Semiotics in Innovative Language Learning: A Systematic Literature Review

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ABSTRACT:

This study aims to examine the effectiveness of applying a semiotic approach in innovative language learning through a Systematic Literature Review (SLR) analysis of 27 international and national articles after passing the article screening process in Scopus. The results of the study indicate that the multimodal semiotic approach, which includes translanguaging practices, Digital Multimodal Composing (DMC), and edu-semiotics, is able to overcome the limitations of conventional approaches that are oriented towards monolingualism and single texts. This approach consistently improves conceptual understanding, emotional engagement, and social agency of learners by utilizing the entire semiotic repertoire such as gestures, visuals, sounds, and mother tongue. In addition, the integration of digital technology, virtual reality, and artificial intelligence (AI) strengthens the multimodal dimension of learning that is more interactive and reflective. These findings confirm that semiotics-based learning is not only a pedagogical strategy but also a humanistic paradigm that places learners as active meaning makers in the context of 21st-century global communication.

Keywords: Semiotics, Multimodality, Translanguaging, Innovative Language Learning, Digital Literacy, Social Agency

Introduction

The rapid development of digital technology has changed the way humans interact, communicate, and learn languages. In the context of language education, innovations such as virtual reality-based learning, learning analytics, and online collaborative platforms have opened up opportunities for the emergence of various forms of multimodal representations of meaning. Language learning is no longer merely a process of understanding linguistic systems, but also a process of interpreting the signs, symbols, and social contexts contained within them. This change demands a new paradigm in understanding how meaning is constructed and communicated in digital learning spaces.

Several previous systematic literature reviews have made important contributions to the development of knowledge in this field, particularly highlighting important aspects of this transformation. (Mystakidis et al., 2021) shows how Social Virtual Reality environments can create deep and meaningful learning experiences through cognitive, social, and affective engagement. A systematic review of multimodal emotion recognition (Rahmalina & Gunawan, 2024) emphasizes the importance of interpreting various expressive signs such as voice, facial expressions, and text in understanding the

emotions of technology users. Meanwhile, (Gonçalves et al., 2020) highlights the importance of clarity in symbols and conceptual visualization so that users do not experience excessive cognitive load in understanding system representations. These three studies show that meaning, signs, and symbols play a central role in the effectiveness of digital learning and communication processes.

The three studies show that although various studies have discussed meaning, emotion, symbols, and representation in the context of educational technology, there has been no systematic review that comprehensively reviews semiotics in the context of innovative language learning. Meanwhile, SLR (Escala, et al , 2022) discusses semiotics and audiovisual narratives in films and animated series. This study collected 42 articles between 2012 and 2022. Quantitative results show that the majority of publications originated from Spain and the United States, with a significant increase in the number of articles between 2018 and 2021. Thematically, the selected studies discussed the role of music, the use of characters and settings, and the analysis of signs and symbolism. Regarding exclusion criteria, articles that did not specifically discuss the topic of semiotics and audiovisual narrative in the context of animated series and films were rejected, as were articles related to educational approaches, technical aspects (audiovisual translation), advertising, politics, or technology, as well as articles written in languages other than Spanish and English. Based on Escala's study, educational approaches were not included in the review. Yet this field is highly promising because language is fundamentally the most complex and contextual system of signs. In the digital age, learner interactions take place through various modes of text, sound, images, gestures, and even virtual avatars, all of which carry their own semiotic meanings. Therefore, a systematic study is needed to examine how semiotic principles and theories are applied in language learning innovations, both to understand the process of meaning representation and multimodal interaction, as well as the development of symbol-based learning designs.

In the context of language education transformation in the digital age, learning is no longer limited to the delivery of linguistic material, but requires an understanding of the various modes of meaning representation that arise through human-technology interaction. Therefore, examining semiotics in innovative language learning is important to understand how signs, symbols, and multimodal modalities work together to create a more immersive, adaptive, and contextual learning experience. Unlike previous SLRs that focused on VR learning ((Mystakidis et al., 2021), multimodal emotion recognition (Rahmalina & Gunawan, 2024), as well as the effectiveness of visual symbols in conceptual models (Escala, et al., 2022), the study emphasizes semiotics in the audiovisual narratives of films and animations without touching on the realm of language pedagogy. These four SLRs show that although the aspects of signs, meaning, expression, and representation have been widely discussed in the context of technology, emotions, and audiovisual media, there has not been a comprehensive review of the integration of semiotics theory into innovative language learning practices.

As a follow-up to this gap, this study will conduct a Systematic Literature Review (SLR) to map the direction, trends, and findings of recent research related to semiotics in innovative language learning (Zhu et al., 2024). This study offers a new perspective by placing semiotics as an analytical foundation for understanding how modalities: text, sound, images, gestures, and digital representations, can enrich the language learning process. This is because there is still an open gap, such as the lack of systematic studies that holistically examine the role of semiotics in innovative language learning, particularly how sign theory can be applied practically in various effective and persuasive learning strategies. This approach not only fills a void in previous literature, but also makes a strategic contribution to designing language learning that is more meaningful, creative, and responsive to the needs of multimodal communication in the digital age. This effort is very important so that semiotic theory can be integrated more deeply into

learning practices, significantly improving the quality of cross-cultural and cross-linguistic communication. According to Ahmadi (2019), the human thought process produces writing containing linguistic symbols. This strengthens the argument that signs (symbols) in innovative learning are concrete manifestations of students' mental activity. This study is expected to provide theoretical contributions in the form of mapping the relationship between semiotics theory and modern language pedagogy practices, as well as practical contributions for educators and media developers in designing more meaningful, contextual, and humanistic learning in the digital age as innovative learning.

Based on the gap and focus of the study, this research will answer the main questions based on the PICOC (Population, Intervention, Comparison, Outcome, Context) theoretical framework (Mystakidis et al., 2021), which focuses on mapping the application of semiotics theory in the context of innovative language learning. (1) Who are the population or participants that are the focus of research on the application of semiotics in innovative language learning? (Population); (2) What semiotics-based learning strategies or models have been applied in innovative language learning? (Intervention); (3) How do the differences in the effectiveness of semiotics-based learning approaches appear in the data? (Comparison), (4) What learning outcomes, meanings, or communicative effects have been reported from the application of semiotics in innovative language learning? (Outcome); (5) What is the context of the semiotic approach in innovative language learning that has been studied (e.g., formal, informal, online, hybrid, or AI-based education)? (Context)

This study departs from a semiotic framework as a basis for understanding how signs and symbols are used in constructing meaning in innovative language learning. Semiotics, as the study of signs and the process of meaning creation (signification), plays a central role in understanding the mechanisms of transcreation. Classical semiotic theory, starting from Ferdinand de Saussure, who introduced the concepts of signifier and signified, to Charles Peirce, with his classification of signs into icons, indices, and symbols, has enriched our understanding of how linguistic and visual signs form meaning in cross-cultural communication (Chandler, 2002; Eco, 1979). Roland Barthes added the dimensions of connotation and myth, emphasizing the importance of cultural context in the interpretation of signs (Alghamdi, 2024;Patrick French, 2020). Roland Barthes' semiotics focuses on the analysis of myths and connotations, which is important for understanding how the meaning of language transcends its literal level and is influenced by cultural context. In the context of language learning, this approach allows researchers to see how language is not only taught as a system of rules, but also as a tool for interpreting and producing meaning in a broader context, such as in texts, images, or digital media.

Multimodality refers to the combination of various modes of communication, including text, images, sound, and movement (Kress, 2010), which collectively construct rich symbolic meaning. This approach emphasizes that meaning is not only based on verbal words, but on the simultaneous interaction of many modes. In transcreation, multimodality enables a more complete and adaptive transfer of messages to new cultural contexts and audiences.

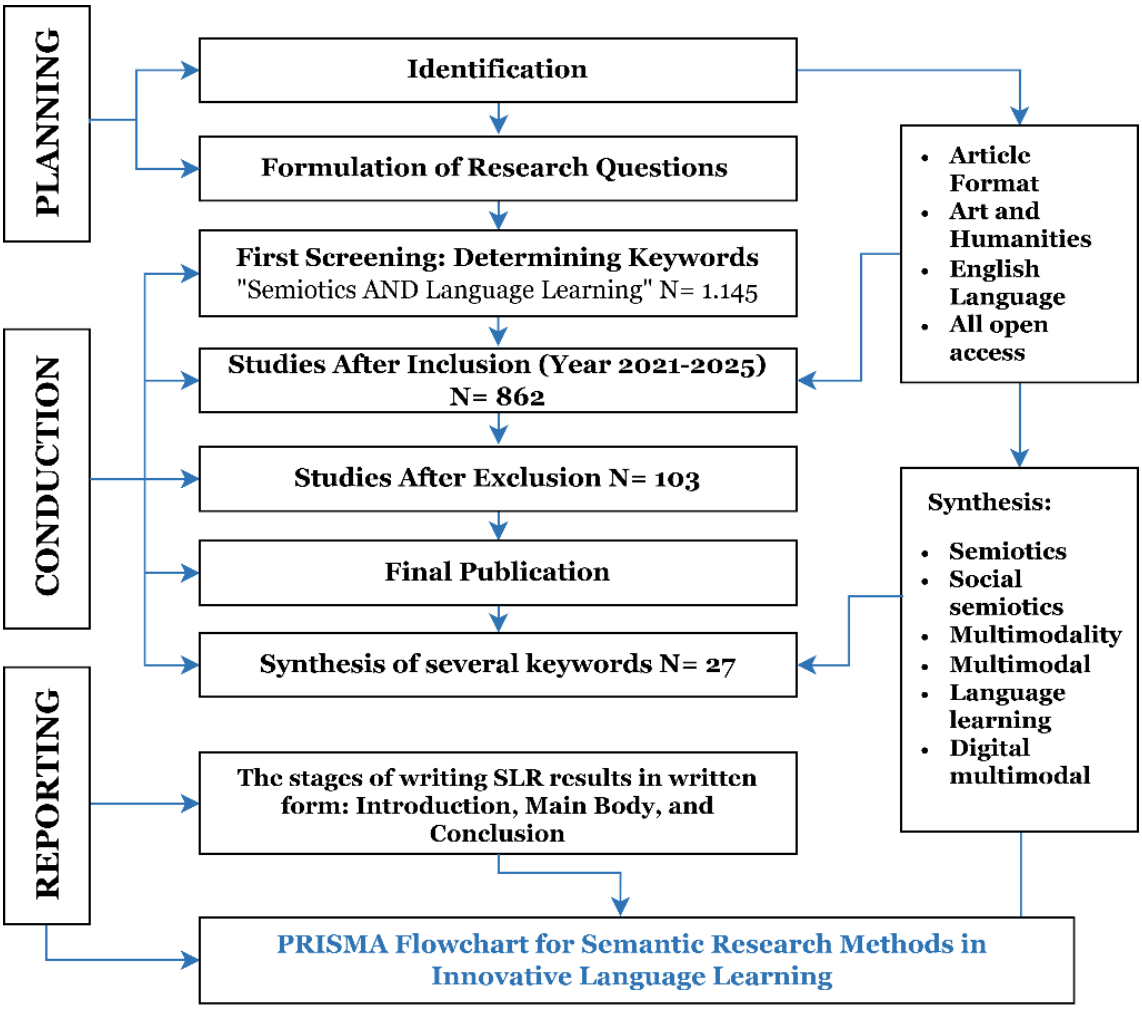
Innovation in language learning is no longer limited to conventional methods, but has evolved alongside advances in technology and pedagogical understanding. Innovative language learning, especially digital-based learning, is often multimodal, involving various modes of communication such as text, images, sound, and video simultaneously. This is where multimodal semiotics becomes relevant, as it focuses on how meaning is constructed through the combination of different semiotic modes (Bezemer & Halloran, 2019). Multimodal semiotics theory allows this SLR to examine how various signs, such as images in language learning applications or gestures in videos, interact with text to enrich the learning process. Thus, this study can evaluate how semiotics-based learning models that utilize these multimodal elements can effectively

influence students' understanding and learning outcomes.

Methods

This study uses a systematic literature review (SLR) approach and has applied the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol to ensure transparency and replication in the process of searching, selecting, and synthesizing literature (Moher et al., 2009; Andriani, 2022). The purpose of applying this protocol is to ensure a transparent, systematic, and replicable process. The stages of research that have been carried out are the planning, conduction, and reporting stages. In the Planning stage, data was identified in Scopus through review protocol steps, assisted by five PICOC questions. The Conduction stage began with determining the keywords for literature search and determining the source (in this study, we focused on Scopus). The results of the search, selection, and inclusion of studies were visualized in a PRISMA flow diagram showing the number of studies at each stage. Meanwhile, in the reporting stage, the results were written with a writing structure consisting of an introduction, main body, and conclusion. The following is the flow of data search from Scopus with a PRISMA flow diagram.

Picture 1: identify studies through databases and registries



Based on the diagram above, data screening was conducted in several stages: publication year (2015–2025), publication type (article), and finally selected studies (inclusion and exclusion), followed by data extraction in accordance with the research criteria. Various aspects were then synthesized using the following keywords. Semiotics, as a general study of signs and symbols. Social Semiotics, analyzing students creating and interpreting meaning in social

interactions in the classroom that are relevant to innovation in social learning. Multimodality, meaning is created not only through text, but also through images, sounds, gestures, and other media that are often used in innovative learning. Multimodal, refers to the integration of various modes (ways) of communication and representation of information. Language learning, the four language skills (listening, speaking, reading, writing) are improved through a multimodal approach. Digital Multimodal Composing, is highly relevant to innovations that use digital technology.

Table 1: Corpus 27 article data

Number	Article	Data Code
1	Empowering elementary preservice science teachers: Harnessing diverse language resources in the practice of modeling.	Fac_25
2	Translanguaging space construction in five Chinese EFL learners' collaborative English-language culture-introduction videos: Patterns and influential factors.	Fu_25
3	The future of TESOL with multimodality.	Lim_25
4	The shaping of an idea as temporal, multimodal, and collaborative activity: Exploring how students develop a board game in L1.	Kab_25
5	ESL classroom interactions in a translanguaging space.	Lin_24
6	Digital multimodal composing as a translanguaging space: Understanding students' initial experiences and challenges.	Wan_24
7	Low proficiency level learners' translingual and transmodal practices in teletandem: Challenging the separation of languages principle.	Sat_24
8	Multimodality in EMI educational materials: The use of semiotic modes in a business administration course.	Val_24
9	Translanguaging-for-learning: A perspective from the South.	Mc_24
10	International law in the era of blockchain: Law semiotics.	Bak_23
11	Student's agency in English as Foreign Language learning in a virtual environment: An interaction analysis.	Roj_23
12	Sounding out science: The Sonaphor and electronic sound design as a learning tool in secondary science.	Wea_23
13	Using Peircean abduction to understand teacher mentoring.	De_23
14	The multi-modal design of PowerPoint oral presentations: A case study from Spanish L2 literature classroom.	Sol_23
15	Translanguaging practices of Macau junior-one students in a remedial class.	Cha_22
16	Identifying compositional instruments in a bilingual picture book for language learning	Muf_22
17	"Our country has gained independence, but we haven't": Collaborative translanguaging to decolonize English language teaching.	Raj_22

Number	Article	Data Code
18	Multimodal communication in an early childhood bilingual education setting: A social semiotic interaction analysis.	Sco_22
19	Fifth graders' use of gesture and models when translanguaging during a content and language integrated science class in Hong Kong.	Wil_22
20	Multimodal, digital artefacts as learning tools in a university subject-specific English language course.	Hel_22
21	Depicting urgencies of the integration of cybertext context in educational pragmatics with a sociosemiotic multimodal perspective.	Rah_22
22	Empowering learners of English as an additional language: Translanguaging with machine translation.	Kel_22
23	Teaching responsive to play and linguistic diversity in early childhood education: Considerations on theoretical grounds.	Kul_22
24	Exploring translanguaging praxes in Pakistani multilingual ESL classrooms of first-year students at university level. 3L: Language, Linguistics, Literature	Att_22
25	Reexamining feedback on L2 digital writing. Studies in Second Language Learning and Teaching	Elo_22
26	Social activity and learning de-encapsulation under a multimodal approach in English language teaching.	Bar_23
27	Translanguaging challenges in multilingual classrooms: Scholar, teacher and student perspectives.	Tic_19

Findings and Discussion

In the reporting phase, various findings were obtained from the extracted data. To facilitate discussion on semiotics in innovative language learning, we compiled the data and reported the study analysis included to answer the research questions that had been formulated.

Population/Participants in the Application of Semiotics in Innovative Language Learning

Based on the analysis of 27 synthesized data, the following is a summary of the distribution based on the population or participants who were the focus of the study.

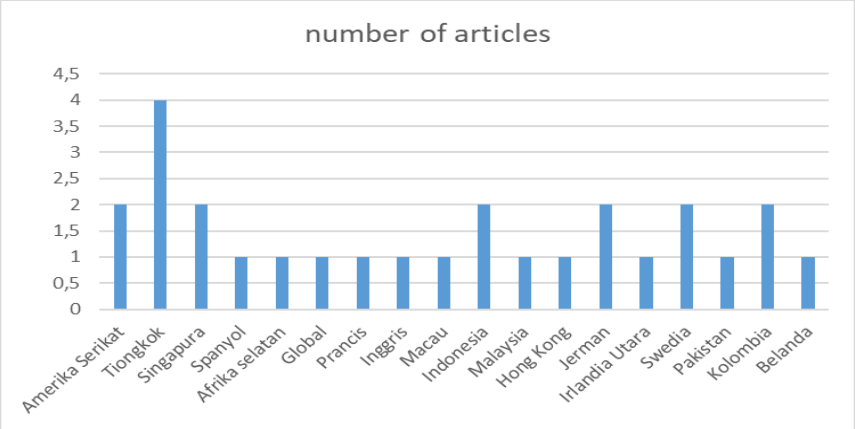
Table 2: Population Distribution

Population Categories	Number of Articles	Year Range	Dominant Country
Higher Education	10	2022–2025	China, Colombia, Spain
Primary & Secondary Education	10	2019–2023	Singapore, Denmark, USA, Hong Kong, Pakistan
Prospective Teacher (Preservice)	2	2025	USA
Beginner Teacher	1	2023	France
Teachers + Students (Mixed TESOL/EAL)	4	2020–2025	South Africa, Northern Ireland, Pakistan

An analysis of 27 articles shows that the research population studying the application of semiotics in innovative language learning is dominated by two main groups, namely university students and primary–secondary school students, each accounting for 37% of the total studies. The dominance of these two groups reflects that the semiotic approach is considered relevant at two

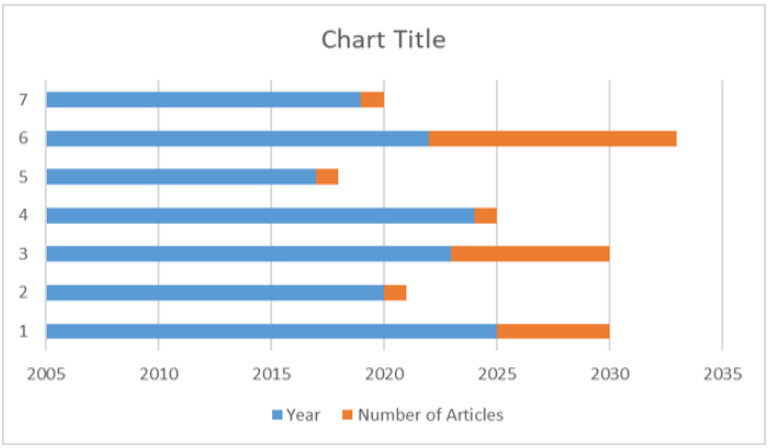
ends of the learning spectrum: first, at the beginner level, such as bilingual students in elementary and secondary schools who need multimodal support to construct meaning; and second, at the advanced academic level, such as EAP/ESP/EMI students who utilize complex modalities to understand and produce academic meaning. In addition, the group of TESOL/EAL teachers and learners contributed 14.8% of the research, signaling the importance of semiotics in the context of multilingual teaching. The populations of prospective teachers (7.4%) and novice teachers (3.7%) also appeared, particularly in research focusing on multimodal literacy and translanguaging practices.(Chan & Chou, 2022)

Picture 2: Country Distribution (27 Articles)



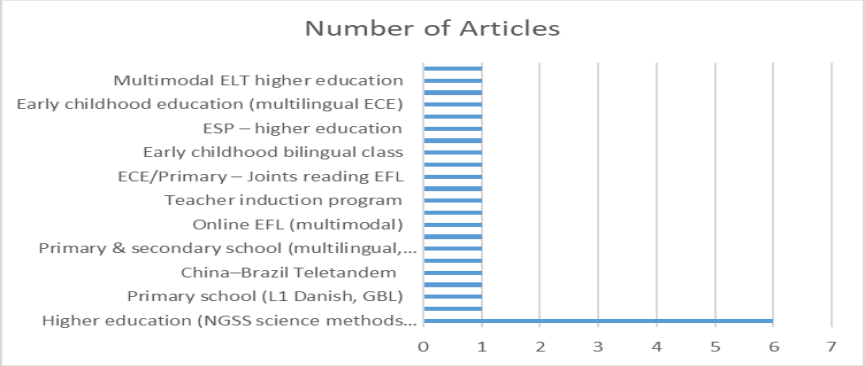
An analysis of 27 articles reveals a highly diverse geographical composition, reflecting that research on semiotics and multimodality in language learning is developing globally. The countries that contributed the most were China (5 articles), Indonesia, Sweden, Colombia, and the Netherlands–Germany region, while other contributions came from South Africa, the United Kingdom, Spain, the United States, Pakistan, and Hong Kong. This regional variation confirms that the issue of the use of signs, language, and modalities in pedagogy is not only a concern of the Global North, but is also developing strongly in the Global South and in multilingual Asian contexts.(McKinney, 2024)

Picture 3: Distribution of Publication Years



From a temporal perspective, publications show a steady upward trend. 2022 and 2023 were the most productive periods, contributing 10 and 8 articles respectively, before increasing again in 2025 with 5 articles.(Wahyuni, 2022) This surge indicates that the issues of multimodality, translanguaging, and semiotics have become mainstream in learning innovation after the pandemic, in line with the development of digital multimodal composing, virtual exchange, and multiliteracies curriculum support in various countries.

Picture 4: Distribution of Learning Contexts



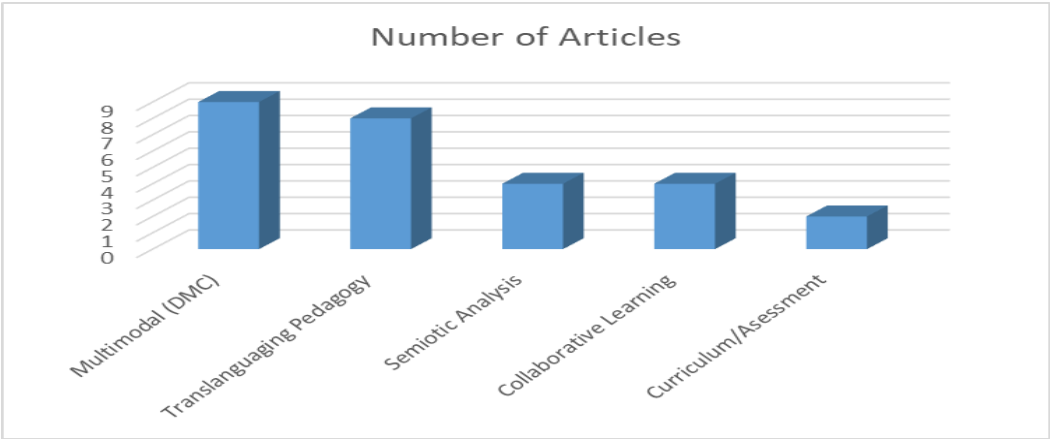
In terms of learning context, the articles cover a wide range of educational ecosystems. Higher education is the most dominant context (more than a third of the articles), especially in EAP, EMI, multimodal ELT, and PST programs. In line with (Ahmadi Anas, Darni, Yulianto Bambang, 2021) as a reference and supporting learning material, symbol- and culture-based analysis (which is the core of semiotics) is part of the innovation in developing teaching materials at the higher education level. Primary and secondary school contexts are also significant, especially in relation to translanguaging, CLIL science, bilingual classes, and game-based pedagogy. Meanwhile, research on Early Childhood Education (ECE) emphasizes the importance of a semiotic repertoire from an early age through play and multilingual interaction. Several specific contexts emerge—for example, cross-border teletandem, Web3 law semiotics, and postdigital science learning—which demonstrate the expansion of semiotics applications far beyond the traditional classroom.

Overall, this distribution of years, countries, and contexts shows that the study of semiotics in innovative language learning is developing rapidly and is transcontinental, trans-level, and transdisciplinary. The visual findings from the graph reinforce the conclusion that sign-based innovation and multimodality have become a new paradigm in contemporary language research.

Semiotics-Based Learning Strategies/Models in Innovative Language Learning

Based on the available article data, the following table outlines various semiotics-based and multimodal learning strategies or models that have been applied in the context of innovative learning, particularly in language learning and integrated content. The following is a visualization of the analysis of semiotics learning models that we have grouped into five clusters of strategies or models.

Picture 5: Number of Articles for each Learning Model Group



The distribution reveals two dominant clusters—Multimodal/Digital Multimodal Composition (DMC) and Translanguaging Pedagogy—alongside three smaller yet still influential clusters that contribute to the study's theoretical framework. The Multimodal/DMC cluster accounts for the largest share with 10 articles (37%), reflecting a strong research focus on meaning-making through multiple representational modes such as visual, textual, audio, and gestural forms, particularly within digitally mediated learning environments, and positioning multimodality as a key orientation in innovative language learning aligned with 21st-century digital literacy. Closely following, the Translanguaging Pedagogy cluster comprises 9 articles (33.3%), highlighting the growing prominence of translanguaging as a pedagogical approach that supports flexible use of learners' linguistic repertoires and fosters collaborative, dialogical, and inclusive learning spaces suited to plural and hybrid language contexts (Kultti, 2022). The near-equal proportions of these two clusters indicate that multimodality and translanguaging constitute the most prominent theoretical foundations in current literature on innovative semiotics-based learning.

The fourth and fifth clusters—Semiotic Analysis Frameworks and Collaborative/Interactive Learning—each represent 11.1% of the total, with three articles per cluster. The semiotic analysis cluster highlights the use of semiotic theories, such as Peircean and Saussurean models or sonic metaphors, as analytical tools for interpreting meaning in learning activities, while the collaborative/interactive cluster focuses on interaction-driven learning, shared meaning-making, and cooperation within classroom settings or digital platforms. Even though these clusters are smaller in scale, they play a meaningful role as methodological foundations that support and enrich the more dominant approaches. Meanwhile, the Curriculum/Assessment Innovation cluster appears as the smallest group, with only two articles or about 7.4%, suggesting that semiotics-based innovation in curriculum and assessment remains an emerging area that has not yet attracted extensive scholarly attention, though existing studies point to clear potential for future research, particularly in multimodal assessment design and meaning-oriented curriculum policy development.(Mufida & Ningsih, 2022)

Overall, the visual pattern in the diagram shows that contemporary research in innovative language learning is more oriented towards multimodality and translanguaging, while approaches based on semiotic analysis, collaboration, and curriculum innovation serve as supporting factors that enrich the theoretical perspective. According to (Ticheloven et al., 2019), this distribution not only reflects the current focus of research, but also opens up space for deeper exploration of approaches that are still in the minority category. Mukhazamilah et al. (2023) in his article not only reflects current research trends, but also fills the "minority space" in several important aspects such as multimodality and digital technology. So, strategies based on semiotics are dominated by a paradigm shift towards multimodality and translanguaging. This application is no longer focused on language as a single system (monomodal and monolingual), but rather as an integrated semiotic repertoire that includes spoken language (L1 and L2), gestures, visuals, and sounds. Models such as Digital Multimodal Composition (DMC) (digital video/story creation) and Scientific Modeling Practices demonstrate that semiotics is used to mediate complex content (such as scientific or architectural concepts), enabling learners to express their understanding flexibly, overcome linguistic gaps, and build collaborative spaces (translanguaging spaces) that are equitable. Furthermore, these models support broader pedagogical goals, such as decolonizing language teaching and overcoming restrictive monolingual ideologies.

Differences in the Effectiveness of Semiotics-Based Learning Approaches (Innovative)

The effectiveness of the semiotic-based learning approach has consistently been reported to yield superior, inclusive, and in-depth results. The semiotic approach, particularly through the lens

of social multimodality and translanguaging, empowers learners by utilizing their entire communication repertoire. Based on the data, the effectiveness of semiotics-based language learning (Innovative) can be seen in Increased Conceptual Understanding and Accessibility, Student Engagement & Communicative Skills (Multimodal), the Superiority of Translanguaging vs. Monolingualism, and Digital Relevance (Cyberpragmatics & DMC).

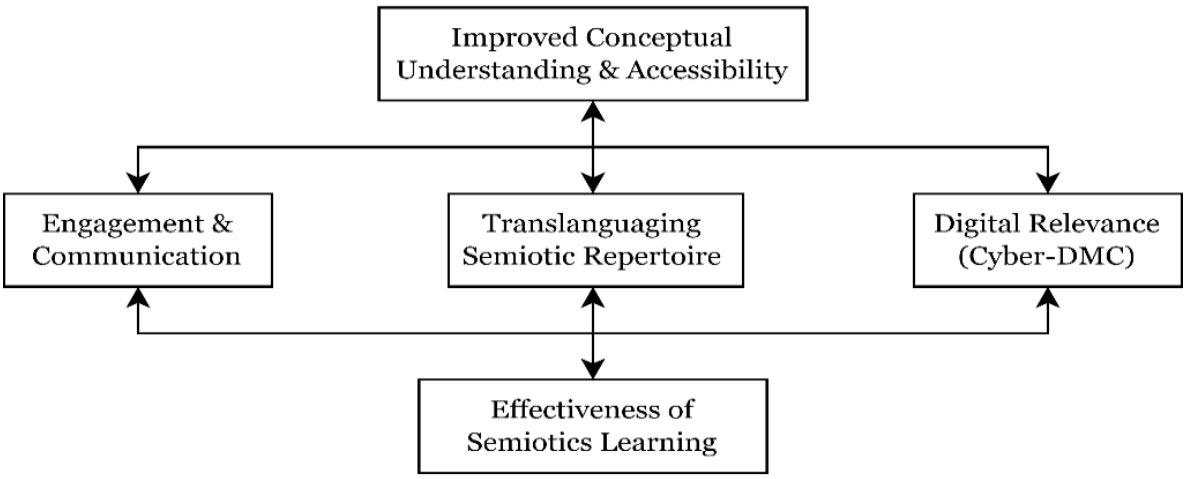
From the improvement in conceptual understanding and accessibility, semiotics-based learning is reported to be effective because it does not only focus on verbal texts and language structures and memorizing rules and definitions. Several studies have found that innovative semiotic learning focuses more on improving conceptual understanding (de Paor, 2023), multimodal learning, comprehension, and retention (Escobar-Alméciga & Brutt-Griffler, 2022). Similarly, (Mufida & Ningsih, 2022) wrote in their article about the appeal of bilingual picture books for improving story comprehension. Meanwhile, (Carolina Favaretto Santos, 2021;Hellwig, 2022) discussed multimodal production, environmental concept learning, multimodal technical discourse, and conceptual understanding. Similarly, (Weaver et al., 202;Fackler & Harman, 2025) discuss Sonaphor; sonic metaphors; conceptual modeling and Semiotics in Modeling Multimodal PST.

In terms of student engagement and communicative/multimodal DMC skills, some data show that innovative semiotics learning can increase engagement and creative activities (Wang, 2024). Similarly, multimodal EMI can increase audience engagement (La et al., 2024), multimodal feedback can increase agency and voice (Elola & Oskoz, 2022), multimodal PST modeling for increased engagement (Lim, 2025), and multimodal meaning-making as agency and communicative participation (Rojas & Escobar-Alméciga, 2023). Collaborative semiotics in creative ideation is also extensively discussed by (Kabel et al., 2025). Similarly, student involvement and the communicative/multimodal skills of graduate students as meaning producers (Soliman, 2023). Thus, activities tend to be active, not only focusing on writing/written exams, and communication is not only assessed through a single mode (written or oral), but prepares students to face multichannel communication.

Compared to monolingualism, translanguaging has many advantages. Translanguaging as a practice of decolonization and social justice. (Rajendram, 2022), Transmodal-translingual meaning-making for low-proficiency students (Satar a moge, 2024), Gesture & modeling as a linguistic bridge in science (Williams, 2022), Machine Translation as a digital translanguaging tool (Kelly & Hou, 2022), Multimodal translanguaging; co-construction of knowledge (Lin & Leung, 2024), Full semiotic repertoire; critical understanding (McKinney, 2024), L1 scaffolding; affectively safe & supportive of understanding. (Atta & Naqvi, 2022), DMC creates digital translanguaging space and identity (Fu & Zhang, 2025), Natural translanguaging aids concept retention & discourse flow (Ticheloven et al., 2019), and Multilingual Semiotic Resources in ECE (Kultti, 2022), and the use of translanguaging in English remedial classroom learning activities (Chan & Chou, 2022). Thus, it does not emphasize monolingualism, which assumes that the use of one's first language is a mistake. The interactions built are also more flexible, authentic, and tend to utilize the potential of the students' languages.

Finally, digital relevance (Cyberpragmatics and DMC) that discovered Ccybertext, virtual extralinguistic context (Rahardi, 2022), digital multimodal EMI (La et al., 2024), DMC digital composing (Wang, 2024), resemiotisation, technical digital discourse (Hellwig, 2022), multimodal digital feedback (Elola & Oskoz, 2022) Semiotics, Blockchain AI-Learning Logic (Baktygul, 2023), and Digital Relevance & Cybergenres; PowerPoint as a multimodal academic genre and part of digital literacy (Kultti, 2022). Innovative semiotics learning encompasses multimodal digital literacy, does not focus too much on printed text, and trains students to deal with complex forms of cyber communication.

Picture 6: Innovative semiotics learning

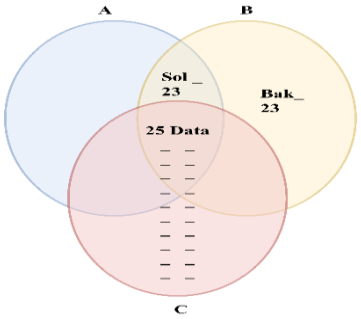


This diagram shows that the semiotic approach is not only more effective pedagogically, but also more suited to contemporary communication needs. While conventional learning still operates in a linear and monomodal realm, semiotic learning emphasizes sign-based understanding, creative participation, utilization of all student languages, and readiness to face the digital ecosystem.

Learning Outcomes, Meaning, and Communicative Effects Reported from the Application of Semiotics in Innovative Language Learning

The application of a semiotics-based and multimodal learning approach has produced a variety of learning outcomes, meaning constructions, and communicative effects that are profound, transformative, and far-reaching, especially in the context of 21st-century language and literacy. The following is an analysis of the main results reported from available sources, grouped according to (A) Learning Outcomes, (B) Meaning/Semiotic Processes, and (C) Communication/Social Effects.

Picture 7: Learning Outcomes, Understanding Process/Semiotics, and Communication/Social Effects.



Based on a comprehensive analysis of the sources, most modern studies examining semiotics and multimodality in language learning show findings that are inherently interconnected across all three categories (A, B, and C). Only a few articles are strictly limited to one or two domains. The categorization of findings indicates a highly asymmetrical configuration among the three main domains—learning outcomes, semiotic processes, and communication effects. A singular focus on meaning processes appears in only one study (Bak_23), while no study places learning outcomes or communication effects exclusively at the center of analysis. The intersection of two domains is also relatively limited, with only Sol_23 linking semiotic mechanisms to improved academic achievement without integrating the socio-communicative dimension.

The absence of research on the intersection of learning outcomes and communication or meaning and communication shows that separate approaches to these two dimensions have not been widely developed. Conversely, the majority of the corpus—25 of the 27 articles—are at the intersection of all three domains, indicating a strong tendency in contemporary research to

conceptualize language learning as an integrated process involving cognitive performance, multimodal meaning construction, and social interaction dynamics simultaneously. This pattern signals an epistemological shift from a linear approach to an ecological-semiotic perspective that maps learning as the co-constitution of meaning and communication in a pedagogical context. The following is a summary of the three-way intersection of Learning Outcomes (A), Meaning (B), and Communication Effects (C).

Table 3: intersections between cognitive (A), semiotic (B), and socio-affective (C) focuses

Category	Theme Summary	Article Code
A. Cognitive Focus	Conceptual understanding, scientific reasoning, multimodal literacy, creative ideation, and knowledge consolidation through translanguaging/DMC.	Fac_25, Lim_25, Fu_25, Wan_24, Sat_24, Val_24, Mc_24, Muf_22, Kab_25, Bar_23, Hel_22, Sco_22, Att_22, Rah_22, Kel_22
B. Semiotics/Multimodal Focus	Modality orchestration (visual–gestural–audio–linguistic), semi-automation, sonic metaphors, compositional analysis, cybertext, AI/MT as semiotic modalities.	Fac_25, Fu_25, Lim_25, Lin_24, Wan_24, Sat_24, Val_24, Wea_23, Muf_22, Hel_22, Kab_25, Raj_22, Sco_22, Wil_22, Kel_22, Rah_22
C. Social/ Affective Effects	Agency and identity, safe spaces, collaboration, anxiety reduction, social equity, family involvement, and participatory environments.	Fu_25, Wan_24, Lin_24, Sat_24, Raj_22, Mc_24, Att_22, Sco_22, Kab_25, Bar_23, De_23, Tic_19

From the data that does not include the intersection of the three aspects, there are two. First, the article (Bak_23) is categorized under meaning/semiotic process (B) only because it focuses on technical solutions and international legal semiotics. This article is entirely centered on the theoretical framework of semiotics, namely legal semiotics. The author proposes a langue and parole formula in which multisig blockchain operations work under international legal semiotics to restore enforcement based on pure state will, and this requires reconnecting the signifier and the signified. The article does not discuss the cognitive outcomes of learners (A) or the communicative/social effects in the context of learning or the classroom (C). The focus is on international law enforcement through technical and theoretical solutions. Second, the article (Sol_23) only focuses on learning outcomes (A) and meaning (B). In Learning Outcomes (A) / Cognitive Focus, it shows that a strategic verbal semiotic system can help students achieve their learning goals. In Meaning/Semiotic/Multimodality Focus (B), it examines the multimodal design of PowerPoint presentations and the dominance of verbal systems that are considered useful for the context of L2 literature teaching.

The Context of the Semiotic Approach in Innovative Language Learning

The context of this research focuses on semiotics in innovative language learning with four main domains, namely Multilingual-Based Formal Education, Virtual and Online Education, Academic/Professional Higher Education, and Advanced Technology Integration (AI/MT). The social semiotic and multimodal approach provides a framework for analyzing how meaning is constructed through various modes of communication (linguistic, visual, gestural, etc.) in various educational environments. The following are details of the research context along with the findings and their support in the data.

Table 4: Details of the research context along with findings and data support

Research Context	Data Code	Summary of Quotes & Keyword Findings
Multilingual-Based Formal Education	Fac_25, Wil_22 Kul_22, Sco_22 Att_22, Cha_22 Raj_22, Tic_19	Multilingual learning in formal settings emphasizes translanguaging and multimodal resources (language, gestures, objects, models) to build collaborative meaning, reduce communication barriers, and strengthen linguistic identity and justice in CLIL/ESL/EAL classrooms. ***Keywords:*** *translanguaging, multimodal scaffolding, equity pedagogy, language decolonization, safe linguistic space.*
Online and Virtual Education (Online/Hybrid)	Roj_23, Sat_24 Sco_22, Wan_24 Lim_25, Kel_22 Hel_22, Fu_25	The digital environment enables multimodal interactions (chat, video, voice, gestures, visuals) that expand identity expression and cross-language collaboration. Through Digital Multimodal Composing and Teletandem, learners practice translanguaging-transmodality despite technological limitations. ***Keywords:*** *virtual multimodality, digital translanguaging, teletandem, identity expression, transmodal meaning.*
Academic and Professional Higher Education	Fac_25, Val_24 Roj_23, Wan_24 Lin_24, Lim_25 Att_22, Rah_22 Hel_22	In higher education, multimodality is a core communication competency, supporting plurilingual mediation, technical presentation design, and professional literacy in EMI/ESP. The semiotic approach fosters academic agency and authentic scientific modeling. ***Keywords:*** *academic multimodality, professional semiotic competence, multi-modal assessment, disciplinary literacy.*
AI-Based Education and Advanced Technology	Bak_23 Wea_23 Kel_22 Wan_24	AI and advanced technology expand semiotic practices through machine translation, AI-assisted learning, and sonic semiotics (e.g., Sonaphor), helping to construct 4D scientific meaning. Focus also on understanding cybertext and the impact of AI on digital literacy. ***Keywords:*** *AI-assisted multimodality, MT literacy, sonic semiotics, cybertext pragmatics, digital augmentation.*

These four contexts show that the semiotic and multimodal approaches are widely applied—from basic classes that focus on direct interaction with physical resources, to higher education and virtual education driven by technology and multilingual integration. This approach consistently emphasizes the full utilization of learners' semiotic repertoires to improve understanding and equity in education. Meanwhile, six additional data points (Kab_25, Mc_24, De_23, Sol_23, Elo_22, Bar_23) were not included as separate contexts because their findings serve as theoretical, methodological, and specific practice support that reinforces the four main contexts—namely Multilingual Formal Education, Online Education, Higher Education, and Technology-Based Education.

Data (Kab_25) examines how ideas emerge and are shaped in collaborative activities in mother tongue (L1) classrooms in Denmark through metaphorical chains and the use of semiotic resources such as oral, written, and visual in various time scales (micro, meso, macro). These findings provide important insights into the creative processes involved in multimodal meaning construction that are relevant to various forms of innovative learning, particularly in the context of Formal Education, as they illustrate how students construct their ideas before producing multimodal artifacts. The data (Mc_24) presents a strong theoretical view of translanguaging from a Global South perspective, emphasizing the full utilization of linguistic and semiotic repertoires as a form of resistance against monolingual ideology and to strengthen social justice. Its contribution primarily strengthens the theoretical foundation and asset-based principles of multilingual formal education contexts, while affirming the importance of equitable pedagogy.

Data (De_23) introduces the concept of Edusemiotics and uses Charles Sanders Peirce's reasoning framework (abduction, deduction, and induction) to understand how mentors support new teachers in the process of classroom reflection and inquiry. This document provides philosophical and analytical tools for examining teachers' reasoning and professional development, thereby contributing to aspects of mentoring and teacher preparation relevant to the context of academic and professional higher education. The case study (Sol_23) analyzes the multimodal design of PowerPoint oral presentations by L2 Spanish learners in a Literature course. The results of the study show the dominance of verbal and typographic semiotic systems, but also highlight the importance of non-verbal elements. These findings directly support the context of academic and professional higher education, particularly in terms of the use of digital artifacts for L2/FL academic presentation assignments.

The study (Elo_22) focuses on the need to review feedback practices in Digital Multimodal Composing (DMC), emphasizing that feedback should include linguistic and non-linguistic aspects such as visual, audio, and spatial. This research deepens and refines the practices discussed in the context of online/hybrid education and higher education, particularly in the aspect of multimodal assessment. Finally, the document (Bar_23) describes multimodal pedagogical interventions in a 9th grade English class in Brazil, based on Social Activity Theory and the concept of de-encapsulation (breaking down the boundaries between school and real life). This study is a concrete example of the application of the principle of maximizing semiotic and multimodal resources in language teaching, which is highly relevant to the context of formal multilingual education.

In short, these documents are valuable because they provide the theoretical, methodological, and empirical details used to construct the core findings under four broader research contexts. This was done to keep the categorization framework focused on different types of environments or educational objectives, rather than on each supporting study separately.

Discussion

Overcoming the Limitations of Conventional Approaches

The findings of this study indicate that the multimodal semiotic approach consistently overcomes the limitations of conventional approaches that are monolingual and text-centric. In the traditional paradigm, language learning often treats language as a closed system and separates its use from social contexts and other modalities. This view is in line with the ideology of the "separation of languages principle," which (Bezemer & Halloran, 20 19) criticize as unrealistic in contemporary educational practice.

The semiotic approach, on the other hand, positions translanguaging as a co-learning practice that allows learners to use their entire linguistic and semiotic repertoire. Through cross-modal interactions—native language, gestures, images, and sounds—learners construct deeper and more contextual meaning. This is in line with Multimodal Social Semiotic Theory (Routledge,

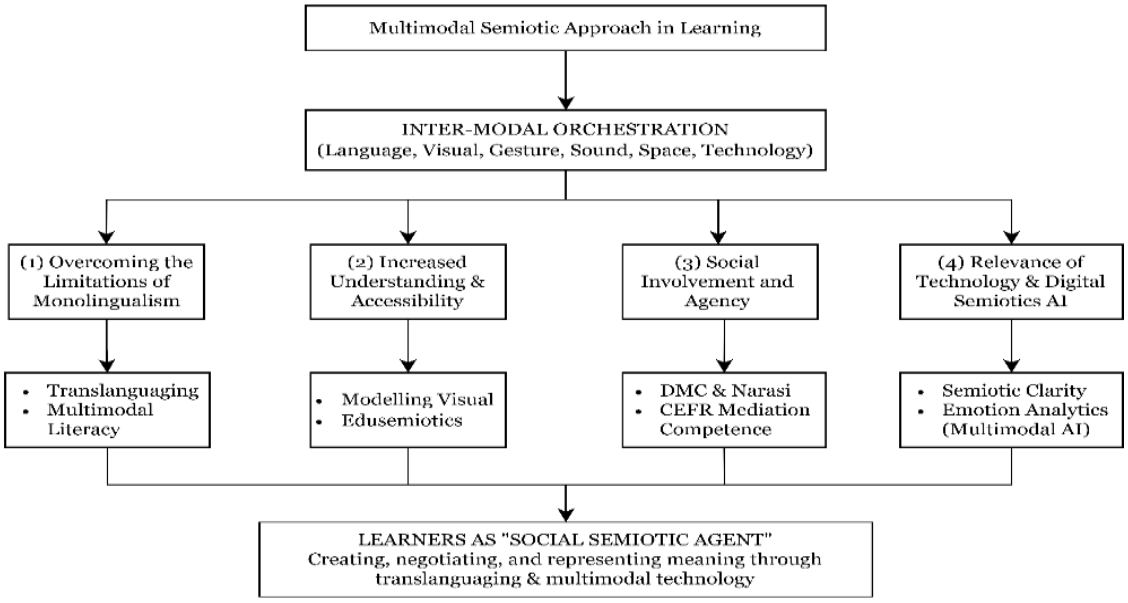
2010), which views meaning as the result of the orchestration of modes of communication.

In addition, this approach shifts the focus of learning from a structural-linguistic perspective towards asset-oriented and equitable pedagogy that values students' diverse semiotic resources. In the context of formal education, this practice creates a safe linguistic space where students can collaboratively negotiate identity and meaning without the constraints of monolingualism.

Improved Conceptual Understanding and Accessibility

Analysis shows that multimodal modeling practices expand students' ability to understand complex scientific concepts. Various resources such as visualizations, diagrams, symbols, and gestures work synergistically in constructing scientific meaning. These results reinforce the findings (Bezemer & Halloran, 2019) that multimodality enables students to construct conceptual meaning by combining ideational, interpersonal, and textual functions as described in the Systemic Functional Linguistics framework.

Picture 8: The Systemic Functional Linguistics framework



Recent research by (Mystakidis et al., 2021) in Deep and Meaningful E-Learning with Social Virtual Reality Environments supports these findings by showing that multimodal interactions in social virtual reality environments can enhance deep and meaningful learning. Through embodied experiences, three-dimensional spaces, and virtual social interactions, learners are able to construct more authentic and accessible representations of meaning.

In a scientific context, students are no longer limited to text as the sole source of knowledge. The combination of gestures, models, visuals, and language enables more efficient idea processing, making difficult concepts such as glycolysis easier to understand. This is in line with the principles of edu-semiotics (Hellwig, 2022), which emphasize the importance of modeling, abduction, and representation in the process of meaning formation.

Student Involvement and Social Agency

The multimodal semiotic approach has also been shown to increase student engagement and social agency. In the context of teaching English as a Foreign Language (EFL), multimodal communication—through facial expressions, gestures, intonation, and visuals—encourages active participation and multi-directional dialogue in the classroom. (Routledge, 2010) refers to this process as semiotic orchestration, in which each mode is used strategically to construct complex social meanings.

The study "Digital Multimodal Composing as a Translingual Practice" reinforces these findings by showing that DMC tasks encourage students to create personal translingual spaces that reflect their linguistic and cultural identities. Students not only use more target language (Mandarin), but also combine sound, visual, and text elements to express themselves authentically. Similar findings are also reported by Semiotics and Audiovisual Narrative in Animation, which confirms that multimodal narratives can build deeper emotional resonance and conceptual understanding than single-text-based narratives.

This approach is also in line with the latest edition of the Common European Framework of Reference for Languages (CEFR), which introduces mediation competence and plurilingualism. Through multimodal digital tasks such as video and presentation creation, students act as mediators of meaning and social agents who are able to bridge communication between cultures and academic contexts.

Translanguaging and Transmodality

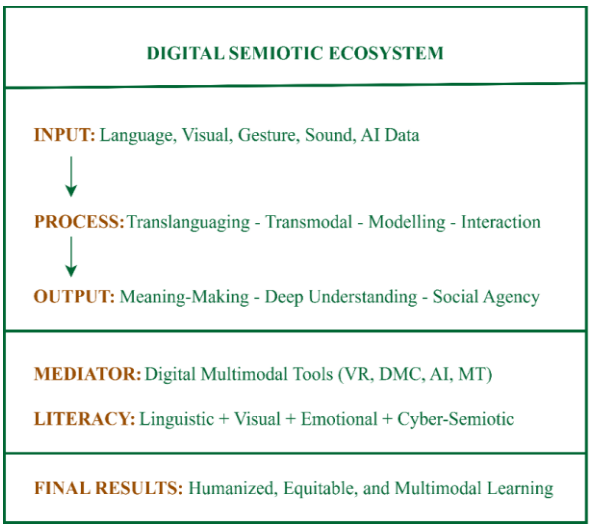
In a multilingual context, the semiotic approach expands the function of translanguaging into a practice of transmodality that transcends the boundaries between languages and between semiotic modes. Jewitt and Kress emphasize that meaning is always social and historical—each sign reflects individual choices based on social interests and available resources. Thus, translanguaging is understood as semiotic hybridity, in which learners mix various symbolic systems to negotiate meaning.

Research (Satar a moge, 2024) shows that translanguaging strategies create a safer and more collaborative learning environment for students with limited L2 abilities. They can express ideas through visualization or gestures without losing depth of meaning. Thus, translanguaging is not merely a linguistic strategy, but a form of social literacy that supports educational equity and inclusivity.

The Relevance of Technology and the Age of AI

The digital age brings new epistemological consequences to meaning and representation. The study Using Empirical Studies to Mitigate Symbol Overload in iStar Extensions (Gonçalves et al., 2020) shows the importance of semiotic clarity in digital communication to avoid symbol overload, which can obscure meaning. This principle is important in the application of machine translation (MT) and AI-based learning systems, which are increasingly multimodal.

Picture 9: Digital Semiotic Ecosystem



In addition, Multimodal Emotion Research highlights that students' emotional responses in online learning can be analyzed through multimodality—intonation, facial expressions, and body movements—to understand their engagement and motivation more comprehensively. This approach expands the

understanding of digital literacy to emotional literacy rooted in sensory and social experiences.

Research Implications

This study reinforces the position of Multimodal Social Semiotic Theory (Bezemer & Halloran, 2019) as a relevant conceptual framework for 21st-century education. Meaning is no longer understood as merely linguistic representation, but rather as the result of social negotiation between modes. This approach opens up new possibilities for understanding learning as a reflective, collaborative, and multimodal process of meaning design.

Furthermore, the results of this study confirm the relevance of Edusemiotics (Hurley, 2021) in contemporary education, especially in shaping abductive reasoning, creative thinking, and scientific representation. By integrating classical semiotics theory and modern multimodal practices, this study offers a synthesis that can broaden the epistemological horizons of language and communication studies.

Table 5: The Relationship between Theory and Findings

Theoretical Framework	Related Research Findings	Implications in the Context of Language Teaching
Multimodal Social Semiotic Theory (Bezemer & Halloran, 2019)	Meaning is constructed from the orchestration of various modes (gestures, sounds, texts, visuals).	Learning becomes collaborative and multimodal, not solely linguistic.
Systemic Functional Linguistics (Halliday; (Bezemer & Halloran, 2019)	Each mode has an ideational, interpersonal, and textual function.	Visualization reinforces ideational functions; gestures and sounds reinforce interpersonal functions.
Edusemiotics (Ferguson et al., 2024)	The learning process is a semiotic activity – abduction, modeling, representation.	Teachers and students interpret signs together to build new understanding.
Digital Multimodal Pedagogy (Mystakidis et al., 2021)	The use of VR and digital media enhances deep learning and social empathy.	Developing digital semiotic competence in online and hybrid contexts.
Translanguaging Theory (Rajendram, 2022)	Language is not a separate system, but a social practice that transcends modes and cultures.	Fostering multilingual literacy and a safe space for identity expression.

In practice, the multimodal semiotic approach can be implemented through: a) Multimodal Learning Design – Integrating text, visuals, gestures, and sound in the delivery of material, 2) Digital Multimodal Assessment (DMC) – Using video projects, infographics, or interactive simulations to assess students' conceptual understanding, 3) Multilingual Teacher Training – Developing teacher competence in translanguaging and transmodality to be more responsive to linguistic diversity, 4) Immersive Technology integration – Utilizing virtual reality (VR) and AI to create dynamic semiotic learning experiences.

For education policymakers, these findings underscore the importance of reviewing monolingual policies that restrict the use of

mother tongues in learning, integrating multimodal and mediation competencies into the national curriculum, and providing technological infrastructure that supports digital semiotics-based learning. The multimodal semiotic approach not only improves linguistic learning outcomes, but also changes the way we understand language, meaning, and learning itself. By placing students as active meaning-makers, this approach offers a more humanistic, inclusive, and relevant vision of education for the communication needs of the 21st century. This aligns with (Purnomo, Yulianto, Muhamad Arif Mahdiannur and Hasan Subekti., 2023) findings, which explain that the Independent Curriculum, as a form of educational policy direction, is designed to accommodate various knowledge perspectives to achieve 21st-century skills. This supports the argument that innovative, semiotic-based learning enables students to view phenomena from various perspectives of signs and meanings.

Conclusion

Based on the results of a Systematic Literature Review of 27 articles, it can be concluded that the application of semiotics in innovative language learning shows a close connection between population, intervention, comparison, outcome, and research context (PICOC). The study population was dominated by students at the elementary–secondary and university levels, confirming the relevance of this approach at various levels of education. The most effective interventions were found in the Digital Multimodal Composing (DMC) and Translanguaging Pedagogy models, which consistently expanded students' semiotic repertoire to construct meaning across languages and modes. Compared to conventional monolingual approaches, the multimodal semiotic approach proved to be superior in improving students' conceptual understanding, engagement, and social agency. Reported learning outcomes include improvements in multimodal literacy, collaboration, and cross-cultural mediation competence, while the context of application encompasses formal, online, and technology-based educational ecosystems such as AI and machine translation. Thus, semiotics-based language learning not only enriches the process of meaning representation but also revolutionizes the pedagogical paradigm towards a more inclusive, creative, and humanistic direction in the digital age.

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