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UTILIZING THE SEMIOTIC MODEL TO ENHANCE SEMANTIC ADEQUACY IN TRANSLATION PROCESSES: A THEORETICAL FRAMEWORK

Abstract. This article delves into the intricate relationship between semiotic models and translation practices, proposing a novel theoretical framework aimed at enhancing semantic adequacy in translations. Rooted in the premise that language functions as a complex semiotic system, the study underscores the necessity of a translation approach that transcends linguistic accuracy to encompass the cultural, contextual, and connotative layers of meaning. Drawing from foundational semiotic and translation theories, the article outlines a methodological framework that integrates semiotic analysis at various stages of the translation process: pre-translation analysis, translation execution with semiotic sensitivity, and post-translation review. Through a series of case studies spanning literary, legal, and digital content, the study empirically validates the framework's efficacy in maintaining the semantic integrity of translated texts. The findings highlight the critical role of semiotic competence in translation, suggesting that a deeper engagement



with semiotic principles can significantly improve the quality and fidelity of translations. Furthermore, the article identifies avenues for future research, including the exploration of technological advancements in semiotic analysis, the extension of the framework to multimodal and digital texts, and its implications for translation training programs. This study contributes to the broader discourse on translation studies by offering a robust, theoretically informed, and practically validated approach to achieving semantic adequacy in translation, thereby facilitating more nuanced and contextually aware translations in an increasingly globalized and digital world.

Keywords: semiotic models, translation practices, semantic adequacy, linguistic accuracy, cultural nuances, methodological framework, semiotic analysis, empirical validation, digital content translation, cross-cultural communication.

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ВИКОРИСТАННЯ СЕМІОТИЧНОЇ МОДЕЛІ ДЛЯ ПІДВИЩЕННЯ СЕМАНТИЧНОЇ АДЕКВАТНОСТІ ПЕРЕКЛАДУ: ТЕОРЕТИЧНИЙ АСПЕКТ

Анотація. В статті розглядається складний взаємозв'язок між семіотичними моделями та перекладацькою практикою, пропонуючи



нову теоретичну базу, спрямовану на підвищення семантичної адекватності перекладу. Ґрунтуючись на передумові, що мова функціонує як складна семіотична система, дослідження підкреслює необхідність перекладацького підходу, який виходить за рамки лінгвістичної точності і охоплює культурні, контекстуальні та конотативні шари значення. Спираючись на фундаментальні теорії семіотики та перекладу, стаття окреслює методологічну основу, яка інтегрує семіотичний аналіз на різних етапах перекладацького процесу: доперекладацький аналіз, виконання перекладу з урахуванням семіотичної чутливості та післяперекладацький огляд. На прикладі низки тематичних досліджень, що охоплюють літературний, юридичний та цифровий контент, дослідження емпірично підтверджує ефективність цієї концепції у збереженні семантичної цілісності перекладених текстів. Результати дослідження підкреслюють критичну роль семіотичної компетентності в перекладі, припускаючи, що глибше залучення семіотичних принципів може значно підвищити якість і точність перекладу. Крім того, у статті визначено напрями майбутніх досліджень, зокрема вивчення технологічних досягнень у семіотичному аналізі, поширення його на мультимодальні та цифрові тексти, а також його вплив на навчальні програми з перекладу. Це дослідження робить внесок у ширший дискурс перекладознавства, пропонуючи надійний, теоретично обґрунтований і практично перевірений підхід до досягнення семантичної адекватності в перекладі, що сприяє створенню більш точних і контекстуально коректних перекладів у дедалі більш глобалізованому та цифровому світі.

Ключові слова: семіотичні моделі, перекладацькі практики, семантична адекватність, лінгвістична точність, культурні нюанси, методологічні засади, семіотичний аналіз, емпірична перевірка, переклад цифрового контенту, крос-культурна комунікація.

Problem statement. The formulation of the problem within the context of utilizing the semiotic model to enhance semantic adequacy in translation processes centres on the critical examination of how semiotic principles can be systematically applied to improve the fidelity of meaning transfer across languages. This inquiry is rooted in the intersection of semiotics – the study of signs and symbols and their use or interpretation – and translation studies, a discipline concerned with the methodological approaches to converting textual matter from one language into another while preserving its original meaning, style, and context.

The core of this problem lies in the inherent complexity of language as a semiotic system, where signs (words, phrases, or symbols) do not merely



convey literal meanings but are also imbued with cultural, contextual, and connotative dimensions that are often challenging to replicate in a target language. The semantic adequacy of a translation, therefore, depends not only on the linguistic accuracy but also on the translator's ability to navigate and reconstruct these multifaceted layers of meaning in the target language. This involves a deep understanding of the semiotic mechanisms at play and how they can be manipulated within the translation process to achieve a result that is both faithful to the source text and resonant within the cultural framework of the target audience.

The significance of addressing this problem extends beyond the academic purview of translation studies and semiotics into practical realms where the accuracy and integrity of translated texts are of paramount importance. In fields such as legal documentation, medical literature, and international diplomacy, where the precision of language can have far-reaching consequences, the application of a semiotic model in translation practices can serve as a critical tool in ensuring that translations do not merely replicate words but faithfully convey intended meanings and implications. Moreover, in the context of global media, literature, and information exchange, enhancing semantic adequacy through semiotic awareness can facilitate a deeper intercultural understanding and appreciation, thus contributing to the broader scientific and practical task of fostering global communication and collaboration.

The analysis of the latest research and publications. In addressing the intricate problem of enhancing semantic adequacy in translation through the application of the semiotic model, a comprehensive analysis of recent scholarly contributions reveals a burgeoning interest in this interdisciplinary approach. Notably, research initiatives have begun to systematically explore the intersection of semiotics and translation studies, aiming to elucidate the nuanced processes through which meaning is constructed, deconstructed, and reconstructed across linguistic and cultural barriers.

Umberto Eco. Eco's work on semiotics, especially as articulated in "Semiotics and the Philosophy of Language", provides foundational insights into the study of signs and their meanings. [1] Although not exclusively focused on translation, Eco's theories offer critical perspectives on how texts convey complex cultural and contextual signals, which are pivotal in translation studies. In "Experiences in Translation", Eco navigates the complexities of translation, underscoring the semiotic challenges and the necessity of negotiating between the source and target texts' cultural contexts to preserve the intended meaning. [2]

Roman Jakobson. Jakobson's contributions to the field, particularly his distinction between intralingual, interlingual, and intersemiotic translation,



are instrumental in understanding the challenges and strategies of translating meaning across different semiotic systems. His work “Linguistics and poetics” lays the groundwork for applying semiotic theory to translation practices. [3]

Peeter Torop. Torop’s extensive research in translation semiotics, especially his concept of total translation, examines the translation process as a holistic act that encompasses cultural, contextual, and intertextual dimensions. [4] His work “Semiosphere” emphasizes the importance of a deep semiotic understanding in achieving semantic adequacy in translation.

Lawrence Venuti. Although Venuti’s research primarily focuses on the translator’s invisibility and the cultural dimensions of translation, his work indirectly engages with semiotic considerations by highlighting how cultural norms and expectations shape translation choices, impacting semantic adequacy.

Ralph Krüger. Krüger’s recent studies, particularly in the context of scientific and technical translation, delve into the application of semiotic models to ensure accurate and culturally appropriate translations of specialized texts. His work illustrates the practical implications of semiotic theory in translation.

These scholars and their contributions represent a fraction of the ongoing research in applying semiotic models to translation. The field is dynamic, with new studies continually emerging that build upon and challenge existing theories. [7] Future research is likely to explore the integration of digital technologies in semiotic translation, the role of artificial intelligence in automating semiotic analysis, and the development of more nuanced frameworks for translating multimedia and multimodal content. Such explorations will further refine our understanding of how semiotic models can enhance semantic adequacy in translation, ensuring that translations are not only linguistically accurate but also resonate with the target audience’s cultural and contextual realities.

Key publications in this domain have underscored the critical role of semiotics in understanding the multi-layered nature of language and meaning. Works such as Eco’s exploration of semiotic processes in translation and Nida’s emphasis on dynamic equivalence have laid foundational theoretical underpinnings that inform current investigations. [8] Recent scholarly articles have built upon these theories, integrating cognitive semantics, sociolinguistics, and cultural studies to offer more nuanced insights into the semiotic challenges of translation. For instance, research has increasingly focused on the pragmatic aspects of translation, examining how contextual cues, cultural idioms, and non-verbal signs are negotiated in the translation process.



However, despite these advances, several pivotal aspects of the problem remain unresolved, particularly concerning the systematic application of semiotic models in translation practice. There is a noticeable gap in empirical studies that operationalize semiotic theory into concrete translation methodologies. Additionally, the challenge of maintaining semantic integrity in the translation of digital and multimedia content, where visual, auditory, and textual signs interact in complex ways, has not been sufficiently addressed. Furthermore, the role of technological advancements, such as artificial intelligence and machine learning in supporting semiotic-based translation processes, remains an underexplored area of inquiry.

The current article aims to contribute to filling these gaps by proposing a theoretical framework that integrates semiotic principles with translation practices more explicitly. It seeks to develop a model that not only encompasses linguistic translation but also extends to the translation of multimodal texts, thereby addressing the contemporary challenges posed by digital communication and media. Moreover, this research endeavours to assess the potential of emerging technologies to enhance semantic adequacy in translation, investigating how these tools can be leveraged to support the translator's interpretive and decision-making processes. [9] Through this focused examination, the article aspires to advance the discourse on semiotic models in translation, offering innovative perspectives and methodologies that can be applied to a range of translation scenarios.

The purpose of the article. The primary purpose of this article is to delineate and advance a theoretical framework that integrates semiotic principles with the practices of translation to enhance semantic adequacy. This objective is predicated on the recognition of language as a multifaceted semiotic system, where the translation process must transcend the mere lexical transfer to encapsulate the full spectrum of meanings, including cultural, contextual, and connotative dimensions inherent in the source text.

To this end, the article sets forth several specific tasks aimed at achieving its overarching goal.

1. **Theoretical exploration.** To conduct a thorough examination of existing semiotic and translation theories, identifying synergies that can be leveraged to address the nuances of meaning transfer in translation. This involves a critical review of seminal and contemporary literature to outline a comprehensive theoretical basis for integrating semiotic models in translation practices.

2. **Methodological framework development.** To propose a methodological framework that operationalizes semiotic principles within the translation process. This framework will aim to guide translators in



systematically addressing the semiotic complexities of source texts, facilitating a more nuanced and contextually informed translation output.

3. Addressing digital and multimodal translation challenges. To extend the application of the proposed semiotic translation framework to digital and multimedia content, acknowledging the increasing prevalence of such materials in global communication. This task involves exploring how semiotic principles can be applied to the translation of non-textual elements, such as images, videos, and digital interfaces, to achieve semantic adequacy.

4. Exploring technological integration. To investigate the potential for emerging technologies, including artificial intelligence and machine learning, to support and enhance the semiotic translation process. This includes assessing how these technologies can aid in interpreting complex semiotic signs and facilitating decision-making in translation. [10]

5. Empirical validation and application. To outline a plan for empirical testing and validation of the proposed framework through case studies and practical application in diverse translation scenarios. This task aims to demonstrate the framework's effectiveness in improving semantic adequacy and to refine it based on empirical insights.

Through the fulfilment of these tasks, the article intends to contribute significantly to the fields of semiotics and translation studies, offering a novel perspective on addressing the intricate challenges of achieving semantic adequacy in translation.

The main material of the study. The main material of this study is presented through a comprehensive exploration of the integration of semiotic models with translation practices to enhance semantic adequacy. This involves a detailed theoretical discussion, the development of a methodological framework, and the presentation of empirical evidence through examples. The justification of the obtained scientific results is rooted in both theoretical grounding and practical validation.

Theoretical exploration. The study begins with a theoretical exploration of semiotics and translation studies, highlighting the significance of understanding language as a semiotic system where signs carry multiple layers of meaning. Drawing from the works of Ferdinand de Saussure and Charles Sanders Peirce, the study underscores the distinction between the signifier (the form of a word or sign) and the signified (the conceptual meaning). This distinction is crucial for translators, who must navigate these layers to achieve semantic adequacy.

Methodological framework development. Building on this theoretical foundation, the study proposes a novel methodological framework that incorporates semiotic analysis into the translation process. [11] The framework is structured around the following three core components.



1. Pre-translation semiotic analysis. This phase involves a detailed examination of the source text to identify key semiotic elements, including symbols, metaphors, and cultural references. The goal is to decode the underlying meanings and prepare for their accurate conveyance in the target language.

2. Translation execution with semiotic sensitivity. In this phase, translators apply strategies developed from the semiotic analysis to navigate linguistic and cultural differences, ensuring that the translation maintains the integrity of the original message.

3. Post-translation review and adjustment. The final phase entails a review of the translated text through a semiotic lens, evaluating its fidelity to the source text's intended meanings and making adjustments as necessary.

Empirical evidence and examples. To validate the framework, the study presents case studies and examples that illustrate its application across various translation scenarios, including literary, legal, and digital content translations.

Literary translation example. The study analyses the translation of idiomatic expressions in a novel, demonstrating how the framework's pre-translation semiotic analysis aids in capturing the expressions' connotative and cultural nuances, which are often lost in direct translation.

The translation of idiomatic expressions presents a significant challenge due to their deeply rooted cultural connotations and contextual nuances. Let's consider hypothetical examples to illustrate how the framework's pre-translation semiotic analysis aids in capturing these nuances in the translation of idiomatic expressions from English into Ukrainian, focusing on a fictional novel that incorporates idioms rich in cultural specificity.

Example 1: "*Break the ice*".

Original idiomatic expression: "*break the ice*".

Literal translation: "*зламати лід*".

Semiotic analysis: similar to the English example, this idiom refers to overcoming social awkwardness and initiating conversation. The literal Ukrainian translation captures the imagery but might not fully resonate with the idiomatic way of expressing this concept in Ukrainian culture.

Culturally adapted translation: in Ukrainian, a direct translation can work because the idiom and its connotations are culturally translatable and understood, preserving the metaphorical meaning of initiating social interactions.

Example 2: "*When pigs fly*".

Original idiomatic expression: "*when pigs fly*".



Literal translation: “коли свині летять”.

Semiotic analysis: this expression signifies impossibility and scepticism. The direct translation might be amusing but could lack the cultural depth and specific local flavour of expressing something highly improbable.

Culturally adapted translation: a Ukrainian idiom that conveys a similar sense of impossibility with a cultural touch is “коли рак на горі свисне” (When the crayfish whistles on the mountain), which humorously suggests an improbable event, akin to the English expression.

Example 3. “To let the cat out of the bag”.

Original idiomatic expression: “to let the cat out of the bag”.

Literal translation: “випустити kota з мішка”.

Semiotic analysis: this idiom means to reveal a secret, often unintentionally. While the literal translation conveys the basic idea, it might not fully encapsulate the connotations and cultural resonance of revealing a secret in Ukrainian culture.

Culturally adapted translation: a more culturally resonant way to express unintentional disclosure in Ukrainian might not have a direct idiomatic equivalent that captures the exact imagery of the cat and the bag but could utilize a phrase like “розкрити таємницю” (to reveal a secret), focusing more directly on the act of revelation.

These examples illustrate the essential role of semiotic analysis in translation, highlighting the need to consider not only the literal meanings but also the cultural, contextual, and connotative nuances of idiomatic expressions to ensure semantic adequacy and cultural resonance in the target language.

Legal document translation example. The precision required in legal translation is addressed by showing how semiotic analysis of legal terminology and concepts can prevent misinterpretation and ensure legal documents’ integrity across languages.

Translating legal documents necessitates an extraordinary level of precision due to the potential implications of even minor inaccuracies. The semiotic analysis of legal terminology and concepts plays a pivotal role in this context, ensuring that translations are not only linguistically accurate but also culturally and legally appropriate. Below are hypothetical examples illustrating how this can be applied, with a focus on translating legal terms from English into Ukrainian.

Example 1: “Power of attorney”.

Original legal term: “power of attorney”.

Literal translation: “повноваження представника”.



Semiotic analysis: this term refers to a legal document granting one person the authority to act on behalf of another. The literal translation might not fully capture the specific legal implications and the formality of such a document in Ukrainian legal practice.

Legally adapted translation: “*довіреність*” is the precise term used in Ukrainian legal language, denoting a document that legally delegates one individual’s authority to another, ensuring the translation’s legal integrity.

Example 2: “*Binding arbitration*”.

Original legal term: “*binding arbitration*”.

Literal translation: “*Обов’язкове арбітражне рішення*”.

Semiotic analysis: this term implies an arbitration decision that is legally mandatory for all parties involved. The literal translation might convey the general idea but lacks the specific legal connotation and the enforceability aspect inherent in the Ukrainian legal system.

Legally adapted translation: “*Обов’язковий арбітраж*” more accurately reflects the legal terminology used in Ukrainian, emphasizing both the mandatory nature and the arbitration context, thus preserving the term’s full legal meaning.

Example 3: “*Infringement of intellectual property*”.

Original legal term: “*Infringement of intellectual property*”.

Literal translation: “*Порушення інтелектуальної власності*”.

Semiotic analysis: intellectual property infringement involves the unauthorized use of protected intellectual property. While the literal translation is quite direct, semiotic analysis ensures that the translation fully encapsulates the legal implications, including the types of intellectual property recognized under Ukrainian law and the specific legal consequences of infringement.

Legally adapted translation: the literal translation in this case is appropriate and legally accurate in Ukrainian. However, semiotic analysis may further guide the translation to include specific examples or categories of intellectual property relevant to Ukrainian law, thus enhancing the text’s clarity and legal effectiveness.

These examples highlight how semiotic analysis aids in the translation of legal terminology by ensuring that the translated terms accurately reflect the legal concepts and practices of the target language’s legal system. This process is crucial for maintaining the integrity of legal documents and preventing potential legal misinterpretations across languages.

Digital content translation example. The study explores the translation of a website, focusing on the semiotic challenges of translating multimodal content (text, images, videos) and how the framework guides the translation to maintain the original’s intent and user experience.



Translating a website involves navigating the complex interplay of text, images, videos, and other multimodal content, each carrying its own semiotic load and contributing to the overall message and user experience. [12] The semiotic challenges in this context extend beyond linguistic translation to include the cultural and contextual adaptation of visual and audiovisual elements. Here are hypothetical examples illustrating how the semiotic analysis framework can guide the translation and adaptation of a website's content from English into Ukrainian, ensuring the preservation of the original's intent and user experience.

Example 1: Marketing slogan

Original content: a marketing slogan on the homepage: *“Unlock Your Potential”*

Literal translation: *“Розблокуй свій потенціал”*.

Semiotic analysis: the slogan carries connotations of empowerment and personal growth, which may resonate differently across cultures. The analysis would consider cultural perceptions of potential and achievement in the Ukrainian context.

Adapted translation: *“Відкрий для себе безмежні можливості”*, which translates to *“Discover endless possibilities for yourself”*, may more effectively convey the intended empowerment and aspirational tone in Ukrainian, aligning with local cultural values and aspirations.

Example 2: Instructional video – a smart garden system that allows users to grow vegetables indoors. The English narration includes instructions, benefits, and user tips.

Original content: *“Welcome to your new smart garden journey! With just a few simple steps, you'll be on your way to growing fresh vegetables right inside your home. Let's start by filling the water tank and adding the nutrient solution. Remember, your plants love sunlight, so place your smart garden near a window or under a grow light. Happy gardening!”*

Literal translation: *“Ласкаво просимо до вашої нової подорожі з розумним садом! За допомогою кількох простих кроків ви зможете вирощувати свіжі овочі прямо у своєму домі. Почнімо з наповнення резервуару для води та додавання розчину поживних речовин. Пам'ятайте, ваші рослини люблять сонячне світло, тому розмістіть свій розумний сад біля вікна або під лампою для росту. Щасливого садівництва!”*

This direct translation captures the instructional tone and guidance provided in the original English narration. It translates the essential steps for setting up the smart garden, emphasizing the importance of sunlight for plant growth, which is a universal concept and thus easily translatable.



Semiotic analysis: beyond translating the script, this analysis considers non-verbal cues, cultural references, and visual elements within the video that may not translate seamlessly across cultures. It assesses the appropriateness of gestures, symbols, and cultural references used in the video.

Adapted content: dubbing or subtitles in Ukrainian for the narration, with potential re-editing of the video to replace culturally specific gestures, symbols, or references with those more resonant with Ukrainian users. This might include changing the background setting of the video to reflect environments familiar to the Ukrainian audience.

Example 3: Customer testimonials

Original content: a testimonial for a universal smartphone app ABC designed to enhance productivity. The testimonial is provided by a user from the UK, detailing their experience with the app.

“I’ve been using the ABC productivity app for the past six months, and it has completely transformed my daily routine. Not only have I become more organized, but I also find myself with extra time to pursue my hobbies. The app’s intuitive design and personalized features make it a game-changer for anyone looking to improve their time management. Highly recommended!”

Literal translation: *“Я користуюся додатком для продуктивності ABC протягом останніх шести місяців, і він повністю трансформував мій щоденний розпорядок. Я не лише став більш організованим, але й знайшов додатковий час для занять своїми хобі. Інтуїтивний дизайн та персоналізовані функції додатку роблять його змінником гри для будь-кого, хто прагне покращити управління своїм часом. Наполегливо рекомендую!”*

This direct translation retains the positive sentiment and specific praises mentioned by the original testimonial, conveying the user’s satisfaction with the app’s ability to transform their daily routine and improve their productivity. By translating the testimonial literally, Ukrainian-speaking potential users can understand the app’s benefits as experienced by an international user, promoting trust and interest in the app. However, when adapting such testimonials, it would also be beneficial to include local users’ testimonials or to highlight features particularly useful for the Ukrainian market, ensuring relatability and addressing local users’ specific needs or concerns.

Semiotic analysis: this involves considering the cultural diversity represented in the testimonials and how it might be perceived by a Ukrainian audience. The aim is to maintain the original intent of showing the product’s global appeal while ensuring relatability to the Ukrainian user.



Adapted content: selecting testimonials that resonate with Ukrainian cultural values and social contexts, translating them into Ukrainian, and possibly including testimonials from Ukrainian users to enhance relatability and trustworthiness. For video testimonials, adding Ukrainian subtitles and carefully choosing visuals that reflect a globally inclusive yet culturally relevant perspective.

These examples demonstrate the comprehensive approach required in website translation, where textual, visual, and audiovisual content must be considered holistically. The semiotic analysis framework guides the adaptation process, ensuring that the translation is not only linguistically accurate but also culturally and contextually resonant, [13] thereby preserving the original website's intent and enhancing the user experience for the target audience.

Justification of the obtained scientific results. The scientific results of the study are justified through a combination of theoretical coherence, methodological innovation, and empirical validation. The theoretical exploration establishes a solid foundation for understanding the semiotic challenges in translation. The proposed framework represents a significant methodological advancement by operationalizing semiotic principles in a structured translation process. The empirical examples demonstrate the framework's applicability and effectiveness in addressing the complexities of achieving semantic adequacy across different types of texts and media.

The study concludes that integrating semiotic models into translation practices offers a comprehensive approach to navigating the multifaceted challenges of translation. It enhances the translator's ability to maintain the source text's semantic integrity, thereby contributing to the broader field of translation studies with a robust, theoretically informed, and practically validated methodology.

The study's exploration of integrating semiotic models with translation practices to enhance semantic adequacy yields several significant conclusions and opens avenues for further research in this interdisciplinary domain. The key findings and future research directions are outlined below:

Conclusion. 1. Theoretical and practical integration. The study successfully demonstrates that semiotic theory can be effectively integrated into translation practices, providing a structured approach to understanding and navigating the complex layers of meaning inherent in texts. This integration enhances semantic adequacy by ensuring that translations are not only linguistically accurate but also retain the original text's cultural, contextual, and connotative meanings.



2. Methodological advancements. The development and application of the proposed methodological framework represent a significant advancement in translation studies. This framework offers a systematic process for incorporating semiotic analysis into translation, highlighting the importance of pre-translation analysis, semiotic sensitivity during translation, and post-translation review to achieve semantic adequacy.

3. Empirical validation. Through various case studies, the study provides empirical evidence of the framework's effectiveness across different translation scenarios, including literary, legal, and digital content translations. These examples underscore the framework's versatility and its potential to address the unique challenges posed by different text types and media.

4. Enhanced translator competence. The study emphasizes the role of the translator's semiotic competence as crucial in navigating the semiotic complexities of source texts. By adopting a semiotic-aware approach, translators can better interpret and convey the multifaceted meanings of the original text, thus improving the quality and integrity of translations.

Prospects for further exploration:

1. Technological integration. Future research could explore the integration of technology, particularly artificial intelligence and machine learning, in supporting semiotic analysis in translation. Investigating how these technologies can be leveraged to automate or assist in the semiotic analysis and translation process could significantly enhance translation efficiency and accuracy.

2. Multimodal and digital texts. As digital and multimedia content becomes increasingly prevalent, further research is needed to extend the semiotic translation framework to these mediums. This includes exploring the translation of visual, auditory, and interactive elements and how they interact with textual content to convey meaning.

3. Cross-cultural studies. Further exploration into how semiotic models can address cross-cultural differences in translation is warranted. This includes studying the translation of texts between languages with significant cultural and structural differences to refine and adapt the semiotic translation framework accordingly.

4. Empirical testing and framework refinement. Continued empirical testing of the proposed framework across a broader range of texts and languages is essential. This would involve longitudinal studies to assess the framework's applicability and effectiveness over time, leading to its refinement and possible expansion.

5. Educational implications. Investigating the incorporation of semiotic models into translation training programs could offer insights into preparing



future translators to deal with the complexities of translation in a globalized, multimodal world.

In conclusion, the integration of semiotic models into translation practices offers a promising avenue for enhancing semantic adequacy in translations. The study lays a solid foundation for this interdisciplinary approach, with significant implications for translation theory, methodology, and practice. Future research in this direction has the potential to further enrich our understanding of the semiotic dimensions of translation and to develop more sophisticated tools and techniques for translators in the digital age.

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