Artificial Intelligence-Generated Narratives to Enhance EFL Early Literacy Skills for Academic Underachievers in the Primary Stage

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Abstract

The present study aimed to examine the impact of Artificial Intelligence-Generated Narratives (AIGN) on Enhancing EFL early literacy skills (ELSs) for EFL academic underachievers in the primary stage. The participants were eighteen (n= 18) academic underachievers in the fourth-grade primary stage across four governmental schools in Minya El-Qamh in the academic year (2024-2025). The participants were assigned to one experimental group in a quasi-experimental design. The study applied two instruments (prepared by the researcher): an EFL ELSs test which was pre-post administered to the study group before and after the AI instructional intervention; and a rubric to score the test, tailed with a descriptive qualitative part in order to judge if the participants progressed beyond the underachieving level to which they belonged before the AI intervention. T-test for paired samples was calculated. Statistical results revealed significant improvements in the post-assessment of ELSs for the study participants. Descriptive findings also provided explicit qualitative evidence that the study participants successfully moved upward from underachieving performance levels to (higher) grade-appropriate proficiency levels in EFL early literacy skills. These findings highlighted the significant impact of AIGN intervention on enhancing early literacy skills for EFL primary stage academic underachievers.

Keywords: *Artificial Intelligence, Generated Narratives, Early Literacy Skills, Academic Underachievers.*

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القصص المولّدة بالذكاء الإصطناعي لتعزيز المهارات الهجائية المبكرة (القراءة والكتابة) باللغة الإنجليزية لدى المتأخرين دراسيا بالمرحلة الإبتدائية

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المستخلص:

هدفت الدراسة الحالية إلى تعزيز المهارات الهجـــائية المبكرة (القراءة والكتابة) باللغة الإنجليزية لدى المتعلمين المتأخرين دراسياً بالمرحلة الإبتدائية باستخدام القصص المولّدة بالذكاء الإصطناعي. تكونت عينة الدراسة من ثمانية عشر متعلماً في الصف الرابع من أربعة مدارس إبتدائية حكومية. تبنّت الدراسة المنهج شبه التجريبي ذو المجموعة التجريبية الواحدة درسوا باستخدام القصص المولّدة بالذكاء الإصطناعي. واستخدمت الدراسة أداتين اثنتين أعدّهما الباحث وهما: اختبار في المهارات الهجائية المبكرة باللغة الإنجليزية ، تم تطبيقه قبلياً وبعدياً ، و روبريك للتصحيح ، مُـذَيّـلاً بجزء وصفي لِـتقدير ما إذا كان المتعلمون أحرزوا تقدماً يتجاوز مستواهم المنخفض قبل التجريب. وأسفرت نتائج الدراسة عن فروق دالة إحصائياً بين متوسطات درجات المجموعة التجريبية في التطبيق القبلي والبعدي لصالح التطبيق البعدي. كما أفـــادت النتائج الوصفيـــة أنّ المشاركين انتقلـوا بنجاح من مستويات الأداء المتدنية إلى مستوى كفاءة أعلى مناسباً للصف الدراسي الحالى في مهارات القراءة والكتابة المبكرة. ومن ثم فإن استخدام القصص المُولّدة بالذكاء الإصطناعي قد حققـــت تحسنـــاً دالاً في المهارات الهجائية المبكرة (القراءة والكتابة) باللغة الإنجليزية.

الكلمات المفتاحية: القصص، الذكاء الإصطناعي، المهارات الهجائية المبكرة، المتأخرين دراسياً.

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Introduction

Early literacy skills (ELSs) are the core foundational competences that children develop throughout the so-called preschool years and which are crucial precursors to traditional reading and writing. These emergent literacy capabilities include phonological features, alphabet knowledge, concepts of print, reading readiness, basic reading comprehension, vocabulary entries and oral language; and they possess strong predictive relations to later successful academic performance. Significance of these early skills go beyond the academic realm; establishing a child's early literacy skills within the primary grades is critical for reading comprehension, spelling and writing, and language holistic development and proficiency, which are all paramount to a preschooler's academic achievement and sustainable learning skills. Despite the key role of such fundamental skills, many struggling readers fail to acquire these skills because they lack phonological processes, print awareness, and orthographic knowledge and, therefore, new instructional approaches are urgently needed (Chakrabarty, 2022; Francis & Nájera, 2025).

These emergent literacy skills, initially introduced by Marie Clay in the seventies, account for a developmental continuum that involves six primary predictors delineated by the National Early Literacy Panel (NELP): "alphabet knowledge (recognizing and naming letters), phonological awareness (detecting, manipulating, and analyzing sounds in spoken language), rapid automatized naming of letters or digits, rapid automatized naming of objects or colors, letter writing or name writing, and phonological memory" (NELP, 2008, p. vii). This interrelatedness among these skills can be supported by studies indicating that narrative ability, print knowledge, vocabulary development, and oral language abilities work synergistically to contribute to ongoing reading development; hence, skills of emergent literacy are categorized into two independent yet interconnected domains: oral language and code-related skills whose relative importance vary during different stages of development, as shown via the structural equation model of Zhao et al. (2023). Longitudinal studies over decades have shown that children who cultivate strong emergent

early literacy skills exhibit improved reading comprehension, spelling accuracy, and overall academic achievement over the course of their educational process, with relatively strong gains observed for children from at-risk for literacy failure or disadvantaged backgrounds (Aydın & Yıldız, 2022; Gayathri, 2023; Hussein, 2025).

Conventional pedagogical methods like rote learning and print-based/static reading materials, however, often fail to effectively fulfill the needs of specifically targeted learners, particularly in resource-constrained classrooms (Chakrabarty, 2022). Therefore, the demand for innovative interventions that can dynamically adapt according to learners' individual profiles is crucial for addressing these gaps. Recent advances in artificial intelligence (AI) such as AI-Generated Narratives (AIGN) have paved the way for fostering personalized literacy instruction. Such narratives, generated by large language models (LLMs), can be customized to support targeted literacy skills (e.g., phoneme discrimination, vocabulary units, or print concepts) using multimodal support systems, such as text-to-speech or other interactive features (Erdogan & Kitson, 2025). These systems implement Vygotskyian' s zone of proximal development (ZPD) of students by giving timely scaffolding (immediate feedback), which is tailored toward individual students and their unique learning level, pace and background (Ribes-Lafoz et al., 2024).

AIGN are a revolutionary pedagogical tool, providing dynamic content adaptation to learners' diagnostic profiles and cultural backgrounds. Preliminary studies reveal that AI-produced narrations improved phonological awareness (PA) and decoding skills; however, its application in diverse EFL primary classrooms remains little investigated. In other words, despite these promising developments, considerable limitations and research gaps impede the successful integration of AIGN into early literacy instruction. First, a majority of the current studies are short-term oriented, and few studies have longitudinal data to examine the retention and transfer of FL literacy skills over time (Arif et al., 2024; Choi et al., 2025). Second, many AI tools are developed without proper attention to cultural relevance and ethical aspects like bias and stereotyping that can undermine learner engagement and identity (Kundu & Bej, 2025). Third, the diversity of underachieving learners, particularly in bilingual and resource-limited contexts, requires diagnostic, adaptive strategies that are insufficiently developed or evaluated (Chakrabarty, 2022; Usmani et al., 2025). For example,

AI applications like Storytime AI proved to be effective for fostering children's PA and print knowledge through culturally meaningful storytelling, especially for Arabic-speaking EFL learners struggling with cross-linguistic transfer errors (Chen & Zhao, 2024). Specifically, despite the acknowledgeable advancements, major limitations still exist in the research of early literacy and applications of AI. Although there is a substantial body of studies on the overall adoption of AI in education, but very little specifically focuses on AI utilization within a school-based EFL contexts and few studies reported on AI-stories in the in early education and for young learners overally (Butler-Ulrich & Hughes, 2025; Metaxoudis, 2025).

The current literature generally tends to standardized interventions rather than personalized and diagnostic interventions, and the heterogeneity of underachievers is neglected (Chakrabarty, 2022; Ma, 2019; Zhao et al., 2023). In addition, important research gaps limit the incorporation of AI into frameworks of early literacy. Most studies find short-term improvements in decoding but longitudinal data on skill retention and transfer are still scares. Further, a critical research gap exists in comprehending how AI-created narratives can be fused within comprehensive, holistic literacy frameworks addressing numerous language aspects simultaneously. Some studies showed improvements in either decoding or vocabulary when isolated; nevertheless, few studies examined how such interventions influence related skills over the long term like print concepts, orthographic awareness, and comprehension (Kundu & Bej, 2025). At present, existing frameworks regularly segmenting literacy aspects fail to leverage AI's ability for holistic skills construction and integration. This fragmentation contradicts the NELP's (2008) emphasis on interconnected predictors of literacy success, such as phonological memory and rapid automatized naming which require synchronized intervention strategies to develop simultaneously (Ribes-Lafoz et al., 2024; Sun et al., 2025).

Remarkably, the rationale of reviewing literature and pertinent studies in the current study relied mainly on literature related to EFL young learners or beginners in the early stages for two basic reasons: (1) there is a scarcity of the studies on problems/weaknesses of ELSs for EFL underachievers, either remedy interventions or empirical evidence-based diagnostic studies; and (2) ELSs constitute the foundational level for pre-reading and pre-writing skills which should be mastered in the early stages of learning, i.e. in the pre-school stage.

These skills are not expected to be left underdeveloped beyond kindergarten stage, except in some cases such as the primary fourth grade pupils, as in this study, who have been categorized as underachievers in English literacy skills.

Ultimately, and filling an essential research gap, the current study aimed to tackle and enhance some deficits and weaknesses in early literacy skills for some of EFL academic underachievers. Tailoring learning experiences to address particular literacy deficits for each pupil, the study optimized the capabilities and merits of AIGN to create context-rich vocabulary exercises evoking multi-senses, provide adaptive feedback to respond immediately to each learner performance patterns, personalize learning pathways tailor-fitted to address individual specific deficits/weaknesses in literacy, and progress in complexity according to the learner own pace and level with possibility of repetition, considering learning preferences of each learner.

Context of the Problem

Problems in ELSs for EFL elementary learners are considered deep-rooted barriers representing systematic gaps in this foundational level. This is because for the next learning stages in all subjects, underdeveloped receptive skills (listening/reading) hinder understanding of text structures and meanings, while inadequate practice in productive skills (speaking/writing) blocks communication and hinder connections between ideas and proper application of writing conventions and rules. It is worthy to emphasize that isolated drills inherently failed to address this interdependence.

For making sure of an existing problem concerning ELSs (pre-reading, reading, and mechanics of writing) among some of the academic underachievers in the first grades in the primary school pupils, the researcher conducted three procedures. Firstly, she held some structured interviews with some teachers in three governmental schools to gather information about the performance of the academic underachievers in these grades concerning ELSs basically. They assured that most of those pupils showed very low level in PA while reading (most letters, some familiar or unfamiliar words), did not understand simple sentences or simple classroom instructions, and exhibited much difficulty in manipulating the alphabet. Furthermore, they showed struggle in imitating some letters, in spelling words, in connecting letters with their sounds (phoneme-grapheme relationship), and in writing some letters/words in dedication

assignments. Secondly, the researcher reviewed large amount of the pupils' regular assignments and tasks and she reached the problematic points just mentioned before in addition to other orthographical problems relating to directionality, uppercase and lowercase of letters and other concepts of print, as well as additional problems in encoding and decoding English consonants in frequently used words and simple sentences. Thirdly, in a retrospective procedure and guided by the principles of dynamic assessment established by Lu and Hu (2018), the researcher selected and administered some parts of 'The Comprehensive Test of Phonological Processing' by Wagner et al. (2013) to a random sample about 173 pupils who received English language learning within same contexts and during same years (about 6 years); some of them were high achievers, achievers, and underachievers according to the expectations of literacy skills attainment (basic reading and writing) to make sure of the earlier factors or problems contributing to underachievement in literacy skills for some pupils. The results of this piloting showed discrepancies between actual FL word reading/writing achievement and achievement predicted on the basis of FL experience which had been available to them until Grade 3.

Developing ELSs for EFL learners is a constructive step for all forthcoming learning and development in EFL. Stipulating a good base of these skills is a necessity for all EFL learners generally and for academic underachievers particularly. For those latter pupils, the problems are duplicated or even magnified, because weak performance of these skills is the main responsible factor for their overall academic underachievement or failure in most of academic tasks. In a study with preschoolers at risk for academic problems, Cabell and his colleagues (2011) used latent profile analysis to examine patterns of emerging literacy skills. The study focused on four core literacy domains: alphabet knowledge, PA, print concepts, and oral language; and they determined four distinct skill profiles (clusters) ranging from Broadly Low to Broadly High. These profiles predicted reading successful outcomes beyond kindergarten. Each of these profiles characterized and categorized specific frequent literacy difficulties experienced by some at-risk pupils. Some exhibited below-average performance across all domain; others showed poor decoding skills, weak oral skills and limited comprehension (Cabell et al., 2011). Furthermore, more recent studies emphasized that EFL underachievers in the primary stage face significant challenges and difficulty in establishing and developing early literacy base. These challenges include deficits in PA, words

and vocabulary, print conventions, and metacognitive strategies, frequently exacerbated compounded by curricular misalignment, limited exposure to English print material, and cross-linguistic transfer issues (Chakrabarty, 2022; Gayathri, 2023; Hawass, 2019).

Concerning phonological deficit, Hawass (2019) emphasized PA deficits as a core barrier to decoding and fluency. In different EFL contexts, Aydın and Yıldız (2022), for example, investigated primary EFL course-books and found systemic gaps in phonological and orthographic awareness instruction, leaving young learners unprepared for decoding English orthography. Their mixed-method research showed that classroom developed (locally designed) materials did not fit with evidence-based principles in literacy which multiplied difficulties for underachievers. Their results censured primary EFL syllabuses for excessive focus on oral skills and lack of structured systematic phonics instruction, culminating in fragmented literacy learning. Similarly, Li et al. (2025) observed that PA of the Chinese EFL learners can robustly predict English connected speech perception, thus suggesting evidence for cross-linguistic processing difficulty in sound manipulation process. Concerning print awareness and directional confusion, a study on primary learners by Van Staden (2014) found that EFL students persistent difficulty in practicing the correct directional writing of letters (e.g., *b*, *d*, *p* , *q* reversals) especially in orthographic systems different from English. This reflected a deficiency in print awareness during early schooling years is often clear-cut indicative of risk for persistent difficulty in reading in EFL classrooms. As for vocabulary and comprehension monitoring, Nurhidayah (2024) identified deficient vocabulary and comprehension monitoring as critical internal barriers for Indonesian EFL primary learners; these barriers grew intensified by anxiety and disengagement. Gayathri (2023) discussed the impact of limited literacy-rich inputs on vocabulary growth and comprehension monitoring. Keezhatta and Omar's (2019) review of Saudi EFL contexts corroborated this, noting that underachievers often lack strategies to infer meaning or self-correct during reading from the very beginning.

Concerning underachievers in English as a FL, Hu and Schuele (2015) recorded problematic variables in learning new words and accordingly in reading: lexical-level, text-level, and rote word learning abilities. These abilities, according to Hu and Schuele, (2015), have been associated

theoretically and empirically with a learner's capacity to process, store, and retrieve relevant information about a new word as a foundation to establish form–meaning correspondences, and accordingly forthcoming underdeveloped reading outcomes. Other problematic points with struggling EFL learners experiencing difficulties, disabilities, deficits, or at risk of reading poor achievement were reported in previous literature: phonological awareness (predictability and modifiability) (Lu & Hu, 2018); associate learning deficits in reading English (Litt & Nation, 2014); morphological knowledge and literacy acquisition (Nagy et al., 2014); morphological awareness in biliteracy development (Zhang et al., 2014); different levels of English proficiency of primary stage pupils with one-third never studied English (Chien, 2012); predictors of spelling and reading comprehension (Li et al., 2012); morphological awareness and lexical inference ability to FL vocabulary knowledge and reading comprehension (Zhang & Koda, 2012); level of language skills of monolingual and bilingual children and the effects of L1 interference (Sparks et al., 2009; 2012; Scheele et al., 2010); cross-language transfer on literacy skills of English (Chen et al., 2010); emergent literacy skills in bilingual children (Gabriele et al., 2009); naming learning of learners in relation to their risk for reading disability (Gilliver & Byrne, 2009); working memory and reading disabilities (Swanson et al., 2009); effects of phonological memory and sensitivity (Palladino & Ferrari, 2008); difficulties in reading and writing (Ho et al., 2007); phonemic awareness (Hulme et al., 2007); orthographic learning effects of exposure, durability, and context of EFL (Nation et al. , 2007); interference of L1 with weak novice readers in EFL (Kahn-Horwitz et al., 2006); morphological awareness in biliteracy (Wang & Chen, 2006); bilingualism and reading in two writing systems (Bialystok et al., 2005); and poor phonological awareness (Hu & Schuele, 2005).

For Arab EFL learners, generally speaking, underachievement in emergent literacy among young EFL learners in Arab settings was linked to apparent linguistic, environmental, and instructional challenges. Alshaboul et al. (2014) examined the transfer of Arabic PA to reading in English for beginning Arab EFL learners. They claimed that different mappings between Arabic's consonant-based orthography and English's alphabetic system inhibit pre-lexical processing in FL. Finally, weak vowel awareness in Arabic restricted the discrimination ability of English letters in terms of phonemes among early EFL readers, resulting in slow and less accurate word recognition. Cross-language

transfer was evidenced -strong L1 phonemic skills predicted FL decoding- though many children had insufficient Arabic PA to sustain English reading progress (Alshaboul et al., 2014).

For Egyptian EFL learners, Abdelaziz (2019), for example, demonstrated that explicit phonological awareness strategies (e.g., rhyming, blending) significantly improved oral reading fluency among Egyptian fourth-graders, emphasizing the need for structured PA interventions. From the perspective of primary stage teachers, Hussein (2025) highlighted cultural and institutional barriers in Iraqi urban peripheries, where EFL teachers reported inadequate training and oversized classrooms as primary obstacles to addressing underachievement. Chakrabarty (2022) assured that limited exposure to written texts prevents intuitive grasp of punctuation rules and logical thought organization. Students produce dense, unstructured writing because they lack opportunities to analyze how punctuation clarifies meaning in authentic materials. Similarly, Turkish teachers in Aydın and Yıldız's (2022) study lacked training in FL literacy acquisition principles, perpetuating ineffective teaching practices. For more validation with struggler readers, Zhao et al. (2023) conducted a meta-analysis revealing that combining main idea identification, text structure analysis, and retelling skills magnified cognitive load for struggling readers. Collectively, these studies emphasize that addressing cognitive, linguistic, pedagogical problems and barriers is pivotal for advancing early literacy outcomes among EFL underachievers throughout the primary stage to establish a consolidated base for forthcoming language learning.

Statement of the Problem

The study problem can be presented in the following statement 'EFL academic underachievers in the primary fourth grade showed observable frequent deficiencies in EFL ELSs, i.e. in pre/reading and writing skills particularly in English consonants'. Accordingly, the study attempted to answer this question:

- What is the impact of AIGN on enhancing EFL underachievers' ELSs?

Hypothesis of the Study

The study attempted to test this hypothesis: 'There would be statistically significant differences between the means of AIGN experimental group on the pre-post assessments of EFL ELSs favoring the post-assessment'.

Significance of the Study

The current study is expected to pioneer an approach that is not only innovative but also grounded in the core principles of established literacy acquisition models and learning skills, seeking to provide a scalable and effective solution to the persistent challenges of early literacy development for underachiever or even at-risk EFL pupils. The significance of this study is multifaceted, contributing to theoretical, pedagogical, and practical domains by exploring an innovative intervention for a vulnerable student population. First, the study holds significant pedagogical value for supporting underachieving learners. These learners often exhibit deficits in specific literacy components, requiring targeted and differentiated instruction. Within the frame of Literacy Processing Theory, struggling learners follow non-linear developmental paths and benefit from individualized scaffolding rather than standardized curricula. AIGN offer a unique potential to provide such tailored support by creating personalized stories that can be adapted in real-time to a learner's specific needs; accordingly, addressing processing deficits in areas like phonological awareness and orthographic knowledge as frequently identified via diagnostic frameworks like the whole-to-part model.

Second, this study presents theoretical extension of the established early literacy models into the digital age. The investigation aligns with emerging study directions calling for the integration of digital literacy into foundational learning frameworks. While significant established models emphasize the importance of dynamic, socially mediated, and enriched literacy settings, this study explores how AI can function as a tool to create such settings virtually. By examining how EFL learners interact with AI-generated text, the study can provide empirical insights into how technology shapes the development of the core predictive skills, e.g. alphabet knowledge, phonological knowledge, vocabulary basis, and core writing skills, as NELP identified them as core literacy components. Finally, the study offers practical contributions to curriculum design and intervention instructional strategies in EFL settings. The

findings, hopefully, may have the potential to inform the development of evidence-based, technology-enhanced interactive frameworks in EFL. By leveraging AI to generate engaging and level-appropriate narratives, educators may be better empowered and equipped to foster the component skills of literacy, including phonological processes, word identification, vocabulary repertoire, listening comprehension, and inference skills.

Definition of Terms

AI-Generative Narratives

Operationally, AIGN referred to digitally created, pedagogically structured short narratives (stories, tales, rhymes, songs, chants, puzzles, dialogues, etc.) produced by AI-powered applications; these narratives are systematically designed, content-contextualized, personalized and adapted to address specific deficits in early literacy skills among primary-stage underachievers. They are characterized by five core operational features: diagnostic driven-content based on real-time assessment data of learners' skill gaps; multimodal immediate scaffolding; culturally responsive adaptation (avoiding stereotyping, and using localized regional folklore, values, and linguistic patterns); progressive complexity sequencing in a structured progression from controlled decodable texts to full generated-content; and human-AI collaborative validation, because teachers review and refine AI-generated content weekly to ensure pedagogical alignment, correct prompts to avoid biases, and maintain narrative coherence.

Early Literacy Skills (ELSs)

Operationally, ELSs referred to the measurable language competencies in three interrelated domains -pre-reading, reading, and writing mechanics of the English consonant alphabet which underachieving primary-stage pupils are expected to demonstrate to overcome the identified deficits. These skills manifest full consolidated alphabetic understating encompassing: phonological and graphemic knowledge, reading comprehension and print concepts, writing mechanics and orthography. By turn, each of these skills entails other sub-skills which represent specific observable abilities demonstrated in the pupils' performance in English language tasks.

Literature Review

EFL Early Literacy Skills: Conceptual Framework

Emergent literacy is another term representing ELSs which represents a fundamental concept in childhood education which outlines how children develop preliminary level of language understanding, symbols representations, and print principles prior to formal literacy instruction (Chen & Jamiat, 2023). This developmental process, largely formulated in monolingual terms, has recently attracted considerable interest in EFL contexts, particularly as young leaners try to reconcile FL learning and literacy development. The notion posits that literacy knowledge develops through meaningful use of language in multiple contexts, versus through teacher instruction by itself (Lonigan et al., 2009; Lucas et al., 2020). The concept of emergent literacy, initially coined for first language learning, has been extended to EFL learning contexts with significant modifications. Historical analysis of Clay's theoretical framework reiterates that emergent literacy denotes to the pre-reading and pre-writing experiences of young learners, before starting traditional reading and writing. This foundational understanding has been extended to EFL contexts, where NELP (2008) established specific criteria for early literacy skills: first, the skill must be present before formal language teaching, and second, it must be related to or predictive of formal literacy outcomes (Doyle, 2018).

The Emergent Literacy Theory represents the theoretical foundation for the analysis of early childhood literacy development in first as well as in foreign language situations. This theory, as Teale and Sulzby (cited in Gavelek & Raphael, 2021) describe, reframed literate practice, distinguishing it from the traditional printed-material beginning to concentrate, rather, on the emergent literate practices at the center of learners' meaningful engagement as competent learners. The theory shifts the notion that literacy development is a skill that one acquires through formal instruction to a more dynamic conception– as a developing process over time with formulated origins in the infancy period (Lucas et al., 2020).

For EFL contexts, emergent literacy theory becomes even more important since it acknowledges that literacy beginning experiences of preschoolers (both at home language and at foreign language instructional setting) might have a cumulative effect on literacy development. Studies in this area reveal that as

literacy develops very early in life, children's early experiences with reading and writing are of prime significance for their subsequent literacy development, highlighting the role of early parent-child interactions around reading and storytelling. Such theory emphasizes developing family literacy programs in addition to early intervention in EFL settings (Gavelek & Raphael, 2021; Manirakiza et al., 2024). Further, this theory emphasizes the significance of real reading experience in the development of the learner. This real-world engagement supports the philosophy of emergent literacy, which focuses on the importance of authentic experiences with texts over a focus on discrete skills (Khemlani-David, 2015; Wang et al., 2009). This standpoint fundamentally reconfigures comprehending from viewing literacy as a school-based ability to recognizing it as an emerging developmental process established over time and experiences (Lindahl & Sayer, 2018; Manirakiza et al., 2024).

Literacy, in the context of EFL, consists of core components classified according to emergent literacy research as "Print Awareness and Concepts about Print …. Phonological Awareness Development ….. Letter knowledge … and the Alphabetic Principle" (Marguti et al., 2022, p. 554). These components take on additional complexity in foreign language learning environments where learners may experience little exposure to the new language beyond formal instruction (Johnson & Tweedie, 2012). Moreover, research indicates that emergent literacy begins to develop at birth and lasts through early childhood until children achieve conventional literacy, typically around elementary school age. However, in EFL contexts, this timeline may be significantly altered by factors such as age of first exposure to English, intensity of instruction, and home language support. The recognition that literacy skills can transfer bi-directionally between first and foreign languages suggests that EFL literacy instruction can begin even before children achieve literacy in their native language (Lucas et al., 2020; Shin & Crandall, 2014; Wang et al., 2009).

The foundational components of EFL literacy skills build upon well-established early literacy research while incorporating the unique challenges of foreign language development. PA represents a critical foundational skill, defined as being capable of perceiving and manipulating the subtle phonetic elements within words. Research with Arabic-speaking EFL learners demonstrates that "explicit training in phonological awareness of novel consonant sounds may aid reading comprehension in EFL learners, particularly

when the target phonemes do not exist in learners' first language" (Waked et al., 2024, p. 913). Ehri's (2005; 2014) work has made a major contribution to understanding and development of early reading skills, specifically with respect to how young learners begin to learn to read and recognize words. Thus, Ehri's suppositions reinforce the potentiality of systematic, code-based approaches to beginning literacy instruction, including explicit training in PA, phonics proficiency and orthographic mapping as the basis for successful learning to read. Again, she stresses how much significant PA is; the same applies to grapheme-phoneme knowledge and a systematic progression through distinct stages of developing reading.

Ehri's studies proposed a four-phase model for how children develop word-reading. These stages are referred to as pre-alphabetic, partial alphabetic, full alphabetic, and consolidated alphabetic (Ehri, 2014). This model details the progression from visual-based cues to systematic decoding strategies. According to Ehri's model, the shift between partial to full alphabetic phase is described as a developmental trajectory, with increasingly complete graphemes (letters) and -phonemes (sounds) connections becoming established, resulting in increased accuracy of decoding and word memory. Partial Alphabetic Phase entails children are beginning to develop phonemic awareness, letter knowledge, and are able to make some letter-sound associations to remember and recall words. In doing so, they may need to use partial cues, such the initial and final letters of a word to make some recognizable associations. They are still building their sight word memory and can easily mix up words that look alike. Within Full Alphabetic Phase, and to become fully alphabetic, learners need to learn the more common grapheme-phoneme relationships and they become more skilled in decoding letters of different words. In this phase, students form complete grapheme-phoneme correlations which help them decode unfamiliar words, storing word items in their memories more effectively. When students orthographically map words, all the letters become connected to their sounds to read from memory. As readers make complete connections, they are able to write unfamiliar words with phonetically full spellings by breaking down pronunciations into phonemes and then writing the letters that represent each phoneme (Lane, 2022).

Furthermore, the Comprehensive Emergent Literacy Model proposed by researchers (Hooper et al., 2020) presents an illustrating framework for understanding how literacy components interact dynamically rather than developing in isolation. This model includes four key areas: oral language development, PA, print awareness, and writing skills, with writing positioned centrally as the component where children demonstrate their integrated literacy knowledge. In EFL contexts, this integration becomes particularly complex as learners must coordinate knowledge across multiple linguistic systems while developing foundational literacy concepts (Lonigan et al., 2009; Rohde, 2015).

Phonological Awareness Development

PA, the ability to distinguish among sounds within auditory language, is a critical predictor and indicator of future literacy achievement in both monolingual and EFL contexts. This skill encompasses various levels of sound manipulation, from syllable awareness to phonemic segmentation and blending. Research consistently demonstrates that PA instruction significantly impacts reading development across linguistic contexts. Intervention studies in EFL context provide compelling evidence for the advantages of systematic PA instruction. Research using "an explicit rime-based phonics method" with third-grade EFL children found that "brief and direct beginning reading instruction with an explicit rime-based phonics method helps children in a non-English language context with L1 significantly different from English to rapidly improve their phonological awareness performances" (Agegnehu et al., 2023, p. 20). These findings suggest that the magnitude of intervention effects can be very large for all sub-skills and the total PA performance when instruction is explicit and systematic. Again, explicit rime-based phonics instruction can produce substantial improvements in PA outcomes and rapidly develop basic phonological processing skills (Cabell et al., 2011; Doyle, 2018).

Hu and Schuele (2015, pp. 756-757) and Brandenburg et al. (2017, pp. 8-13) magnified the effects of phonological processing as an overall capacity including "three distinct yet interdependent abilities- three distinct yet interdependent abilities – retrieval, memory, and awareness" (Hu & Schuele, 2015, p. 756). Phonological retrieval encompasses the capacity for swift activation and retrieval of phonological representations housed within memory systems. This cognitive process is typically assessed through rapid serial naming tasks involving highly familiar visual stimuli, including alphabetic

characters, numerical symbols, and everyday objects. Phonological memory constitutes the cognitive mechanism responsible for the temporary retention of incoming auditory-phonological information while more permanent memory representations are formed and consolidated into long-term storage. This capacity is commonly evaluated through nonword repetition tasks, which require individuals to reproduce novel phonological sequences without lexical support (Brandenburg et al., 2017; Hu & Schuele, 2015).

Furthermore, PA represents the metacognitive ability to consciously examine and deliberately manipulate the phonemic and syllabic components that comprise spoken language structures. This metalinguistic skill involves the explicit recognition and manipulation of sound units within words, enabling speakers to engage in conscious reflection about the structural properties of oral language, including phoneme deletion tasks where participants remove specific sound units from target words, phonological similarity identification exercises requiring recognition of shared acoustic elements across lexical items, and rhyme production activities that demand generation of phonologically corresponding words (Litt et al., 2019; Rosyada-As & Apoko, 2023). This metalinguistic competency serves as a critical foundation for code-breaking processes inherent in both written text decoding and oral language comprehension. The ability to consciously manipulate sound structures enables learners to establish systematic connections between phonological representations and their corresponding orthographic symbols, facilitating successful manipulation of literacy-based demands (Brandenburg et al., 2017; Hu & Schuele, 2015).

Letter Knowledge and Alphabetic Principle

Letter knowledge entails understanding that letters differ from one another, knowing letter names and sounds, and recognizing letters across contexts. The development of letter knowledge in EFL contexts must consider the relationship between learners' first language writing systems and English orthography. Research indicates that letter knowledge alone is insufficient for PA development, highlighting the need for integrated approaches that connect letter learning with sound-symbol relationships. The challenge of English orthographic complexity requires particular attention in EFL contexts. To be more specific, English has twenty-six letters that correspond to forty-four phonemes using approximately five hundred spelling patterns so even native

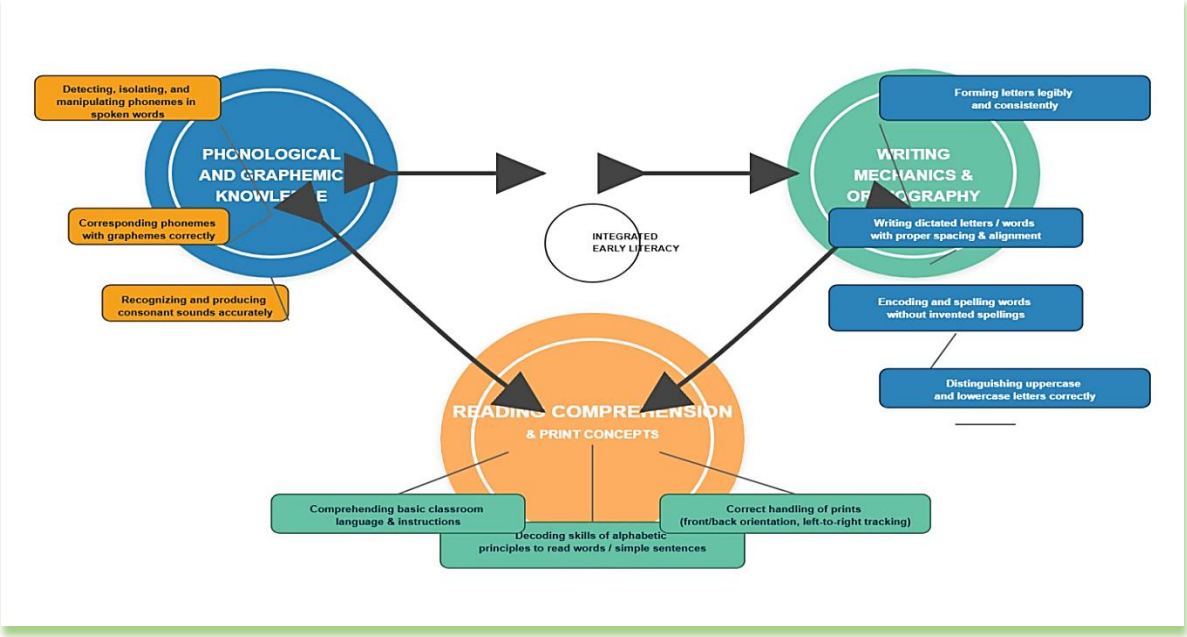
speakers still need systematic instruction in the principles of phonics. Explicit instruction in how to decode and use the alphabet to construct words is necessary for EFL learners; it leads to automaticity in decoding and consider upon transfer effects from the writing systems of their first language (Hall et al., 2022; Lucas et al., 2020).

Morphologically, and because lexical-level abilities are "the abilities to access and process the phonological and morphological components of a word" (Hu & Schuele, 2015, p. 756), morphological knowledge refers to the ability to identify and understand meaningful parts of words -such as the root *learn* and the suffix *–er* in learner; this occurs either implicitly or explicitly (Nagy et al., 2014). This skill helps learners break down complex words into smaller units and use those parts to figure out the word's meaning. Studies show that stronger morphological awareness supports better oral skills and reading ability in a second language (Zhang & Koda, 2012; Zhang et al., 2014). Previous research proved that EFL learners struggling with literacy skills showed difficulties in these processes (e.g. Hu & Schuele, 2005; Litt & Nation, 2014; Logojan, 2021; Palladino & Ferrari, 2008; Rosyada-As & Apoko, 2023). That's why, these three interconnected phonological processing components alongside with morphological knowledge serve as fundamental building blocks for successful language learning and literacy development, particularly in early educational contexts (Lucas et al., 2020).

Orthographical processing skills, furthermore, constitute fundamental competencies for EFL beginners that directly influence their reading and writing development. The orthographical aspect encompasses learners' ability to recognize, name, and produce both uppercase and lowercase letters accurately, while understanding the systematic relationship between printed letters and their corresponding sounds in English. For beginning EFL learners, mastering these orthographical foundations presents unique challenges due to potential interference from their native script systems, particularly for learners whose first languages employ non-Latin alphabets or logographic writing systems (Ehri, 2014; Lane 2022; Wang et al., 2009). Research demonstrates that explicit instruction in letter formation, visual discrimination between similar letters (such as b/d or p/q), and systematic phoneme-grapheme correspondence activities significantly enhance orthographical processing skills. The development of automaticity in letter recognition allows cognitive resources to

be allocated toward higher-order reading processes, making it essential for EFL instructors to provide structured, sequential instruction which progresses from letter identification to sound-symbol relationships. Furthermore, the orthographical dimension of letter knowledge serves as a predictor of later reading success, as students who achieve fluency in letter-sound correspondences demonstrate improved phonological awareness, word recognition accuracy, and overall reading comprehension in their second language learning journey (Calabrich, 2023; Francis & Nájera, 2025).

Figure (1): Visualization of EFL Early Literacy Skills & Sub-skills



Print Awareness and Concepts about Print

Print awareness constitutes a fundamental component of early literacy that involves understanding how print functions and how books operate as meaning-making tools. Children with developed print awareness recognize that print carries meaning, understand directional conventions of reading, and can handle books appropriately. In EFL contexts, print awareness development faces unique challenges as learners may have limited exposure to English print in their immediate context. The development of print awareness in EFL contexts requires explicit attention to contextual print exposure and meaningful interactions with English texts. Teachers should create language-rich environments that compensate for limited English print exposure in children's home communities. It includes utilizing diverse text types, building background

knowledge through content-area materials, and connecting literacy learning to children's cultural experiences (Hall et al., 2022; Lane, 2022).

Rote Word Learning: Rote Memorization or Paired Associate Learning

Rote word learning, particularly by novice readers, ability serves as a fundamental cognitive mechanism that facilitates foreign language vocabulary development, particularly for EFL learners who rely heavily on systematic memorization techniques to build their lexical repertoire. This traditional approach, characterized by repetitive drills and paired-associate learning tasks, remains prevalent among learners from specific cultural and educational backgrounds where such methodologies are deeply embedded in pedagogical practices. Research has consistently demonstrated that rote memorization, while often criticized for its perceived limitations, provides immediate and measurable benefits for vocabulary retention, especially during the initial stages of language learning (Aljasir, 2025; Ganesan et al., 2025; Francis & Nájera, 2025).

Studies examining paired-associate learning paradigms reveal that this method effectively mirrors the natural classroom environment where teachers introduce new vocabulary through direct pairing with first language translations or visual representations, followed by repetitive practice sessions. The significance of rote learning extends beyond mere instructional preference, as it constitutes a core component of standardized language aptitude assessments which recognizes paired-associate learning ability as one of four essential dimensions required for successful foreign language acquisition (khoshsima & Raeissi, 2016; Logojan, 2021; Pattapong, 2022; Rosyada-As & Apoko, 2023). Furthermore, research investigating young learners' vocabulary acquisition patterns indicates that rote memorization plays a particularly crucial role during early developmental stages, when learners naturally gravitate toward concrete, repetitive learning strategies that provide immediate feedback and tangible results. This finding aligns with broader research in first language literacy development, where paired-associate learning abilities demonstrate strong correlations with reading acquisition skills, suggesting that the capacity to form arbitrary word-meaning associations represents a fundamental cognitive ability that transfers across linguistic domains (Calabrich, 2023; Litt et al., 2019; Mansoor et al., 2023; Maroney, 2024).

Innovative Pedagogical Approaches and Interventions

Dramatic storytelling is an effective pedagogic approach for enhancing emergent literacy skills in EFL context. Dramatic storytelling, particularly interactive models, offers a powerful pedagogical strategy for cultivating emergent literacy skills among EFL learners by engaging students emotionally, cognitively, and socially in the language-learning process. When teachers enact stories with expressive gestures, vocal variation, and role play, learners are exposed to rich, contextualized language models that highlight vocabulary, sentence structures, and narrative sequencing in a memorable way. This multimodal engagement anchors new words and phonological patterns in students' minds through visual and kinesthetic experiences, reinforcing letter–sound relationships and print conventions as children follow along in text or picture prompts (Compagnoni, 2025; Satriani, 2021). Moreover, dramatization fosters interactive dialogue, prompting learners to predict plot developments, retell segments, and experiment with language for authentic communicative purposes. As learners inhabit characters' perspectives, they internalize syntactic forms and discourse markers within meaningful contexts rather than isolated drills, accelerating the transition from decoding individual words to comprehending connected text. In the EFL classroom, dramatic storytelling thus bridges learners' oral language proficiency with foundational reading and writing skills, making abstract orthographic and phonemic concepts concrete, motivating active participation, and laying a sustainable foundation for later literacy development (Baskara, 2023; Sun et al., 2025).

Previous research indicates that narrative-based instruction supports development in reading comprehension and interest in reading while promoting growth in writing performance specifically in structure schema, grammar positions, and graphic aspects (Bence, 2017). This integrated approach aligns with current understanding of literacy as a complex, multifaceted competency that requires authentic practice opportunities. The dramatic storytelling model offers a micro-curriculum framework that could inform broader EFL curriculum development. The approach recognizes that stories serve as primary vehicles for engaging children in language learning within early education contexts (Satriani, 2021). By combining narrative structure with physical enactment, dramatic storytelling creates embodied learning experiences that support both language acquisition and literacy development. The quasi-experimental design

involving two hundred children across multiple kindergartens revealed significant main effects for both group membership and time, indicating that children receiving dramatic storytelling intervention outperformed control groups in literacy-related measures. This approach appears particularly effective because it integrates multiple literacy components while providing meaningful, engaging contexts for English language use (Bence, 2017; Butler-Ulrich & Hughes, 2025).

Systematic Instruction and Balanced Approach

Systematic PA instruction has emerged as a cornerstone of effective EFL literacy pedagogy, particularly for young learners developing foundational reading skills. Explicit phonics instruction proved to be significantly effective through some deliberate interventions, where training-based intervention using an explicit rime-based phonics teaching practices produced significant improvements in the outcomes of PA for EFL children. This approach proved particularly effective because it provided systematic exposure to English sound patterns that differ significantly from learners' first language. The implementation of phonics instruction in EFL contexts requires careful attention to cross-linguistic differences and systematic progression through sound-symbol correspondences. Some studies with EFL learners demonstrated that explicit instruction of phonemic awareness aspects can foster young learners in developing phonemic awareness in English language, particularly when instruction targets specific phonemes which do not exist in learners' first language (Johnson & Tweedie, 2012; Lu & Hu, 2018). This targeting approach acknowledges that EFL learners may need additional support for sounds that are novel to their linguistic experience.

Balance literacy approaches become clear-cut present in contemporary research. Such approaches advocate for integrating all four language skills while providing explicit instruction in reading and writing strategies. Also, they emphasize that EFL literacy instruction should be meaning-focused while including systematic attention to code-related abilities like phonics and PA. The balanced approach contradicts earlier assumptions that EFL programs should delay literacy instruction in favor of purely oral language development (Chien, 2012; Shin & Crandall, 2014). For instance, studies with Portuguese preschool children exposed to an innovative EFL pedagogic approach showed significant development in emergent literacy skills including print intentionality awareness,

spoken-written word matching, and print conventions understanding. These findings support recommendations for integrating English instruction into early childhood curricula to build school readiness. The balanced literacy framework emphasizes the importance of scaffolding through a (To/With/By) instructional model. This approach progressed from teacher modeling, where instructors read and write to students, to guided practice, involving collaborative reading and writing with students, and finally to independent application, where students engage in reading and writing on their own. Such systematic scaffolding proves particularly important for EFL learners who require additional support to develop both language proficiency and literacy skills simultaneously (Lucas et al., 2019; Shin & Crandall, 2014).

Technology-Enhanced Interactive Media in Literacy Instruction

Integrating digital technologies into early literacy instruction has generated considerable research interest, with systematic reviews revealing both opportunities and challenges. A comprehensive review of 50 studies examining children's interactive reading applications revealed that multimedia presentations attributes as dictionary database, musical accompaniment, and pictures with animation effectively enhanced emergent literacy performances (Chuang & Jamiat, 2023; Liu et al., 2024). A corpus of research examining digital versus traditional book formats provides mixed findings, with some studies indicating advantages for electronic books and others favoring printed materials (Pérez y Pérez & Sharples, 2023). A systematic review of smart technology for young children's language and literacy development identified five primary domains of impact: print awareness, alphabet knowledge, PA, early vocabulary repertoire, and narrative/oral abilities. Effective optimization of digital interventions appears to depend heavily on design quality and pedagogical integration rather than technology use per se (Liu et al., 2024).

Challenges of ELS for EFL Academic Underachievers

Early literacy development of English language presents multifaceted challenges for academic underachievers, who often face systemic, cognitive, and pedagogical barriers. The main challenges in early literacy skills for EFL learners, especially academic underachievers, include limited exposure to English print and oral language settings, which inhibits the progression of targeted structural skills like PA, print concepts, and letter knowledge

(Gayathri, 2023; Li et al., 2025). These learners often struggle with cross-linguistic transfer issues, where differences between their first language and English orthographies and phonologies create additional barriers to decoding and spelling. Cross-linguistic transfer represents a defining characteristic of EFL literacy development that distinguishes it from first language literacy acquisition (Chakrabarty, 2022; Wang et al., 2009). Research demonstrates both positive and negative transfer effects depending on the similarity between learners' first language and English orthographic and phonological systems. Studies with Arabic-speaking EFL learners revealed that PA of sounds common to both languages facilitates ongoing reading development, while new sounds require explicit instruction (Li et al., 2025; Waked et al., 2024).

Further complicating students' learning is the insufficiency of teacher preparation in literacy instruction for EFL and contextualized responsive pedagogies, as teachers may be deficient in the knowledge which allows them to respond to the needs of their bilingual and bicultural learners. Many learners will already face additional challenges particularly those related to the socioeconomic background including poor access to good reading material and home literacy support; these factors slow progress as learners' underachievement is perpetuated (Gayathri, 2023; Hooper et al., 2020). Furthermore, motivation and self-efficacy problems are observed in underachievers, hampering them from engaging in literacy tasks and acquiring core skills (Schunk & DiBenedetto, 2020). Tackling these challenges demand the application of holistic and contextually appropriate interventions which combine systematic phonics, culturally appropriate materials, and focused teacher professional development (Lucas et al., 2020; Kundu & Bej, 2025).

Characteristics of Underachievers in Foundational Literacy Skills

Focusing on EFL primary stage learners who showed difficulty, confusion or even at-risk of disorder/disability in foundational literacy skills, the key cognitive-linguistic factors that distinguish underachieving foreign FL learners from their expected-achieving peers, revealing critical insights into the mechanisms underlying foreign language reading development in young learners. In this vein, **phonological memory/sensitivity/awareness** emerges as the most significant lexical-level discriminator between underachievers and expected achievers, with underachievers exhibiting deficits not only in English phonological awareness but also in their first language L1phonological structure

insight, suggesting persistent cross-linguistic phonological processing difficulties that transcend language-specific experience. Importantly, these phonological awareness deficits were subtle yet pedagogically significant, indicating that such weaknesses may remain undetected by classroom teachers while substantially impacting individual FL learning outcomes (Gilliver & Byrne, 2009; Hu & Schuele, 2015; Litt & Nation, 2014; Lu & Hu, 2018).

The underachievers also frequently demonstrate **specific difficulties in English rapid naming** rather than general naming speed impairments, suggesting that these learners require extended time to develop automaticity in phonological retrieval and may maintain underspecified word representations that suffice for accuracy but not for fluent processing (Palladino & Ferrari, 2008; Swanson et al., 2009). Morphological awareness further differentiated the groups, with underachievers showing selective difficulties in English plural and agentive forms -morphological units requiring sub-syllabic sensitivity- rather than compound forms, indicating poor awareness of subcomponents within spoken words whether phonological or morphological in nature. Notably, phonological memory did not distinguish the groups, contradicting findings from L1 reading research and suggesting that FL learning contexts may involve different cognitive processing demands (Hulme et al., 2007; Nagy et al., 2014; Wang & Chen, 2006; Zhang et al., 2014). Besides, problems extended to grasp orthographic aspects and confusion emerging from reading and writing in two writing systems, i.e. in bi-literacy contexts (Nation et al., 2007; Scheele et al., 2010; Sparks et al., 2012). Additionally, situation grows worse for underachievers as a result of cross-interference of their L1 language within which they might suffer from counterpart deficits or problems (Kahn-Horwitz et al., 2006; Zhang et al., 2014). Taken together, according to Hu and Schuele (2015), for example, the child FL learners whose attainments in FL word reading at Grade 5 were below the expected levels of FL experience demonstrated a host of deficits in FL phonological processing as early as Grade 3, including “reduced insight into the phonological structure of spoken words, slow retrieval of FL forms for production, and deficient associated learning of novel words” (Hu & Schuele, 2015, p. 757). Like poor readers, they showed obvious deficits in morphological awareness alongside deficiency in developing phonological representations essential for an array of linguistic processing tasks (Rosyada-As & Apoko, 2023).

Concerning **the rote word learning**, findings of previous research revealed that underachievers struggled specifically with productive rather than receptive novel word learning, indicating difficulties in constructing highly specified phonological representations for newly encountered words, which aligns with their phonological awareness deficits. This is a main characteristics of underachievers or poorer readers (Gilliver & Byrne, 2009; Litt & Nation, 2014). The rote word learning parallels nonword repetition in that both require participants to reproduce unfamiliar phonological sequences. However, rote word learning imposes additional cognitive demands: learners must maintain associations between several novel forms and their corresponding referents and later retrieve the exact form linked to each referent. Consistent with studies of first-language readers (Litt et al., 2019), underachievers' challenges emerged during production rather than recognition of newly learned words. Recognition can rely on partial phonological cues, whereas accurate production depends on constructing a fully specified phonological representation. The selective difficulty in production suggests that underachievers struggle to form sufficiently detailed sound representations—a limitation likely rooted in weaker phonological awareness. Research confirms that children with lower phonological awareness exhibit impaired novel-word production in associative learning tasks, even when their recognition of those words remains intact (Francis & Nájera, 2025; Maroney, 2024).

These conclusions collectively suggest that weakness in lower-level phonological processing and other inter-related or co-resultant skills fundamentally constrains young FL learners' ability to benefit from FL experience, with underachievers exhibiting a constellation of early deficits in FL phonological processing, morphological awareness, and novel word learning that cannot be attributed to limited FL exposure, pointing toward a potential phonological core deficit hypothesis in FL reading development (Calabrich, 2023; Ganesan et al., 2025; Litt et al., 2019; Zhang et al., 2014).

Accordingly, tackling such defects in these skills and sub-sequent skills requires employing multimodal strategies and rich material to successfully address these dynamic weaknesses and treat defects for EFL underachievers. For achieving this purpose, the present study optimized some AI-powered tools and apps to generate narratives in various forms to personalize and adapt learning experiences for each participant and for each literacy deficit.

AI-Generated Narratives: Conceptual Framework

The integration of AI technologies into EFL studies represents a paradigm shift, especially of narrative-based learning methods. Recent empirical studies demonstrate that AI-based storytelling and narrative tools greatly improve learners' language acquisition results in a variety of skill areas and at the same time they cater for a range of learner profiles and motivation (Aly et al., 2024). Furthermore, AI-enabled digital storytelling is more than just enhancing traditional language skills; it also fosters essential 21st -Century skills as digital literacy, collaborative problem-solving, in addition to metacognitive awareness. However, the implementation of these technologies presents complex pedagogical challenges requiring careful consideration of ethical frameworks, teacher preparation protocols, and institutional infrastructure requirements (Preetam et al., 2024; Teng, 2024).

Traditionally, narrative genre is the art of storytelling; humans smoothly and appealingly engage in narration as an art. Narratives can be recounting or retelling of actual events or depicting imagined events presented in chronological sequence and used as a fundamental pedagogical genre for EFL development (Aydemir & Fetah, 2023; Chen & Zhao, 2024). AI-generated EFL narratives represent a sophisticated intersection of computational linguistics, educational technology, and foreign language learning theories. Contemporary research defines these narratives as digitally constructed stories that emerge from the collaborative interaction between AI systems and English language learners, designed specifically to enhance linguistic competencies through meaningful, contextualized communication. This definitional scope refers to a variety of technological applications, ranging from simple tools for producing text to complex multi-modal platforms containing writing, visual and audio elements (Arif et al., 2024; Cheung & Shi, 2025).

From conventional methods to digital storytelling, this transition not only retains the instructional benefit of captivating and motivational qualities of conventional narrations but also promotes digital literacy and skills, which expands and deepens learners' language competences and intercultural understanding (Fadlalla et al., 2025). Additionally, digital storytelling promotes individualized learning, development of communication, and holistic development of language skills (Aydemir & Fetah, 2023; Butarbutar, 2024). Generative AI narrations in TEFL are stories, in the form of narratives,

dialogues etc., that are processed through artificial intelligence technologies like LLMs, co-related texts and speech, multimodal content generators, for the purpose of generation, adaptation or co-generation for language learning. They are therefore dynamic interactive experiences that are also personalized and multi-modally integrated where learners can access linguistically rich content and develop their language skills. Instead of conventional static stories, generation AI driven stories are customized according to the learners' input, levels of expertise and cultures that consequently result in making engagement and creativity possible within EFL experiences to every student (Baskara, 2023, Seo, 2024; Sun et al., 2025).

Positioning narratives as vehicles for integrated skills, emotional engagement, and cultural learning in early EFL contexts, Yang (2023) presented a conceptual and practice-oriented paper arguing that narrative picturebooks are particularly suited to teaching English to children because storytelling aligns with children's natural language acquisition tendencies, and ongoing curriculum reforms which emphasizes English communicative competence and affective development alongside sub-competencies such as cooperative communication, knowledge processing, creative thinking, self-management, community, and aesthetic sensibility. He added some defining features of narrative texts and offered concrete techniques and procedures for storytelling lessons that operationalize narrative-based instruction for primary learners, bridging literary discussion with actual classroom practice, i.e. a structured rationale and pedagogical framework for leveraging narrative texts to meet EFL curricula's communicative and holistic aims, supported by a replicable example that teachers can adapt to local contexts (Yang, 2023).

In the AI era, according to Kang et al. (2022), English instruction should cultivate students' creativity by leveraging narrative as a pedagogical mode that goes beyond transactional language use to embrace ambiguity, complex social contexts, and learner experience that cannot be reduced to explicit rules or automated systems. Accordingly, narrative inquiry stimulates children to reimagine, recreate, and re-contextualize language, thereby freeing them from communicative stereotypes, nurturing creative imagination, and promoting innovation and identity development through social and cultural self-expression. They also proposed classroom practices that wholly utilize narrative to enhance communicative competence alongside creativity, positioning storytelling as an

effective means to integrate affective engagement with skill development under contemporary curricular aims (Kang et al., 2022).

According to Compagnoni (2025), AI-enhanced digital narration includes task-oriented methods to advance learners' language skills through virtual story-based with learning tasks based on interactive features. Such a definition accentuates the pedagogical motivation behind AI as a tool for narrative generation, which contrasts with applications oriented solely towards entertainment purposes. The collaborative nature of this content is a significant departure from existing language learning dynamics from a consumer perspective, in which learners are generally treated as passive consumers (Woo et al., 2023). The technical infrastructure of AI-authored narratives commonly entails large language model, natural language processing algorithms and elaborate prompt engineering which responds to learner input while ensuring narrative coherence and educational content and goals. It involves systems that provide learner-generated and guided support for enhancing language while ensuring its communicative naturalness and authenticity (Aydemir & Fetah, 2023; Kundu, & Bej, 2025).

Contextual Evolution of AIGN in EFL Contexts

The contextual evolution of AIGN in EFL contexts reflects broader technological advancements in AI and computational linguistics over the past decade. Initial implementation focused mainly on simple text generation and automatic evaluation systems, but recent advances have extended to more complex multimodal sophisticated systems. Historical analysis confirms that early AI work in language education tended to focus on assessment and feedback tools with limited attention to more creative and narrative-led pedagogic approaches (Erdogan & Kitson, 2025). However, the period from 2020 onwards demonstrates a paradigmatic shift toward collaborative and generative applications, particularly in narratives-based contexts. The evolution correlates with the increasing acknowledgment of the centrality of narrative to language learning and cultural awareness (Cheung & Shi, 2025; Sharma, 2025). Contemporary developments tend to focus on combining the advantages of AI approaches under unified pedagogical frameworks. The emergence of platforms that can generate text, images and audio constitutes a substantial step forward in enabling the development of immersive multimodal training and learning

materials that cater to different learning preferences and backgrounds (El Hassan & Alsalwah, 2025; Chen & Zhao 2024).

Moreover, integrating generative AI with other AI tools can overcome rote-focused EFL practices by creating authentic, context-rich learning that better develops practical language proficiency in real-world scenarios. It illustrates how chatbots, tailored prompts, adaptive exercises, and AI-supported narrative tasks can be aligned to learners' proficiency levels and objectives to deliver immersive, individualized activities that bolster comprehension, confidence, and creative language use. A central theme is co-creation: teachers and learners collaboratively generate materials and tasks, with AI functioning as an engine for personalization rather than a standalone add-on. Accordingly, the emergent practices ultimately urge educators to adopt AI as an integral component of pedagogy to design more engaging, tailored, and effective EFL environments (Aly et al., 2024; Cheung & Shi 2025; Yeh, 2024).

To sum up, EFL narrative genre has developed tremendously since a few years back, including technological use, pedagogical evolution and diversification at different levels and contexts of education. Even the early stages range from digital to storytelling with AI. Early EFL digital storytelling drew on static, multimedia tools and pre-packaged teacher content, using self-contained and linear narratives to support skills-based language learning (Pérez y Pérez & Sharples, 2023). AI brought about a paradigm shift, creating more dynamic, interactive, and personalized storytelling experiences. Initially, EFL-focused AI applications were based on mixed delivery models offering automated writing evaluation and assessment with little interactivity and adaptability (Butler-Ulrich & Hughes, 2025). In terms of teaching for young learners, applying AI storytelling is also being utilized; examples include interactive robots and adaptive digital platforms that support vocabulary, comprehension, and emergent literacy. Utilizing voice recognition and other tools are designed to engage young learners -especially in a bilingual context. Pertinent literature acknowledges that AI has the power to fundamentally change pedagogy EFL early stages, with a call for greater access for larger groups and more proper practices (Algraini, 2024; Ribes-Lafoz et al., 2024).

Core Components of AIGN for Early Education

Core components of AIGN include Text Generation which refers to the AI generation or co-construction of narrative-based text, typically in response to provided prompts or learner choices, and following predefined themes (Erdogan & Kitson, 2025; Lesner et al., 2024). Examples in this case include ChatGPT, AI Dungeon, and Plot Factory. In addition, Visual Generation involves automatic image creation for narrative. This is the task of automatically generating images or visual scenes based on narrative content, of which DALL-E, Craiyon, and Adobe Firefly are representative examples. For auditory learning, Audio/Speech Synthesis enables AI to convert text to speech or generate audio components for listening and pronunciation practice, e.g. *Speechify* and *ElevenLabs*. Adaptive Feedback provides real-time, individualized feedback on language use, structure, and pronunciation, as seen in platforms such as *Duolingo*, and various Intelligent Tutoring Systems (ITS). Interactive Branching allows for non-linear, 'choose your own adventure' storylines driven by learner decisions, with tools like Twine and AI Dungeon facilitating this. Collaborative Tools, such as *VoiceThread*, izi.TRAVEL, and Figma, support group storytelling, peer review, and shared editing functionalities (Sharma, 2025). Finally, Assessment Analytics involve the automated tracking of learner progress, vocabulary growth, and skill development, often integrated into adaptive learning systems and ITS platforms (Artha et al., 2024; Woo et al., 2023).

Characteristics of Effective AIGN for Early Education

Effective AIGN for early education are distinguished by the following characteristics, synthesized from recent empirical studies and technological implementations:

1. Interactivity and Dynamic Engagement: AI-authored narratives allow children to influence story outcomes through choices, prompts, or physical interactions (e.g., selecting characters, altering plotlines). Tools like *AI TaleCraft* and *Tinker Tales* demonstrate that interactive 'choose-your-own-adventure' formats improve comprehension and vocabulary retention. For example, NFC-enabled pawns in *Tinker Tales* allow children to define story elements, fostering co-creation and engagement (Choi et al., 2025; Metaxoudis, 2025; Lesner et al., 2024).

2. Personalization and Adaptivity: Narratives are adapted to individual learning levels, paces, backgrounds, and interests. Platforms like *Storywizard.ai* and *StoryBee* use AI to tailor language complexity, themes, and characters (e.g., cloning a child's voice for narration). Personalized narratives align with Vygotsky's ZPD, scaffolding learning while maintaining accessibility (Lesner et al., 2024; Preetam et al., 2024; Su et al., 2025).

3. Multimodal Integration: Effective narratives combine text, audio, visuals, and tactile elements. *AI TaleCraft* integrates text-to-speech and illustrations to create immersive experiences, while *VoiceThread* uses audio-visual features to foster pronunciation and cognitive engagement. Multimodality reinforces vocabulary and narrative coherence, catering to diverse learning preferences (Artha et al., 2024; Preetam et al., 2024; Sharma, 2025).

4. Cultural and Contextual Relevance: Storylines reflect learners' cultural identities and local contexts. The Sasak Tribe's storytelling model and *izi.TRAVEL*'s culturally responsive virtual tours highlight the importance of embedding folklore, traditions, and moral values. Thus, AI-driven tools should avoid biases and include diverse perspectives to guarantee inclusivity (Chen & Zhao, 2024; Usmani et al., 2025).

Implementation Challenges and Limitations

Infrastructure Barriers: Even when the pedagogical merits of AI-created narrations have been proved, the practice of AI-generated storytelling as a part of the FL curriculum is confronted by considerable technical and infrastructural obstacles. Studies highlight the digital aspect as the main obstacle, widened by unequal access to reliable internet and adequate devices, which in turn makes it difficult to keep good technologies accessible. The systematic review of AI in school-based EFL education finds that successful deployment assumes certain strong infrastructural and institutional arrangements that are not currently the case of many educational settings (Compagnoni, 2025; Kundu & Bej, 2025). Teacher Preparation: is an implementation challenge because teachers need to be fully prepared for both the technological operation and the pedagogical integration. The complexity of effectively balancing AI assistance with student autonomy demands intricate understanding of both technological capabilities and the already established language learning principles. Research indicates that many teachers face confusion in roles involved in using AI tools, in regards to the extent of the technology to intervene and integrate (Kundu & Bej, 2025;

Metaxoudis, 2025). Further, El Hassan and Alsalwah (2025) identified key barriers to implementation including teachers, limited technological familiarity, concerns about academic integrity and potential for misuse, and fears that students might become overly dependent on AI tools rather than developing independent reading skills. Moreover, Barabad and Anwar (2024) acknowledged potential limitations including concerns about academic integrity, the risk of over-dependence on AI tools, and the need for proper integration strategies within existing pedagogical frameworks. Finally, Cognitive Load Management: emerges as a significant concern; several AI platforms are combined into integrated learning experiences. The complexity of technology interfaces challenge students if each tool used involves a different system to access, beside language learning goals. Implementation, too, is complicated by the need for context-specific adaptation, as effective AI storytelling practices are wedded to particular cultural, linguistic, and institutional settings (Erdogan & Kitson, 2025; Kundu & Bej, 2025).

Pedagogical Insights and Empirical Studies in EFL Development

To begin with, Bence (2017) examined how narratives are used in young learners' EFL classrooms, combining a theoretical overview with an empirical component to capture teachers' perceptions and classroom practices. The study outlined benefits of narrative-based instruction for group dynamics, cultural awareness, problem solving, and integrated skill development, and offers criteria for selecting age-appropriate narratives along with guidance on presentation, tasks, and materials. The empirical work included interviews with elementary EFL teachers about experiences and preferences, plus the design and piloting of two narrative-based lesson plans to observe classroom effects and feasibility. Going a step forward, Fadlalla et al. (2025) confirmed that electronic storytelling significantly enhances oral fluency, accuracy, learner confidence, grammatical accuracy, and writing creativity. Afterwards, reaching AI-integration, Artha et al. (2024) synthesized a narrative review about the past decade of work on artificial intelligence in English language learning to chart current trends, key challenges, and directions for future research and practice. The authors highlighted that studies often center on the efficacy of particular AI tools while overlooking long-term effects on proficiency and retention, socio-cultural competence, multilingual/ESL contexts, and the broader ethical and pedagogical implications of widespread AI adoption, especially in EFL

settings. Collectively, empirical evidence consistently demonstrates that AI-based narrations methods can show substantial enhancement in all four dimensions (reading, writing, listening, and speaking) of language among learners (El Hassan & Alsalwah, 2025; Usmani et al., 2025).

Kundu and Bej (2025) conducted a systematic review, covering 22 empirical studies, showing that students using tools based on AI achieve better linguistic comprehension as opposed to using regular instructional methods. Such enhancements relate comprehensively to Bloom's taxonomy, showing broad-based cognitive engagement rather than surficial skill development. Some research demonstrates that AI-enhanced digital storytelling foster comprehensive language development through cooperative meaning-making processes. Students engaged in sophisticated reading comprehension activities when evaluating AI-generated content for appropriateness and relevance, developing metalinguistic awareness through critical analysis of generated texts. The iterative writing processes observed in AI-assisted contexts exemplify enhanced meaning-making practices that align with established theories of effective language instruction. Such sophisticated linguistic engagement demonstrates that AI tools can stimulate critical thinking and collaborative problem-solving capabilities (Chen & Zhao, 2024; Preetam et al., 2024).

In an ethnographic study, Aly et al. (2024) explored the integration of Artificial Intelligence (AI) in creative pedagogy for Teaching English to Young Learners (TEYL). They studied how AI tools, such as adaptive learning systems and ChatGPT, can be employed alongside creative teaching methods to enhance language development and scaffold creativity among children. Lesner et al. (2024) introduced an AI-personalized interactive fiction prototype for young children (ages roughly 4 - 8). Their proposed system showcased a high-fidelity prototype that enabled children to engage with personalized interactive stories by tailoring narrative content and interactions to child-specific inputs, illustrating feasibility and design choices rather than reporting classroom learning outcomes. Moore et al. (2024) introduced and examined a narrative-based learnersourcing platform designed to teach AI concepts by availing extracurricular exercises by engaging students as both "travelers" and "architects" of an interactive story. Aligning creative storytelling with practical AI exercises, this pedagogical platform incorporated hands-on tasks -such as collecting images for training classifiers- and provides "need tickets" to scaffold

content creation. In this model, learners read through a choose-your-own-adventure narrative that introduced AI principles, then contributed to extending and refining the story by authoring new paths and elements, supported by structured guides and peer collaboration on Discord.

Although there is considerable literature regarding the general deployment of AI in education, limited studies specifically address its implementation in EFL schooling settings and a few studies addressed AI-narratives with underachievers or for young learners in general (Zhao et al., 2023). Recent studies collectively demonstrate that AI tools significantly enhance language learning and developmental outcomes for both early childhood learners and older learners in EFL contexts. Lu et al. (2024) explored integrating AI-generated storytelling with sustainability themes for young learners. Using ChatGPT and AI-drawn visuals, sixty preschoolers engaged with structured narratives on resource conservation. The experimental group showed enhanced language skills, narrative coherence, and environmental literacy compared to traditional methods. Other language kills, e.g. vocabulary development, were targeted using AI-based model. For example, Bao and Sile (2024) proposed a model based on generative AI to address traditional challenges in vocabulary teaching, such as limited exposure to authentic contexts and insufficient practice opportunities for individual learners. In their cross-sectional study, Barabad and Anwar (2024) the impact of the most famous AI tool, ChatGPT, on four core language skills: reading, writing, speaking, and listening, while also exploring its influence on vocabulary acquisition and overall motivation in English learning contexts.

Moreover, advocated hybrid models were employed (e.g., StoryBee) to balance screen-time concerns. Tools like Talkpal.AI reduced speaking anxiety and improved pronunciation fluency in Saudi Arabia (Alshumaimeri & Alshememry, 2024), and Tinker Tales, an NFC-enabled board game, boosted preschoolers' narrative sequencing by thirty-seven percent (Choi et al., 2025). Generative AI improved podcast production and vocabulary retention in Indonesian students but faced cultural contextualization gaps (Baskara, 2023), echoing ethical concerns about authorship and oversight. Collaborative AI story-writing enhanced oral fluency and syntactic complexity through prompt engineering (Gero et al., 2024), while Teng's (2024) review of ChatGPT emphasized benefits like instant feedback but warned of overreliance risks.

Cheung and Shi (2025) applied a qualitative content analysis of semi-structured interviews to report reflections on co-creation of digital narratives and podcasts using generative AI, producing written narratives and podcasts that situated English use in authentic intercultural encounters -co-creation occurred between undergraduates in a Hong Kong service-learning subject with asylum-seeking children. El Hassan and Alsalwah (2025) examined ChatGPT integration in EFL reading classes at Hail University in Saudi Arabia, focusing on teacher challenges and student engagement outcomes. Erdogan and Kitson, (2025) examined how generative AI chatbots and dialogue systems can meaningfully develop and stimulate young learners' pragmatic competence (authentic, varied interactions that build inference-making, politeness strategies, and speech act performance in context) through contextual, interactive tasks guided by teachers employing implicature practice prompts with contextualized scenarios, guiding learners to infer implied meanings and discuss socially appropriate responses. Metaxoudis (2025) highlighted AI's efficacy in multicultural classrooms, showing large vocabulary gains on the behalf of the participants. Usmani et al. (2025) linked task-based AI storytelling to high improvements in writing and speaking. Collectively, these studies affirm AI's potential to foster language skills, engagement, and cultural relevance in early childhood and EFL education generally.

Methodology

Participants

The current study involved eighteen (n=18) EFL fourth-grade pupils in the primary stage in governmental schools in Minya El-Qamh, El-Sharqia Governorate; they enrolled in the second term in (2024-2025) academic year. They were categorized as academic underachievers suffering from observable recurrent difficulty in foundational skills of pre/reading and writing English consonant letters. The participants were selected from fifty-nine (n=59) learners across four schools, because they faced the same problems in reading and writing most of the English Alphabet, particularly consonant letters. The participants were assigned as one experimental group receiving the intended AI-intervention; they were at the same average age (about 10 years) and completed three years in primary stage in some governmental schools of similar learning contexts, studying English the formal foreign language. In addition, they studied

the same English curriculum and followed the same distribution of English subject classes across the term.

Study Design

The present study adopted the quasi-experimental design, including only one-experimental group receiving AI-based instructional intervention which was intended to achieve the study objectives. The experimentation took about a month and a half in addition to the time of pre-post administrations in (2024-2025) academic year. For the sake of data collection, a pre-post EFL early literacy skills test was carefully prepared and administered before and after the AI-intervention. The obtained data were statistically analyzed employing *t*-tests to examine the impact of the intervention.

Instruments

A pre-posttest on EFL early literacy skills test (See Appendix B) was developed to measure students' performance pre- and post- the AI intervention. The test consisted of fifty items measuring about ten skills related directly to the EFL ELSs. Concerning test validity, it was submitted to a panel of TEFL expert specialists to ensure its validity. The panel evaluated the clarity, wording, accuracy, and appropriateness of the instrument for the participants' competence level. Additionally, the test was piloted with fifty students other than the study sample to gather feedback on instructions clarity and individual items suitability. To determine reliability, the test-retest method was employed, and the internal consistency was calculated (alpha coefficient = 0.83.75). Scoring reliability for the test was ensured using a **rubric** designed to evaluate responses. The rubric validity was performed the same way as the test; and its reliability (consistency and internal coherence) was calculated (Cronbach's alpha = 0.81) (See Appendix C). The scoring scale ranged from .5 to 1 mark (for correctness) and .5 to 1 mark (for accurateness) for each response for each item of the test where the total was (100 marks). The descriptive qualitative part of the rubric includes how to judge if the pupil is still "*Underachiever*" in case of exhibiting: **Phonological Deficits**: Failure to segment/blend phonemes in ≥80% of trials; **Decoding Errors**: Misreading ≥50% of grade-appropriate consonants in isolation or within words; **Orthographic Challenges**: Inability to differentiate uppercase/lowercase letters in ≥30% of questions.

Study Material

Based on the literature review and previous studies, four units were designed according to AI-applications of generating narratives, e.g. *AI Storywizard.ai, AI TaleCraft, StoryBee, Storytime, and Tinker Tales* incorporated to enhance ELSs for the study participants. The units were tailored to address the intended skills in a distributive manner; an intervention AI-based unit was assigned to develop specific group of skills. Unit One tackled 'Phonological and Graphemic Knowledge', Unit Two addressed 'Reading Comprehension and Print Concepts', Unit Three presented 'Writing Mechanics and Orthography', and Unit Four was a 'Review' (See Appendix D). These units aimed to:

1- Fulfill the learning objective of the school curriculum.
2- Enhance students' EFL English Alphabet (foundational reading and writing).
3- Leverage the use of AI-enhanced instruction.
4- Highlight the individualized learning treatment.
5- Adapt the content according to each pupil's pace and proficiency.
6- Emphasize holistic development of targeted literacy skills.

Units Content

The content consisted of varied AIGN narratives adapted according to each pupil weaknesses and his/her own pace of learning. Unit One included short engaging narratives about **'***Phonological and Graphemic Knowledge***'** of the English consonant letters. Each sub-skill was addressed in more than one narrative with progressive quizzes in order to check the learners understanding. Unit Two included others short narratives tailored to present and enhance '*Reading Comprehension and Print Concepts*'. Each sub-skill was developed through various narratives ascending in complexity levels according to each learner progression. Unit Three presented AI-narratives explaining and developing skills of '*Writing Mechanics and Orthography*'. Each sub-skill was addressed by two or three different narratives and so many real-time exercises to assess the pupil's performance through some interactive responses to copy or imitate letters and words, particularly for the letters which have confusing orthography as [p , q , d , b]. Unit Four was a '*Review*' presenting various exercises dealing with all pre-determined skills in overlapping intersections as

they occurred finally in language spoken or written outputs. The exercises were also AI-generated designed and individualized to assess performance of each pupil in the intended skills in combination, i.e. holistically.

Results

The results of this study were presented according to the study hypothesis. Paired samples *t*-test was applied as the study adopted one experimental group design. Statistics, both descriptive and inferential were calculated according to the SPSS.

Verifying the Study Hypothesis

The study hypothesized that 'there would be statistically significant differences between the means of the AIGN experimental group on the pre-post assessments of EFL ELSs favoring the post-assessment'.

Table1. T-*test Results Comparing Pre- and Post-Assessments of AI-Experimental Group in EFL ELSs Test*

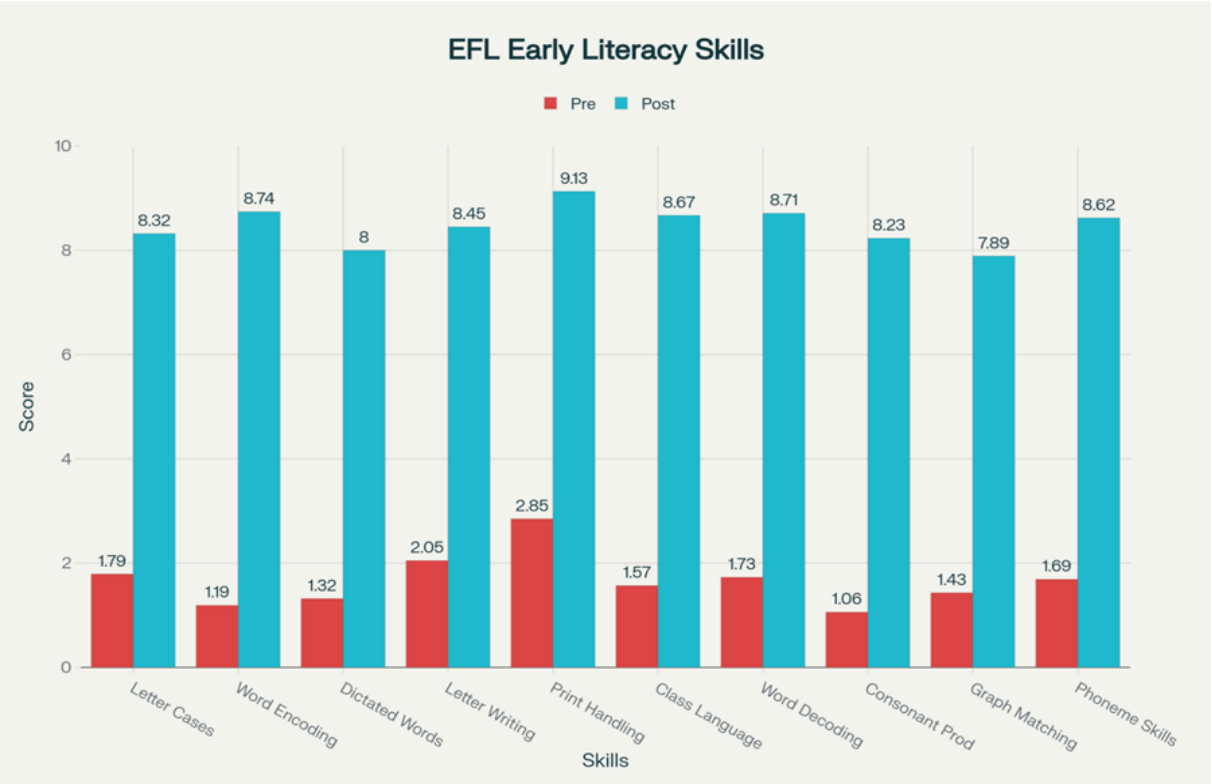
Dimension		N	Mean	S.D	t-Value	DF	Sig.
Phonological and Graphemic Knowledge							
-Detecting, isolating, and manipulating phonemes in spoken words	Post	18	7.89	0.972	22.86	17	0.00
	Pre	18	1.43	0.975			
-Corresponding phonemes with their graphemes correctly	Post	18	8.74	0.945	26.85	17	0.00
	Pre	18	1.19	0.986			
-Recognizing and producing consonant sounds accurately	Post	18	8.23	0.984	23.58	17	0.00
	Pre	18	1.06	1.265			
Reading Comprehension and Print Concepts							
-Decoding skills of alphabetic principles to read words/simple sentences	Post	18	8.71	0.954	28.31	17	0.00
	Pre	18	1.73	0.992			
-Comprehending basic classroom language & instructions	Post	18	8.67	0.927	23.17	17	0.00
	Pre	18	1.57	0.929			
-Correct handling of prints (front/back orientation, left-to-right tracking)	Post	18	9.13	0.793	23.82	17	0.00
	Pre	18	2.85	1.041			
Writing Mechanics and Orthography							

-Forming letters legibly and consistently	Post	18	8.45	1.060	24.39	17	0.00
	Pre	18	2.05	0.874			
-Writing dictated letters/words with proper spacing and alignment	Post	18	8.00	1.152	23.26	17	0.00
	Pre	18	1.32	0.632			
-Encoding and spelling words without invented spellings	Post	18	8.62	1.129	21.67	17	0.00
	Pre	18	1.69	0.638			
-Distinguishing visually uppercase and lowercase letters in proper cases	Post	18	8.32	1.163	23.58	17	0.00
	Pre	18	1.79	0.859			
Total	Post	18	84.76	3.126	112.65	17	0.00
	Pre	18	16.68	1.865			

Table 1 illustrates that the AI-intervention group students exhibited significant improvements in EFL early literacy skills across all dimensions when comparing their pre- and post-assessment scores. For the first group of skills under the umbrella skill *"Phonological and Graphemic Knowledge"*, the mean scores of "Detecting, isolating, and manipulating phonemes in spoken words"; "Corresponding phonemes with their graphemes correctly"; and "Recognizing and producing consonant sounds accurately" in the post-assessment were (7.89), (8.74) and (8.23), respectively; all are substantially higher than the corresponding pre-assessment means of (1.43), (1.19), and (1.06). For the second group of skills entitled *"Reading Comprehension and Print Concepts"*, the mean scores of "Decoding skills of alphabetic principles to read words/simple sentences"; "Comprehending basic classroom language & instructions"; and "Correct handling of prints (front/back orientation, left-to-right tracking)" were (8.71), (8.67) and (9.13) which were significantly higher than those of the pre-assessments (1.73), (1.57) and (2.85) respectively. The mean scores of the third group of skills entitled *"Writing Mechanics and Orthography"*: "Forming letters legibly and consistently"; "Writing dictated letters/words with proper spacing and alignment"; "Encoding and spelling words without invented spellings"; and "Distinguishing visually uppercase and lowercase letters in proper cases" were (8.45), (8.00), (8.62) and (8.32) respectively. These scores proved significant when compared to those of the pre-assessments (2.05), (1.32), (1.69) and (1.79).

The overall mean score for the EFL ELSs Test rose dramatically, from (16.68) in the pre-assessment to (84.76) in the post-assessment with (112.65) *t*-value. These differences are statistically significant, as evidenced by the *t*-values: (22.86) for "Detecting, isolating, and manipulating phonemes in spoken words"; (26.85) for "Corresponding phonemes with their graphemes correctly"; and (23.58) for "Recognizing and producing consonant sounds accurately". Furthermore, *t*-values were significant: (28.31) for "Decoding skills of alphabetic principles to read words/simple sentences"; (23.17) for "Comprehending basic classroom language & instructions"; and (23.82) for "Correct handling of prints (front/back orientation, left-to-right tracking)". Additionally, the third group of skills showed significant *t*-values: (24.39) for "Forming letters legibly and consistently"; (23.26) for "Writing dictated letters/words with proper spacing and alignment"; (21.67) for "Encoding and spelling words without invented spellings"; and (23.58) for "Distinguishing visually uppercase and lowercase letters in proper cases". The overall *t*-value of (112.65) confirms the AI-narrative intervention's efficacy at the 0.01 level of significance. These findings strongly validate the study hypothesis, demonstrating that the AI-based instruction substantially improved the EFL literacy skills wholly and dimensionally.

Figure 2. Pre-Post Assessment Results of EFL Early Literacy Skills



The graph clearly shows the dramatic improvements achieved across all 10 EFL early literacy skills, with the vertical format emphasizing the upward progression from pre-test to post-test scores, ranging from the lowest pre-test score of 1.06 (Consonant Production) to the highest post-test score of 9.13 (Print Handling), demonstrating the substantial learning gains achieved by the experimental group. The most notable finding is the consistency of substantial gains across all ten sub-skills, with improvements ranging from 220% to 676%. Sub-skill (Recognizing, producing consonant sounds) showed the highest improvement at 676.4%, while all sub-skills achieved post-assessment scores above 7.89 on the 10-point scale, indicating that students reached proficiency levels across all measured language learning dimensions following the intervention.

Concerning the descriptive qualitative data, and based on the comprehensive pre-post assessment data from the experimental group, the quantitative results provide compelling qualitative evidence that learners successfully moved upward from underachieving levels across all three early literacy domains specified in the rubric. Concerning Phonological Processing, students transitioned from severe phonological processing deficits (success rates below 15%) to proficient phonological awareness skills (success rates above 73%), clearly surpassing the 20% accuracy threshold needed to move beyond underachieving classification. In Decoding Competences, students progressed from severe decoding difficulties (correct reading rates below 18%) to proficient word recognition skills (accuracy rates above 82%), demonstrating clear movement beyond the 50% error threshold that defines underachieving readers. In Orthographic Knowledge, students moved from severe orthographic confusion (82.1% failure rate) to strong visual letter discrimination skills (79.2% success rate), clearly surpassing the 70% accuracy threshold needed to move beyond underachieving classification. With regard to Overall Literacy Skills: The 408.2% average improvement across all literacy skills.

Discussion

Based on the results discussed above, the findings demonstrated that AIGN significantly enhanced foundational EFL literacy skills among underachieving primary pupils, aligning with and extending essential insights of the previous empirical-evidence studies and the theatrical concepts in the literature review. Accordingly, the participants become no longer

underachievers after the advancements they fulfilled as a result of AI-intervention in overall literacy skills and across sub-skills. To begin with, the study clearly proved theoretical alignment in Clay's (2001) literacy processing theory and the NELP framework, which AI narratives operationalize to predict, enhance and assess some literacy aspects: PA, print concepts, decoding skills, basic comprehension, and writing mechanics.

Empirically, the results are consistent with previous studies either utilized AI-enhanced interventions or targeted some literacy skills or sub-skills. In this discussion, because of the scarcity of studies on academic underachievers in literacy skills, the researcher grasped studies related to preschoolers as they overlapped with the current study participants in the earlier steps in learning foundational literacy skills. Utilizing AI-based instruction provides compelling evidence that adaptive, contextually responsive, diagnostically driven AI-crafted narratives can effectively target core literacy deficits -specifically phonological knowledge, decoding skills, print concepts, and basic writing mechanics which is consistent with Abdelaziz's (2019) findings, can incorporate minimal pairs and orthographic scaffolding delivering explicit phonological training as asserted by Hawass (2019), and focus on orthographic feedback as ensured by Chakrabarty (2022). Furthermore, significant improvements in phoneme–grapheme correspondence and decoding skills (basic reading comprehension) align with those of Aydın and Yıldız (2022) confirming the potentiality of AI literacy activities which are multi-modal, self-extending and real-world embedded in fostering EFL literacy skills. Within the same vein, the results parallel those of Cabell et al. (2011) which advocated for multi-component screening and differentiated instructional plans in preschool programs, providing a crucial context for AI-driven assessment tools, and with Alshaboul et al. (2014) who emphasized preschool phonological awareness programs in Arabic contexts -teaching consonant and vowel distinctions and pairing Arabic letter-sound games with English phoneme blending- to facilitate L1–L2 transfer in ways that parallel AI narrative personalization. In addition, the present study results highlighted the distinguished features of AI narratives as being interactive, sequenced text-leveling enhanced directional confusions such as b/d reversals as previously asserted by Van Staden (2014); and because these narratives are dynamic, adaptive, learner-centered meditational tools successfully reinforced print knowledge and letter formation which align with Doyle (2018) and Pérez y Pérez and Sharples (2023).

Results pertinent to significant advancement in basic reading comprehension align with those of Zhao et al. (2023) who asserted that cognitive load optimization through structured AI-driven narrations significantly enhanced reading outcomes, vocabulary retention as reported by Baskara (2023), oral fluency and syntactic complexity as affirmed by Gero et al. (2024), and instant feedback benefits alongside caution about learner overreliance as Teng (2024) emphasized. Optimizing the preeminent features of AIGN such as multimodal integration of oral and visual elements and scalable hybrid models, improvements in holistic literacy skills and its sub-dimension are consistent with those of Lu et al. (2024) who found that ChatGPT-generated, sustainability-themed narratives improve preschoolers' language skills, narrative coherence, and environmental literacy; and with Choi et al. (2025) who documented significant increase in narrative (oral) sequencing through the NFC-enabled Tinker Tales board game. In parallel with these convergent results, the results advocated Li et al. (2025) who demonstrated that cross-linguistic transfer issues were highly mitigated through AI's multimodal integration of text-to-speech audio and visual glossaries. They also underscored the significance of personalized-diagnostic precise assessment of each learner during exposure to AI-created narrations, a feature which Hussein (2025) proposed to overcome challenges in overcrowded classrooms. Besides, the results of successful performance in skills of directionality –left-to-right- attributed to AI's multimodal integration of text-to-speech and visual glossaries mitigates interactive text-leveling techniques, were compatible with those of Van Staden (2014) who assured that the visual element in AI-output successfully correct the directional confusions frequently done by the learners. Diagnostic case-contrast scaffolding addresses classroom constraints (Hussein, 2025), and dynamic, learner-centered meditational tools reinforced print knowledge and letter formation as proposed by other studies (e.g. Doyle, 2018).

Zooming out the ultimate progress in English early literacy skills which was attributed to AI-generated narratives, and confirming the potential of AI-enhanced practices in language learning development, the results agreed with those of Cheung and Shi (2025) whose study found that GenAI played an assistant role as students used it mainly as a translator, organizer, and language polisher, and occasionally for image generation via specific tools—while maintaining agency and critically editing AI outputs to preserve their own voices. Such participation expanded students' creative potential and fostered

linguistic, digital, and cultural awareness, offering a ‘third spac’ for engagement with diverse communities and enabling greater ownership of English for creative communication. Simultaneously, their findings indicate teachers valued narratives for engagement and language growth but struggled with selection, preparation, and sustaining motivation, underscoring the need for training and structured scaffolding before, during, and after storytelling; a point to be seriously considered and further investigated.

From a broader standpoint, again the overall development achieved in targeted literacy skills via enormous merits of AI-intervention, as a main finding, matched with those of El Hassan & Alsalwah (2025) who recorded significantly improves multiple dimensions of EFL reading performance, including comprehension levels, vocabulary acquisition, and overall student engagement with texts; and with those of Erdogan and Kitson (2025) who integrated pragmatics tasks into regular lessons using AI to generate tailored examples, role-plays, and feedback loops aligned to learners’ proficiency and age. AI capacities enabled them to easily prioritize explicit instruction on maxims, implicatures, presuppositions, and common speech acts, using AI outputs as analyzable, modifiable teaching materials. The same matching of findings extended to grasp the findings of Aly et al. (2024) who concluded that AI significantly contributes to personalized learning, increased student engagement, and the provision of immediate feedback, thereby improving the overall learning experience; and those of Artha et al. (2024) Underscoring explicit promise of AI systems and language apps in personalization, engagement, and scalable support for varied learners with different skill levels. Furthermore, the overall attainments in literacy skills align with the results by Bao and Sile (2024) who assured significant improvements in vocabulary retention rates, contextual understanding, and learner engagement compared to traditional instruction methods; they added that AI apps also facilitated autonomous learning by providing students with immediate, targeted support while maintaining pedagogical integrity through structured learning sequences. A similar alignment of overall results attributed the adaptability and multimodal features of AI outputs to the high degree of profound engagement was approved by Lesner et al. (2024); framed as ‘choose-your-way’ adventures, the prototype combines text, images, music, and sounds for ages roughly from four to eight, emphasizing personalization and child-centered engagement in example use cases typical of a demo track contribution. The findings of the present study and

those of Artha et al. (2024) and Lesner et al. (2024) also agreed in positioning AI-driven personalization as a promising direction for child-focused interactive stories and provides a foundation for follow-up empirical research on literacy and engagement in educational settings.

From a qualitative perspective, the detailed quantitative data evidence qualitative transformation from underachieving to proficient performance levels. Every single sub-skill demonstrated high improvement rates. The comprehensive assessment data provides unequivocal qualitative evidence that all 18 students in the experimental group successfully moved beyond underachieving classification across all three literacy domains: achieving 71-82% success rates in phoneme processing tasks, 82-87% accuracy rates in consonant recognition and word reading, and 79-85% success rate in letter case differentiation. This systematic improvement across all measured competencies demonstrates that the AI-instructional intervention successfully facilitated comprehensive upward movement from underachieving performance levels to grade-appropriate proficiency in EFL early literacy skills. The consistency of gains across all students and all skill areas provides robust evidence of pedagogical effectiveness in supporting struggling learners' literacy development. Accordingly, these results are consistent with the studies which advocated explicit instruction such as transformative practices which lie AI-based instruction of literacy skills for students with persistent literacy difficulties or of low proficient level (e.g. Chakrabarty, 2022; Hussein 2025; Kundu & Bej, 2025; Lu et al., 2024; Ma, 2019; Moore et al., 2024; Yeh, 2024; Zhao et al., 2023).

Collectively, aligning with the current study, these studies trace a coherent progression from theoretical underpinnings and early validations through increasingly context-sensitive AI narrative interventions that reliably yield substantial literacy improvements across phonological, orthographic, and comprehension dimensions for EFL learners. The convergent findings demonstrate that AIGN function both as elevated pedagogical designs and as potential interventions, offering differentiated, evidence-based, data-driven, and scalable solutions for English literacy development. As such, they hold considerable promise for redefining early literacy instruction and assessment, especially with varied-level weak learners and in resource-constrained EFL settings, by integrating phonological precision, orthographic accuracy, and

narrative engagement into cohesive, learner-centered experiences. To focus it directly, the study revealed that AI-enhanced creative pedagogical practices enable teachers to design more interactive and individualized learning experiences that cater to diverse learning styles and developmental needs of EFL beginners and weak language learners

Recommendations

To optimize the integration of AI-generated materials in EFL early literacy instruction, educators and policymakers should prioritize several evidence-based strategies. That's, it is highly recommended to:

- Develop AI-generated narratives that use learners' diagnostic data to tailor phonological exercises, including minimal pairs and phoneme–grapheme mapping, to address individual error patterns.
- Incorporate print-based features -such as color-coded letter forms and left-to-right tracking animations -within these narratives, and align text with synchronized audio, visuals, and interactive prompts to support diverse learning channels and reinforce orthographic rules and conventions.
- Use real-time AI analytics to provide immediate feedback on decoding, pronunciation, and comprehension, and employ dynamic assessment models that track progress on NELP's six literacy predictors to adjust narrative difficulty, focus, and progress.
- Provide remedial curricula/material to overcome deficits and flaws particularly for those who struggle with foundational literacy skills.
- Develop systematic strategies for integrating AI-tools and apps into existing EFL curricula while maintaining pedagogical integrity.
- Equip teacher training programs with dedicated modules on AI literacy, ethical content selection, and interpretation of diagnostic analytics to ensure effective implementation in varied classroom environments.
- Design hybrid/multimodal/integrated instructional models that combine AI narratives with hands-on manipulatives and augmented-reality activities to balance screen use and promote multisensory engagement of learners, particularly vulnerable ones.

- Advocate for policies that fund offline AI literacy tools and infrastructure in resource-limited schools, ensuring all primary-stage underachievers can access these interventions.
- Guarantee that AI-generated content is culturally appropriate and free from bias, and conduct longitudinal evaluations of reading fluency, vocabulary acquisition, comprehension, and overall literacy development to confirm sustained learning gains.
- Establish explicit ethical guidelines for AI usage in academic settings.
- Address AI literacy gaps among educators, creating frameworks for responsible use, and fostering innovation-oriented institutional cultures to optimize learning outcomes.
- Provide families with bilingual AI-based narrative applications and clear guidelines for collaborative story creation at home to develop specific FL skills, strengthening and expanding connections between learners' first and foreign language experiences.

Suggestions for Further Research

The study proposed some suggestions for future research as follows:

1. Investigating the longitudinal impact of AI-Generated narratives on literacy retention.
2. Investigating AI-based instruction on other EFL foundational skills in listening and speaking.
3. Examining AI-generative stories on EFL phonological processes for early childhood learners.
4. Preparing AI-training modules to empower kindergarten teachers with AI-tools and applications.
5. Preparing AI-based assessment tools for EFL young learners.
6. Preparing AI-based remedial personalized interactive courses for EFL underachievers.
7. Examining AI-based instruction on some affective factors like motivation and engagement.
8. Investigating the effect of AI-based instruction with some psychological variables, i.e. working memory and verbal memory.

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