignment: The MEDu program addresses all six DigCompEdu areas, with particularly strong coverage of Areas 1–4. Areas 5 (Empowering Learners) and 6 (Facilitating Learners' Digital Competence) are addressed, but with less explicit focus.

(2) Documentation Gap: Despite this substantive alignment, no documentation exists mapping PLOs to DigCompEdu or communicating this alignment to students, employers, or accreditation bodies.

(3) Competency Language Mismatch: While the program develops DigCompEdu-aligned competencies, it uses locally developed outcome language that may not be immediately recognizable to international audiences.

(4) Progression Invisibility: The curriculum lacks explicit articulation of how students' progress through DigCompEdu proficiency levels (from A1 to C2) across the program.

Table V provides a detailed mapping of selected CLOs to specific DigCompEdu competencies, demonstrating the depth of implicit alignment.

This mapping reveals that MEDu graduates are being prepared at proficiency levels (B2–C1) consistent with master's-level expectations in European contexts, yet this achievement remains unacknowledged in program documentation.

### C. Identified Critical Gaps

Despite strong design, five key gaps hinder full OBE implementation and international competitiveness:

(1) Lack of Explicit Internal Mapping: No visual curriculum map exists to explicitly link CLOs↔PLOs↔ILOs, obscuring coverage, redundancies, and progression.
(2) Broken Assessment Loop: Course-level assessment data is not aggregated to evaluate PLO/ILO achievement, preventing data-driven program improvement and evidence-based external reporting.
(3) Absence of External Benchmarking Documentation: Despite substantive alignment with DigCompEdu, this alignment is undocumented, unvalidated, and uncommunicated representing a missed opportunity for enhancing graduate competitiveness and program recognition.
(4) Static Curriculum: No formal process exists for periodic review and update of outcomes, risking obsolescence in the fast-evolving digital education field and failure to keep pace with evolving international frameworks.
(5) Insular Program Validation: PLOs are validated only through internal processes, lacking the external credibility that comes from documented alignment with internationally recognized competency frameworks.

### D. Discussion: Implications for Graduate Competitiveness

The finding that MEDu substantively addresses DigCompEdu competencies without documenting this alignment has significant implications for graduate competitiveness. As digital education becomes increasingly globalized, employers and academic institutions increasingly rely on recognized frameworks to evaluate candidate qualifications [10].

For graduates seeking international employment, the absence of documented DigCompEdu alignment means:

- They cannot easily communicate their competencies using an internationally recognized language
- Their qualifications may be undervalued compared to graduates from programs with explicit framework alignment
- They lack the credentialing advantage that comes from framework aligned program documentation

For graduates pursuing doctoral studies, the gap means:

- International admissions committees lack familiar benchmarks for evaluating their preparation
- The substantial research competencies developed (evidenced in thesis work) may not be immediately recognized
- Credit transfer and advanced standing opportunities may be diminished

For the program's regional mission, the gap represents a tension: while the program successfully contextualizes digital education for GCC needs, it has not yet developed the bilingual competency of articulating regional relevance in internationally recognized terms.

### E. Recommendations for Enhancement

To address these gaps and transition from implicit design to explicit, internationally-engaged OBE, the following evidence-based recommendations are proposed:

#### *1) Develop a Dynamic, Collaborative Curriculum Map with International Framework Integration*

Create a visual, interactive map that explicitly links all CLOs to PLOs, ILOs, and DigCompEdu competencies. This tool should be developed collaboratively by faculty, as recommended by Beverley, Cowie, and Furness [22], framing mapping as a "boundary encounter" that breaks down silos and fosters shared ownership. The map should:

- Show progression through DigCompEdu proficiency levels across the program
- Identify gaps in international framework coverage
- Enable faculty to see collective contribution to internationally-recognized graduate competencies

#### *2) Institute a Systematic Program-Level Assessment Cycle with External Benchmarking*

Implement a formal process where CLO assessment data is aggregated and analyzed annually to evaluate PLO achievement and DigCompEdu competency development. This cycle should follow Banta and Palomba's [17] model, where data directly informs decisions about curriculum adjustment, while also generating evidence for external stakeholders about the program's alignment with international standards.

#### *3) Establish a Standing Curriculum Review Committee (CRC) with International Advisory Input*

Mandate a CRC, comprising faculty, external stakeholders, and international advisors, to conduct biennial reviews of the program's outcomes, alignment, and content. This committee should:

- Use data from the assessment cycle
- Scan the evolving digital education landscape, including updates to DigCompEdu and other frameworks
- Track graduate career outcomes and international placement success
- Recommend timely updates to maintain both regional relevance and international competitiveness

#### *4) Systematically Align and Communicate External Benchmarking*

Proactively map all PLOs to major international competency frameworks (DigCompEdu, ISTE Standards

for Educators, UNESCO ICT Competency Framework) and document this alignment in all program materials, including:

- Program specifications and handbooks
- Course syllabi
- Marketing and recruitment materials
- Graduate transcripts and supplementary credentials
- Accreditation and quality assurance submissions

This documentation should clearly articulate how the program's regional focus complements its international alignment, positioning graduates as possessing both contextual understanding and globally-recognized competencies.

*5) Develop a Framework Communication Strategy for Stakeholders*

Create targeted communications about the program's international framework alignment for different stakeholders:

- For prospective students: Articulate how DigCompEdu alignment enhances global career mobility
- For current students: Integrate framework awareness into the curriculum, helping students develop professional identities grounded in international standards
- For employers: Translate program competencies into DigCompEdu language to facilitate graduate recognition
- For international partners: Use framework alignment to articulate program quality and facilitate collaboration

*6) Pursue International Network Engagement*

Actively engage with international networks and initiatives related to DigCompEdu, including:

- Participation in European and international conferences on digital competence
- Collaboration with institutions already implementing DigCompEdu
- Contribution to discussions on adapting frameworks for non-European contexts
- Exploration of formal recognition or endorsement pathways

### *F. Addressing the Tension Between Regional Relevance and International Alignment*

A legitimate concern in recommending international framework alignment is the potential tension with regional contextualization. However, this need not be a zero-sum choice. The most effective approach treats frameworks like DigCompEdu as common languages for describing competencies, not as prescriptive curricula that override local needs.

For the MEDu program, this means:

- Using DigCompEdu to communicate competencies developed through regionally-relevant content and examples
- Maintaining GCC-focused cases, challenges, and applications while articulating how these develop internationally-recognized capabilities
- Contributing to discussions about how DigCompEdu might be adapted or supplemented for Middle Eastern contexts
- Positioning graduates as bilingual professionals fluent in both regional educational contexts and international professional discourse

This approach transforms potential tension into competitive advantage, producing graduates who understand local needs while speaking the global language of digital education competence.

## VII. Conclusion

This case study affirms that the Master of Science in Digital Education (MEDu) program at Arabian Gulf University exhibits a thoughtfully designed, intentional alignment across institutional, program, and course learning outcomes. This structural coherence provides a solid foundation rooted in the principles of Outcomes-Based Education (OBE). Critically, the study's external benchmarking analysis reveals that the program substantively addresses the competencies outlined in the European DigCompEdu framework, covering all six areas with particular strength in professional engagement, digital resources, teaching and learning, and assessment.

However, the analysis reveals that this alignment-both internal and external-remains predominantly implicit and document-centric. The absence of explicit curriculum mapping, a systematic mechanism for aggregating assessment data to evaluate program-level outcomes, a formalized process for dynamic curricular review, and documented alignment with international competency frameworks constitutes a significant "implementation gap" that directly impacts graduate competitiveness. While MEDu graduates develop competencies comparable to those from European programs with explicit DigCompEdu alignment, they lack the credentialing advantage and communicative power that documented framework alignment provides in international academic and professional markets.

To transition from robust design to demonstrable educational effectiveness and enhanced graduate competitiveness, the program must formalize its alignment architecture and explicitly engage with international professional standards. This requires the development of a dynamic curriculum map that visualizes both internal and external alignment, the establishment of a closed-loop.

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