Journal of Curriculum and Teaching; Vol. 15, No. 4; 2026
ISSN 1927-2677 E-ISSN 1927-2685
Published by Sciedu Press

Self-Efficacy, Professional Judgement, and Reported Technology-Integrated Differentiated Instruction: A Sequential Explanatory Study in Abu Dhabi Private-School English Classrooms

Saima Ali[1,*] & Norliza binti Kushairi[2]

[1]Universiti Utara Malaysia, 06010 Sintok, Kedah Darul Aman, Malaysia

[2]UUM College of Arts and Sciences, Universiti Utara Malaysia, 06010 Sintok, Kedah Darul Aman, Malaysia

*Correspondence: Saima Ali, Universiti Utara Malaysia, Malaysia. ORCID: 0009-0000-0469-2508. E-mail: Saimaali9876@gmail.com

Received: September 27, 2026 Accepted: October 26, 2026 Online Published: November 18, 2026

doi:10.5430/jct.v15n4p386 URL: https://doi.org/10.5430/jct.v15n4p386

Abstract

Favourable teacher beliefs and technology access do not always produce technology-integrated differentiated instruction (TIDI). This sequential explanatory mixed-methods study examined why, among English teachers in seven private British-curriculum schools in Abu Dhabi, United Arab Emirates. In the quantitative phase, survey data from 120 teachers were analysed using hierarchical multiple regression. Self-efficacy was the strongest unique correlate of reported TIDI implementation ($\beta = .567$, 95% confidence interval [0.360, 0.764] for B, $p < .001$; model $R^2 = .460$). This result held under an alternative order of entry and in a dominance analysis, where self-efficacy accounted for about 70% of the explained variance. Beliefs and a revised contextual-enablers measure correlated with implementation but did not contribute unique variance once self-efficacy was included. In the qualitative phase, interviews with 12 teachers were analysed using reflexive thematic analysis, supported by six illustrative classroom observations, yielding five themes. A joint display coded each quantitative–qualitative relationship as confirmation, expansion, discordance or silence. Teachers described their confidence as situated professional judgement: deciding when, why and how technology should support differentiation. The integration also showed a clear discordance. Time and accountability pressure dominated teachers' accounts of barriers, yet the revised contextual measure, which retained only enabling conditions, added no unique variance. The findings are associational and suggest that professional learning which builds confidence and judgement, together with attention to time and accountability constraints, is a promising direction for strengthening TIDI.

Keywords: teacher confidence, teacher decision-making, joint display, mixed methods, secondary education, United Arab Emirates

1. Introduction

Educational reform in the United Arab Emirates has, for some years now, pursued two goals at once: more inclusive and responsive pedagogy, and deeper digital transformation of the classroom (United Arab Emirates Ministry of Education, 2021). Technology-integrated differentiated instruction (TIDI) sits where these two goals meet. The term is used here to mean the purposeful use of digital tools to adapt content, process, product, and learning environment to learner variability. This is not technology use in general, but technology deployed specifically to widen who a lesson actually reaches. Differentiation itself is a well-established response to variability within a class (Smets & Struyven, 2020; Pozas et al., 2020; Hu, 2024), and Tomlinson's (2014) framework of planned instructional adaptation remains its most widely cited theoretical basis. Technology integration, meanwhile, is only considered meaningful when it is deliberately built around pedagogical intent rather than simply added on top of an existing routine (Børte & Lillejord, 2024).

Policy ambition and pedagogical theory point the same direction here, yet the evidence on actual implementation tells a more uneven story. Curriculum pacing, assessment accountability, and workload pressure all appear to blunt how

consistently differentiated, technology-integrated teaching is enacted in secondary classrooms (Smets & Struyven, 2020; Pozas et al., 2020; Blundell et al., 2022). Smale-Jacobse et al.'s (2019) review of differentiated instruction in secondary settings found relatively few methodologically rigorous studies to draw on, and what evidence there is has been built on inconsistent, fragmented definitions of the construct itself.

It would be a mistake to put this unevenness down to technology access or teacher goodwill alone. What a teacher believes about differentiation is one thing; what they feel able to carry out under classroom conditions is another. Self-efficacy, that is, confidence in managing the demands of adaptive, technology-integrated practice, appears more closely associated with whether beliefs are translated into practice than the beliefs themselves (Bandura, 1997; Zee & Koomen, 2016). Layered on top of that is the school environment itself: leadership support, workload, access to professional learning, and accountability pressure all either open up or close down the room a teacher has to experiment (Kenney et al., 2024; Khlaif et al., 2023).

Three gaps in the existing literature motivate this study. First, quantitative research in this area has generally modelled beliefs, self-efficacy, and context as parallel predictors added to the same equation. This is useful for establishing that a relationship exists, but not for explaining why two teachers with near-identical survey profiles can enact TIDI so differently in practice. Second, no study, as far as this review could establish, has examined these factors together, in one integrated quantitative and qualitative design, within a single subject-specific secondary setting; the teacher-level and contextual literatures have largely developed on parallel tracks, and neither has been tested specifically in secondary English classrooms in UAE private schools. Third, mixed-methods studies in this area often present the two strands side by side without making explicit where they confirm, extend, or contradict one another (Fetters et al., 2013).

The present study responds to these gaps through a sequential explanatory mixed-methods design (Creswell & Plano Clark, 2018). A quantitative phase first examines which teacher-level and contextual factors are associated with reported TIDI implementation; a qualitative phase then explains that pattern in teachers' own words, and the two strands are brought together through a structured joint display (Fetters, 2020) in which each relationship is explicitly coded. The study makes three contributions. It offers quantitative evidence, tested against alternative orders of entry and a dominance analysis, that self-efficacy rather than belief or contextual enablement was the strongest unique correlate of reported implementation in a policy-heavy, inspection-driven system. It shows, through the joint display, what that statistical association looks like when translated into teachers' accounts of professional judgement. And it identifies a specific discordance between the strands: the constraints teachers described most often were not captured by the quantitative contextual measure, which has direct implications for how context is measured in future work.

2. Literature Review

2.1 Differentiated Instruction and the Enactment Gap

Tomlinson's (2014) model describes differentiation as a teacher's deliberate adaptation of content, process, product, and learning environment to match student readiness, interest, and learning profile. What matters about this model, for present purposes, is what it rules out: differentiation is not the same thing as generally good teaching, informal help offered on the fly, or simply handing weaker students an easier version of a task. It is planned instructional responsiveness, resting on the premise that treating every student identically does not, in practice, give every student equitable access to learning.

That premise is widely accepted; enacting it consistently is another matter. Across the literature, teachers' stated commitment to differentiation tends to run well ahead of how consistently it shows up in their classrooms (Smets & Struyven, 2020; Pozas et al., 2020). Smale-Jacobse et al. (2019), in their systematic review of secondary-level differentiation research, trace part of this gap to the field's own inconsistency: differentiation is defined and measured so differently from study to study, ranging from broad philosophical commitments to narrowly specified techniques, that building a coherent, comparable evidence base has proven difficult. That inconsistency has practical consequences. A study reporting "high" differentiation and another reporting the same thing may not be describing comparable practices at all, which complicates any attempt to draw general lessons for professional learning or policy.

The persistence of an enactment gap across such varied educational systems and subject areas suggests that no single cause is likely to explain it fully. Where the literature has looked for barriers, it has pointed to thin planning time, gaps in pedagogical content knowledge, tight curriculum pacing, and assessment structures that reward sameness over responsiveness. Underneath most of these explanations sits an assumption that belief and practice should align once some specific external obstacle is cleared, an assumption the present study's findings complicate.

2.2 Self-Efficacy as a Proximal Influence

Bandura's (1997) social cognitive theory supplies one account of why belief and enactment so often part ways. Self-efficacy, in Bandura's formulation, is a person's own judgement of their capacity to organise and carry out whatever a specific task demands, and it is theorised to sit closer to actual behaviour than general attitudes, background traits, or the surrounding environment. Self-efficacy shapes the goals a person sets, how much effort they invest, how long they persist when something proves difficult, and how they interpret a setback, whereas a general belief in the value of a practice reaches behaviour only indirectly.

Zee and Koomen's (2016) synthesis, drawing on four decades of research, supports this proximity claim empirically, connecting teacher self-efficacy to classroom processes, persistence, and student outcomes across a wide range of settings. Technology-integrated differentiation is a demanding test case for self-efficacy specifically, because it requires pedagogical, technological, and assessment-related capabilities to operate simultaneously, in real time (Fu & Wang, 2021). A teacher might feel entirely at ease explaining a text to a full class, and considerably less at ease running three technology-supported small groups at once; the demands compound rather than sit side by side.

Self-efficacy research has also faced a fair criticism: that it risks circularity, defining confidence in terms of the very behaviours it is then used to predict. This study addresses that concern in three ways: by measuring self-efficacy and implementation as separate composites on different response scales (confidence versus frequency; Section 3.3), by reporting the strength and confidence interval of their association so that possible overlap can be judged (Section 4.3), and by checking the quantitative relationship against what participants said, independently, about what their confidence consists of (Section 4.7).

2.3 Contextual Conditions and Policy Enactment

Neither belief nor self-efficacy operates in a vacuum; both sit inside institutions that set priorities, allocate time, build accountability structures, and, whether deliberately or not, reward some kinds of practice over others. Research on policy enactment suggests that implementation is something teachers work out for themselves, weighing local feasibility, rather than something they simply comply with or resist (Kenney et al., 2024). Read this way, a teacher who scales back an ambitious differentiation plan because the assessment calendar leaves no room for it is not necessarily resisting the practice; they may be making a defensible judgement about what is achievable in their school in that term.

Kenney et al. (2024) go further, arguing that accountability pressure and tight curriculum pacing can push differentiated instruction toward whatever is easiest to document, such as grouping arrangements or tiered worksheets, even where a more flexible, responsive approach would serve students better. Khlaif et al. (2023) add a related concern specific to technology: where implementation demands outrun the training, infrastructure, or organisational backing available to teachers, the tools meant to expand instructional flexibility instead become one more source of strain. These accounts imply that context has at least two faces, enabling conditions and constraining pressures, which need not move together.

In the UAE specifically, the national inspection framework names both differentiated teaching and purposeful technology integration as markers of instructional quality (United Arab Emirates Ministry of Education, 2021), and schools have invested accordingly. Even so, teachers' reported competence does not line up neatly with what is enacted in the classroom (Siyam et al., 2025), and assessment pressure together with workload appear to narrow instructional flexibility, particularly in examination-oriented settings (Khalil, 2024; Alsalhi et al., 2023). This combination of strong policy backing and uneven enactment makes UAE private secondary schools a useful setting for asking what best explains variation in reported implementation.

2.4 Technology Integration as Pedagogical Alignment

Technology integration research often measures frequency of use, or how closely a classroom follows a named framework, and both can obscure the question that matters most: whether a given tool is doing anything pedagogically. The presence of devices, apps, and platforms says little on its own about whether access, autonomy, or engagement with content has improved, which is why this study measures implementation in terms of adaptation rather than simply counting how often technology appears (Section 3.3).

Technology integration decisions can usefully be understood as an ill-structured instructional design problem: teachers rarely make these decisions under tidy conditions, following one correct sequence of steps. Instead they weigh curriculum goals, the nature of the subject matter, what a tool can plausibly do, individual students' needs, the time available, and institutional expectation, all at once. Where that balancing goes badly, technology use tends toward the superficial, with the same task simply delivered on a screen rather than anything that changes how learning happens (Blundell et al., 2022).

2.5 An Integrated Framework and the Present Study

Read together, this body of work suggests that beliefs, self-efficacy, technology alignment, and context are less like four independent predictors competing for a share of variance, and more like linked stages in a single process. Quantitative research has tended toward the independent-predictors framing, partly because it is easier to test statistically; qualitative research has tended to explore teachers' reasoning in depth without pairing it with any quantitative sense of which factors carry the most weight. Few studies attempt both within one design.

The framework adopted here, a Contextualised TIDI Enactment model, brings together Tomlinson's (2014) pedagogical model, Bandura's (1997) self-efficacy theory, and the policy-enactment literature (Kenney et al., 2024). On this view, beliefs orient teachers toward a practice, self-efficacy governs whether they feel able to attempt it, and both are filtered through teachers' own judgement about what is locally feasible. The framework does not by itself specify what that judgement consists of in teachers' professional experience, or whether its statistical signature (the association between self-efficacy and reported implementation) and its lived counterpart (teachers' accounts of professional judgement) genuinely correspond. Examining that correspondence is the specific purpose of this study's mixed-methods design and joint display. The present study is associational and does not test indirect or causal pathways.

3. Methodology

3.1 Research Design

This study was guided by three research questions.

RQ1: What are the reported levels of differentiated-instruction beliefs, TIDI self-efficacy, contextual enablers, and TIDI implementation among English teachers in participating Abu Dhabi private schools?

RQ2: To what extent are teachers' beliefs, TIDI self-efficacy, and perceived contextual enablers associated with reported TIDI implementation after selected demographic characteristics are controlled?

RQ3: How do teachers' accounts and observed practices help explain the quantitative relationships among beliefs, self-efficacy, contextual conditions, and TIDI implementation? This question was refined after the quantitative phase to focus on explaining the emergent finding that self-efficacy was the strongest unique correlate; it was not stated in this precise form before Phase 1.

The study followed a sequential explanatory mixed-methods design (Creswell & Plano Clark, 2018). A cross-sectional survey phase came first, addressing RQ1 and RQ2. Its results shaped the qualitative explanatory phase addressing RQ3 in two ways: the interview guide was built around the quantitative findings, and participants were invited to comment on those findings once they had been shared with them. The two phases were integrated through a joint display (Fetters, 2020) in which each relationship between the strands was coded as confirmation, expansion, discordance, or silence (Fetters et al., 2013).

3.2 Quantitative Phase: Participants and Sampling

The sample comprised 120 English teachers recruited from seven private British-curriculum schools in Abu Dhabi. The survey was distributed through each school's secondary coordinator, establishing secondary English provision as the intended sampling frame. Recruitment proceeded through convenience and referral sampling via these coordinators and associated professional networks. Two participating schools operated newly established secondary divisions in which Years 5–7 were institutionally located within the secondary phase. This organisational variation explains the inclusion of teachers working with Years 5–6 (31.7% of the sample), year groups more commonly classified as upper-primary in other British-curriculum settings. Because the anonymous survey did not record participants' schools, individual respondents could not subsequently be matched to particular institutional phase structures. Schools were chosen to keep curricular context constant (all British curriculum) while allowing variation in leadership support, technology infrastructure, and assessment pressure.

Ten schools were approached, of which seven agreed to take part and three did not respond. Based on staffing information supplied by each school, the eligible population of English teachers across the seven schools was estimated at roughly 170–200. On this estimate, the 120 completed responses represent an approximate response rate of 60–71%. A precise response rate cannot be reported because coordinators distributed a standard invitation without recording the number of teachers who received it, and because school identity was not collected; for the same reason, respondents could not be compared with non-respondents. Convenience and referral recruitment may have favoured

teachers with stronger interest in differentiation or technology, and this possible selection bias is considered in Section 6.

An a priori power analysis for the regression (seven predictors, $f^2 = 0.15$, $\alpha = .05$, power = .80) indicated a minimum sample of 103, and Tabachnick and Fidell's (2019) rule for testing individual predictors ($N \geq 104 + m$) indicated 111; the achieved sample exceeded both. A sensitivity power analysis was also conducted (Cohen, 1988). With N = 119, seven predictors, and $\alpha = .05$, the regression had 80% power to detect an increment of $f^2 = 0.07$ for a single predictor, a small-to-medium effect, and $f^2 = 0.13$ for the full model. The observed effects (full model $f^2 = 0.85$; self-efficacy increment $f^2 = 0.32$) were well above these thresholds.

Table 1. Participant Demographic Characteristics (N = 120)

Characteristic	Category	%
Gender	Female	66.7
	Male	33.3
Teaching experience	More than five years	73.3
	Five years or fewer	26.7
Highest qualification	Master's degree / PGCE-PGDE	70.0
	Bachelor's degree	20.0
	PhD / MPhil	9.2
	Other (role, not a degree)*	0.8
Grade level(s) taught	Years 5–6	31.7
	Years 7–8	25.8
	Years 9–10	24.2
	Years 11–12	18.3

Note. *One respondent's qualification entry described a role rather than a degree and could not be coded into the ordinal qualification variable; this case was excluded from the regression analyses (N = 119 for those analyses only). All other analyses use N = 120.

3.3 Quantitative Instrumentation

Because no existing scale matched this study's constructs closely enough, the survey instrument was developed for the study, with four sections: Beliefs about Differentiated Instruction (7 items), Self-Efficacy for Technology-Integrated Differentiated Instruction (7 items), Contextual Factors (7 items, later revised; see Section 4.1), and TIDI Implementation (6 items). The four scales used three different 5-point response formats: belief and contextual items used an agreement scale (1 = Strongly Disagree to 5 = Strongly Agree), self-efficacy items a confidence scale (1 = Not at all confident to 5 = Extremely confident), and implementation items a frequency scale (1 = Never to 5 = Always). The six implementation items were deliberately written to parallel the belief items (for example, B1 "I believe English instruction should be adapted to address differences in students' readiness" and TIDI1 "I use technology to adapt English instruction to different readiness levels"), so that the gap between belief and practice could be compared directly. Four items were negatively worded (B4, SE4, CF4, and CF7). All four negatively worded items were reverse-coded before composite scores and reliability coefficients were computed. The survey also included three optional open-ended questions on challenges, effective examples, and support needs; responses to these were not analysed for this article. The self-efficacy items drew on Bandura's (1997) social cognitive theory and on established domains of English language teaching efficacy (Fu & Wang, 2021; Zee & Koomen, 2016), while the contextual items were built from the literature on policy implementation, leadership support, professional development access, and workload (Kenney et al., 2024; Khlaif et al., 2023). The full questionnaire is provided in Appendix A, the interview protocol in Appendix B, the classroom walk-in guide in Appendix C, and the lesson plan review framework in Appendix D; the progression from codes to themes is summarised in Appendix E.

Content validity was established in two stages before the instrument was finalised: expert review by specialists in educational technology, differentiated and inclusive pedagogy, and UAE curriculum and assessment; and a bilingual review by two education specialists, checking linguistic accessibility for a multilingual teaching population.

Construct scores were computed as item means. For descriptive purposes (Table 4), mean scores were grouped into three bands: low (1.00–2.33), moderate (2.34–3.67), and high (3.68–5.00).

3.4 Qualitative Phase: Participants

Twelve teachers, drawn from survey volunteers, were purposively selected to cover a wide range of professional roles, in keeping with the study's explanatory purpose (Patton, 2015). Because most roles are represented by a single participant, the sample was designed to capture a breadth of perspectives rather than to compare roles, and no role-based claims are made in this article. Participants are referred to only by codes; any names in supporting documentary material have been removed to protect confidentiality.

Table 2. Qualitative Participant Profile (N = 12)

Code	Role	Primary focus
ET-LP1	Years 5–6 English Teacher & Lead Planner	Curriculum consistency, collaborative planning
HI1	Head of Inclusion	Whole-school inclusion, tiered provision
EDL1	English Teacher & EAL/Differentiation Lead	Language access, whole-school support
ET-ER1	Years 9–10 English Teacher	Examination-focused differentiation
ML1	Years 7–8 English Teacher & Middle Leader	Teacher capacity-building
ET-LA1	Years 5–6 English Teacher	Language access, multilingual learners
ET-INQ1	Years 7–8 English Teacher	Inquiry-based learning, collaboration
ET-CP1	Years 5–6 English Teacher & Year Group Lead	Curriculum systems
ET-EX1	Years 9–10 English Teacher	Exam preparation, language development
ET-SV1	Years 7–8 English Teacher	Student voice, creativity
ET-AS1	Years 7–10 English Teacher	Assessment-informed differentiation
ET-INN1	Homeroom Teacher, MUN & TED Talks Lead, Innovation Ambassador	Student voice, innovation

3.5 Data Collection Procedures

The survey was administered online through Google Forms and took roughly 15–20 minutes to complete. Participation was voluntary and fully anonymous; no names, email addresses, or IP data were linked to survey responses. At the end of the survey, participants wishing to volunteer for the interview phase were directed to a separate form where contact details were collected independently of their survey responses, so volunteers could not be matched to their individual quantitative answers. School coordinators sent a standard invitation but did not track who responded.

Each of the 12 qualitative participants took part in an individual semi-structured interview, audio-recorded with consent and transcribed verbatim. Interviews lasted approximately 11 to 38 minutes, shorter than the 45–60 minutes allowed for in the protocol. The protocol (Appendix B) had seven parts: teaching context; beliefs and pedagogical understanding; classroom decision-making; confidence, adaptation, and professional judgement; contextual influences and constraints; linguistic and cultural responsiveness; and explanation of the survey patterns. In the sixth part, participants were told that the survey showed many teachers valued differentiated instruction but found it difficult to implement consistently with technology, and were asked to explain this pattern from their own experience. Each interview closed with a summary of the emerging points and an invitation to correct or add to it. Interviews were conducted in English, face-to-face or through a secure online platform according to each participant's preference.

Six of the interview participants were also observed teaching one lesson each, using a non-evaluative classroom walk-in guide (Appendix C). The guide recorded technology use, the type of differentiation observed (content, process, product, readiness-informed support, flexible grouping), language-support and context-related indicators, and an overall judgement of the extent of technology-integrated differentiation. The form was completed within 24 hours of each lesson. The lesson plan for each observed lesson was reviewed using a separate framework (Appendix D) covering learning objectives, differentiation of content, process, and product, the learning environment, technology integration, and assessment for learning, with each indicator rated Evident, Partially Evident, Not Evident, or Not Applicable. Each lesson plan, together with its presentation materials, was reviewed before the corresponding lesson was observed, and both the plan and the observed lesson were then given an overall rating on the same scale (Evident, Partially Evident, Not Evident, Not Applicable), so that planned and enacted practice could be compared directly (Section 4.6). Because a single researcher completed both ratings and no second rater was available, inter-rater reliability could not be calculated. The observational strand is therefore treated throughout as illustrative of the interview themes, not as triangulation or validation of the survey findings.

3.6 Ethical Considerations

The study received institutional research ethics approval, and written permission to conduct research was obtained from the leadership of each participating school. School leaders granted site access but were not involved in identifying or encouraging individual teachers, and school coordinators had a purely administrative role. Survey participants read an information sheet and gave informed consent electronically before beginning the questionnaire; they could withdraw at any point before submission. Interview and observation participants gave separate written informed consent, including consent for audio recording, and were told they could withdraw their data at any point before analysis was completed, without consequence. Survey data were collected anonymously. Interview recordings and transcripts were de-identified, participants were assigned role-based codes, and identifying details were removed from all quotations. All data were stored on encrypted, password-protected drives accessible only to the researcher, with survey data, transcripts, observation notes, and artefacts kept in separate folders to prevent linkage, and will be retained for five years in line with institutional policy before secure destruction.

3.7 Data Analysis

Quantitative data were screened for missing values and outliers; the final dataset had no missing responses on any item. Internal consistency was assessed with Cronbach's alpha. The factor structure of the instrument was not formally tested in this study (Section 6).

Descriptive statistics addressed RQ1. RQ2 was addressed through Pearson correlations (with 95% confidence intervals computed using Fisher's z transformation) and hierarchical multiple regression predicting TIDI implementation. The order of entry followed the study's conceptual framework. Demographic controls were entered first (Block 1): gender; years of experience (dichotomised as five years or less versus more than five years); highest qualification (coded ordinally as Bachelor's, Master's/PGCE-PGDE, or PhD/MPhil); and grade level taught (lower secondary, Years 5–8, versus upper secondary, Years 9–12). These were entered first because they precede and may shape the psychological variables. Beliefs were entered next (Block 2), because in the framework beliefs are the most general and earliest-formed orientation toward differentiation. Self-efficacy followed (Block 3), as the more task-specific, proximal judgement of capability. Contextual enablers were entered last (Block 4) to test whether perceived conditions added explanatory value beyond the teacher-level variables. Because hierarchical ΔR^2 depends on the order of entry, two further checks were run: the model was re-estimated with contextual enablers entered before self-efficacy, and a dominance analysis (Azen & Budescu, 2003) was used to estimate each predictor's average contribution to R^2 across all possible orders.

Regression assumptions were checked with the Breusch-Pagan test (homoscedasticity), Ramsey's RESET test (linearity), and variance inflation factors (multicollinearity). Because the Breusch-Pagan test indicated heteroscedasticity, the conventional standard errors reported in Table 7 should be interpreted with caution.

Interview transcripts were analysed using reflexive thematic analysis (Braun & Clarke, 2022). Analysis began with repeated reading of the full transcript set for familiarisation. Initial codes combined a deductive layer, drawn from the study's quantitative constructs and findings, with an inductive layer capturing explanations the framework had not anticipated; both semantic content (what participants explicitly said) and latent content (underlying assumptions about what confidence and judgement meant) were coded. Codes were grouped into candidate themes, reviewed against the full dataset for coherence, and refined iteratively into the five themes reported in Section 4.5. Several early candidate themes were merged or discarded where they did not hold up against the wider dataset. Consistent with Braun and Clarke's (2022) approach, no intercoder reliability statistic was calculated, since reflexive thematic analysis treats the researcher's interpretive judgement as an analytic resource rather than a source of error. Reporting of the qualitative phase followed the Standards for Reporting Qualitative Research (O'Brien et al., 2014).

3.8 Rigour and Reflexivity

Several procedures were used to support the trustworthiness of the qualitative analysis (Nowell et al., 2017).

Audit trail. A record was kept linking raw transcripts, initial codes, categories, and final themes, together with reflexive memos documenting analytic decisions, including the reasons for merging or discarding candidate themes. A summary of the progression from codes to categories to themes is provided in Appendix E, and a participant-by-code matrix was maintained during analysis.

Reflexivity and positionality. The researcher is a practitioner in the Abu Dhabi private-school sector. This insider familiarity with the UAE policy and inspection context helped in interpreting participants' references to accountability and curriculum demands, but it also brought assumptions, particularly a prior expectation that contextual constraints would dominate teachers' accounts. These assumptions were recorded in memos before coding began and revisited

during theme review, and the analysis deliberately looked for accounts that did not fit them. Peer debriefing was used during analysis: a co-author, who was not involved in data collection, reviewed the developing themes against coded extracts as a critical friend.

Negative and disconfirming cases. During theme review, the dataset was searched for accounts that contradicted or complicated each candidate theme. Two kinds of disconfirming evidence shaped the analysis. First, several participants described lessons in which technology disrupted rather than supported learning, through login failures that left other students distracted (ML1) and school software restrictions (ET-INQ1); one participant also described deliberately avoiding technology for discussion and debate (ML1). In one observed lesson (ET-LP1), learner distraction during technology use limited how fully the planned differentiation was enacted. These accounts prevented Theme 1 from becoming a simple claim that technology supports differentiation, and sharpened it into a claim about judgement: technology helped only when its use was deliberately matched to a learning need. Second, the equity-and-access framing of Theme 2 was weak or absent among participants focused on assessment or examinations, so the theme was bounded as one emphasis among several rather than a shared view. Divergent accounts are reported alongside supporting ones in Section 4.5.

Member reflection. Member reflection was used. At the end of each interview, the researcher summarised the points emerging from that conversation and asked the participant how accurately the summary reflected their perspective and whether anything should be changed or clarified (Appendix B, Part 7). The final cross-case themes were not returned to participants, which is acknowledged in Section 6.

Information power and saturation. Consistent with a reflexive approach, the adequacy of the sample was judged by information power rather than by coding saturation as a stopping rule (Braun & Clarke, 2021; Malterud et al., 2016). The study's aim was narrow (explaining one quantitative finding), participants held specific professional experience of TIDI, and interviews were guided by the quantitative results, all of which increase the information each interview contributes.

4. Findings

4.1 Preliminary Analysis: Reliability

The original seven-item Contextual Factors scale did not hold together as a single measure ($\alpha = .415$). Item-level analysis showed why: two items, concerning administrative expectations limiting flexibility and accountability and inspection pressure, failed to correlate either with the remaining five items or with each other (inter-item $r = .083$). The decision to remove these two items was made after data collection, on the basis of this reliability analysis, and the revision should therefore be regarded as exploratory and in need of cross-validation in an independent sample.

Removing these items changed the meaning of the measure, not only its reliability. The five retained items (professional development access, curriculum flexibility, leadership support, time, and technical support) describe enabling conditions, whereas the two removed items describe constraining pressures. The revised scale is therefore labelled Contextual Enablers, and the study cannot draw conclusions from it about contextual constraints. The other three constructs showed acceptable reliability without changes (Table 3).

Table 3. Reliability of Study Instruments

Construct	Items	Cronbach's α
Beliefs about Differentiated Instruction	7	.789
Self-Efficacy for TIDI	7	.790
Contextual Enablers	5 (revised from 7)	.766
TIDI Implementation	6	.813

4.2 RQ1: Levels of Study Constructs

Teachers in this sample reported fairly strong beliefs about differentiated instruction. Self-efficacy for the technology-integrated version of that practice was somewhat lower and sat mostly in the moderate band, and perceived contextual enabling conditions were the lowest-rated of the four constructs. Reported TIDI implementation also clustered predominantly in the moderate band (Table 4).

Table 4. Descriptive Statistics for Study Constructs (N = 120)

Construct	M	SD	% Moderate	% High
DI Beliefs	3.65	0.49	51.7	47.5
Self-Efficacy	3.45	0.48	73.3	26.7
Contextual Enablers	3.17	0.49	89.2	10.0
TIDI Implementation	3.39	0.47	83.3	16.7

Note. Bands based on mean scores: low = 1.00–2.33, moderate = 2.34–3.67, high = 3.68–5.00. The low band is omitted from the table because it was negligible (< 1%) for all constructs.

4.3 RQ2: Relationships between Study Variables

At the bivariate level, all three predictors were significantly associated with TIDI implementation (Table 5). Self-efficacy showed the strongest association, beliefs the next strongest, and contextual enablers a noticeably weaker one whose confidence interval approached zero. Beliefs and self-efficacy were strongly correlated (r = .640), which is relevant to interpreting their unique contributions below. Beliefs and contextual enablers were not significantly related.

The correlation between self-efficacy and implementation (r = .672, 95% CI [.56, .76]) is substantial but clearly below unity, which suggests that the two scales are related but not interchangeable. Even so, because both were self-reported in the same questionnaire, some shared method variance and item-content overlap cannot be ruled out (Podsakoff et al., 2003); this is addressed in Sections 5 and 6.

Table 5. Pearson Correlations among Study Variables, with 95% Confidence Intervals (N = 120)

Variable	1	2	3
1. DI Beliefs	—		
2. Self-Efficacy	.640*** [.52, .73]	—	
3. Contextual Enablers	.085 [−.10, .26]	.254** [.08, .41]	—
4. TIDI Implementation	.493*** [.34, .62]	.672*** [.56, .76]	.195* [.02, .36]

Note. Confidence intervals computed using Fisher's z transformation. *p < .05. **p < .01. ***p < .001.

A hierarchical multiple regression was then run with TIDI implementation as the outcome. The demographic controls in Block 1 accounted for a modest but significant 11.3% of the variance. Adding beliefs (Block 2) and then self-efficacy (Block 3) each improved the model significantly; contextual enablers (Block 4) added no further variance (Table 6).

Table 6. Hierarchical Regression Model Summary Predicting TIDI Implementation (N = 119)

Block	Variables added	R^2	ΔR^2	F-change	p
1	Gender, experience, qualification, grade group	.113	.113	3.62	.008
2	+ DI Beliefs	.285	.172	27.17	< .001
3	+ Self-Efficacy	.458	.173	35.85	< .001
4	+ Contextual Enablers	.460	.002	0.31	.579

In the final model, self-efficacy was the only significant unique predictor (Table 7). All variance inflation factors were below 2.2, indicating that multicollinearity was not severe enough to destabilise the estimates. However, given the strong beliefs–self-efficacy correlation, the unique contribution of each is estimated with less precision than either variable's total association with implementation, and the non-significance of beliefs in the final model should not be read as evidence that beliefs are unrelated to implementation.

Table 7. Final Model Coefficients (Block 4, N = 119)

Predictor	B	SE	95% CI for B	β	t	p	VIF
(Intercept)	0.900	0.376	[0.155, 1.645]	—	2.391	.019	—
Gender (male = 1)	−0.058	0.075	[−0.207, 0.091]	−.059	−0.781	.436	1.18
Experience (more than 5 years = 1)	0.055	0.083	[−0.109, 0.219]	.053	0.666	.507	1.28
Qualification (ordinal)	0.008	0.067	[−0.125, 0.141]	.009	0.121	.904	1.21
Grade (upper secondary = 1)	0.049	0.067	[−0.084, 0.182]	.052	0.724	.471	1.05
DI Beliefs	0.101	0.092	[−0.081, 0.283]	.105	1.096	.275	1.88
Self-Efficacy	0.562	0.102	[0.360, 0.764]	.567	5.531	< .001	2.16
Contextual Enablers	0.040	0.072	[−0.103, 0.183]	.041	0.557	.579	1.12

Note. R^2 = .460, adjusted R^2 = .426, F(7, 111) = 13.49, p < .001. Confidence intervals based on conventional standard errors.

4.4 Assumption Checks, Robustness, and Sensitivity Analyses

Linearity was supported (Ramsey RESET: F(2, 109) = 2.33, p = .102), and multicollinearity was within acceptable limits (all VIF < 2.2). The Breusch-Pagan test indicated heteroscedasticity (LM = 20.46, df = 7, p = .005), so the conventional standard errors should be interpreted with caution; the self-efficacy association is the only significant unique effect, and its robustness to order of entry and to dominance analysis is reported below.

Because hierarchical ΔR^2 depends on the order in which predictors are entered, two sensitivity analyses were conducted (Table 8). First, the order was reversed so that contextual enablers entered before self-efficacy, consistent with the argument that context may shape self-efficacy. Self-efficacy still added substantial unique variance when entered after both beliefs and enablers (ΔR^2 = .193), and when self-efficacy was entered before beliefs, beliefs added almost nothing further (ΔR^2 = .007). The pattern of significance was therefore unchanged by order of entry. Second, a dominance analysis was used to estimate each predictor's average contribution to R^2 across all possible orders of entry (Azen & Budescu, 2003). Self-efficacy accounted for about 70% of the variance explained by the three substantive predictors, beliefs for about 27%, and contextual enablers for about 4%. Together these analyses indicate that the prominence of self-efficacy is not an artefact of its position in the original model.

Table 8. Sensitivity Analyses: Alternative Order of Entry and Dominance Analysis

Analysis	Beliefs	Self-Efficacy	Contextual Enablers
ΔR^2, original order (B → SE → E)	.243	.215	.001
ΔR^2, enablers first (E → B → SE)	.229	.193	.038
ΔR^2, enablers then self-efficacy (E → SE → B)	.007	.414	.038
General dominance weight	.123	.320	.017
Share of explained variance (R^2 = .459)	26.7%	69.6%	3.7%

Note. Computed from the correlation matrix in Table 5 for the three substantive predictors only, without demographic controls; the original-order values therefore differ slightly from Table 6.

4.5 Qualitative Themes

Five themes were generated. Each is presented below with illustrative extracts, including accounts that complicated the theme. Extracts are reproduced verbatim from the transcripts, except that fillers and false starts have been removed (marked with ellipses) and obvious transcription errors corrected. Theme names were revised from descriptive labels to reflect the interpretive claim each theme makes.

Theme 1: Confidence as Judgement-in-Action. Across the interviews, participants located effective implementation not in the technology itself but in the teacher's capacity to decide what a learner needed and whether a tool would help. Confidence, in these accounts, was not general comfort with devices; it was trust in one's ability to make these situated decisions well.

"Professional judgment is central. Technology can provide the information and support, but teachers still need to decide what the students need, when they need it, and how much support they need." (ET-ER1)

"I encourage teachers to begin the learning objective and the student need. This tool is useful only if it improves access, feedback, independence or even participation." (EDL1)

Participants tied their own confidence to purpose and practice rather than to technology in general:

"I feel confident when the technology directly supports writing improvement and exam preparation." (ET-ER1)

"I am confident with those tools which I have, you can say, practiced more. Like I am quite handy with Padlet and like Teams and… Microsoft Forms." (ET-EX1)

Judgement also meant deciding against technology. One middle leader described deliberately simplifying, and avoiding technology altogether for some kinds of learning:

"The one well-used tool is usually most effective… So they just have to keep it simple." (ML1)

"In some of the cases, I would avoid using technology like where there is discussion, debates, and some, you know, reading activities." (ML1)

Accounts of lessons that went wrong complicated any assumption that more technology means more differentiation. Problems arose from login failures, school software restrictions, and the classroom management demands of device-based tasks:

"There was a lot of… several students, they had login issues. And when I was solving those issues, the others became distracted while waiting." (ML1)

"It's technology. It doesn't always have to work. But sometimes if there's a heavy software and there are restrictions in school…" (ET-INQ1)

Theme 2: Technology as a Language-Access Lever, Not an Innovation Badge. Several participants reframed the purpose of technology away from novelty and toward removing barriers to participation, particularly for multilingual learners. Here technology mattered because of who it let into the lesson, not because it made the lesson look modern.

"Effective technology integrated, differentiated instruction is not about the technology itself. It is rather about whether the technology removes barriers to learning and improves access, participation, independence, and progress for students." (HI1)

"Language often determines whether students can fully access the curriculum or not." (EDL1)

"Digital tools can provide vocabulary support, audio input, visual examples and structured writing frames." (EDL1)

This framing was not universal. Some participants, particularly those focused on assessment and examination preparation, more often discussed technology in terms of feedback, rigour, or creative expression than access, a contrast that shaped how the theme was bounded.

Theme 3: Time as the Hidden Cost of Responsiveness. Time was the barrier participants raised most often. Their accounts suggest that time is not simply a scarce resource but the price of responsiveness: each adaptation for a particular learner must be found from somewhere, and that cost falls largely on individual teachers.

"I think time is the most important factor. So effective differentiation, it requires a lot of planning, then adaptation of the resources, reflection, and adjustment." (ML1)

"Teachers may feel they do not have enough time to adapt material or to provide alternative pathways, particularly in examination-focused year groups." (EDL1)

For a lead planner, the cost was the cumulative load of planning for others:

"When it comes to… every week's planning for five to six lessons, and thinking about every child, thinking about teachers' need, co-teachers' need, it takes a lot of stretching of my brain… So when we do plan, we keep it flexible… and then we do keep it very simple, to the minimal." (ET-LP1)

Theme 4: The Accountability Pull Toward Sameness. Participants described a persistent tension between personalising learning and preparing all students for the same assessments. Common examinations, termly baselines, and inspection expectations exerted a steady pull back toward uniform tasks, even among teachers who valued differentiation.

"Effective TIDI is helping students reach common examination standards through different levels of support. So differentiation is important, but in the end, students sit the same exams and that creates unavoidable tensions." (ET-ER1)

"The schools promote personalized learning, but the systems, the assessment systems, encourage uniformity." (ET-ER1)

"We are being held accountable for not only at the end of the year; we have baselines, we have term one, term two, so it goes gradually towards the end of the year." (ET-EX1)

"Curriculum pacing and assessment demands can limit flexibility because teachers will often feel that they have a lot of pressure because they have to complete that content in that particular time, especially when there's an assessment coming up." (ML1)

The tension also shaped how teachers judged success. One participant described a creative multimedia task that "students enjoyed, but then it didn't translate effectively into examination performance" (ET-ER1). By contrast, a teacher of younger year groups felt the pull less strongly: "when we are in Year 7, for example, the pressure isn't as much" (ET-INQ1).

Theme 5: From Heroic Individuals to Shared Systems. Participants rejected the idea that sustaining TIDI should depend on individual teachers' extra effort. They argued that implementation lasts only when it is built into shared planning, resource banks, and school structures.

"Sustainable implementation requires ongoing professional development, protected collaborative planning time, strong leadership support, and access to reliable digital resources and technical assistance." (HI1)

"In my opinion, collaborative planning and modelling practical examples have had the greatest impact on teachers' implementation of differentiation." (EDL1)

"Through classroom observations and coaching, we often see that teachers know what they should be doing, but implementation can vary depending on confidence, time, subject demands, as well as available resources." (HI1)

Participants linked this theme directly to Theme 3: protected collaborative time was described not as a convenience but as the condition that makes differentiation sustainable beyond individual effort. The lesson plans reviewed for the observed lessons pointed the same way, showing a common pattern of tiered, criteria-banded differentiation across different teachers, which suggests shared planning conventions rather than isolated individual practice.

4.6 Illustrative Comparison of Planned and Enacted Practice

Table 9 compares the separately rated lesson plans with real-time observation ratings for the six observed lessons. Five of the six cases converged. In the remaining lesson (ET-INQ1), the written plan used technology in places beyond what the learning required, but the enacted lesson was rated more favourably: field notes recorded adaptive questioning, responsive modelling, and selective use of technology during the lesson. This is consistent with real-time professional judgement, although alternative explanations cannot be ruled out from a single observation. In the two lessons rated Partially Evident, field notes recorded examination-related constraints on flexibility (ET-EX1) and learner distraction during technology use (ET-LP1). Given the small number of lessons and the single-rater design, this comparison is illustrative only.

Table 9. Planned and Enacted TIDI Ratings for Observed Lessons (N = 6)

Participant	Lesson context	Plan rating	Observed rating	Result
ET-INN1	English/Social Studies inquiry on European landmarks; tiered research roles, map extension task	Evident	Evident	Convergence
ET-INQ1	Persuasive advertising analysis linked to SDG 12; tiered scaffolds, ethical redesign extension	Partially evident	Evident	Enacted exceeded planned
ET-EX1	IGCSE narrative writing; Quizizz retrieval starter, tiered success criteria, buddy support	Partially evident	Partially evident	Convergence
ET-ER1	English/IT unit on cyber-security threats; Padlet collaboration, presentations	Evident	Evident	Convergence
ML1	Language development on healthy/unhealthy food; ClassKick, tiered bilingual and visual scaffolds	Evident	Evident	Convergence
ET-LP1	Persuasive formal-letter writing; tiered sentence frames, PowerPoint vocabulary support	Partially evident	Partially evident	Convergence

4.7 Joint Display: Integrating Quantitative and Qualitative Findings

Table 10 integrates the two strands for every quantitative result and every theme (Fetters, 2020). Each row is coded according to how the strands relate (Fetters et al., 2013): confirmation (the strands agree), expansion (the qualitative strand extends the quantitative finding or covers ground it did not measure), discordance (the strands point in different directions), or silence (one strand has no counterpart in the other).

Table 10. Joint Display of Quantitative and Qualitative Findings

Quantitative finding	Qualitative evidence	Integration code	Meta-inference	Implication
Self-efficacy was the strongest unique correlate of implementation (β = .567; ~70% of explained variance in dominance analysis)	Theme 1: confidence described as the ability to make situated decisions about when and how technology helps	Confirmation	Teachers experience self-efficacy for TIDI as confidence in their own judgement, not as general comfort with technology	Self-efficacy measures for TIDI should include judgement-based items; professional learning should rehearse decisions, not only tools
Beliefs correlated with implementation (r = .493) but added little once self-efficacy was included	Theme 1: participants described valuing differentiation yet needing confidence to act on it	Expansion	Positive beliefs appear necessary but not sufficient; what teachers said separated wanting to differentiate from feeling able to	Belief-change campaigns alone are unlikely to shift practice where beliefs are already favourable
Contextual enablers added no unique variance (r = .195; ~4% of explained variance)	Themes 3 and 4: time and accountability pressure were the most frequently and specifically described barriers	Discordance	The quantitative measure, after item removal, captured enabling conditions only, whereas teachers described constraints as decisive; context was under-measured, not shown to be unimportant	Future instruments should measure enabling and constraining conditions as separate dimensions
Contextual enablers measured general conditions (PD, leadership, time, technical support)	Theme 2: technology valued as a language-access tool for multilingual learners	Expansion	Equity-specific purposes of technology were not captured by the general enabler items	Implementation measures should include access-oriented uses of technology
No quantitative counterpart	Theme 5: sustainability depends on shared systems rather than individual effort	Silence	System-level supports for sustaining TIDI were outside the survey's scope	Leadership should treat sustainability as a structural task (shared planning, resource banks)
Six observed lessons: five converged with plan ratings	Theme 1: in-the-moment adaptation (ET-INQ1 exceeded plan)	Expansion (illustrative)	Real-time decision-making may raise enacted practice above what plans show	Plan-based monitoring may under-record responsive teaching

Read together, the joint display shows what neither strand could show alone. The regression identifies self-efficacy as the strongest correlate but cannot say what that confidence consists of; the interviews show that teachers understand it as confidence in their own situated judgement. At the same time, the integration exposes a limitation that the regression alone would have hidden. The contextual result, read in isolation, might suggest that context does not matter. Read against Themes 3 and 4, it instead indicates that the revised measure omitted the constraining pressures teachers found most salient.

5. Discussion and Implications

5.1 Self-Efficacy and Professional Judgement

The central finding is that self-efficacy was the strongest unique correlate of reported implementation, and that this finding was robust to an alternative order of entry and to a dominance analysis. In the dominance analysis, self-efficacy accounted for more than twice the explained variance of beliefs. This addresses the concern that its prominence might simply reflect its position in the regression model.

The qualitative findings help explain what this association looks like in practice. Teachers described their confidence not as comfort with devices but as trust in their ability to decide when, why, and how technology should support a particular learner. This is consistent with Bandura's (1997) conception of self-efficacy as task-specific judgement of capability, and with the policy-enactment view that teachers translate expectations into what is locally feasible (Kenney et al., 2024). Self-efficacy (measured) and professional judgement (described) are treated here as related but distinct: the first is a teacher's appraisal of their capability, the second is how teachers describe exercising that capability. The present design shows that they correspond; it does not show that one produces the other.

An alternative explanation must be weighed. Self-efficacy and implementation were measured in the same questionnaire, at the same time, by self-report, and their correlation is substantial ($r = .672$). Shared method variance or overlap in item content could inflate this association (Podsakoff et al., 2003). Several features of the data make this explanation less likely to account for the whole pattern, although they do not eliminate it: the two scales used different response formats (confidence and frequency); the correlation, though strong, was clearly below unity; and participants independently described confidence in terms of situated decision-making rather than general enthusiasm. A further feature of the instrument is particularly informative. The implementation items were written to parallel the belief items, not the self-efficacy items (Section 3.3), so item-content overlap would bear more directly on the belief association than on the self-efficacy association. Yet self-efficacy showed the stronger association with implementation ($r = .672$ versus .493) and dominated in every model. Because the survey did not measure overlap between self-efficacy and implementation items directly, however, wording overlap cannot be excluded as a contributor to the association, and this should be kept in mind when interpreting it.

5.2 Beliefs: Necessary but Not Sufficient

Beliefs about differentiation were mostly favourable and correlated moderately with implementation, but added little once self-efficacy was taken into account. Two cautions apply to interpreting this. First, beliefs and self-efficacy were strongly correlated, so their unique effects are hard to separate in a sample of this size. Second, the cross-sectional design does not allow the relationship among beliefs, self-efficacy, and implementation to be decomposed into direct and indirect paths, and no such claim is made here. What the data do support is a practical point: in a setting where most teachers already value differentiation, further strengthening of beliefs is unlikely, on its own, to be where the greatest gains in practice lie. Participants' accounts reinforce this: they separated wanting to differentiate from feeling able to do it.

5.3 Context: Under-Measured, Not Unimportant

The clearest discordance between the strands concerns context. Quantitatively, contextual enablers had the weakest bivariate association with implementation and no unique contribution in any order of entry. Qualitatively, time and accountability pressure were the barriers teachers described most often and in the most detail. Three explanations are possible, and they are not mutually exclusive.

The first is measurement. The two items removed from the original contextual scale were precisely those concerning constraints (administrative expectations and accountability pressure), and they were also the only negatively worded items in that scale (Appendix A, CF4 and CF7). Their poor fit may therefore reflect a separate constraint dimension, a wording effect, or both; the present data cannot separate these explanations. The revised scale captures the presence of enabling conditions, not the weight of constraining ones, and teachers may experience these as separate dimensions: a school can offer good professional development and leadership support while still imposing heavy assessment demands. The poor coherence of the original scale is itself consistent with this two-dimensional reading. The second is restricted range. Most teachers rated enabling conditions as moderate (89.2%), leaving little variance for the measure to explain. The third is that context operates at the school level, through shared conditions that individual ratings capture poorly; because school identity was not recorded, school-level variation could not be modelled.

Together, these explanations indicate that the quantitative null result for enablers should not be read as evidence that context is irrelevant. The joint display suggests the opposite: the constraints teachers found most salient were simply not measured. This is the most important methodological implication of the study for future instrument design.

5.4 Illustrative Observational Evidence

The six observed lessons offer illustrative support for Theme 1. Five plan and observation ratings matched, and in the sixth (ET-INQ1) enacted practice exceeded the plan, which is consistent with teachers adapting instruction in real time. Because only six lessons were observed, each once, and the same researcher rated plans and lessons, these data illustrate the interview accounts rather than validate the survey findings.

5.5 Implications for Practice and Policy

These implications follow from associational evidence and should be treated as promising directions rather than tested interventions.

For professional learning providers, the findings suggest building TIDI training around supported practice rather than belief-change messaging or generic tool instruction. Because teachers described confidence as built through experience and collaboration, short implementation cycles may be valuable: a teacher trials one strategy, receives structured feedback within days, and repeats the cycle with a related strategy. Because teachers described their confidence as judgement, such training could include case-based discussion of real decisions, such as when a translated glossary supports a text and when it lets a student avoid it.

For school leaders, the discordance around context suggests that providing resources and encouragement is not enough if time and assessment demands remain unchanged. Protected planning time, shared resource banks, and inspection-ready evidence that recognises responsive rather than uniform teaching may matter as much as professional development. Theme 5 indicates that teachers see sustainability as a structural, not individual, responsibility.

For the UAE policy context, where the inspection framework names differentiation and technology integration as quality indicators (United Arab Emirates Ministry of Education, 2021), the findings suggest that policy attention to teacher confidence and to the constraints of common assessment may be more productive than further emphasis on resource provision or belief change alone.

5.6 Directions for Future Research

Four priorities follow from this study. First, longitudinal or intervention designs, with self-efficacy and implementation measured at different time points and, ideally, implementation observed independently, are needed to test whether self-efficacy precedes changes in practice, and whether beliefs and context operate through self-efficacy. Second, the instrument should be validated in a larger and more diverse sample, using confirmatory factor analysis, with enabling and constraining contextual conditions measured as separate dimensions. Third, studies should record school membership so that school-level effects can be modelled with multilevel methods. Fourth, larger, stratified qualitative samples with independent second raters for observations would allow differences between professional roles, which this study could only note as individual variation, to be examined directly.

6. Limitations

Several limitations should be weighed when interpreting these findings. The cross-sectional design permits examination of associations but not causal inference or tests of indirect effects. Implementation was self-reported, and all quantitative constructs were measured in a single questionnaire, so common-method variance and item-content overlap, particularly between self-efficacy and implementation, remain plausible alternative explanations for part of their association.

The instrument was newly developed. Its factor structure was not formally tested, and the revision of the contextual scale was made after data collection on the basis of reliability; both should be confirmed in an independent sample using factor analysis. Heteroscedasticity was detected and robust standard errors were not reported, so precision estimates should be read cautiously. The two removed items were also the only negatively worded contextual items, so a wording effect cannot be ruled out as a reason for their poor fit. The revised contextual measure captures enabling conditions only, so the study cannot draw conclusions about contextual constraints from the quantitative data.

The quantitative sample was recruited through convenience and referral sampling from seven private British-curriculum schools in Abu Dhabi, and a precise response rate and respondent–non-respondent comparison could not be obtained; findings may not transfer to other school types, curricula, or systems. School identity was not recorded, which is a significant design limitation: respondents are nested within schools that differ in leadership, resources, and accountability pressure, and ignoring this clustering may have led to underestimated standard errors. School-level effects could not be modelled, and this limitation should be weighed alongside the robustness checks reported in Section 4.4. Teachers of Years 5–6 were included because two schools located these year groups within

their secondary divisions; because respondents could not be linked to schools, the sample reflects institutionally defined secondary provision rather than a phase beginning uniformly at Year 7. Highest qualification was treated as a single ordinal variable combining Master's degrees with PGCE/PGDE qualifications; dummy coding would have been more conservative, although this variable's coefficient was close to zero.

The qualitative sample (N = 12) was selected for breadth of roles rather than representativeness, and most roles were represented by a single participant, so no role-based conclusions can be drawn. Themes were not formally member-checked. Interviews lasted 11–38 minutes, shorter than the 45–60 minutes planned, which may have limited depth, and interviewees were self-selected survey volunteers. Data were collected during a single period of the academic year, so the findings capture a snapshot rather than variation across the year, for example near examinations. The observational strand was small (six lessons, one per teacher) and relied on a single rater for both plan and lesson ratings, so it is treated as illustrative only.

7. Conclusion

This study asked why favourable teacher beliefs and available technology do not consistently produce technology-integrated differentiated instruction among English teachers in Abu Dhabi private schools. Its answer has three parts.

First, teacher self-efficacy was the strongest unique correlate of reported implementation. This finding held under an alternative order of entry and a dominance analysis, in which self-efficacy accounted for about 70% of the explained variance. Beliefs, though favourable, were not sufficient on their own. Second, teachers described this confidence as situated professional judgement: the capacity to decide when, why, and how technology should support a particular learner. The joint display shows that the statistical association and teachers' accounts correspond, giving the regression result a concrete meaning that it lacked alone. Third, the integration revealed a discordance. Time and accountability pressure were the barriers teachers described most often, yet the revised contextual measure, which had lost its constraint items, captured only enabling conditions and explained almost nothing. Context in this study was under-measured, not shown to be unimportant.

The study contributes to theory by linking a quantitative self-efficacy finding to a qualitative account of judgement within one integrated design, supporting the view that self-efficacy for complex practices such as TIDI is experienced as confidence in one's own decision-making. It contributes to method by showing how a coded joint display can expose a measurement gap that a regression model would conceal, and by indicating that enabling and constraining conditions should be measured separately. For practice and policy, it suggests that professional learning which builds confidence and judgement through supported cycles of practice, combined with leadership action on time and assessment demands, is a promising route to strengthening TIDI. These implications rest on cross-sectional, self-reported data from one system, and testing them with longitudinal designs, independently observed practice, and multilevel samples is the necessary next step.

References

Alsalhi, N. R., Al Arabi, K. S., Zakarneh, B., Alakashee, B. A., & Al Qatawneh, S. S. (2023). Unveiling the teacher's journey: Understanding the insider and outsider dynamics of teacher burnout. *ArtsEduca, 36*, 281–292. https://doi.org/10.6035/artseduca.3618

Azen, R., & Budescu, D. V. (2003). The dominance analysis approach for comparing predictors in multiple regression. *Psychological Methods, 8*(2), 129–148. https://doi.org/10.1037/1082-989X.8.2.129

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

Blundell, C. N., Mukherjee, M., & Nykvist, S. (2022). A scoping review of the application of the SAMR model in research. *Computers & Education Open, 3*, 100093. https://doi.org/10.1016/j.caeo.2021.100093

Børte, K., & Lillejord, S. (2024). Learning to teach: Aligning pedagogy and technology in a learning design tool. *Teaching and Teacher Education, 148*, 104693. https://doi.org/10.1016/j.tate.2024.104693

Braun, V., & Clarke, V. (2021). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health, 13*(2), 201–216. https://doi.org/10.1080/2159676X.2019.1704846

Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide*. SAGE.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Lawrence Erlbaum.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd Ed.). SAGE.

Fetters, M. D. (2020). *The mixed methods research workbook*. SAGE.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs: Principles and practices. *Health Services Research, 48*(6 Pt 2), 2134–2156. https://doi.org/10.1111/1475-6773.12117

Fu, Y., & Wang, J. (2021). Assessing mainstream pre-service teachers' self-efficacy to teach English language learners. *International Journal of Instruction, 14*(3), 153–174. https://doi.org/10.29333/iji.2021.1439a

Hu, L. (2024). Utilization of differentiated instruction in K–12 classrooms: A systematic literature review (2000–2022). *Asia Pacific Education Review, 25*, 507–525. https://doi.org/10.1007/s12564-023-09871-3

Kenney, A. W., Langley, S. D., Hemmler, V., Callahan, C. M., Gubbins, E. J., & Siegle, D. (2024). Different or differentiated? Recoupling policy and practice in an era of accountability. *Educational Policy, 38*(1), 134–160. https://doi.org/10.1177/08959048221119046

Khalil, A. A. (2024). *The challenges of implementing the Emirates Standardized test as a proficiency test in the UAE: An exploratory study*. In K. Al Marri, F. A. Mir, S. A. David, & M. Al-Emran (Eds.), BUiD Doctoral Research Conference 2023 (Lecture Notes in Civil Engineering, Vol. 473, pp. 80–88). Springer. https://doi.org/10.1007/978-3-031-56121-4_8

Khlaif, Z. N., Salha, S., & Kouraichi, B. (2023). Factors influencing teachers' technostress during technology integration. *Technology, Knowledge and Learning, 28*, 865–899. https://doi.org/10.1007/s10758-022-09603-9

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research, 26*(13), 1753–1760. https://doi.org/10.1177/1049732315617444

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*(1), 1–13. https://doi.org/10.1177/1609406917733847

O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: A synthesis of recommendations. *Academic Medicine, 89*(9), 1245–1251. https://doi.org/10.1097/ACM.0000000000000388

Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th Ed.). SAGE.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Pozas, M., Letzel, V., & Schneider, C. (2020). Teachers and differentiated instruction. *Journal of Research in Special Educational Needs, 20*(3), 217–230. https://doi.org/10.1111/1471-3802.12498

Siyam, Y., Siyam, N., Hussain, M., & Alqaryouti, O. (2025). Evaluating technology integration in education: A framework for professional development. *Discover Education, 4*, 53. https://doi.org/10.1007/s44217-025-00448-z

Smale-Jacobse, A. E., Meijer, A., Helms-Lorenz, M., & Maulana, R. (2019). Differentiated instruction in secondary education: A systematic review of research evidence. *Frontiers in Psychology, 10*, 2366. https://doi.org/10.3389/fpsyg.2019.02366

Smets, W., & Struyven, K. (2020). Implementing differentiated instruction in secondary education. *Cogent Education, 7*(1), 1742273. https://doi.org/10.1080/2331186X.2020.1742273

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th Ed.). Pearson.

Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners* (2nd Ed.). ASCD.

United Arab Emirates Ministry of Education. (2021). United Arab Emirates school inspection framework [inspection Manual]. https://www.moe.gov.ae/En/ImportantLinks/Documents/inspection/2021guidEN.pdf

Zee, M., & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes and outcomes. *Review of Educational Research, 86*(4), 981–1015. https://doi.org/10.3102/0034654315626801

Appendix A. Survey Instrument

Technology-Integrated Differentiated Instruction Practices of English Teachers in the United Arab Emirates (online questionnaire; anonymous; approximately 15–20 minutes; institutional ethical approval).

Introduction to respondents. This anonymous survey explores secondary English teachers' instructional practices, confidence, and contextual experiences related to technology-integrated differentiated instruction (DI) in UAE schools. Technology-integrated differentiated instruction (TIDI) refers to the purposeful use of digital tools to adapt content, process, and product in response to diverse student readiness, linguistic, and cultural needs. Participation is voluntary and confidential, and no identifying information is collected. At the end of the survey, respondents may volunteer for a follow-up interview via a separate secure link; survey responses cannot be linked to interview participation.

Section 1: Demographic Information

1.	**Years of teaching experience: Less than 3 years / 3–5 years / 6–10 years / More than 10 years**
2.	School type: Public/Government / Private / Charter / Other
3.	Main year group currently taught (select one): Years 5–6 / Years 7–8 / Years 9–10 / Years 11–12
4.	Highest qualification: Bachelor's degree / Master's degree / PGCE/PGDE / PhD/MPhil / Other (please specify)

Section 2: Beliefs about Differentiated Instruction (1 = Strongly Disagree to 5 = Strongly Agree)

Item	Statement
B1	I believe English instruction should be adapted to address differences in students' readiness and learning pace.
B2	I believe formative assessment is essential for adjusting English instruction during lessons.
B3	I believe students should be able to demonstrate English learning in different ways.
B4 (R)	Differentiated instruction is too difficult to implement consistently in secondary English classrooms.
B5	I believe planning lessons around key concepts is more important than covering all textbook content.
B6	I believe varying instructional processes supports effective English learning.
B7	I believe technology can support differentiated English instruction when it is used purposefully.

Section 3: Self-Efficacy for Technology-Integrated Differentiated Instruction (1 = Not at all confident to 5 = Extremely confident)

Item	Statement
SE1	I am confident in designing English lessons that use technology to address different learner needs.
SE2	I am confident in adjusting technology-based activities when students respond differently.
SE3	I am confident in using digital tools to provide differentiated feedback.
SE4 (R)	I struggle to make technology-supported differentiation manageable during lessons.
SE5	I am confident in managing technology while maintaining instructional flow during differentiated lessons.
SE6	I am confident in sustaining technology-integrated differentiation despite time constraints.
SE7	I am confident in making instructional decisions about when technology supports differentiation effectively.

Section 4: Contextual Factors Influencing Implementation (1 = Strongly Disagree to 5 = Strongly Agree)

Item	Statement
CF1	I receive professional development that supports technology-integrated differentiation.
CF2	I find curriculum requirements allow flexibility for differentiated instruction.
CF3	I feel school leadership supports thoughtful use of technology for diverse learners.
CF4 (R)†	Administrative expectations sometimes limit my ability to differentiate instruction flexibly using technology.
CF5	I have sufficient time to implement technology-integrated differentiation.
CF6	I have access to timely technical support when issues arise.
CF7 (R)†	I find accountability and inspection expectations influence how flexibly I can differentiate using technology.

Section 5: Implementation of Technology-Integrated Differentiated Instruction (1 = Never to 5 = Always; items written to parallel the belief items)

Item	Statement
TIDI1	I use technology to adapt English instruction to different readiness levels.
TIDI2	I use digital tools to adjust instruction based on formative assessment.
TIDI3	I use technology to allow students to demonstrate English learning in different formats.
TIDI4	I design technology-supported lessons focused on key concepts rather than textbook coverage.
TIDI5	I use technology to vary instructional processes such as pacing or grouping.
TIDI6	I use technology purposefully to support differentiated English instruction.

Note. (R) = negatively worded item, reverse-scored. † = removed from the final Contextual Enablers scale (Section 4.1).

Section 6: Open-Ended Reflection (optional)

1.	**I experience the following as the main challenge when implementing technology-integrated differentiated instruction.**
2.	I have used technology effectively to address different learner needs in the following example.
3.	I would benefit most from the following support to improve my implementation of technology-integrated differentiation.

Section 7: Voluntary Interview Participation. Respondents willing to take part in a follow-up interview were directed to a separate form requesting name, email, school name (optional), and preferred interview timing. Survey responses could not be linked to this form.

Appendix B. Interview Protocol

Follow-up interviews: technology-integrated differentiated instruction in UAE secondary English classrooms. Planned duration 45–60 minutes; audio-recorded with consent.

Introduction script (summary). Participants were thanked, reminded that the survey was anonymous and that the researcher had no access to individual responses, told that the interview would explore common patterns from the survey, assured that there were no right or wrong answers and that identifying information would be removed, and invited to ask questions before beginning.

Teaching context

1.	**Can you briefly describe your teaching context, including the curriculum you teach, the types of students you work with, and how technology is typically used in your English classroom? (Probes: diversity of language proficiency and learning needs; frequency of digital tool use.)**

Part 1: Beliefs and pedagogical understanding

2.	**What does effective technology-integrated differentiated instruction look like to you in a secondary English classroom? (Probes: what makes it effective; role of technology; importance of flexibility in planning.)**
3.	Can you describe a recent English lesson that you feel represented effective technology-integrated differentiated instruction? (Probes: learning goals; how instruction was adapted; what guided decisions; student response; what you would change.)

Part 2: Classroom decision-making and implementation

4.	**How do you decide when technology genuinely supports differentiated instruction and when it may not be appropriate? (Probes: influencing factors; when non-digital approaches work better; how student needs shape tool choice.)**
5.	When selecting digital tools for English lessons, what criteria do you use to ensure they support different learner needs? (Probes: most useful features; decisions not to use a tool; evaluating whether a tool helps learning.)
6.	Can you describe a time when technology-integrated differentiated instruction did not work as expected? (Probes: what happened; challenges; why; what you learned.)

Part 3: Confidence, adaptation, and professional judgement

7.	**Can you describe a moment when you felt particularly confident, or less confident, using technology to differentiate instruction? (Probes: what contributed to that feeling; student response; influences on in-lesson decisions; what you would do differently.)**
8.	How comfortable do you feel adjusting technology-supported activities during lessons when students respond differently than expected? (Probes: an example; what helps real-time adaptation; what makes it difficult.)

Part 4: Contextual influences and constraints

9.	**How do curriculum expectations, assessment requirements, or accountability pressures influence your ability to implement technology-integrated differentiated instruction? (Probes: pacing; inspection and assessment expectations; tensions between coverage and differentiation.)**
10.	From your experience, what does meaningful support for technology-integrated differentiated instruction look like in practice? (Probes: an example of helpful support; missing support; role of leadership, professional development, and technical support.)
11.	What contextual factor most strongly influences your use of technology for differentiated instruction? (Probes: how it influences teaching; support or constraint; effect on students.)

Part 5: Linguistic and cultural responsiveness in the UAE context

12.	**How do students' linguistic and cultural backgrounds influence the way you design English reading, writing, speaking, or discussion activities using technology? (Probes: adapting for different language abilities; cultural considerations in selecting resources; student response.)**
13.	Can you describe a specific instance where you modified a digital resource or activity to better suit your students' cultural context or learning needs? (Probes: why; impact; what you learned.)

Part 6: Explaining survey patterns and future priorities

14.	**The survey findings suggested that many teachers value differentiated instruction but experience challenges implementing it consistently with technology. To what extent does this reflect your experience? (Probes: why this happens; what makes consistency difficult; whether some forms of differentiation are easier.)**
15.	If one change or form of support could improve your implementation of technology-integrated differentiated instruction, what would make the greatest difference? (Probes: why; likely effect; practical changes in schools.)

Part 7: Member check and closure

16.	**To summarise, it sounds like your experiences with technology-integrated differentiated instruction are shaped by factors such as [summary of emerging points]. How accurately does this reflect your perspective? (Probes: anything to change or clarify; anything misunderstood.)**
17.	Is there anything important about your experience that we have not discussed?

Closing. Participants were thanked.

Appendix C. Classroom Walk-in Guide

Observing technology-integrated teaching practices in secondary English classrooms (UAE). The observation was explained to teachers in advance as non-evaluative and intended solely to document observable practices related to TIDI. The observer sat where they could observe without disruption, took notes unobtrusively, and completed the form within 24 hours.

Part 1: Basic information. Teacher code; date and time; grade; lesson focus (reading, writing, speaking, listening, other); approximate class size; seating arrangement (groups, rows, mixed).

Part 2: Core observation focus (guideposts only; not all indicators expected in one lesson)

Area	Indicators (tick all that apply, with notes and evidence)
A. Technology integration	Digital tools used to support learning; students used devices purposefully; teacher managed technology smoothly
B. Differentiation	Content (different texts, materials, levels); process (different tasks, pacing, pathways); product (different output formats); readiness or data-informed support; flexible grouping
C. UAE classroom context	Language support strategies (visuals, modelling, scaffolding); examples or materials connected to students' lived context; inclusive and respectful classroom environment

Part 3: Lesson snapshot. Main goal of the lesson; technology used (interactive board, student devices, online platform or app, other); one thing that worked well; one challenge noticed.

Part 4: Quick reflection. How technology supported different learners; visible adaptation for the UAE context; student engagement; overall extent of technology-integrated differentiation observed (no observable evidence / limited observable indicators / multiple observable indicators / sustained and integrated evidence), with a one- to two-line rationale.

Part 5: Optional follow-up with the teacher. How typical the lesson was of usual teaching; what influenced the choice of technology; anything the teacher wished to add.

Indicators were aligned with differentiated instruction principles (Tomlinson, 2014) and pedagogy-first technology integration. All notes were confidential and used only for research purposes.

Appendix D. Lesson Plan Review Framework

The framework was used to identify evidence of planned TIDI in the lesson plan for each observed lesson. It was not used to evaluate teacher performance or lesson quality. Each indicator was rated Evident (clear and explicit evidence), Partially Evident (some evidence, only partially described), Not Evident, or Not Applicable.

Dimension	Indicator	Evidence sought in the lesson plan
1. Learning objectives	Differentiated learning outcomes	Objectives recognise learner diversity through differentiated expectations, varied challenge, or adaptation to readiness, interests, or needs
	Alignment with curriculum	Objectives align with curriculum outcomes while allowing flexibility for different learners

Dimension	Indicator	Evidence sought in the lesson plan
2. Differentiation of content	Multiple learning resources	Different texts, reading materials, multimedia, visual supports, or materials for different learners
	Content adaptation	Content modified, simplified, enriched, or extended for diverse needs
3. Differentiation of process	Varied instructional activities	Different activities for diverse preferences or readiness levels
	Flexible grouping	Planned individual, pair, small-group, whole-class, or flexible grouping
	Scaffolding	Modelling, guided practice, prompts, vocabulary support, sentence frames, or teacher guidance
	Learner choice	Choice of activities, resources, or learning pathways
4. Differentiation of product	Multiple ways of demonstrating learning	Alternative formats (oral, written, digital, collaborative, visual)
	Appropriate challenge	Tasks vary in complexity or expected outcomes
5. Learning environment	Classroom organisation	Arrangements promote collaboration, independent learning, or flexible movement
	Inclusive learning environment	Activities consider participation, engagement, and accessibility
6. Technology integration	Purposeful technology use	Tools selected to support objectives, not only for presentation
	Technology supporting differentiation	Differentiated content, personalised or adaptive pathways, flexible pacing, choice, collaboration, or differentiated feedback
	Student engagement	Technology promotes active participation, interaction, communication, or collaboration
7. Assessment for learning	Formative assessment	Planned formative assessment throughout the lesson
	Differentiated assessment	Varied questioning, differentiated tasks, flexible success criteria, or multiple formats
	Feedback	Planned teacher, peer, digital, or self-feedback
8. Overall evidence of TIDI	Alignment across lesson components	Coherent alignment of objectives, activities, technology, differentiation, and assessment
	Evidence of intentional planning	Technology-supported differentiation deliberately planned rather than incidental

Appendix E. Development of Themes from Codes

Initial codes	Category	Final theme
Professional judgement; technology as secondary to pedagogy; simplicity over multiple tools; technology as distraction when purpose is unclear	Professional decision-making	Theme 1: Confidence as Judgement-in-Action
Language access; vocabulary scaffolds; technology removing barriers	Equity and inclusive participation	Theme 2: Technology as a Language-Access Lever, Not an Innovation Badge

Initial codes	Category	Final theme
Time for planning; resource adaptation; workload; time to analyse assessment data	Organisational constraints	Theme 3: Time as the Hidden Cost of Responsiveness
Examination standards; curriculum pacing; accountability pressure	Structural tension	Theme 4: The Accountability Pull Toward Sameness
Collaborative planning; shared systems; leadership support	Organisational capacity-building	Theme 5: From Heroic Individuals to Shared Systems

Author Statements

Acknowledgments

The authors sincerely thank the English teachers who generously contributed their time to complete the survey, participate in interviews, and facilitate classroom observations. The authors also gratefully acknowledge the participating schools and their leadership teams for facilitating access and supporting the research process.

Author Contributions

Conceptualization: Saima Ali, https://orcid.org/0009-0000-0469-2508

Methodology: Saima Ali, https://orcid.org/0009-0000-0469-2508; Assoc. Prof. Dr. Norliza binti Kushairi, https://orcid.org/0000-0001-7551-3378

Formal analysis: Saima Ali, https://orcid.org/0009-0000-0469-2508

Investigation: Saima Ali, https://orcid.org/0009-0000-0469-2508

Data curation: Saima Ali, https://orcid.org/0009-0000-0469-2508

Writing – original draft: Saima Ali, https://orcid.org/0009-0000-0469-2508

Writing – review & editing: Saima Ali, https://orcid.org/0009-0000-0469-2508

Supervision: Assoc. Prof. Dr. Norliza binti Kushairi, https://orcid.org/0000-0001-7551-3378

Consent for Publication

All authors have read and approved the final version of the manuscript and consent to its publication.

Funding

This research received no external funding.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed Consent

Informed consent was obtained from all participants before their involvement in the study. Survey participants provided electronic consent before accessing the questionnaire. Participants involved in interviews and classroom observations provided separate written informed consent, including consent for audio recording where applicable.

Ethics Approval

Written permission to conduct the research was obtained from the heads of the participating schools, and informed consent was obtained from all participants. An application for ethical review was submitted to the relevant ethics committee at Universiti Utara Malaysia (UUM). The application was pending a formal decision at the time of manuscript submission.

Data Availability Statement

The datasets generated and analysed during the current study are not publicly available because of confidentiality and privacy considerations. In particular, interview transcripts and classroom observation records may contain contextual information that could potentially identify individual teachers or participating schools. De-identified quantitative data

may be made available from the corresponding author upon reasonable request, subject to applicable ethical and institutional requirements.

Use of Artificial Intelligence

The authors used generative artificial intelligence tools, including Claude (Anthropic), solely to assist with proofreading, language editing, and improving the clarity and consistency of the manuscript and responses to reviewers' comments. All AI-assisted suggestions were critically reviewed, revised where necessary, and verified by the authors. The authors take full responsibility for the accuracy, originality, and integrity of the final manuscript.

Supplementary Materials

No separate supplementary materials are available. The research questionnaire, interview protocol, classroom walk-in guide, lesson plan review framework, and summary of theme development are included as Appendices A–E in the manuscript.

Journal Information

Ethics Statement

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Preservation Policy

This journal is archived by Library and Archives Canada (LAC).

Open Access

This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0). Please find details at https://creativecommons.org/licenses/by/4.0.

Copyright © The Author(s)

Copyright remains with the author(s). The author(s) grant the journal the right of first publication, and the article is published under the terms of the Creative Commons Attribution (CC BY 4.0) License.