

Digital Semiotics and the Construction of Meaning in Technology-Mediated ESL Pedagogy

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Abstract

This study examines the role of digital semiotics in the construction of meaning within technology-mediated English as a Second Language (ESL) pedagogy among secondary school learners. Anchored in Social Semiotics and Multimodality Theory. Recent studies have shown that AI tools have become deeply embedded in learners' writing processes, functioning as virtual tutors that support idea generation, language accuracy, and text production. Despite the growing use of AI technologies in language education, existing studies have largely focused on their pedagogical effectiveness, including improvements in writing performance, language proficiency, and learner engagement, with little attention being paid to the semiotic processes through which learners construct, negotiate, and interpret meaning while interacting with AI-powered tools. The study explores how artificial intelligence (AI) tools reshape meaning-making processes in classroom contexts. A qualitative classroom-based design was adopted, involving a hundred (100) purposively selected students who engaged in structured writing, grammar correction, and translation tasks using AI tools such as ChatGPT, Grammarly and Google Translate. Data were generated from learners' engagement with these tools, including immediate responses, revised texts, and observational notes. Findings reveal that construction of meaning in AI-mediated ESL classrooms is a co-produced and multimodal process, shaped through interaction between learners and algorithmic systems. Learners demonstrated different degrees of agency, ranging from direct adoption of AI outputs to critical modification and iterative prompting. The study further shows that AI tools function as active semiotic agents, greatly influencing linguistic choices, restructuring classroom authority, and expanding the means through which meaning is negotiated. The study concludes that AI integration represents a significant transformation in ESL pedagogy and recommends the development of critical AI literacy and guided pedagogical frameworks for effective classroom implementation.

Keywords: *Digital semiotics; Meaning construction; Technology-mediated pedagogy; Multimodality;*

Introduction

The integration of digital technologies into English as a Second Language (ESL) classrooms has significantly transformed pedagogical practices, particularly at the secondary school level. Traditional approaches to language teaching, which are often teacher-centred and text-bound, are increasingly being replaced by digitally mediated learning environments where learners actively engage with language through a wide range of semiotic resources. These resources extend beyond written and spoken language to include emojis, images, hyperlinks, audiovisual materials, and

algorithm-generated content produced through artificial intelligence (AI) tools such as ChatGPT, Grammarly, and Google Translate. The growing presence of these technologies reflects a shift in language learning environments, where meaning is continuously negotiated through processes such as automated feedback, translation, text generation, and interactive dialogue.

Artificial intelligence-powered technologies have become important mediators of language learning experiences in contemporary ESL classrooms. These tools provide learners with instant feedback, language modelling, translation support, and opportunities for interactive engagement. Beyond aiding language learning, they influence how meaning is constructed, interpreted, and negotiated within educational contexts. Consequently, learners operate within complex semiotic environments in which meaning is distributed across both human and machine-generated forms of communication.

Digital semiotics refers to the study of signs, symbols and meaning-making processes in digital environments. It encompasses how meaning is created, interpreted and transmitted through digital means and resources. Within educational contexts, digital semiotics explains how learners engage with different semiotic resources available through technological platforms to craft and communicate meanings. It also provides a valuable framework for understanding these developments by emphasising the role of multiple sign systems in the construction of meaning, particularly within digitally mediated communication spaces. From this perspective, language is no longer viewed as an isolated system of communication but as part of a broader multimodal network in which visual, textual, auditory, and algorithmic elements interact to produce meaning. As a result, effective participation in contemporary digital learning environments requires not only linguistic competence but also semiotic competence, enabling learners to interpret and negotiate meaning across diverse modes of communication.

Meaning construction, on the other hand, is the process through which individuals create, interpret and negotiate meaning during communication and learning activities. In educational settings, learners construct meanings by interpreting information, relating it to the knowledge they have before and negotiating meanings through social interaction. This is further enhanced by the introduction of multimodality and interactive learning, where learners integrate visual, textual, auditory and algorithmic resources in the interpretation of meaning. The relevance of this study is particularly important within the educational sphere in Nigeria, where the integration of digital tools has increased rapidly over the years. Nigerian students, including those in secondary schools,

have been exposed to new forms of language learning that extend beyond the traditional method of teaching in the classroom. Many students, even at the secondary school level, now heavily depend on AI tools such as ChatGPT, Grammarly and Google Translate to support writing, translation and language learning practices. Despite the increasing adoption, there is limited research on how these technologies influence the processes through which learners craft and negotiate meaning in the English language, since English is the official language and the medium of instruction.

The choice of Oyo State for this study is informed by the fact that it is regarded as one of Nigeria's prominent educational centres. The state hosts several schools, both private and public schools, with different access to technological tools. In addition, the state is growing in its adoption of digital technologies and internet-enabled learning resources. Recently, in conjunction with the World Bank, selected teachers underwent training, and Tabs were distributed to them to ensure the transition to the use of digital tools in the learning process. The use of secondary schools is as a result of the fact that they represent a critical level in the educational process. At this level, students are expected to demonstrate increasing ability in English for academic, social and professional purposes. Also, they are regarded as one of the most highly active groups when it comes to the use of digital tools and AI-assisted applications. Understanding their integration will serve as an asset for teachers, curriculum developers and policy makers to promote effective and responsible use of artificial intelligence in language leaning and education.

AI- mediated pedagogy includes teaching and learning practices that are facilitated and enhanced through the integration of artificial intelligence technologies. It involves the use of AI-powered tools to support teaching and instructional delivery, learners' engagement and assessment. It extends beyond the use of AI tools but includes the positioning of these tools as active agents in the learning process. Yusuf (2026) argues that AI has the potential to transform educational practices in Nigeria by increasing learners' engagement and supporting adaptive learning. This is evident in the use of tools such as ChatGPT, Grammarly and Google Translate, which help in writing, grammar correction, translation and interactive language practices. Therefore, this study investigates the role of digital semiotics in the construction of meaning within technology-mediated ESL pedagogy among secondary school learners. Specifically, it explores how AI-powered tools function as semiotic resources that shape meaning-making processes and influence learner engagement within contemporary language learning environments.

Statement of the Problem

The integration of digital technologies into secondary school English as a Second Language (ESL) classrooms has significantly transformed language teaching and learning within digitally mediated environments. Learners increasingly interact with artificial intelligence (AI) tools such as ChatGPT, Grammarly, and Google Translate, which extend beyond traditional instructional support by actively participating in meaning-making processes through instant feedback, translation, text generation, rewriting, and multimodal language assistance (Fryer et al., 2020; Song & Song, 2023).

Recent studies have shown that AI tools have become deeply embedded in learners' writing processes, functioning as virtual tutors that support idea generation, language accuracy, and text production (Dizon & Gayed, 2021; Zhao et al., 2023). ChatGPT, in particular, facilitates interactive dialogue that assists learners in developing and refining written texts, while Grammarly and Google Translate provide automated corrective feedback and translation support (Wang & Cheng, 2021; Zhao et al., 2023). These developments suggest that meaning-making in contemporary ESL classrooms extends beyond human-centred linguistic activity and increasingly involves interactions between learners and machine-generated semiotic systems.

Despite the growing use of AI technologies in language education, existing studies have largely focused on their pedagogical effectiveness, including improvements in writing performance, language proficiency, and learner engagement. Comparatively little attention has been paid to the semiotic processes through which learners construct, negotiate, and interpret meaning while interacting with AI-powered tools. Consequently, there remains limited empirical evidence regarding how AI technologies function as active semiotic resources within secondary school ESL classrooms.

This gap is particularly evident in research examining how learners engage with ChatGPT, Grammarly and Google Translate as interconnected meaning-making systems rather than as isolated instructional tools. Therefore, there is a need for a deeper theoretical and empirical investigation into the role of AI-powered digital semiotic resources in shaping meaning construction within technology-mediated ESL pedagogy. This study addresses this gap by exploring how secondary school learners interact with AI tools as collaborative participants in the construction and negotiation of meaning.

Aim and Objectives

This study aims to examine the role of digital semiotics in the construction of meaning within technology-mediated English as a Second Language (ESL) pedagogy among secondary school learners. The specific objectives are:

- v. to investigate how AI tools aid meaning construction in technology-mediated ESL classrooms
- vi. to examine the semiotic and multimodal resources through which learners negotiate and construct meaning while engaging with AI tools
- vii. to explore the interface between learners' agency and AI participation in the construction of meaning in secondary schools' ESL pedagogy.

Literature Review

Artificial Intelligence and ESL Pedagogy

The integration of artificial intelligence (AI) into English as a Second Language (ESL) education has expanded rapidly in recent years, reshaping both teaching practices and learner engagement. AI-powered tools such as ChatGPT, Grammarly, and Google Translate are increasingly employed to support writing development, vocabulary acquisition, language practice, and feedback provision within language classrooms (Song & Song, 2023; Zhao et al., 2023). These technologies function as intelligent learning assistants by providing instant corrective feedback, generating model texts, and facilitating learning beyond the traditional classroom environment.

Recent Nigerian studies have also highlighted the growing role of digital technologies in language teaching and learning. According to Adebayo and Akinyemi (2023), the integration of AI-supported learning tools in Nigerian secondary schools has enhanced learners' participation, writing development, and independent learning. Similarly, Adeoye, Olatunji, and Yusuf (2024) observed that digital learning platforms encourage learner-centred instruction and improved language engagement among ESL learners. Their findings suggest that AI technologies are gradually transforming traditional classroom practices by providing learners with immediate access to linguistic support and feedback mechanisms. This indicates that AI-mediated learning environments are becoming important for language development and meaning construction in the Nigerian educational setting.

Research indicates that ChatGPT, in particular, enhances learner engagement by facilitating interactive dialogue that resembles human tutoring, thereby supporting writing fluency, idea

generation, and language development (Fryer et al., 2020; Song & Song, 2023). Similarly, Grammarly assists learners through automated grammatical corrections and stylistic recommendations, while Google Translate facilitate multilingual communication, lexical development, and meaning transfer across languages (Dizon & Gayed, 2021; Wang & Cheng, 2021). Despite these contributions, existing studies have predominantly focused on the pedagogical effectiveness of AI technologies rather than the semiotic processes through which meaning is constructed and negotiated.

Multimodality and Meaning Construction in Digital Learning Environments

The emergence of digital learning environments has introduced a multimodal dimension to ESL pedagogy in which meaning is constructed through the interaction of linguistic, visual, auditory, and algorithmic resources. Multimodal discourse theory argues that meaning is not confined to language alone but is distributed across multiple semiotic modes that operate simultaneously to facilitate communication (Jewitt, 2005; Kress, 2010).

Within digital classrooms, learners engage with texts embedded with images, hyperlinks, emojis, audiovisual materials, and AI-generated feedback, all of which contribute to the meaning-making process. Recent studies suggest that digital multimodal resources enable learners to combine diverse semiotic elements in the production of texts, thereby enhancing creativity, engagement, and communicative competence (Fang et al., 2025; Liang & Lim, 2021). In AI-mediated environments, these multimodal resources are not static but dynamically generated through algorithmic intervention. Tools such as ChatGPT and Grammarly continuously reshape learner output by generating suggestions, revisions, and feedback that influence the construction of meaning (Kalantzis & Cope, 2025). Within the Nigerian context, researchers have greatly recognised the significance of multimodal resources in language education. Olateju(2019) opined that meaning in contemporary communication comes from the interaction of multiple semiotic resources such as language, visuals, gestures and digital symbols. In the same vein, Adegoju (2020) maintains that digital communication environments demand that learners interpret and negotiate meaning across various modes rather than depending solely on linguistic forms. In technology- mediated classrooms, learners encounter texts that combine written language, images, videos, hyperlinks and interactive feedback systems, all of which contribute to the construction of meanings.

Digital Semiotics and Human–AI Meaning-Making

Digital semiotics provides a useful framework for understanding how meaning is created and interpreted within technologically mediated environments. Unlike traditional linguistic approaches that focus primarily on verbal communication, digital semiotics emphasises the interaction of signs across multiple systems, including human language, visual representations, and machine-generated outputs (Kress & van Leeuwen, 2021). Within this framework, AI tools function as active semiotic agents rather than passive instructional supports. They participate directly in meaning-making processes by generating, modifying, and restructuring linguistic content. Emerging studies indicate that learners interacting with AI systems engage in complex processes of negotiation, revision, interpretation, and adaptation of machine-generated texts, reflecting a shift toward co-constructed meaning between human users and intelligent technologies (Li et al., 2024; Woo et al., 2025).

Nigerian scholarship on semiotics also provides valuable insights into digital meaning-making practices. Odebunmi (2016) explains that meaning is not static, but it emerges through contextual interpretation and interaction among speakers. This interaction creates a hybrid semiotic environment in which meaning is distributed across both human cognition and algorithmic processes. Consequently, meaning construction becomes a collaborative activity involving continuous interaction between learners and AI systems. Although previous studies have established the pedagogical benefits of AI technologies in ESL education, there remains limited theoretical and empirical engagement with how these technologies reshape semiotic practices within authentic classroom contexts. Existing scholarship has largely concentrated on language performance, learner engagement, and instructional effectiveness, with comparatively little attention devoted to the semiotic dimensions of learner–AI interaction.

This gap is particularly evident at the secondary school level, where research examining how learners interact with AI tools as interconnected meaning-making systems remains scarce. Furthermore, limited attention has been paid to the ways in which AI technologies function as semiotic resources that influence meaning construction, negotiation, and interpretation in technology-mediated ESL classrooms. Therefore, there is a need for empirical research that explores how secondary school learners engage with AI-powered tools such as ChatGPT, Grammarly and Google Translate as active participants in the meaning-making process.

Theoretical Framework

This study is anchored in Social Semiotics Theory and Multimodality Theory. Together, these theories provide a comprehensive framework for examining how meaning is constructed within technology-mediated ESL pedagogy and how AI-powered tools function as semiotic resources in contemporary language learning environments.

Social Semiotics Theory

Social Semiotics Theory originated from the work of Halliday (1978) and was subsequently expanded by Kress and van Leeuwen (2021). The theory conceptualises language as a social resource for meaning-making rather than a fixed system of grammatical rules. Halliday's Systemic Functional Linguistics established the foundation for understanding language as a socially situated meaning-making system, while Kress and van Leeuwen extended this perspective to include visual, spatial, digital, and other communicative modes.

From a social semiotic perspective, meaning is constructed through social interaction, context, and the semiotic choices made by individuals. Communication is therefore viewed as a dynamic process of sign-making rather than the mere application of linguistic structures. This perspective is particularly relevant to the present study because it facilitates an understanding of AI tools as active semiotic resources within ESL classrooms.

Tools such as ChatGPT, Grammarly and Google Translate do not merely assist language learning; they actively participate in the production, modification, and negotiation of meaning. Through generating, correcting, translating, and restructuring learner output, these technologies contribute to meaning-making processes and influence how learners interpret and produce language.

Multimodality Theory

This study is also grounded in Multimodality Theory, developed by Kress (2010), which extends social semiotic principles by emphasising the role of multiple modes in communication. The theory posits that contemporary meaning-making is achieved through the integration of linguistic, visual, auditory, spatial, and digital resources rather than through language alone. In digitally mediated learning environments, meaning emerges through the interaction of diverse semiotic resources, including text, images, interface design, hyperlinks, audiovisual materials, and algorithmically generated outputs. This perspective is particularly applicable to technology-

enhanced language learning contexts where learners engage with complex multimodal forms of communication.

Within the context of this study, AI tools such as ChatGPT and Grammarly operate within multimodal environments that combine textual content with visual interfaces, feedback systems, prompts, and interactive suggestions. Learners therefore interact not only with language but also with digital structures that guide and shape meaning-making processes. As a result, meaning construction in AI-mediated ESL classrooms is inherently multimodal.

The integration of Social Semiotics Theory and Multimodality Theory provides a robust analytical framework for understanding meaning construction in technology-mediated ESL pedagogy. Social Semiotics explains how meaning is created through socially situated processes of sign-making, while Multimodality Theory accounts for the multiple semiotic resources through which communication occurs in digital environments. Together, these theories facilitate a deeper understanding of how AI-powered tools function as active participants in the construction, negotiation, and interpretation of meaning within secondary school ESL classrooms.

Methodology

This study employed a qualitative classroom-based research design to examine the role of digital Semiotics in the construction of meaning in Technology -Mediated English as a second language (ESL) Pedagogy. This approach was considered appropriate because it gives room for an intensive exploration of learners' engagement with artificial intelligence (AI) tools and the Semiotic process through which meaning is constructed, negotiated and transmitted in ESL classrooms. This will aid a detailed investigation of how learners interact with AI -generated content and how such interaction affects meaning-making practices in ESL learning environments.

The study was conducted in Ogbomosho, Oyo State. Five secondary schools were selected to have a balanced combination of both public and private educational settings. The selected schools are: Baptist Secondary Grammar School, Ahoyaya, Baptist High School, Adeniran Memorial Grammar School, Smith International Academy and Zion Academy, all located in Ogbomoso. Twenty (20) students were selected from each school, making a total of one hundred (100) participants. Students were selected from Senior Secondary School 1 and 2 classes because students at this stage possess adequate linguistic competence and digital literacy to engage adequately with AI- powered language learning tools.

A purposive sampling technique was employed to select the participants. This is to ensure that only students who have access to digital devices and are familiar with technology-assisted learning tools are included in the study. Data were generated through classroom-based activities conducted over a period of four weeks. During these periods, participants engaged in structured language learning tasks designed to facilitate interactions with AI-powered tools such as ChatGPT Grammar and Google Translate. Each participant completed three language learning tasks, namely AI - Assisted writing task, Grammar correction and Translation task. All tasks were completed under classroom supervision to ensure consistency in data generation.

Data for the study were obtained from three primary sources, namely:

- AI-generated outputs produced by ChatGPT, Grammarly, and Google Translate.
- Learners' original, revised, and final written texts.
- Classroom observation notes documenting learners' interactions with AI tools during task completion.

Ethical Consideration

Ethical considerations were observed during the course of the research. Before data collection, permission was obtained from the management of the selected schools. The purpose of this was to ensure informed participation. Participation was largely voluntary, and students were informed that they could withdraw at any point during the research without penalty. Informed consent was also obtained from participants' parents; this is because the participants were minors. Also, confidentiality and anonymity were maintained throughout the study.

Method of Data Analysis

The data obtained were analysed using thematic analysis. A qualitative method of data analysis used to identify, examine and interpret recurring patterns or themes within a set of data. Learners' interactions with AI tools, written texts, revisions, translations, and observational records were examined to identify recurring patterns and themes. The analysis was guided by Social Semiotics Theory and Multimodality Theory, which served as analytical frameworks for understanding how meaning was constructed through the interaction of linguistic, visual, digital, and algorithmic semiotic resources.

Data Analysis and Discussion of Findings

This presents the findings from the classroom-based qualitative data generated through task-based activities involving one hundred (100) secondary school ESL students. The data were obtained by engaging the learners in activities that involve the use of AI tools such as ChatGPT, Grammarly, and Google Translate during writing, translation and grammar correction. The findings were thematically organised using social Semiotics theory and multimodality theory.

Theme 1: AI as a collaborator in the construction of meaning in ESL writing

Task: AI-assisted writing with ChatGPT (Baptist Secondary School Ahoyaya)

AI Prompt: Write a paragraph on the importance of education

ChatGPT Response: 'Education is the foundation of success in life and provides opportunities for personal and professional growth' without modification reveals a very high level of dependence on AI.

Student's Final Version:

Student 1: Education is the key to success because it gives people knowledge and opportunities to achieve their future goals.

Student 2: Education is the bedrock of every society; it is a pathway to success and goal achievement.

Another learner modified the phrase 'foundation of success' to 'means' to discovering future goals, demonstrating that there is room for contextual and negotiation of meaning by learners.

Writing Task for Adeniran Memorial Grammar School

AI Prompt: Write a short paragraph on the importance of reading

ChatGPT response: Reading is an important habit that improves knowledge, vocabulary and critical thinking skills.

Student's Version

Student 1: Reading is a valuable habit because it expands knowledge, improves vocabulary and helps students think more critically.

Student 2: Reading is a good habit that helps students to think more critically, gives knowledge and improves vocabulary.

Writing Task for Baptist High School

AI Prompt: Write a paragraph about the benefits of technology in education

ChatGPT Response: Technology has transformed education by providing access to information and enhancing communication between teachers and students.

Student's final version

Student 1: Technology has improved education by giving students quick access to information and making communication between teachers and learners more effective, especially through online platforms.

Student 2: Technology has enhanced education, giving access to students to more information among teachers and students.

Writing Task for Smith International Academy

AI Prompt: Write a paragraph on Environmental cleanliness

ChatGPT Response: Environmental cleanliness is more important because it promotes good health and prevents diseases

Student's final version

Student 1: Environmental cleanliness is essential because it promotes good health, prevents the spread of diseases and creates a safe and pleasant environment for everyone.

Student 2: Environmental cleanliness is significant because it enhances wellbeing and stops diseases.

Writing Task for Zion Academy

AI Prompt: Write a paragraph on the value of hard work

ChatGPT: Hard work is important because it helps individuals achieve their goals and become successful.

Student's final version

Student 1: Hard work is important because it enables people to achieve their goals, overcome challenges and attain lasting success in life.

Student 2: Hard work is essential because it helps individuals to pursue their future and be successful.

Pattern of Response	Frequency	Percentage
Direct use of AI	30	30%
Minor modification	45	45%
Total modification	25	25%

The table above reveals that ChatGPT serves as a Semiotic resource that gives linguistic variance where learners negotiate and use language in a way that is suitable to their communicative desire. Out of 100 participants, 30 students used ChatGPT responses directly without modification (30%), 45 students made minor modifications (45%), and 25 students made extensive modifications (25%), demonstrating that ChatGPT acts as a collaborative agent in meaning-making in alignment with social semiotic theory that states that meaning is created through a combined interaction between human and semiotic systems. In the creation of meaning, learners engage in varying degrees of negotiation, acceptance and rejection of AI-generated meaning.

Theme 2: Multimodal Meaning Construction through AI Feedback Systems

Participants used Grammarly to revise sentences

Extract 1

Original Text: Students should study hard because the examination is important.

Grammarly Suggestion: Students should study diligently because examinations are important.

Student's Version: Students should study diligently because examinations are important and often determine future academic opportunities.

The learner accepted Grammarly's lexical suggestions while adding contextual information. The combination of textual feedback and visual prompts influenced the learner's meaning-making process.

Extract 2

Original Text: Social media is good because it helps people to communicate faster.

Grammarly: Social Media is beneficial because it helps people communicate more efficiently and stay connected with friends and family across distances.

Student's Revision: Social Media is beneficial because it helps people communicate more efficiently.

Extract 3

Original Text: Eating fruits is good for health.

Grammarly Suggestion: Eating fruit is beneficial to health.

Student's Revision: Regular exercise is beneficial to health because it improves physical fitness and reduces the risk of diseases.

The students did not merely adopt the AI correction but elaborated on it. This demonstrates how multimodal AI feedback can stimulate further meaning construction.

Extract 4

Original Text: My teacher gives us mangoes every day.

Grammarly Suggestion

My teacher gives us mangoes regularly

Student's Revision:

My teacher gives us mangoes every day to improve our immunity.

The learner used Grammarly's correction as a foundation for developing a more detailed expression of meaning. The AI tool functioned as a semiotic resource that guided linguistic improvement while allowing room for learner creativity.

Attitude	Frequency	Percentage
Accepted Grammarly completely	40	40%
Modified suggestion	38	38%
Rejected suggestion	22	22%

The table above suggests that meaning is negotiated through the integration of text, visual and algorithmic semiotic resources.

Data gotten from students' interaction with Grammarly also revealed that algorithm feedback is highly visible in the participants' writing practices. Out of the 100 participants, 40 students (40%) accepted Grammarly corrections, 38 students (38%) accepted the corrections with modification, and 22 students (22%) rejected all corrections and retained the original statement. Grammarly operates as a visual-linguistic semiotic system where meaning is generated and shaped through colour-coded feedback and structural suggestion. This indicates that learners can choose by selectively engaging with algorithm correction. This is in line with multimodality theory, which states that meaning is distributed across several modes.

Theme 3: Meaning Negotiation Across Translation Activities

Extract 1

Source Text: opolopo eniyan nberu

Google Translate: Many people are afraid

Student final version: Many people are afraid of uncertainty concerning their future

The student expanded the translated output by adding "of the uncertainty surrounding their future."
This demonstrates that meaning construction involved interpretation and elaboration rather than simple acceptance of the machine-generated translation.

Extract 2:

Source Text: Ijoba Naijiria ko SE daadaa to

Google Translate: The Nigerian government has not done well enough

Student's final version: The Nigerian government has not performed well enough in addressing the needs of the citizens. The student expanded the AI-generated translation by adding a specific area of concern to reflect active meaning construction rather than accepting the AI translation blindly.

Extract 3

Source Text: Eje ka fowo so wopo dada

Google Translate: Let us work together properly

Student's final revision: Let us work together effectively to achieve our common goals

The student retained the core meaning of the translated text but also enriched it with contextual information.

Findings from the translation task given to the participants using Google Translate show that learners engage in comparison of interpretation of meaning across translation platforms. Out of the 100 participants, 50 students (50%) cross-checked responses thoroughly. 30 students (30%) made mild changes, and 20 students (20%) relied solely on Google Translate.

This indicates that translation is not a direct transfer of meaning; it is a reconstruction process that involves comparison, linguistic judgement and adaptation to context. This agrees with the multimodal perspective that states that meaning-making is realised in different ways across multiple semiotic systems.

Theme 4: Learners' Agency and AI Participation in the Construction of Meaning

Extract 1:

ChatGPT Suggestion: Technology has greatly improved the educational setting by making learning accessible and the retrieval of information easier.

Student's Response: Technology has improved education by making learning very easy and accessible, especially for students in remote areas.

The learner expatiated more on the AI-generated statement by introducing contextual information through the use of ‘remote areas’ rather than accepting the AI response.

Extract 2: Write a short paragraph on punctuality

ChatGPT Response: Punctuality is good because it helps manage time effectively and creates a positive impression.

Student’s Response: punctuality is good because it helps people to manage their time effectively, creates a positive image and encourages discipline.

The student accepted the central point proposed by ChatGPT but added the concept of discipline. This clearly states that the learners, though they generated ideas from AI tools, still have input to add.

Level of Agency	Frequency	Percentage
High dependence on AI	35	35%
Moderate dependence	40	40%
Critical engagement	25	25%

Across all the tasks, varying levels of learners’ agency were observed. Out of all the participants, 9 students (45%) demonstrate high dependence on AI responses. 7 students (35%) reveal a moderate dependency, and 4 students (20%) show critical evaluation and frequent rejection of AI suggestions.

From the analysis, the participants displayed three levels of agency. Learners’ agency depicts the ability of learners to make choices and take control of their learning and actively participate in constructing knowledge rather than passively receiving information from teachers or learning tools. These findings indicate that learners who demonstrated a high level of critical engagement often question AI-generated input and content, thus incorporating personal experiences into their final texts.

Discussion of Findings

The overall findings of this study reveal a significant reconfiguration of meaning-making processes in secondary school ESL classrooms through the integration of artificial intelligence (AI) tools. Across the 100 participants, interaction with tools such as ChatGPT, Grammarly, and Google Translate demonstrates that meaning construction is no longer a linear process controlled

solely by the learner or teacher but a distributed semiotic activity shared between human cognition and algorithmic systems.

From a Social Semiotic perspective, the findings challenge the traditional view of classroom discourse as teacher-centred and linguistically bounded. Instead, AI tools function as semiotic actors that actively participate in shaping linguistic output. Learners do not simply receive knowledge; they negotiate meaning through cycles of prompting, revising, accepting, and rejecting AI-generated suggestions. This confirms that meaning is not inherent in language structures but is continuously reconstructed through interaction with socially and technologically embedded sign systems (Kress & van Leeuwen, 2021).

Importantly, the varying learner responses across the twenty participants reveal that AI does not produce uniform meaning-making patterns. While a proportion of learners demonstrated high dependency on AI-generated output, others engaged in critical evaluation and contextual adaptation. This variation signals a shift in classroom dynamics where agency is redistributed rather than eliminated. Learners still exercise interpretive control, but this control is now negotiated within a hybrid environment where algorithmic outputs exert strong semiotic influence. From a Multimodality perspective, the findings further illustrate that meaning-making in ESL classrooms extends beyond linguistic forms to include visual, structural, and interactive dimensions embedded in digital platforms. For example, Grammarly's colour-coded feedback system does not merely correct grammar; it visually structures attention and guides learner decision-making. Similarly, ChatGPT's conversational interface and outputs introduce multiple layers of meaning representation that learners must interpret simultaneously. This multimodal interaction indicates that ESL learning in digital environments is fundamentally non-linear and multi-layered, requiring learners to navigate between textual meaning, interface cues, and machine-generated suggestions. Meaning is therefore distributed across multiple semiotic modes rather than residing in a single linguistic source.

Findings from this study reveal that AI tools do not simply facilitate language learning but actively reshape epistemic authority in the classroom. Traditionally, teachers were the primary arbiters of correctness and meaning. However, the data show that many learners now attribute authority to AI-generated responses, sometimes even privileging them over teacher or personal judgment. This shift raises important pedagogical implications regarding the evolving role of teachers in AI-mediated classrooms. Furthermore, the classroom emerges as a hybrid semiotic space, where

human and non-human agents jointly participate in meaning production. This aligns with contemporary digital literacy perspectives, which argue that learning environments are increasingly characterised by human–machine collaboration rather than human-only interaction systems.

The findings further suggest that AI integration in ESL pedagogy should not be understood merely in terms of efficiency or skill enhancement, but as a profound transformation of how meaning itself is constructed, negotiated, and validated in educational contexts. This has significant implications for curriculum design, teacher training, and classroom practice, particularly in secondary school settings where learners are still developing critical literacy and interpretive autonomy.

Conclusion

This study examines how meaning is constructed in technology-mediated ESL pedagogy through the use of artificial intelligence (AI) tools among secondary school learners. Grounded in Social Semiotics and Multimodality Theory, the study demonstrated that meaning-making in contemporary ESL classrooms is no longer confined solely to human interaction but is shaped through engagement with digital and algorithmic systems.

Findings from the hundred (100) participants reveal that AI tools such as ChatGPT, Grammarly, and Google Translate function as active meaning-making agents within the ESL classroom. Learners interacted with these tools in different ways, ranging from direct adoption of outputs to critical modification and iterative prompting, stating that meaning is co-produced within a human–AI interactional space.

The study further revealed that meaning construction in such environments is mainly multimodal, involving not only linguistic forms but also visual forms, interface structures, and interactive feedback embedded in AI platforms. This confirms that contemporary ESL pedagogy operates within a complex semiotic system where multiple modes and agents integrate to shape communication. Finally, the study contributes to the growing body of knowledge on digital pedagogy by demonstrating that the integration of AI tools represents not merely a technological enhancement but a fundamental transformation in the processes of meaning construction, learner agency, and classroom interaction in ESL contexts.

Recommendations

The study recommends the following:

1. Educators should adopt a guided and deliberate approach to integrating AI tools such as ChatGPT and Grammarly into ESL instruction. Classroom activities should be designed to ensure that AI supports rather than affects learners' cognitive and linguistic engagement.
2. Students should be equipped with AI literacy skills, which will equip them to question, evaluate, and refine AI-generated outputs. This will help prevent dependence on algorithmic responses and promote deeper engagement with meaning-making processes.
3. Teachers should be trained as facilitators of AI-supported learning, guiding students in interpreting and negotiating AI-generated content.
4. Curriculum developers should combine multimodal and AI-mediated learning tasks into ESL programs. Such tasks should reflect real-world communication practices where learners interact with digital tools to construct meaning.
5. Balanced Use of AI Tools should be encouraged. Though AI tools offer significant pedagogical benefits, their use should be placed side by side with traditional language learning practices to ensure the development of writing skills, critical thinking, and linguistic competence.

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