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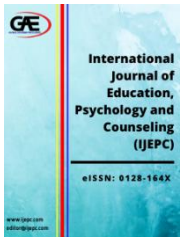

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TEACHING COMPLEX ENGLISH CONCEPTS IN LINGUISTICALLY DIVERSE UAE MIDDLE SCHOOLS: CHALLENGES AND EVIDENCE-BASED TECHNOLOGICAL INTERVENTIONS

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Abstract:

Teaching complex English concepts to middle school students in the United Arab Emirates is not always straightforward, especially in classrooms where learners come from diverse linguistic backgrounds. Many students struggle to understand abstract elements such as advanced grammar structures, cohesive devices, idiomatic expressions, and literary interpretation. Although national initiatives like UAE Vision 2031 and the Smart Learning Program strongly promote digital transformation in education, there is still a noticeable gap between having technological tools available and using them meaningfully in multilingual classrooms where students speak Arabic, Hindi, Urdu, Tagalog, and other home languages. In many cases, traditional teacher-centred and text-heavy approaches do not make abstract language concepts visible or engaging. Teachers also face challenges in addressing mixed proficiency levels within the same classroom, while opportunities for targeted professional development in technology integration remain limited. As a result, students often experience cognitive overload and may hesitate to participate due to low confidence. This Design-Based Research study proposes a Technology-Integrated Model grounded in Constructivist Learning Theory, Dual Coding Theory, and Cognitive Load Theory, guided by the SAMR framework. It develops and refines practical visualisation strategies using interactive applications, multimedia, and gamified tools to make abstract English concepts more accessible and engaging for diverse learners in the UAE.

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Design-Based Research, English Language Teaching, Linguistically Diverse Classrooms, Technology Integration, Visualisation Strategies.

Introduction

The United Arab Emirates (UAE) has made significant strides in educational reform, with national initiatives like UAE Vision 2031 and the Smart Learning Program advocating for digital transformation. However, in the multilingual landscape of UAE classrooms, where students speak Arabic, Hindi, Urdu, Tagalog, and other languages, a critical disparity persists. While technological infrastructure is often available, its pedagogical application to address the unique challenges of teaching complex English concepts remains underdeveloped. Middle school teachers face the daunting task of making abstract linguistic elements—such as sophisticated grammatical structures, idioms, and literary interpretations—accessible to students with varying levels of English proficiency. This paper reports on the initial phase of a Design-Based Research (DBR) study aimed at identifying these challenges and exploring evidence-based technological solutions.

Research Questions: This study seeks to answer the following research questions:
What are the primary pedagogical challenges teachers face when teaching complex English concepts in linguistically diverse middle school classrooms in the UAE?
How does student performance in complex English concepts correlate with their preferred learning modalities?

Research Objectives: The specific objectives of this study are:
To identify and describe the key pedagogical challenges reported by middle school English teachers in linguistically diverse UAE classrooms.
To measure middle school students' performance on complex English concepts and their preferred learning modalities.

To examine the alignment between teacher-reported challenges and student learning preferences to inform the design of technology-integrated interventions.

Literature Review

The challenges of teaching English in multilingual contexts are well-documented. Students often struggle with abstract concepts due to differences in native language structure and cultural context (Cummins, 2000). Furthermore, the integration of technology, while promising, often faces significant barriers, including inadequate teacher training and a lack of localised, empirically validated pedagogical approaches for diverse student populations (Mardiana, 2024;

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Saleem et al., 2025). This can lead to cognitive overload when students must simultaneously process new linguistic information without adequate visual or contextual support (Sweller, 1988). For instance, studies in similar contexts have highlighted how a decline in English proficiency can be a significant concern, emphasising the need for effective pedagogical interventions (Sasan et al., 2022).

Traditional, lecture-based methods often fail to make these concepts "visible," leading to disengagement and surface-level learning (Paivio, 1986). This necessitates the integration of multimodal strategies that can bridge the gap between abstract English concepts and the diverse linguistic backgrounds of students, thereby enhancing comprehension and active participation (Lian, 2025).

The SAMR model (Substitution, Augmentation, Modification, Redefinition) provides a useful framework for integrating technology in a way that transforms learning, moving beyond simple substitution of traditional tools to creating new, previously inconceivable tasks (Puentedura, 2006). This framework emphasises the progressive enhancement of pedagogical practices through technology, ranging from mere substitution to significant redefinition of educational tasks (Puentes-Rodriguez et al., 2022).

This study is anchored in Constructivist Learning Theory, which posits that learners actively construct knowledge through experience (Vygotsky, L. S.,1962; Vega et al., 2023), and Dual Coding Theory, which suggests that learning is enhanced when information is presented in both verbal and non-verbal forms (Yıldız, 2025). Furthermore, Cognitive Load Theory underscores the importance of optimising instructional design to manage cognitive load, particularly for complex linguistic concepts (Nguyen, 2024) and is crucial for designing instructional materials that optimise working memory capacity by managing intrinsic, extraneous, and germane cognitive loads (Gao, 2025). These theoretical underpinnings guide the development of a Technology-Integrated Model, which leverages interactive applications, multimedia presentations, and gamified platforms to visualise abstract English concepts, thereby addressing the challenges of linguistic diversity and cognitive load in multilingual classrooms (GARCIA & Cruz, 2025; Lian, 2025).

Methodology

This study employed a mixed-methods, Design-Based Research (DBR) approach to capture the complexities of the educational context. DBR is particularly suitable for this investigation as it focuses on developing practical, evidence-based solutions to real-world educational problems through iterative cycles of design, implementation, and refinement (Bacovsky-Novak, 2023). Reeves (2006) noted that DBR effectively bridges the gap between educational research and practice, facilitating the evolution of instructional strategies within authentic learning environments. The methodology integrates both quantitative and qualitative data collection to comprehensively evaluate the impact and efficacy of the developed technological interventions in enhancing English language proficiency (Muslimin et al., 2024; Wahyuni et al., 2020).

Semi-structured teacher interviews, a key qualitative component, were utilised to gather in-depth insights into participants' experiences and perceptions of the technology-enhanced language learning interventions (Refat et al., 2025). Diagnostic assessments along with learning preferences, including perceived ease of use and usefulness, were quantitatively

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measured to determine the interventions' effectiveness and user acceptance, aligning with the Technology Acceptance Model (Mulyanah et al., 2025).

Participants

Teachers: Six middle school English language teachers from a private school in the UAE participated in a questionnaire. Their experience ranged from 15 to 25 years, and they taught Grades 6-8 in highly diverse classrooms.

Students: Thirty-three Grade 7 students participated in a "complex English concepts" practice quiz and a learning preferences survey. The student body represents a linguistically diverse population with home languages including but not limited to Arabic, Hindi, Tamil, Malayalam, Urdu, and Tagalog

Instruments

Teacher Semi-structured Interview Questionnaire: An open-ended questionnaire exploring teaching context, challenges in teaching complex concepts, impact of multilingualism, student engagement, current technology use, and professional development needs.

Student Concept Analysis & Learning Preference Quiz: A two-part online quiz. Part 1 assessed student understanding of complex English concepts (e.g., grammar, figurative language, reported speech) through 20 multiple-choice and fill-in-the-blank questions. Part 2 gathered data on their preferred learning modalities (e.g., visual, collaborative, and independent).

***Data Analysis*:** Qualitative data from teacher questionnaires were analysed using thematic analysis. Quantitative data from student quizzes were analysed using descriptive statistics (mean scores, frequency distributions).

Results

The results from both teacher and student datasets reveal converging themes regarding challenges and potential solutions.

Teacher Perspectives

Thematic analysis of teacher responses identified four key themes:

Abstract Nature of Content: Educators consistently underscored students' challenges in grasping abstract concepts. One participant observed, "Students find grammar rules, idioms, and figurative language difficult to understand," while another emphasised that "abstract concepts like idioms or figurative language can still be tricky even for proficient speakers." Traditional pedagogical approaches were regarded as inadequate for rendering these concepts concrete.

Linguistic Diversity as a Double-Edged Sword: Teachers recognised that linguistic diversity profoundly shapes comprehension of abstract concepts. One educator noted that learners often interpret such ideas variably according to their native language grammars. A

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Grade 6 teacher illustrated this challenge: Arabic-speaking students may struggle with sentence structure and verb tenses because Arabic follows different grammar patterns... Indian students... might face challenges with spelling and pronunciation. Nonetheless, another teacher underscored a constructive facet, observing that diversity "also helps students learn from each other."

Disengagement with Traditional Methods: Teachers reached a strong consensus that lecture-based and textbook-centric pedagogies foster low student engagement. Educators reported that students "lose interest in lecture-based teaching," "find it difficult to analyse, deduce and infer," and "often depend on memorisation instead of understanding." One teacher illustrated this phenomenon: "In writing tasks... students may find it difficult to organise their thoughts, use correct grammar, or support their answers with examples."

Demand for Visual, Gamified, and Collaborative Tools: When asked about effective digital tools, responses consistently pointed to strategies that make learning active and concrete.

Gamification: "Gamification seems to be the most effective. Then come challenging activities like quizzes" (Teacher 1).

Visualisation & Collaboration: "Visuals, videos, and interactive tools help students understand concepts better," "Concept maps, collaboration tools" (Teacher 5), and "Mind maps, graphic organisers, and storyboards help students see connections between ideas" (Teacher 6).

SAMR Transformation: Teachers saw the SAMR model as a way to "move beyond simple use of devices to more meaningful learning experiences" and "cater to students of different learning abilities" (Teacher 6).

Student Performance and Learning Preferences

The student quiz provided a quantitative lens for validating teacher observations and revealing student preferences.

Table 1: Grade 7 Student Performance on Complex English Concepts (N=33)

Concept Area Tested	Sample Question Type	Average Score (out of max for that section)	Notes
Vocabulary in Context	Fill in the blank (6 items)	5.2 / 6 (87%)	Strong performance; students generally grasp word meaning from context.
Grammar & Mechanics	Punctuation, reported speech, subject-verb agreement, adverbs, phrases, clauses (12 items)	8.1 / 12 (68%)	**Significant gaps** – especially in subject-verb agreement (27% correct) and reported speech (58% correct).
Literary Analysis	Theme, prediction, simile identification (6 items)	4.2 / 6 (70%)	Moderate; students can identify similes but struggle with inferring theme.
Learning Preferences	3 items (not scored for correctness)	–	Used for qualitative analysis.
Average Overall Score	**(30 points total)**	**21.9 / 30 (73%)**	The overall average masks critical weaknesses in foundational grammar and literary interpretation.

Note: While the overall average appears high, deeper analysis reveals significant gaps in specific foundational areas. The performance on Subject-Verb Agreement and Reported Speech indicates critical areas of difficulty.

The analysis of student learning preferences (N=33) provided a clear directive for instructional design.

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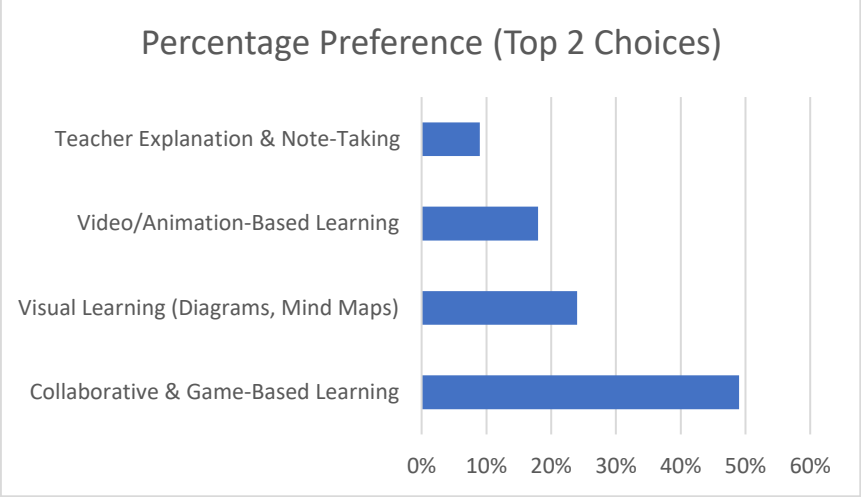
Table 2: Grade 7 Student Learning Preferences

Learning Modality	Percentage Preference (Top 2 Choices)
Collaborative & Game-Based Learning	**49%**
Visual Learning (Diagrams, Mind Maps)	24%
Video/Animation-Based Learning	18%
Teacher Explanation & Note-Taking	9%

Figure 1: Preferred Modalities for Understanding Complex English Concepts



These preferences strongly align with the teachers' recommendations. Students are not just asking for "more fun," but for specific, research-backed strategies: collaboration to navigate language barriers and games/visuals to reduce cognitive load and make abstract concepts concrete.

Discussion

The outcomes of this inaugural Design-Based Research phase underscore a substantial misalignment between prevailing instructional approaches and the exigencies of learners in linguistically heterogeneous UAE classrooms.

The findings from this initial Design-Based Research phase indicate a pronounced discrepancy between prevailing pedagogical practices and the needs of learners in linguistically diverse UAE classrooms. Teacher-reported student performance data substantiate these challenges: while proficiency is evident in basic vocabulary assessments, difficulties with core grammatical structures—such as subject-verb agreement and reported speech—expose foundational deficits that impede the articulation of complex ideas. The overall average score of 73% obscures these underlying weaknesses, emphasising the imperative for targeted

interventions. This phenomenon aligns with cognitive load theory, wherein learners overwhelmed by rudimentary mechanics are precluded from engaging with deeper semantic content.

Secondly, students' pronounced preference for collaborative and gamified learning modalities aligns with constructivist principles and the inherently social dimensions of knowledge construction (Mulyanah et al., 2025; Vega et al., 2023). In linguistically diverse classrooms, peer interactions enable learners to co-construct meaning, employing their home languages as scaffolds to access target language proficiency. Moreover, the emphasis on visual aids is consonant with Dual Coding Theory (Mulyanah et al., 2025; Yıldız, 2025), as integrating abstract linguistic rules with concrete visual representations renders elusive concepts tangible, thereby mitigating cognitive load for English as an Additional Language learners (Gao, 2025; Nguyen, 2024).

Thirdly, the advocacy for technological integration, particularly as conceptualised within the SAMR framework, prioritises profound pedagogical transformation over mere novelty. Educators recognise that deploying smartboards as "digital worksheets" fails to address deficits in student engagement and comprehension. Rather, they envision technology facilitating the "Modification" and "Redefinition" levels of SAMR. Although current utilisation of platforms such as Nearpod, Wordwall, and Kahoot corresponds to their initial stages, teacher and student data indicate preparedness for advancing to higher-order transformations that harness interactivity and collaboration to accommodate diverse learner needs.

Conclusion

This research substantiates the multifaceted challenges inherent in instructing intricate English language concepts to linguistically heterogeneous middle school learners in the UAE. Learners grapple with abstract notions, compounded by their diverse linguistic repertoires and predominantly remediated through suboptimal traditional pedagogies. The integration of teacher perceptions and empirical student data delineates an evidence-based imperative: pivoting to a technology-infused instructional paradigm—visual, collaborative, and gamified—that transcends superficial substitution toward profound pedagogical redefinition, as articulated in the SAMR framework.

Future Directions

This paper represents the initial "problem identification" and "solution formulation" stages of a larger Design-Based Research project. The next phases (enactment and appraisal, and assessment and contemplation) will involve:

Developing a Technology-Integrated Model: Creating a practical teaching model that uses digital tools to explicitly teach abstract concepts through visualisation and collaborative tasks.

Designing a Professional Development Program: A hands-on PD program for teachers focused on applying the SAMR model to transform their teaching of complex English concepts.

***Implementation and Evaluation*:** Piloting the model and PD in middle school classrooms, collecting data on its impact on student engagement, conceptual understanding, and academic performance.

The ultimate goal is to provide educators, curriculum architects, and policymakers with contextually attuned, research-validated interventions to augment English language proficiency among heterogeneous middle school cohorts in the UAE and analogous multicultural scholastic contexts.

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Ethics Statement:	This study was conducted in accordance with established ethical research standards for studies involving human participants. Informed consent was obtained from all participating teachers, as well as from the parents or guardians of student participants, before data collection. Participation was voluntary, and all respondents were assured of confidentiality and anonymity. No personally identifiable information was recorded, and all data were used solely for academic and research purposes.
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