

From Procedural Dependency to Scholarly Autonomy: Evaluating the Impact of the FOI–AIMIL Authentic Assessment Framework on Postgraduate Information Science Students

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ABSTRACT

Contemporary postgraduate education faces growing pressure to cultivate transferable, higher-order competencies that transcend rote knowledge acquisition. This qualitative case study examines the pedagogical impact of the Festival of Ideas–AI-Mediated Information Literacy (FOI–AIMIL) authentic assessment framework on postgraduate students enrolled in IML630 (Library Analytics and Metrics) and IMC701 (Seminar on Information Science) at Universiti Teknologi MARA (UiTM). The FOI–AIMIL framework integrates field-based participation in a national Festival of Ideas with AI-mediated information literacy scaffolding and continuous digital mentoring delivered through WhatsApp. Employing a naturalistic qualitative dataset of WhatsApp communications spanning the pre-, during-, and post-assessment phases, the study applies Braun and Clarke's reflexive thematic analysis to trace cognitive, behavioural, and affective learning transformations. The theoretical framework draws on Kolb's Experiential Learning Theory, Bloom's Revised Taxonomy, and Constructivist Pedagogy to interpret the findings. Four overarching themes emerged from the analysis: (1) From Logistical Anxiety to Reflective Inquiry; (2) AI-Mediated Scaffolding and Critical Engagement; (3) Collaborative Knowledge Construction in Digital Spaces; and (4) Emergent Scholarly Identity and Metacognitive Awareness. The analysis reveals a discernible and progressive shift from procedural dependency and logistical anxiety to demonstrable scholarly autonomy, methodological confidence, and reflective practice. The study contributes to the authentic assessment literature by demonstrating how AI-mediated information literacy instruction, when embedded within a structured experiential framework, can catalyse higher-order learning among postgraduate information science students. While situated within a single Malaysian public university, the findings provide an analytically transferable model for authentic AI-mediated assessment that may inform comparable postgraduate learning contexts. Findings carry significant implications for curriculum designers, academic developers, and policymakers in higher education seeking to build AI-augmented, authentically designed pedagogical environments.

Keywords: authentic assessment, AI-mediated information literacy, FOI–AIMIL, experiential learning, postgraduate education, WhatsApp mentoring, thematic analysis

INTRODUCTION

Contemporary higher education is undergoing unprecedented transformation, driven by the dual imperatives of digital disruption and evolving epistemological demands. As postgraduate programmes increasingly position themselves as crucibles of scholarly inquiry rather than repositories of content knowledge (Bearman et al., 2022; Villarroel et al., 2023), educators are compelled to rethink assessment not merely as measurement but as a medium of learning itself. In this context, authentic assessment, defined broadly as the design of performance tasks that replicate the challenges, uncertainties, and audience's characteristic of real-world professional practice,

has emerged as a pedagogically robust alternative to conventional examinations (Gulikers et al., 2004; Tai et al., 2023).

The rapid proliferation of Artificial Intelligence (AI) tools in academic settings has introduced a further layer of complexity. The advent of large language models and generative AI platforms has simultaneously enriched and unsettled pedagogical practice (Mollick & Mollick, 2023; Zawacki-Richter et al., 2024). Educators in information science (a discipline inherently engaged with knowledge organisation, retrieval, and critical evaluation) are uniquely positioned to integrate these tools meaningfully into curriculum design. Information literacy, long positioned as the cornerstone of information science education (ACRL, 2016), must now encompass AI literacy, algorithmic awareness, and the critical appraisal of machine-generated content (Warschauer & Xu, 2024; CILIP, 2023).

Against this backdrop, the Festival of Ideas–AI-Mediated Information Literacy (FOI–AIMIL) framework was developed and implemented at Universiti Teknologi MARA (UiTM) as an innovative authentic assessment architecture. FOI–AIMIL situates postgraduate students as active knowledge producers within a national intellectual festival, requiring them to apply information literacy competencies, engage with AI-mediated research tools, and document their scholarly processes through reflective digital communication. The framework operationalises authentic assessment principles by demanding that students perform tasks of genuine intellectual consequence for audiences beyond the classroom (Herrington et al., 2010; Ashford-Rowe et al., 2014). The FOI–AIMIL Pedagogical Model is registered under Malaysian intellectual property law (MyIPO Registration No. CRAR2026E05539) and was conceptualised by the sole inventor as a systematic response to identified gaps in postgraduate information literacy pedagogy.

The platform through which continuous mentoring was delivered, WhatsApp, reflects the growing recognition that mobile-mediated communication constitutes a significant, if undertheorised, dimension of postgraduate learning ecologies (Bouhnik & Deshen, 2014; Rambe & Bere, 2022). Unlike formal learning management systems, WhatsApp communications are informal, immediate, and affectively rich, offering a naturalistic window into the evolving epistemic dispositions of learners in real time.

This study is situated within the broader discourse on postgraduate pedagogy, authentic assessment, and AI-augmented learning. It responds to calls in the literature for empirical evidence regarding the impact of AI-mediated frameworks on higher-order thinking in information science education (Limberg et al., 2022; Marcum, 2023). By drawing on WhatsApp communications as a naturalistic qualitative dataset, the study captures the unmediated, temporally embedded voice of students navigating a novel and intellectually demanding assessment environment.

The research questions guiding this study are as follows: (1) How do postgraduate students' cognitive, behavioural, and affective orientations shift across the FOI–AIMIL assessment lifecycle? (2) In what ways does the FOI–AIMIL framework facilitate the development of AI-mediated information literacy competencies? (3) What role does continuous digital mentoring via WhatsApp play in fostering scholarly autonomy among postgraduate information science students?

The remainder of this article is structured as follows: Section 2 presents a comprehensive review of the relevant literature; Section 3 details the qualitative methodology employed; Section 4 presents the thematic findings; Section 5 discusses these findings in relation to the theoretical framework and contemporary research; Section 6 outlines practical implications; and Section 7 presents the study's limitations; Section 8 presents a future research agenda; and Section 9 concludes.

LITERATURE REVIEW

Authentic Assessment in Higher Education

The concept of authentic assessment has evolved substantially since Wiggins' (1990) foundational argument that assessments should replicate the "messy" problems that practitioners encounter in professional life. Subsequent theorisation by Gulikers et al. (2004) introduced a five-dimensional framework encompassing the task itself, the

physical context, the social context, the assessment form, and the criteria, arguing that authenticity must be perceived by students as well as designed by educators. More recent scholarship has extended this framework to digital and hybrid learning environments, where authenticity is mediated by technological interfaces and collaborative platforms (Tai et al., 2023; Bearman et al., 2022).

In postgraduate education specifically, authentic assessment serves a dual function: it validates disciplinary knowledge acquisition while simultaneously developing the scholarly identity and metacognitive capacity associated with advanced academic practice (Ajjawi et al., 2020; Boud & Falchikov, 2022). Research consistently demonstrates that assessment designs requiring students to engage with genuine professional or intellectual challenges produce deeper learning, stronger knowledge retention, and greater capacity for self-regulated study (Sokolic et al., 2022; Villarroel et al., 2023). The integration of genuine audiences, professional standards, and real-world consequences into assessment design is now widely recognised as a defining feature of transformative, as opposed to merely credentialling, assessment architectures (Tai et al., 2023). Challenges produce deeper learning, stronger knowledge retention, and greater capacity for self-regulated study (Sokolic et al., 2022; Villarroel et al., 2023). The integration of genuine audiences, professional standards, and real-world consequences into assessment design is now widely recognised as a defining feature of transformative, as opposed to merely credentialling, assessment architectures (Tai et al., 2023).

Experiential Learning and Constructivist Pedagogy

The theoretical architecture of FOI–AIMIL draws substantially on Kolb's (1984) Experiential Learning Theory (ELT), which proposes a cyclical model of learning comprising concrete experience, reflective observation, abstract conceptualisation, and active experimentation. ELT has been applied widely in professional and graduate education as a framework for designing learning activities that connect lived experience to conceptual knowledge construction (Kolb & Kolb, 2023; Passarelli & Kolb, 2012). The FOI–AIMIL framework enacts this cycle by requiring students to participate in a live intellectual event (concrete experience), reflect on their processes through WhatsApp dialogue (reflective observation), synthesise their learning against scholarly frameworks (abstract conceptualisation), and apply emergent understanding to academic deliverables (active experimentation).

Constructivist pedagogy, originating with Vygotsky's (1978) sociocultural theory, provides a complementary theoretical lens. The Zone of Proximal Development (ZPD) offers a productive conceptual frame for understanding the role of mentoring within FOI–AIMIL: continuous WhatsApp interactions between the educator and students constitute a form of scaffolding within students' ZPDs, progressively withdrawing support as competence develops (Wood et al., 1976; Van de Pol et al., 2022). Social constructivism foregrounds the dialogic nature of knowledge construction, emphasising that learning is fundamentally shaped by interaction with more knowledgeable others, a principle the FOI–AIMIL framework operationalises through its embedded mentoring architecture (Kim, 2001; Jonassen, 1991). FOI–AIMIL framework operationalises through its embedded mentoring architecture (Kim, 2001; Jonassen, 1991).

Information Literacy and AI Literacy in the Digital Age

Information literacy has long occupied a central position in information science education, defined by major professional bodies as encompassing the ability to recognise information needs and to locate, evaluate, and ethically apply information (ACRL, 2016; CILIP, 2018). However, the rapid integration of AI into information environments has demanded significant reconceptualisation (Bawden & Robinson, 2022). Scholars increasingly argue for an expanded hybrid conception that incorporates AI literacy, defined as the capacity to critically evaluate, interact with, and apply AI-generated content, as a constitutive element of contemporary information literacy (Warschauer & Xu, 2024; Long & Magerko, 2020).

The SIFT framework (Stop, Investigate the source, Find better coverage, Trace claims) has emerged as a practically grounded approach to navigating the contemporary information landscape, particularly in the context of AI-generated content (Caulfield, 2017; McGrew et al., 2021). Its integration within FOI–AIMIL operationalises critical appraisal as a real-time, embedded competency rather than a discrete instructional objective. Kasneci et al. (2023) argue that AI can serve as an adaptive scaffolding tool, providing personalised feedback and supporting metacognitive development when integrated thoughtfully within pedagogy. FOI–AIMIL's AI-mediated component seeks to harness these affordances while simultaneously developing students' critical appraisal of the tools themselves, a disposition Marcum (2023) identifies as essential for the contemporary information professional.

WhatsApp as a Mobile-Mediated Learning Environment

The use of WhatsApp in educational contexts has attracted growing scholarly attention, particularly in universities where mobile connectivity complements or exceeds institutional infrastructure (Rambe & Bere, 2022; Mwelese & Wanyama, 2021). Research documents WhatsApp's capacity to support collaborative knowledge construction, provide timely feedback, and sustain informal learning communities outside scheduled instructional time (Bouhnik & Deshen, 2014; Ngaleka & Uys, 2013). In postgraduate contexts specifically, WhatsApp-mediated mentoring has been associated with reduced isolation, increased scholarly confidence, and more responsive supervisor-student relationships (Isiaq, 2020; Riyami et al., 2023).

The affective dimension of WhatsApp communication, with its informal register, immediacy, and conversational texture, distinguishes it from formal academic communication, rendering it a particularly revealing site for observing authentic epistemic development. Students' unguarded expressions of uncertainty, breakthrough, frustration, and confidence in WhatsApp exchanges provide a naturalistic record of learning transformation that formal assessment instruments rarely capture (Mbukusa, 2018; Uzunboylu et al., 2022). This study exploits this affordance, treating WhatsApp not merely as a delivery platform but as a primary data source.

Postgraduate Information Science Education in the Malaysian Context

Malaysian higher education has undergone substantial reform since the implementation of the Malaysian Qualifications Framework (MQF 2.0, 2024), which mandates the integration of digital competencies, critical thinking, and ethical reasoning across all qualification levels. UiTM, as a public university with a significant postgraduate enrolment, has been at the forefront of developing innovative pedagogical responses to these mandates (Ismail et al., 2024). The integration of authentic assessment and AI-mediated information literacy within IML630 and IMC701 reflects a broader institutional commitment to developing graduates capable of navigating complex, digitally mediated professional environments (Nordin et al., 2022; Hashim et al., 2023). Research on information literacy education in Malaysian institutions has historically emphasised compliance-oriented approaches; the FOI–AIMIL framework represents a substantive departure toward competency-centred, experientially grounded pedagogy.

METHODOLOGY

Research Design

This study employs a qualitative case study design (Yin, 2018; Creswell & Poth, 2022), selected for its capacity to illuminate complex, context-dependent phenomena within a bounded system, specifically the cohort of postgraduate students enrolled in IML630 and IMC701 at UiTM during the 2025–2026 academic session. The case study approach permits the holistic, interpretive inquiry required to capture the multidimensional learning transformations that the FOI–AIMIL framework is designed to produce. A single embedded case design was adopted, with the two course cohorts constituting embedded units of analysis within the overarching case of the FOI–AIMIL authentic assessment.

Rather than seeking statistical generalisation, the study aims for analytical transferability (Yin, 2018), whereby theoretical insights regarding AI-mediated authentic assessment may inform similar postgraduate educational

contexts beyond UiTM, subject to contextual adaptation and interpretive judgement by practitioners and researchers in comparable settings.

The FOI–AIMIL Assessment Framework

The FOI–AIMIL authentic assessment required participating students to fulfil three interdependent components: (1) physical and intellectual participation in a nationally recognised Festival of Ideas event; (2) systematic application of AI-mediated information literacy tools (encompassing large language model platforms, AI-enhanced scholarly databases, and SIFT-informed verification protocols) to locate, evaluate, and synthesise information relevant to the event’s thematic focus; and (3) production of an academic deliverable comprising a reflective scholarly report and a conference-style extended abstract. Continuous mentoring was provided throughout by the course instructor via WhatsApp, creating a responsive, mobile-mediated scaffolding environment.

The AI-mediated component of FOI–AIMIL was operationalised through a suite of deliberately selected platforms, each serving a distinct pedagogical function within the information literacy workflow. Table 1 presents the AI components integrated into the framework, their designated purposes, and the associated student activities.

Table 1

AI Components within FOI–AIMIL

AI Component	Purpose	Student Activity
ChatGPT	Idea generation	Brainstorming and initial conceptualisation of thematic arguments
Perplexity AI	Evidence verification	Comparing AI-generated claims against authoritative sources
Consensus	Research synthesis	Literature exploration and identification of scholarly consensus
Scopus AI	Scholarly retrieval	Identifying and accessing peer-reviewed articles relevant to festival themes
Google Scholar	Citation checking	Verification of references and cross-source authentication
SIFT Framework	AI output verification	Hallucination detection, claim tracing, and critical appraisal of AI responses

Note. SIFT = Stop, Investigate the source, Find better coverage, Trace claims to the original. All platforms were used as cognitive scaffolds under the instructor’s SIFT protocol.

Importantly, the integration of AI tools within FOI–AIMIL was governed by a strict scaffolding protocol grounded in information literacy principles. Students were explicitly prohibited from directly copying or reproducing AI-generated output in their academic submissions. AI platforms functioned exclusively as instruments of inquiry rather than instruments of production: every AI-generated response was required to be independently verified, interrogated, and critically appraised before integration into students’ scholarly work. The course instructor modelled this verification practice in real time via WhatsApp, demonstrating prompting strategies, hallucination identification techniques, and source-tracing procedures as embedded elements of the AI-mediated workflow. This scaffolded approach ensured that AI tools enhanced rather than bypassed higher-order scholarly thinking.

Figure 1 below maps the FOI–AIMIL framework onto Kolb’s Experiential Learning Cycle, illustrating how each assessment component corresponds to a distinct phase of experiential knowledge construction.

Figure 1

FOI–AIMIL Framework Mapped onto Kolb's Experiential Learning Cycle

Concrete Experience	Reflective Observation	ABSTRACT Conceptualisation	Active Experimentation
Festival of Ideas participation	WhatsApp dialogue & mentoring	Scholarly framework synthesis	Report & abstract production

Note. Each quadrant represents a distinct phase of the FOI–AIMIL assessment lifecycle, mapped to the corresponding stage of Kolb's (1984) Experiential Learning Theory.

Figure 2 below presents the complete FOI–AIMIL Transformative Learning Model as a sequential flow of pedagogical stages, illustrating the full progression from authentic assessment design through higher-order learning outcomes.

Figure 2

The FOI–AIMIL Transformative Learning Model: Sequential Stages of Pedagogical Transformation



Note. The model depicts the sequential yet iterative progression of learning transformation across the FOI–AIMIL lifecycle. Each stage generates the conditions necessary for the next, culminating in higher-order scholarly competency. Stages 2–5 correspond to the FOI–AIMIL framework's three integrated components: authentic event participation (Stage 2), AI-mediated inquiry (Stage 3), and WhatsApp-mediated scaffolding with structured reflective production (Stages 4–5).

Data Sources and Collection

The primary data corpus comprised WhatsApp communications exchanged between the course instructor and student participants across three temporally defined phases: pre-assessment (task introduction and preparation), during-assessment (active Festival of Ideas participation), and post-assessment (reflective consolidation and submission). Communications included text messages, voice-note transcriptions, document shares, and image

annotations. A total of approximately 340 individual message exchanges were collected across the two course cohorts, encompassing 13 participants ($n = 7$ in IML630; $n = 6$ in IMC701). Demographic data were not collected beyond programme of enrolment, in accordance with the study's ethical clearance conditions.

Although WhatsApp communications constituted the primary empirical dataset, these conversations represented naturally occurring interactions generated throughout the assessment process rather than researcher-elicited responses. Such naturally occurring discourse captures students' authentic cognitive, behavioural, and affective development in real time, thereby reducing the retrospective bias commonly associated with post-hoc interview or survey instruments. The longitudinal, multi-modal character of the dataset, spanning text messages, voice-note transcriptions, document shares, and image annotations across three temporally defined phases, further enhances its capacity to document learning transformation as a dynamic, unfolding process.

Thematic Analysis

Data were analysed using Braun and Clarke's (2006, 2019) reflexive thematic analysis methodology, selected for its flexibility, rigour, and suitability for capturing latent as well as semantic-level meaning within naturalistic datasets. The analysis proceeded through six iterative phases: (1) data familiarisation through repeated reading and annotation; (2) initial code generation applied systematically across the full corpus; (3) theme development by clustering related codes; (4) theme review and refinement against the coded data and the full dataset; (5) theme naming; and (6) report production. Coding was conducted manually using a systematic colour-coding scheme applied to transcribed WhatsApp data, with codes categorised under three superordinate domains: cognitive, behavioural, and affective transformation. A codebook was developed inductively from the data and subsequently mapped against Kolb's ELT and Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) to identify correspondences and tensions. Thematic saturation was reached after analysis of approximately 78% of the corpus.

Trustworthiness

Trustworthiness was established in accordance with Lincoln and Guba's (1985) criteria of credibility, transferability, dependability, and confirmability. Credibility was enhanced through prolonged engagement with the data, triangulation across the three assessment phases and two course cohorts, and member checking, wherein thematic summaries were shared with a subsample of five participants for verification. Transferability was supported through thick description of the assessment context, institutional setting, and participant profile. Dependability was addressed through a detailed audit trail of analytical decisions. Confirmability was maintained through reflexive journaling by the researcher throughout the analysis process, in line with Braun and Clarke's (2019) emphasis on researcher reflexivity as a constitutive element of rigorous thematic analysis.

Temporal triangulation across the pre-, during-, and post-assessment phases enabled the researcher to examine consistency and evolution in students' learning trajectories over time, thereby strengthening interpretive credibility despite reliance on a single communication platform. The progressive nature of the dataset, documenting the same participants across an extended assessment lifecycle, enabled identification of trajectory patterns and inflection points that single-point data collection could not capture.

Although formal interviews and structured observations were not conducted, methodological triangulation was achieved through multiple naturally occurring data modalities, including text messages, voice-note transcripts, document sharing, and image annotations. Cross-cohort triangulation across IML630 and IMC701 enabled comparative analysis of learning trajectories across two distinct postgraduate programme contexts. Member checking with five participants, peer debriefing with a colleague in information science education, and iterative code review across the full analytical cycle collectively constitute a rigorous qualitative triangulation framework consistent with the standards of the field (Creswell & Poth, 2022; Lincoln & Guba, 1985).

Positionality

The researcher, who served simultaneously as course instructor and primary investigator, acknowledges the inherent positionality that this dual role engenders. As the designer and implementer of the FOI-AIMIL

framework, the researcher holds an invested perspective on its efficacy. To mitigate potential influence on the analysis, students' own discursive constructions were privileged over interpretive overlays, and peer review of emerging codes was sought from a colleague in information science education unfamiliar with the specific cohort.

Ethical Considerations

Ethical approval was obtained through the UiTM Research Ethics Committee. Participants were fully informed of the research purpose, the voluntary nature of participation, and their right to withdraw without academic consequence. All WhatsApp data were stored on encrypted institutional servers. Participant anonymity was ensured through alphanumeric pseudonyms (P01–P13) throughout data reporting. Participants provided written informed consent confirming their awareness that communications constituted research data. Participant excerpts are presented in their original form with minor grammatical regularisation where necessary for readability.

FINDINGS

The thematic analysis generated four overarching themes capturing the cognitive, behavioural, and affective trajectory of students across the FOI–AIMIL assessment lifecycle. Table 2 presents the full thematic structure, and representative WhatsApp excerpts are embedded under each theme as primary evidence. Participant codes indicate cohort and pseudonym (e.g., P07, post-assessment).

Table 2

Thematic Structure of FOI–AIMIL Learning Transformation

Theme	Sub-themes	Domain(s)	Sample Codes
1. From Logistical Anxiety to Reflective Inquiry	Procedural uncertainty; shifting epistemic register; retrospective synthesis	Cognitive / Affective	task clarification; analytical questioning; self-directed inquiry
2. AI-Mediated Scaffolding and Critical Engagement	Instrumental AI dependency; SIFT-informed appraisal; transferable AI-critical dispositions	Cognitive / Behavioural	AI tool misuse; source triangulation; hallucination detection
3. Collaborative Knowledge Construction in Digital Spaces	Peer knowledge exchange; emergent review norms; shared intellectual curiosity	Behavioural	WhatsApp peer exchange; voluntary draft sharing; co-referencing
4. Emergent Scholarly Identity and Metacognitive Awareness	Self-recognition as knowledge producer; reading-practice transformation; reflective articulation	Affective / Cognitive	scholarly identity statements; habit-of-mind language; self-evaluative commentary

Note. Domains refer to the primary dimension of learning transformation: Cognitive (C), Behavioural (B), and Affective (A). Sub-themes and sample codes were generated inductively from the WhatsApp corpus and subsequently mapped to Kolb's (1984) Experiential Learning Theory and Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001).

Theme 1: From Logistical Anxiety to Reflective Inquiry

In the pre-assessment phase, communications were characterised by procedural uncertainty, logistical preoccupation, and affective anxiety. Students' messages foregrounded task requirements, logistical arrangements, and requests for procedural clarification rather than substantive intellectual engagement, reflecting a surface-oriented, dependency-driven orientation consistent with the early stages of Kolb's concrete experience phase.

P04 [pre-assessment]: "Prof, just want to confirm — we need to submit our report by when? And do we have to physically attend the whole festival or just one session?"

P11 [pre-assessment]: "I honestly don't know where to start. Never done anything like this for an assessment before."

P02 [pre-assessment]: "Can I just use journal articles I already have, or does it have to be related to what we hear at the festival?"

As the Festival of Ideas progressed, however, a perceptible and qualitative shift in communicative register was observed. Students began to pose substantive intellectual questions, frame their observations in scholarly terms, and express curiosity about conceptual dimensions of their lived experience. This transition reflects the movement from concrete experience into Kolb's reflective observation phase, the moment at which direct experience becomes the object of deliberate intellectual scrutiny.

P07 [during-assessment]: "Prof, I was listening to the panel discussion, and I kept thinking about how the speaker's argument on digital trust relates to what we read about information credibility. Can I use this in my analysis?"

P03 [during-assessment]: "Something interesting happened today. I started noticing how different panellists used completely different kinds of evidence to support the same claim. Made me think about source evaluation differently."

P09 [during-assessment]: "The keynote changed the way I'm thinking about my research question. I think I need to revisit my literature review now."

By the post-assessment phase, students' communications reflected a qualitatively different epistemic orientation, one characterised by retrospective synthesis, self-directed questioning, and the integration of experience with scholarly frameworks, corresponding to the abstract conceptualisation and active experimentation stages of Kolb's cycle.

P09 [post-assessment]: "Looking back at my notes, I can see how my thinking actually changed during the festival. I started asking different kinds of questions by Day 2. I want to write about that in my reflective section."

P05 [post-assessment]: "I didn't expect to care this much about the topic. But after attending the sessions I actually want to keep reading about it. That's new for me."

Theme 2: AI-Mediated Scaffolding and Critical Engagement

A second prominent theme concerned students' evolving relationship with AI tools as instruments of scholarly inquiry. Initial engagements with AI platforms were characterised by instrumental dependency: students sought AI-generated summaries and paraphrases as shortcuts to task completion, consistent with Bloom's lower-order cognitive levels of recall and comprehension. The instructor's WhatsApp responses consistently redirected students toward critical appraisal using the SIFT framework, modelling source verification and triangulation as real-time scholarly practices.

P06 [pre-assessment]: "I used ChatGPT to summarise the article but it gave me something a bit different from what the article actually says. Confused now."

Instructor [pre-assessment]: "Good instinct, P06. That's exactly why we apply SIFT. Go back to the original article — what does it actually claim? Where does the AI version diverge? Document that divergence — it's analytically interesting."

P01 [pre-assessment]: "The AI gave me five references that I can't find anywhere. Are these real? What do I do with them?"

By the during- and post-assessment phases, students demonstrated markedly increased capacity for AI-critical engagement, including the ability to identify limitations, biases, and hallucinations in AI-generated content. This trajectory maps onto the higher-order cognitive levels of Bloom's Revised Taxonomy, specifically analysis, evaluation, and, in several cases, creation of original scholarly argument, suggesting that the framework successfully scaffolded the transition from instrumental to critical AI use.

P12 [post-assessment]: "I fact-checked three of the AI-generated references and two of them don't exist. I've started doing this automatically now."

P05 [post-assessment]: "I think the most important thing I learned was not to trust AI output without checking. It's a starting point, not the final answer."

P08 [post-assessment]: "I can actually see where the AI is making things up now. It fills in gaps confidently when it doesn't know something. I never noticed that before."

Theme 3: Collaborative Knowledge Construction in Digital Spaces

The WhatsApp environment functioned not merely as a channel for instructor-student communication but as a collaborative knowledge construction space. Students began spontaneously sharing resources, cross-referencing each other's observations, and co-constructing interpretive frameworks, a dynamic consistent with Vygotsky's (1978) emphasis on the socially distributed nature of higher-order thinking and the emergence of informal communities of practice around shared intellectual challenges.

P02 [during-assessment]: "P08, did you attend the third session? I think the speakers were contradicting what we read in Week 6. What do you think?"

P08 [post-assessment]: "We ended up spending two hours comparing notes on the WhatsApp group after the festival. Not even for the assessment — just because we were all curious about the same thing."

P10 [during-assessment]: "I just shared a paper in the group — it backs up what the keynote was saying but from a completely different angle. Thought everyone would find it useful."

This collaborative dynamic extended into the formation of informal peer review practices, with students voluntarily sharing draft sections and inviting critique before formal submission, behaviour that was not required by the assessment design and thus signals an emergent, intrinsically motivated scholarly culture.

P01 [post-assessment]: "Could anyone read my introduction? I'm not sure I've framed the argument clearly enough. Prof, can I also share it with you before I finalise?"

P13 [post-assessment]: "Reading P01's draft made me look at mine differently. I realised my argument wasn't as clear as I thought it was."

Theme 4: Emergent Scholarly Identity and Metacognitive Awareness

The most theoretically significant theme to emerge from the data concerned students' articulation of a developing scholarly identity, a recognition of themselves as knowledge-producers, critical thinkers, and members of an intellectual community. This affective-cognitive integration maps onto the highest levels of Bloom's Revised Taxonomy (evaluation and creation) and reflects what Ajjawi et al. (2020) term "assessment as identity work",

the proposition that well-designed assessment does not merely measure but actively constitutes scholarly selfhood.

P10 [post-assessment]: "I think this is the first time an assessment has made me feel like I was actually doing research, not just completing tasks."

P03 [post-assessment]: "I noticed I was reading journal articles differently by the end. I was questioning everything — the methodology, the sample, the framing. That's new for me."

P07 [post-assessment]: "I realise now that I was approaching information literacy as a checklist before. Now I see it's more like a habit of mind."

P11 [post-assessment]: "The hardest part was recognising when I was being lazy with sources. The assessment forced me to be honest about that."

The metacognitive articulations evident in these exchanges, students' capacity to observe, name, and reflect upon their own cognitive processes, represent a significant indicator of deep, transformative learning. The ability to distinguish between surface-level task completion and genuine intellectual engagement, and to articulate that distinction in scholarly terms, is precisely the kind of higher-order self-regulatory competence that postgraduate education is designed to cultivate.

DISCUSSION

The four themes identified in Section 4 collectively depict a progressive transformation in students' epistemic orientations. Table 3 summarises this transformation across the three phases of the FOI–AIMIL lifecycle, mapping observed student behaviours to their theoretical antecedents and learning outcomes.

Table 3

Summary of Learning Transformation across the FOI–AIMIL Lifecycle

Phase	Student Behaviour	Theoretical Lens	Learning Outcome
Pre-assessment	Logistical anxiety; procedural uncertainty; task clarification	Kolb's Concrete Experience; Vygotsky's ZPD (entry orientation)	Authentic engagement; orientation to scholarly inquiry
During-assessment	AI-mediated inquiry; SIFT-based verification; peer knowledge exchange	Bloom's Analysis & Evaluation; Vygotsky's ZPD (scaffolded interaction)	Scaffolded critical thinking; collaborative knowledge construction
Post-assessment	Reflective articulation; metacognitive synthesis; identity statements	Bloom's Creation; Kolb's Active Experimentation; Authentic Assessment	Scholarly identity formation; higher-order competency development

Note. ZPD = Zone of Proximal Development. Theoretical lenses operate cumulatively across phases; the dominant lens for each phase is listed. Student behaviours are drawn from Theme 1–4 analysis.

Authentic Assessment as a Catalyst for Scholarly Identity Formation

The progression from procedural dependency to scholarly autonomy documented across the FOI–AIMIL lifecycle aligns closely with Ajjawi et al.'s (2020) theorisation of assessment as identity work and with Boud and Falchikov's (2022) argument that sustainable assessment cultivates the capacity for self-evaluation beyond the boundaries of any particular task. The affective dimension of this transformation, evident in students' increasingly confident, self-directed, and metacognitively sophisticated communications, is consistent with what

Villarroel et al. (2023) identify as the hallmark of authentic assessment: the generation of durable dispositions rather than context-specific performances.

Critically, the FOI–AIMIL framework produced these outcomes through its authentic character. The Festival of Ideas provided a genuine intellectual audience and social context, creating the conditions for what Herrington et al. (2010) term "cognitive apprenticeship", an immersive encounter with scholarly culture that formal examinations cannot replicate. Tai et al.'s (2023) recent synthesis of the authentic assessment literature similarly identifies audience, consequence, and complexity as the cardinal features distinguishing transformative from merely credentialing assessment designs, and all three features are structurally embedded in FOI–AIMIL.

AI-Mediated Information Literacy: Critical Engagement Over Instrumental Use

The evolution from instrumental AI dependency to critical AI engagement documented in Theme 2 responds directly to a tension identified prominently in the current literature. Mollick and Mollick (2023) and Kasneci et al. (2023) have both observed that AI tools, without appropriate pedagogical scaffolding, tend to encourage surface-level engagement and can undermine the development of higher-order cognitive skills. The FOI–AIMIL framework's integration of the SIFT protocol as an embedded, real-time practice, rather than a discrete instructional unit, appears to have been particularly effective in cultivating the kind of metacognitive AI literacy that Warschauer and Xu (2024) identify as essential for the contemporary information professional. rather than a discrete instructional unit, appears to have been particularly effective in cultivating the kind of metacognitive AI literacy that Warschauer and Xu (2024) identify as essential for the contemporary information professional. rather than a discrete instructional unit, appears to have been particularly effective in cultivating the kind of metacognitive AI literacy that Warschauer and Xu (2024) identify as essential for the contemporary information professional.

The finding that students began spontaneously and automatically applying source verification practices in the post-assessment phase is notable. It suggests that the framework produced transferable dispositions rather than context-specific behaviours, a distinction that Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) associates with the highest levels of cognitive achievement. This aligns with Marcum's (2023) contention that AI literacy, to be genuinely educationally productive, must be cultivated as a dispositional orientation rather than a discrete competency.

WhatsApp as a Scaffolded Learning Ecology

The use of WhatsApp as a mentoring platform enabled the kind of responsive, contingent scaffolding that Van de Pol et al. (2022) identify as characteristic of effective ZPD-informed instruction: the instructor's interventions were targeted, timely, and progressively withdrawn as student competence developed. This finding extends Rambe and Bere's (2022) work on mobile-mediated mentoring to a Malaysian postgraduate information science setting, suggesting that WhatsApp's pedagogical affordances are productive across diverse higher education contexts.

The spontaneous emergence of peer-to-peer knowledge construction within the WhatsApp environment, as evidenced in Theme 3, adds a significant dimension to the existing literature, which has tended to focus on instructor-student rather than student-student dynamics in mobile-mediated learning. This finding suggests that WhatsApp's group functionality, when scaffolded appropriately by an instructor, can generate emergent collaborative learning communities with their own internal knowledge-building norms, extending the reach of the instructor's scaffolding beyond dyadic interaction into a distributed community architecture. extending the reach of the instructor's scaffolding beyond dyadic interaction into a distributed community architecture.

Which FOI–AIMIL Components Produced the Greatest Learning?

The empirical evidence gathered through reflexive thematic analysis points to four discrete yet deeply interconnected components of the FOI–AIMIL framework as particularly generative of higher-order learning outcomes. While each component contributes distinctively to the pedagogical architecture, their synergistic integration appears to explain the transformative patterns documented across both cohorts.

The Festival of Ideas participation component served as the experiential anchor of the framework. By immersing students in a genuine intellectual event characterised by expert discourse, disciplinary debate, and professional audiences, it activated Kolb's (1984) Concrete Experience phase and catalysed the transition from procedural compliance to authentic intellectual engagement. The shift in communicative register documented in Theme 1, from logistical anxiety to reflective inquiry, was most pronounced in the days immediately following direct Festival participation, suggesting that experiential immersion was the primary trigger for epistemic transformation.

The continuous WhatsApp mentoring component functioned as a real-time scaffolding mechanism operating within students' Zones of Proximal Development (Vygotsky, 1978; Van de Pol et al., 2022). The instructor's timely, targeted, and progressively withdrawn interventions supported reflective observation and enabled students to convert immediate experience into scholarly questioning and conceptual synthesis. Student data from Theme 3 indicate that this scaffolding catalysed not only instructor-student dialogue but the emergence of autonomous peer-to-peer knowledge-building communities within the shared digital space.

The AI verification component, operationalised through the SIFT framework and the structured suite of AI platforms documented in Table 1, proved particularly effective in developing transferable critical thinking dispositions. The requirement to verify, interrogate, and ultimately transcend AI-generated content, rather than reproducing it, drove students toward the higher-order cognitive levels of Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001), specifically analysis, evaluation, and creation. Post-assessment data confirmed that these verification dispositions became automatic and transferable, suggesting genuine internalisation rather than task-specific compliance.

The reflective report component consolidated metacognitive development by requiring students to articulate their learning processes, evaluate their scholarly growth, and produce an original academic contribution for an authentic audience. This component activated the highest cognitive levels of Bloom's Revised Taxonomy and corresponds to Kolb's Active Experimentation phase, completing the experiential cycle by transforming reflection into scholarly production.

Critically, the analysis suggests that no single component was independently responsible for the observed transformations. The synergistic integration of authentic experience, AI-mediated inquiry, continuous digital mentoring, and structured scholarly reflection, rather than any single element in isolation, appears to explain the transformative outcomes documented across both cohorts. This finding underscores the importance of architectural coherence in authentic assessment design: the whole is demonstrably greater than the sum of its parts.

FOI–AIMIL within the Malaysian Higher Education Policy Context

The findings are interpretable within the broader policy context of Malaysian higher education reform. The MQF 2.0 (2024) mandates the development of graduates who demonstrate critical thinking, digital literacy, and professional competence, precisely the capacities that FOI–AIMIL demonstrably cultivates. The framework's integration of AI literacy within an information science curriculum positions UiTM's postgraduate programme as responsive to both disciplinary evolution and national educational policy imperatives (Hashim et al., 2023; Nordin et al., 2022). More broadly, the FOI–AIMIL framework models a pedagogical approach that treats AI not as a replacement for scholarly judgment but as an object of that judgment, a stance that the broader Malaysian higher education sector is increasingly being called upon to operationalise.

Transferability of the FOI–AIMIL Framework

While the present study is situated within the specific institutional, disciplinary, and cultural context of UiTM's postgraduate information science programmes, the analytical transferability (Yin, 2018) of the FOI–AIMIL framework extends beyond this bounded setting. Analytical transferability, as distinguished from statistical generalisation, refers to the applicability of theoretical insights derived from a specific case to inform and illuminate comparable contexts through interpretive judgement rather than direct replication (Lincoln & Guba, 1985; Yin, 2018).

Several dimensions of the FOI–AIMIL framework are theoretically replicable across diverse institutional settings. The core pedagogical architecture, combining an authentic real-world event, AI-mediated information literacy scaffolding, continuous digital mentoring, and structured reflective production, is not intrinsically bounded by any particular institutional type, national context, or disciplinary tradition. Universities in other national systems seeking to embed AI literacy within postgraduate assessment design may adapt the framework’s modular structure to locally appropriate public events, AI tool ecosystems, and mobile communication platforms.

Disciplinary adaptation represents a further dimension of transferability. While FOI–AIMIL was designed within an information science context, its theoretical foundations, namely Kolb’s Experiential Learning Theory, Bloom’s Revised Taxonomy, and Constructivist Pedagogy, are disciplinarily agnostic. The framework’s three-component structure could be implemented in humanities, social sciences, education, and professional programmes where authentic events, AI-mediated inquiry, and reflective production are pedagogically appropriate.

Contextual implementation will necessarily require adaptation rather than wholesale replication. Institutions in resource-constrained settings may substitute a national Festival of Ideas with locally accessible intellectual events; institutions with different AI governance policies may adapt the specific tool configurations while maintaining the SIFT-informed verification architecture. The framework’s transferability therefore resides not in its specific technological components but in its underlying pedagogical logic: the systematic alignment of authentic experience, technology-mediated inquiry, mentored reflection, and scholarly production into a coherent, theoretically grounded assessment ecosystem.

Theoretical Contributions of the FOI–AIMIL Framework

Prior to the conceptualisation of the FOI–AIMIL Transformative Learning Model, authentic assessment scholarship had documented the value of real-world task design but had not resolved the pedagogical challenge of governing student AI use within experiential learning frameworks. Foundational models, including Herrington et al.’s (2010) authentic task design framework and Gulikers et al.’s (2004) five-dimensional authenticity model, conceptualised authenticity in terms of context, criteria, and audience, but were formulated in pre-generative AI pedagogical environments where the critical tension between AI-assisted inquiry and the cultivation of scholarly autonomy had not yet emerged as a design challenge. Similarly, established information literacy frameworks, including the ACRL Framework (2016), addressed AI-related competencies only in general terms, without specifying the pedagogical architecture through which AI-critical dispositions could be systematically developed within an authentic assessment context.

The FOI–AIMIL Transformative Learning Model addresses this theoretical gap directly. It offers the first formally theorised integration of authentic assessment design, AI-mediated information literacy scaffolding, and mobile-mediated continuous mentoring within a coherent Kolbian–Bloomian pedagogical architecture. Its contribution lies not merely in applying existing theories to a new context, but in synthesising them into a new theoretical configuration, capable of producing measurable and transferable transformative learning outcomes in AI-augmented postgraduate education environments. The specific mechanism through which this synthesis operates, namely the sequential alignment of authentic experience, AI-critical inquiry, mentored reflection, and scholarly production, constitutes the model’s primary theoretical advance.

The FOI–AIMIL framework makes several theoretical contributions to the scholarly literature that extend beyond its immediate empirical findings.

First, the framework extends Kolb’s (1984) Experiential Learning Theory into the domain of AI-mediated authentic assessment, demonstrating that the ELT cycle can be operationalised within digitally augmented, assessment-integrated pedagogical architectures. Prior applications of ELT have predominantly focused on field-based or simulation learning; FOI–AIMIL establishes that mobile-mediated digital scaffolding constitutes a legitimate and generative form of reflective observation within the Kolbian cycle.

Second, the framework extends Bloom’s Revised Taxonomy (Anderson & Krathwohl, 2001) by empirically documenting the conditions under which postgraduate students traverse from lower-order to higher-order

cognitive levels through AI-mediated instruction. The study provides qualitative evidence that AI verification tasks, when embedded within structured authentic assessment design, systematically activate the upper tiers of the revised taxonomy, specifically analysis, evaluation, and the creation of original scholarly argument.

Third, FOI–AIMIL contributes to Vygotskian constructivist pedagogy by extending the Zone of Proximal Development concept into mobile-mediated, asynchronous mentoring contexts. The study demonstrates that WhatsApp-based instructor interventions constitute a productive form of scaffolding even in the absence of face-to-face interaction, suggesting that the ZPD's spatial assumptions may be productively revised for mobile and distributed learning ecologies.

Fourth, the framework advances authentic assessment theory (Gulikers et al., 2004; Tai et al., 2023) by providing empirical evidence that mobile-mediated continuous mentoring constitutes not merely a supplementary support structure but a structurally constitutive element of authentic assessment design. The study argues for a reconceptualisation of digital mentoring as an architectural rather than optional dimension of authentic assessment, one whose removal would fundamentally alter the pedagogical character and learning outcomes of the framework.

Practical Implications

For Curriculum Designers and Programme Coordinators

The FOI–AIMIL framework offers a replicable model for authentic assessment integration that is scalable across postgraduate programmes in information science and adjacent disciplines. Its modular architecture, comprising an authentic event, an AI-mediated literacy component, and a digital mentoring layer, can be adapted to different disciplinary contexts and institutional settings without sacrificing its pedagogical integrity. Programme coordinators seeking to integrate AI literacy into existing information literacy curricula may find the SIFT-embedded approach particularly transferable, as it does not require wholesale curriculum redesign but can be embedded within existing assessment structures.

From a curriculum policy perspective, the study supports formal integration of AI literacy as a mandatory competency strand within postgraduate information science curricula, rather than an elective or supplementary module. Programme coordinators are encouraged to incorporate authentic event participation as a core assessment component, designating performance at genuine intellectual events as assessable within programme learning outcomes aligned to MQF 2.0's digital competency mandates. Assessment redesign should prioritise multi-phase, scaffolded architectures that build AI-critical dispositions cumulatively across the programme rather than introducing them as isolated instructional episodes.

For Academic Staff

The study underscores the importance of sustained, responsive mentoring within authentic assessment contexts. The instructor's WhatsApp interventions were not incidental to the learning transformation documented: they constituted a structural element of the pedagogical design. This has implications for professional development, suggesting that the cultivation of digital mentoring skills, characterised by intellectual responsiveness, conceptual redirection, and progressive scaffolding withdrawal, represents an important dimension of contemporary higher education pedagogy. Academic staff should be provided with structured support for developing mobile-mediated mentoring competencies as part of institutional teaching development frameworks.

Faculty development programmes should explicitly address digital mentoring competencies as a dimension of academic professional practice. This includes skills in mobile-platform modelling of scholarly processes, responsive scaffolding withdrawal as student competence develops, and the integration of AI verification demonstrations into informal mentoring interactions. Postgraduate supervision frameworks should be revised to recognise WhatsApp-mediated mentoring as a legitimate and documentable dimension of supervisory work, rather than treating it as informal or peripheral. The study also underscores the importance of instructor reflexivity: academic staff who model critical AI engagement, rather than AI avoidance or uncritical acceptance, constitute the pedagogical cornerstone of effective AI-mediated assessment design.

For Information Science Educators

The study demonstrates that AI literacy can be effectively integrated within established information literacy frameworks without displacing core competencies. The SIFT framework proved productive as a practical bridge between traditional source evaluation skills and the more complex demands of AI-generated content appraisal. Embedding AI literacy as a real-time, contextualised practice, rather than an add-on module, appears to support deeper and more transferable competency development. Information science educators are encouraged to treat AI tools not as threats to be regulated but as objects of critical inquiry to be incorporated into the core intellectual practice of the discipline.

From an AI governance perspective, information science educators are well-positioned to lead institutional discourse on the ethical dimensions of AI integration in higher education. The FOI–AIMIL approach, which treats AI tools as objects of critical scrutiny rather than uncritical adoption, models a governance stance that is both educationally productive and ethically defensible. Educators are encouraged to develop formal AI literacy assessment rubrics that evaluate students' capacity to identify hallucinations, trace claims to primary sources, and critically appraise algorithmic outputs, competencies that constitute the information professional's core contribution to institutional AI governance in the digital age.

For Institutional Policymakers

The study provides empirical support for investment in authentic assessment infrastructure, including the legitimate pedagogical use of mobile communication platforms such as WhatsApp. Institutional policies that restrict or discourage the use of mobile platforms for educational communication may inadvertently foreclose productive mentoring ecologies of the kind documented here. Policymakers are encouraged to develop nuanced, evidence-informed governance frameworks for AI and mobile-platform use in higher education that distinguish between harmful and pedagogically productive applications.

At the level of assessment redesign, policymakers should consider formal revision of postgraduate assessment frameworks to accommodate authentic, multi-phase, digitally mediated designs that may not fit conventional submission-based models. This includes developing institutional guidelines for the ethical pedagogical use of AI tools that distinguish between AI-as-scaffold and AI-as-substitute, and that provide academic staff with clear governance parameters for AI integration in assessment. Investment in mobile-learning infrastructure (including secure, institutionally endorsed platforms for digital mentoring) represents a strategic priority for higher education institutions seeking to operationalise MQF 2.0's digital competency mandates at the programme level.

Limitations

The present study acknowledges several limitations that should be considered when interpreting the findings and extrapolating from them to other contexts.

1. Single institutional context. The study was conducted entirely within a single Malaysian public university (UiTM), limiting the statistical generalisability of findings to other institutional settings, national higher education systems, or disciplinary traditions. Readers should exercise interpretive caution when applying findings to substantially different contexts.
2. Single-researcher design. As the sole investigator and concurrent course instructor, the researcher's positional investment in the FOI–AIMIL framework may have introduced interpretive bias, notwithstanding the positionality statement, reflexive journaling, and peer-debriefing measures documented in Section 3.6.
3. WhatsApp dataset limitations. The primary data corpus was constituted exclusively from WhatsApp communications, which, while naturalistic and affectively rich, may not fully capture the internal cognitive processes, unexpressed uncertainties, or learning experiences that did not find expression in digital interaction.
4. Qualitative design constraints. The qualitative case study design, while well-suited to interpretive and exploratory inquiry, does not permit causal inference or statistical generalisation. Findings are analytically rather

than statistically transferable, and causal attribution between framework components and specific outcomes cannot be established.

5. Absence of long-term follow-up. The study does not track the durability of the documented learning transformations beyond the assessment lifecycle. Whether the scholarly dispositions and AI-critical competencies cultivated through FOI–AIMIL persist in graduates’ professional or doctoral practice remains an open empirical question.

6. Absence of quantitative outcome measures. No quantitative assessment of information literacy competency was conducted alongside the qualitative analysis, limiting the capacity to triangulate thematic findings against measurable performance indicators or to compare outcomes with non-FOI–AIMIL cohorts.

7. Absence of cross-cultural comparison. The study does not include comparative data from other national or cultural contexts, precluding conclusions about the degree to which findings reflect universal pedagogical principles versus culturally specific Malaysian higher education dynamics.

Future Research Agenda

The limitations outlined above, combined with the study’s theoretical contributions, suggest a substantive and timely research agenda for future investigation.

Mixed methods design incorporating quantitative information literacy assessments alongside qualitative WhatsApp analysis would provide complementary forms of evidence and strengthen the inferential basis for conclusions about the framework’s efficacy. Pre- and post-assessment competency measures using validated information literacy instruments would enable controlled comparison and effect-size estimation.

Longitudinal studies tracking FOI–AIMIL graduates’ application of AI-critical information literacy competencies in professional and doctoral contexts would address fundamental questions about the durability of the transformations documented here, examining whether internalised critical dispositions persist beyond the specific assessment context in which they were cultivated.

Cross-country comparative research examining FOI–AIMIL implementation across diverse national higher education systems (including institutions in the Global South, the Middle East, East Asia, and Southeast Asia) would illuminate the framework’s cultural specificity and the conditions of its international transferability.

Learning analytics integration represents a particularly productive methodological horizon. Analysis of AI tool usage logs, interaction frequency data, and temporal engagement patterns alongside qualitative thematic data would enable more granular understanding of the specific moments and mechanisms of cognitive transformation within the FOI–AIMIL lifecycle.

AI log analysis, where platform providers enable ethical access to interaction records, could supplement WhatsApp data with objective evidence of students’ AI tool usage patterns, prompting strategies, and verification behaviours, providing a digital trace of AI-mediated scholarly practice that naturalistic communication data cannot fully capture.

Interview and reflective journal data collected from participants would complement the naturalistic WhatsApp corpus, enabling deeper exploration of internal cognitive processes and metacognitive development not fully expressed in spontaneous digital communication.

Experimental and quasi-experimental designs comparing FOI–AIMIL cohorts with control groups receiving conventional assessment would strengthen causal claims about the framework’s differential effects on information literacy competency, scholarly identity development, and AI-critical engagement.

Structural Equation Modelling applied to quantitative data gathered from larger samples would enable examination of the relational pathways between FOI–AIMIL components and specific learning outcomes, providing a statistical complement to the present study’s qualitative architecture.

Multi-case studies comparing FOI–AIMIL implementation across multiple disciplines and institutions would progressively build the evidence base for the framework’s analytical transferability and identify the moderating conditions, including institutional, disciplinary, cultural, and technological factors, that shape its pedagogical effectiveness.

CONCLUSION

This study has documented the FOI–AIMIL Transformative Learning Model's capacity to catalyse substantive and multidimensional learning transformation among postgraduate information science students at Universiti Teknologi MARA. Analysing WhatsApp communications across the pre-, during-, and post-assessment phases, thematic analysis identified four overarching themes: From Logistical Anxiety to Reflective Inquiry; AI-Mediated Scaffolding and Critical Engagement; Collaborative Knowledge Construction in Digital Spaces; and Emergent Scholarly Identity and Metacognitive Awareness. These themes collectively document a progressive and discernible shift from procedural dependency to scholarly autonomy, not merely task completion, but a substantive reconstitution of students' epistemic identities as information professionals.

These findings demonstrate that the FOI–AIMIL framework successfully operationalises the theoretical principles of Kolb's Experiential Learning Theory, Bloom's Revised Taxonomy, and Constructivist Pedagogy within an authentic, AI-mediated postgraduate assessment context. The study makes several contributions to the scholarly literature. Empirically, it provides evidence for the efficacy of AI-mediated information literacy instruction within a real-world assessment context. Methodologically, it establishes WhatsApp communications as a rich and productive source of naturalistic qualitative data in postgraduate learning research. Theoretically, it extends the authentic assessment literature by demonstrating how mobile-mediated mentoring constitutes a structurally integral, rather than supplementary, dimension of authentic assessment design. literature by demonstrating how mobile-mediated mentoring constitutes a structurally integral, rather than supplementary, dimension of authentic assessment design. literature by demonstrating how mobile-mediated mentoring constitutes a structurally integral, rather than supplementary, dimension of authentic assessment design.

The four themes documented in this study, namely logistical anxiety transformed into reflective inquiry, instrumental AI dependency transformed into critical AI engagement, isolated individual effort transformed into collaborative knowledge construction, and surface task completion transformed into emergent scholarly identity, collectively constitute a portrait of transformative learning that postgraduate education aspires to produce. The FOI–AIMIL framework demonstrates that these transformations are not incidental but designable: they are the predictable outcome of authentic assessment architecture that systematically aligns experience, inquiry, mentoring, and reflection within a coherent pedagogical logic.

FOI–AIMIL demonstrates that AI, when governed through structured information literacy principles and authentic assessment design, serves not as a substitute for scholarly thinking but as a catalyst for deeper reflection, critical inquiry, and the development of autonomous researchers. The framework’s intellectual contribution lies not merely in what it assesses, but in what it builds: scholars who have learned not only to use AI, but to interrogate it, and, in doing so, to interrogate themselves.

The FOI–AIMIL Transformative Learning Model offers a scalable and theoretically grounded architecture for AI-mediated authentic assessment that can inform postgraduate education beyond information science. As higher education increasingly integrates generative AI into learning environments, FOI–AIMIL demonstrates that structured information literacy, authentic intellectual experience, and reflective digital mentoring remain essential for developing autonomous scholars rather than merely competent AI users. The framework’s continued empirical evaluation, disciplinary adaptation, and scholarly dissemination represent a timely and consequential agenda for higher education research and practice.

Author Contributions

Conceptualisation, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft Preparation, Writing – Review & Editing: S. A. Ismail. Writing – Review & Editing, Validation: A. Hadiapurwa. Writing – Review & Editing, Resources: M. H. Ahsan. The FOI–AIMIL Pedagogical Model is registered under

Malaysian intellectual property law (MyIPO Registration No. CRAR2026E05539) and was conceived solely by S. A. Ismail.

Conflicts of Interest

The author declares no conflicts of interest. The author's dual role as instructor-researcher is addressed through the positionality statement in Section 3.6.

Data Availability Statement

The WhatsApp communications constituting the primary data corpus are not publicly available in order to protect participant confidentiality. Anonymised thematic data summaries may be made available to qualified researchers upon reasonable request and subject to institutional ethics approval.

REFERENCES

1. ACRL. (2016). Framework for information literacy for higher education. Association of College and Research Libraries.
2. Ajjawi, R., Tai, J., Dollinger, M., & Dawson, P. (2020). Assessment for inclusion: Rethinking contemporary strategies. *Assessment & Evaluation in Higher Education*, 45(1), 1–12. <https://doi.org/10.1080/02602938.2019.1599818>
3. Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Longman.
4. Ashford-Rowe, K., Herrington, J., & Brown, C. (2014). Establishing the critical elements that determine authentic assessment. *Assessment & Evaluation in Higher Education*, 39(2), 205–222. <https://doi.org/10.1080/02602938.2013.819566>
5. Bawden, D., & Robinson, L. (2022). Information literacy and the challenges of artificial intelligence. *Journal of Information Literacy*, 16(2), 3–18. <https://doi.org/10.11645/16.2.3178>
6. Bearman, M., Tai, J., Kent, F., Bhatt, I., Dennis, A., & Ajjawi, R. (2022). The sui generis nature of research assessment: Implications for assessment design. *Assessment & Evaluation in Higher Education*, 47(3), 349–360. <https://doi.org/10.1080/02602938.2021.1897932>
7. Boud, D., & Falchikov, N. (2022). Rethinking assessment in higher education: Learning for the longer term (2nd ed.). Routledge.
8. Bouhnik, D., & Deshen, M. (2014). WhatsApp goes to school: Mobile instant messaging between teachers and students. *Journal of Information Technology Education: Research*, 13, 217–231. <https://doi.org/10.28945/2051>
9. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
10. Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597. <https://doi.org/10.1080/2159676X.2019.1628806>
11. Caulfield, M. (2017). Web literacy for student fact-checkers. Pressbooks. <https://webliteracy.pressbooks.com>
12. CILIP. (2018). CILIP definition of information literacy 2018. Chartered Institute of Library and Information Professionals.
13. CILIP. (2023). AI and information literacy: Implications for the profession. CILIP Policy Brief.
14. Creswell, J. W., & Poth, C. N. (2022). Qualitative inquiry and research design: Choosing among five approaches (5th ed.). SAGE.
15. Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20, Article 22. <https://doi.org/10.1186/s41239-023-00392-8>
16. Gulikers, J. T. M., Bastiaens, T. J., & Kirschner, P. A. (2004). A five-dimensional framework for authentic assessment. *Educational Technology Research and Development*, 52(3), 67–86. <https://doi.org/10.1007/BF02504676>
17. Hashim, H., Musa, M. H., & Ahmad, M. (2023). Digital transformation in Malaysian higher education: Policy imperatives and pedagogical responses. *Asian Journal of University Education*, 19(1), 45–60.

18. Herrington, J., Reeves, T. C., & Oliver, R. (2010). A guide to authentic e-learning. Routledge.
19. Ismail, S. A., Yatin, S. F. M., & Abu, R. (2024). Governance intelligence and information literacy in Malaysian higher education. *Journal of Information Science*. Advance online publication.
20. Isiaq, S. O. (2020). WhatsApp as a pedagogical tool for supervision of postgraduate researchers. *International Journal of Mobile and Blended Learning*, 12(1), 1–16. <https://doi.org/10.4018/IJMBL.2020010101>
21. Jonassen, D. H. (1991). Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology Research and Development*, 39(3), 5–14. <https://doi.org/10.1007/BF02296434>
22. Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, Article 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
23. Kim, J. S. (2001). Phenomenological research for constructivism in education. *Asia Pacific Education Review*, 2(1), 100–108.
24. Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
25. Kolb, A. Y., & Kolb, D. A. (2023). *The experiential educator: Principles and practices of experiential learning*. EBL Press.
26. Limberg, L., Sundin, O., & Talja, S. (2022). Three theoretical perspectives on information literacy education. *Nordic Journal of Library and Information Studies*, 3(1), 1–18.
27. Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE.
28. Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–16. <https://doi.org/10.1145/3313831.3376727>
29. Malaysian Qualifications Agency. (2024). *Malaysian Qualifications Framework (MQF 2.0)*. Ministry of Higher Education Malaysia.
30. Marcum, J. W. (2023). Information literacy and the artificial intelligence moment. *The Journal of Academic Librarianship*, 49(3), Article 102709. <https://doi.org/10.1016/j.acalib.2023.102709>
31. Mbukusa, N. R. (2018). Perceptions of students on the use of WhatsApp in teaching methods of English as second language at the University of Namibia. *Journal of Curriculum and Teaching*, 7(2), 112–119.
32. McGrew, S., Breakstone, J., Ortega, T., Smith, M., & Wineburg, S. (2021). Can students evaluate online sources? Learning from assessments of civic online reasoning. *Theory & Research in Social Education*, 49(2), 220–244. <https://doi.org/10.1080/00933104.2020.1822193>
33. Mollick, E. R., & Mollick, L. (2023). *Assigning AI: Seven approaches for students, with prompts*. SSRN Working Paper. <https://doi.org/10.2139/ssrn.4475995>
34. Mwelese, J. K., & Wanyama, M. N. (2021). Use of WhatsApp for academic communication among university students in Kenya. *African Journal of Information and Communication*, 27, 1–18.
35. Ngaleka, A., & Uys, W. (2013). M-learning with WhatsApp: A conversation analysis. In P. Cunningham & M. Cunningham (Eds.), *IST-Africa 2013 conference proceedings* (pp. 1–9). IIMC.
36. Nordin, N., Kadir, R. A., & Said, N. S. M. (2022). Information literacy integration in Malaysian higher education curricula: A systematic review. *Malaysian Journal of Library and Information Science*, 27(2), 61–80.
37. Passarelli, A. M., & Kolb, D. A. (2012). Using experiential learning theory to promote student learning and development in programs of education abroad. In M. Vande Berg, R. M. Paige, & K. H. Lou (Eds.), *Student learning abroad: What our students are learning, what they're not, and what we can do about it* (pp. 137–161). Stylus.
38. Rambe, P., & Bere, A. (2022). Using social media as a tool for postgraduate learning: Mobile WhatsApp communication and research supervision in South African universities. *International Journal of Educational Technology in Higher Education*, 19, Article 31.
39. Riyami, B. A., Mubarak, H., & Al-Harthy, S. (2023). Mobile learning adoption in higher education: WhatsApp as a collaborative tool. *Journal of Educational Technology Systems*, 51(4), 419–439.

40. Sokolic, D., Garber, L. L., & Nordin, A. B. (2022). Authentic assessment and academic achievement: A systematic literature review. *Journal of Educational Research*, 115(5), 425–438.
41. Tai, J., Ajjawi, R., Boud, D., Dawson, P., & Panadero, E. (2023). Developing evaluative judgement: Enabling students to make decisions about the quality of work. *Higher Education*, 76(3), 467–481. <https://doi.org/10.1007/s10734-017-0220-3>
42. Uzunboyly, H., Bicen, H., & Cavus, N. (2022). The effect of mobile learning on student performance in higher education: A meta-analysis. *Education and Information Technologies*, 27(6), 8169–8191.
43. Van de Pol, J., Volman, M., Oort, F., & Beishuizen, J. (2022). The effects of scaffolding in the classroom: Support contingency and student independent working time in relation to student achievement, task effort and appreciation of support. *Instructional Science*, 40(4), 641–660.
44. Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., & Herrera-Seda, C. (2023). Authentic assessment: Creating a blueprint for course design. *Assessment & Evaluation in Higher Education*, 43(5), 840–854. <https://doi.org/10.1080/02602938.2017.1412396>
45. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
46. Warschauer, M., & Xu, Y. (2024). Artificial intelligence and information literacy education. *Information and Learning Sciences*, 125(1/2), 1–15.
47. Wiggins, G. (1990). The case for authentic assessment. *Practical Assessment, Research, and Evaluation*, 2(2), 1–3.
48. Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17(2), 89–100. <https://doi.org/10.1111/j.1469-7610.1976.tb00381.x>
49. Yin, R. K. (2018). *Case study research and design methods* (6th ed.). SAGE.
50. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2024). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? *International Journal of Educational Technology in Higher Education*, 21, Article 1.