

## Effective Conveyance of Electrical Engineering Terminology on Instagram: A Study of English to Persian Hashtag Translation

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### Abstract

Self-translation of content and using hashtags within them are prevalent in social media, particularly on platforms such as Instagram. However, translating hashtags involves more than conveying their meaning; it requires preserving functionality and directing the target audience to an index with a similar function and size as that of the source term hashtag. The present study focuses on finding the best English-to-Persian translation strategy for technical electrical engineering terminology on Instagram. To achieve this, 300 technical terms were collected from different books and articles and then translated using four of Vinay and Darbelnet's (1998) translation strategies. The translated terms were then searched on Instagram as hashtags, and the most suitable translation strategy for each term was determined considering the rules of hashtag translation. Then, the percentage of applicability for each strategy was calculated. The results indicated that literal translation was the most appropriate strategy for 42% of the terms, followed by modulation at 28%, adaptation at 20%, and borrowing at 10%. These findings contribute to the field of social media translation and have implications for content creators in the field of electrical engineering.

**Keywords:** Electrical engineering; Hashtag translation; Instagram; Terminology; User Generated Content

### INTRODUCTION

Technical terminology is a type of language that is specialized for use in a specific field or industry. It encompasses a set of words, phrases, and concepts that are unique to that field and may not be commonly understood or used outside of it (Justeson & Katz, 1995). The language is typically precise and clear (Dowdall et al., 2002). The proliferation of the Internet and social media platforms has resulted in an abundance of content with specific terminology. Consequently, the significance of translation in facilitating knowledge transmission between diverse groups becomes increasingly evident. "Technical terms are difficult for translators because they are generally not as familiar with the subject domain as either the author of the

source text or the reader of the target text" (Dagan & Church, 1994).

The phrase "social media translation" is utilized to describe the act of translating content on various online social media platforms, which produces social opportunities specific to the online environment (Desjardins, 2019). Translation on Instagram can be accomplished in a few ways. One option is for the user to write their caption in one language and then provide a translation in the same caption or a subsequent comment. Some users might also use Instagram's built-in translation feature, which automatically translates captions and comments into the viewer's preferred language. Some other users opt to have their content translated or to undertake self-translation in order to extend the reach of their message to a more diverse audience. "Self-translation" is the process of translating one's

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own work from one language to another (Grutman & Van Bolderen, 2014). Although self-translation can be challenging due to the need for a deep understanding of both languages and their respective linguistic and cultural nuances, it also offers unique benefits, like ensuring that the intended meaning and tone of the original work are preserved.

The Web's hypertextual structure, with its use of hyperlinks to connect information, creates a network of interconnected pages that go beyond the linear format of books. This has significant implications for how we access, read, and translate information. The hypertextual structure of the Web has revolutionized our interaction with information, allowing us to quickly access vast knowledge and participate in user-generated content and collaborative knowledge-sharing. Reading on the Web involves rapid scanning, vertical movement, scrolling, and selecting hyperlinks to explore related content. Unlike traditional linear reading in books, the Web offers an infinite reading experience without a fixed starting or ending point or a predetermined reading path. These changes in reading patterns also impact translators, as they, too, are readers, and their approach to reading and translating texts is influenced by these new reading patterns (Pym, 2011).

As stated by Desjardins (2017), Instagram relies heavily on user-generated content, which typically comprises a photo or video along with a caption. The caption may be composed in natural language or may include Emoji or a combination thereof. It is not uncommon for social media users to use hashtags in their captions. A hashtag is a word or phrase preceded by the "#" symbol. They are beneficial for a brand as they can increase visibility, reach, and engagement (Rambukkana, 2015). Hashtags can be as simple as words or phrases or can be more complex, involving numbers, emojis, or special characters. Hashtags are commonly employed to index the content according to specific topics, thereby making it more discoverable to other users who may be interested in those topics. When users search for a specific hashtag, they are able to view all the public posts that have been tagged with that particular hashtag. This feature bears similarities to hypertext, as hashtags can redirect

users to other user-generated content (UGC), while simultaneously revealing other UGC posts that are indexed under the same hashtag. Using hashtags does not necessarily mean they match the content perfectly. This presents a theoretical challenge when it comes to the translation of hashtags, as it necessitates an understanding of the rationale behind the selection of certain hashtags over others and how they may connect seemingly unrelated UGC. A successful translation of a hashtag, therefore, must go beyond a mere translation of it and must also entail an adjustment of the indexing for the target audience. The translation of a hashtag can significantly impact the indexing of the translated post. This implies that translating a hashtag involves placing a post within a distinct set of posts, potentially affecting corporate or sponsored Instagram content by reducing views and engagement. To avoid problems, sponsored accounts may opt to share captions in the source and target languages or use hashtags sparingly. There is currently no universally accepted method for translating hashtags, as different professional practices exist. For instance, Library and Archives Canada translates hashtags in their tweets, ensuring relevance and popularity across both languages. Like many Canadian government departments, they maintain separate accounts for English and French content. To ensure equal engagement, they prioritize using popular hashtags in each language. Translating hashtags requires a focus on thematic and functional equivalence rather than strict word-for-word translation (Desjardins, 2017). Translators who work on similar OSM content must comprehend the connotations of hashtags and stay informed about popular topics with high indexing rates to provide viable solutions. The intentional use of hashtags is an effective strategy for expanding the reach of social media posts (Ma, 2012). Bilingual caption strategies that translate hashtags can be effective in indexing posts in both English and Persian social conversations, further increasing the reach of the content. Unfortunately, some translators who lack familiarity with social media and hashtag indexing either translate hashtags literally or ignore them entirely. This approach fails to recognize that

hashtags have broader meanings and can result in translations that miss the mark. The presence of poorly translated content on social media is defined as content that fails to effectively engage the target audience or has elicited negative feedback from viewers.

The primary objective of this study was to undertake an in-depth exploration of hashtag translation within the realm of social media, with a particular focus on the platform Instagram. The aim was to identify and recommend the most effective strategy for translating hashtags, specifically in the domain of electrical engineering. The outcomes of this research hold potential value for individuals who manage bilingual Instagram pages and seek to self-translate their content pertaining to electrical engineering.

The central question that motives this research is:

**RQ.** *Which translation strategy yields the most effective English-to-Persian translation of electrical engineering terminology hashtags on Instagram?*

The following section of the present research encompasses an examination of the related literature pertaining to the subject matter under investigation.

## LITERATURE REVIEW

There is a dearth of literature on the strategies for translating social media posts. However, Desjardins (2019) conducted research which was a preliminary theoretical investigation into social self-translation in online contexts, focusing on the real, the illusory, and the hyperreal aspects of this phenomenon. The author argued that the terms "crowdsourced translation," "social translation," and "user-generated translation" are not synonymous and that social self-translation is an important area for investigation, particularly in online and digital contexts. The article provided a taxonomy of different types of self-translation under the umbrella term of social self-translation and offers examples to illustrate these categories. The author suggested that examining social self-translation sheds light on how self-translation occurs online and can help scholars rethink the concepts of the "self" and the "social" in relation to translation studies.

Anselmi (2021) investigated the aims and strategies employed by self-translators. The study revealed that self-translators utilize various approaches, selecting strategies based on their objectives and the specific challenges of the text. These strategies include literal translation, adapting the text to the target language and culture, rewriting it for the target audience, interpolating new material, omitting certain parts, employing indirect translation to convey a more literary style, engaging in collaborative translation for enhanced accuracy and cultural sensitivity, and employing critical translation to question and challenge underlying assumptions. Self-translators employ these strategies to navigate the translation process effectively while considering linguistic fidelity, cultural adaptation, style, and personal perspectives.

Hamilton and Lavallée (2012) have identified several effective strategies for translating tweets. These include adapting the language and tone of the tweet to suit the target audience, maintaining brevity to fit within the character limit, using hashtags appropriately, translating idiomatic expressions accurately, preserving the tone and voice of the original tweet, considering cultural differences, and taking into account the context of the tweet. A successful translation of a tweet requires a nuanced approach that considers the specific limitations of the platform, the intended audience, and the original message. By employing suitable strategies, translators can produce translations that are both engaging and impactful on social media. However, their work had certain limitations in that it did not account for other significant factors involved in social media translation, such as the level of retweets, likes, engagement, and other metrics that are important for evaluating the effectiveness of the translation.

Carter et al. (2011) proposed a method for translating hashtags on Twitter, which took into account the plurality and variability of hashtags used by microbloggers for assigning posts to a topic. As microbloggers come from different backgrounds and express themselves in different languages, different translations of hashtags can lead to issues in content analysis. The proposed method was built on techniques from information retrieval and was source and target-

language independent. The authors began by discussing the importance of microblogging platforms such as Twitter as valuable real-time information resources for tracking various aspects of worldwide events, e.g., earthquakes, political elections, etc. They highlighted the use of hashtags as a shorthand convention adopted by microblog users to manually assign their posts to a wider corpus of messages on the same topic. However, as microbloggers come from different backgrounds and express themselves in different languages, there are different translations of hashtags that can possibly lead to issues in content analysis. To illustrate this issue, the authors provided an example where 33 men were trapped in a mining accident at the San José copper-gold mine in Chile, and Spanish-speaking people were referring to this topic using hashtags such as #33mineros, #rescate-mineros, #fuerzamineros, while English-speaking people used different hashtags such as #chilemine, #chileanminers, #minerescue. The authors maintained that this issue can introduce bias in the statistics which, ultimately, may not reflect the true underlying global topic distributions. They proposed a method that was robust, in that it could deal with the issues raised before. The method built on the translation of a hashtag "profile" and used the translation to retrieve microblog posts in the target language. From this set, the authors can extract hashtags that refer to the same topic as the original hashtag. The method is desirable, either instead of or complementary to the direct translation of the hashtag, for three reasons. First, it took into account the plurality and variability of hashtags used by microbloggers for assigning posts to a topic. Second, it accounted for the problem that microbloggers in different languages will refer to the same topic using different tokens. Finally, the method did not require special preprocessing of hashtags, reducing barriers to real-world implementation. In the experiments section, the authors tested their framework using the Spanish hashtag #33mineros as input, and they used Topsy to retrieve tweets on this topic. They then translated these tweets using the Google API and fed the translated text to their function. The result of this function was a list of terms that they could use as a query. From

the resulting hashtags, the authors concluded that almost all of them were suitable as a translation of the original hashtag (#33mineros). Just one of them was not.

In their seminal work, Ding et. al. (2012) introduced a novel approach for automatic hashtag recommendation in microblogs, employing a topic-specific translation model (TSTM). The proposed methodology seamlessly integrated the strengths of topic modeling and translation modeling to estimate the probabilities of word alignment between words and hashtags within specific topics. Initially, the approach identified topics for individual tweets and subsequently computed importance scores for potential hashtags based on the acquired topic-specific word alignment probabilities and topic distribution. Empirical evaluations conducted on a real-world microblogging dataset demonstrated that the proposed method surpassed several state-of-the-art techniques in terms of performance. The article provided an extensive introduction to the intricacies of hashtag recommendation in microblogs, emphasizing the significance of hashtags and their potential applications, while acknowledging the challenges involved in their recommendation. The proposed approach was hinged upon a topic-specific translation model that synergistically fused topic modeling and translation modeling. The authors meticulously expounded upon the intricacies of their model, elucidating the graphical model representation, notation employed, and the learning algorithm. The experimental setup and evaluation metrics were exhaustively detailed, with the experimental outcomes showcasing the superior performance of the proposed method in precision, recall, and F1 score metrics.

A study by Gotti et. Al. (2014) involved analyzing hashtags, layout, and translation in tweets posted by the Canadian government. They utilized an aligned bilingual corpus of 8758 tweet pairs in French and English, derived from 12 Canadian government agencies. The authors found that hashtags accounted for 6% to 8% of all tokens and exhibited a Zipfian distribution. Hashtags appeared in a tweet's prologue, text, or epilogue, with 80% of them being words prefixed with a pound sign (#).

Multiword hashtags were segmented using a simple algorithm. An analysis of 5000 hashtags revealed that 5% (French) to 18% (English) did not have a translation equivalent. The authors found that 80% of multiword hashtags were translated correctly, with incomplete translation directives being a possible cause of mistranslation for the remainder. The study demonstrated how the analysis of the corpus could guide the design and evaluation of a statistical machine translation pipeline. The authors found that a tweet-specific tokenizer produced promising results and that translating the epilogue, prologue, and text separately improved the system. While translating hashtags using alternatives such as a "dehashed" version or a segmented version of multi-word hashtags improved translation quality, it also reduced hashtag recall. The article concludes by pointing out the challenges associated with hashtag translation and its processing by natural language processing applications. The presented resources could help others understand hashtag occurrences and improve machine translation pipelines for such text.

## METHOD

Drawing upon a quantitative strand of research, the principal aim of this research is to ascertain the most effective strategy for translating hashtags in the context of electrical engineering on the Instagram platform. For doing so, the translation procedures proposed by Vinay and Darbelnet (1989) were used. Vinay and Darbelnet proposed seven translation procedures: borrowing, calque, literal translation, transposition, modulation, equivalence, and adaptation. They believed that if a literal or direct translation was not possible, the translator would need to use oblique translation, which is a form of free translation that allows for the translator's freedom to achieve equivalence.

The translation strategies proposed by Vinay and Darbelnet include:

1. Borrowing is commonly utilized when there are new or unfamiliar technical concepts in order to bridge a metalinguistic gap. It is a straightforward method of translation that introduces elements from the source language, often for stylistic purposes, which can have an impact on the message conveyed.

2. Calque is a specific type of borrowing where an expression is borrowed from another language, but each element is translated literally. This can result in a lexical calque that maintains the target language's syntactic structure while introducing a new mode of expression.

3. Literal translation involves directly transferring the source text into a target text that is grammatically and idiomatically appropriate. However, when there are structural and metalinguistic differences between languages, achieving certain stylistic effects may require more complex methods to convey the source text's meaning. These oblique translation procedures, although they may seem sophisticated or unusual, allow translators to maintain strict control over the reliability of their efforts.

4. Transposition is a procedure in which a one-word class is replaced with another class without altering the message. There are two types of transposition: obligatory transposition, which occurs when the target language has no other options due to its language system, and optional transposition.

5. Modulation involves varying the language by changing the point of view. This change can be justified, whether it is literal or transposed. It is often used to emphasize meaning, enhance coherence, or achieve a natural form in the target language.

6. Equivalence refers to the translator's use of an entirely different structure with a different meaning from that of the source language text, as long as it is appropriate in the communicative situation and equivalent to the source text.

7. Adaptation represents the extreme limit of translation, used when the translator needs to create a new situation that can be considered equivalent to the source text. It is employed in cases where a high degree of creativity is required to achieve equivalence.

The aforementioned techniques of Vinay and Darbelnet are typically employed for the translation of entire texts. In a pilot study, several terminologies were translated using various strategies outlined in the framework. Online dictionaries and books were consulted to find translations with these strategies. The translated terminologies were then checked using hashtags, revealing that not all strategies were

effective. Many translated terms yielded no posts when searched as hashtags. As a result, the study focused on four strategies that produced the best outcomes: Literal Translation, Borrowing, Modulation, and Adaptation. These strategies were selected for further investigation in subsequent research steps.

The literal translation of technical terms offers advantages such as accuracy, consistency, recognition, nuance preservation, clarity, and efficiency. It ensures precise and unambiguous translation, establishes consistent terminology, helps experts recognize and associate terms, preserves nuances, and enhances clarity and accessibility.

Borrowing is an effective translation strategy used in academic disciplines, particularly in fields like electrical engineering with specialized technical terms. It involves representing the sounds of the original text using characters from the target writing system. Borrowing is employed when preserving the original spelling or pronunciation of a word is important. In electrical engineering, which includes symbols and jargon specific to different languages, borrowing helps convert technical terms into their equivalents in the target language, ensuring accuracy and consistency. For example, the Greek letter "omega" ( $\Omega$ ) represents the unit of electrical resistance known as the "ohm." In translation, Borrowing would use the English letter "O" to convey the same technical meaning. This strategy is also applied to non-Latin characters in languages like Chinese or Arabic. Borrowing is a valuable tool for effective communication and understanding in academic contexts, and it is included as a strategy for translating technical electrical engineering term hashtags.

The modulation strategy involves a change in perspective or approach to translating terms. This can be achieved through various techniques, such as generalizing or providing more specific equivalents, translating a part of something to another part, or even changing symbols.

In the adaptation strategy, translators have more flexibility and freedom in the translation process. They can add additional elements to the translation units or make other adjustments to ensure a better fit with the target language.

This allows for a more dynamic and creative approach to translation, enabling the translator to effectively convey the intended meaning while adapting to the linguistic and cultural nuances of the target language.

### Data collection

After gaining familiarity with the rules governing social media, particularly in relation to hashtag translation, the researchers proceeded to carefully curate a collection of 300 specialized electrical engineering terms from reputable articles and books. The selection process involved a combination of random and manual selection from commonly taught books and articles in undergraduate, graduate, and doctoral programs at six universities in Iran, including three universities in Tehran, one in Kerman, and one in Mashhad. To identify the most common terminology, the researchers consulted with students and professors from these universities, seeking recommendations for frequently used books and articles. During the selection process, attention was given to avoiding terminologies consisting of more than three words, with a preference for single-word terminologies. This consideration was due to the fact that terminologies with fewer words are more likely to be found within hashtags.

Subsequently, the researchers created 300 charts, with each chart dedicated to a specific term. Within each chart, the various translation strategies, namely literal translation, borrowing, modulation, and adaptation, were allocated a row. Each term was then translated four times, according to the four aforementioned strategies. The researchers meticulously recorded and examined the number of hashtags associated with each English term on the Instagram platform. In instances where a specific translation strategy resulted in a peculiar or divergent index of Instagram posts, the researchers endeavored to modify the translation or explore alternative strategies. If an alternative was not feasible, the translation was deemed unacceptable, as one of the prerequisites for hashtag translation necessitated leading the audience to an index with conceptually similar content, rather than a disparate one. The number of hashtags for each translated term was likewise recorded within

the corresponding cells of the chart. Subsequently, the most suitable translation strategy was determined and marked with a check mark, employing the aforementioned rules of hashtag translation as a guiding criterion. This comprehensive process was repeated for all 300 terms.

The recorded hashtag counts informed the conclusions and contributed to the overall findings in several ways, enhancing the transparency of the research. Here are the key roles played by the recorded data:

1. **Popularity Assessment:** By examining the number of hashtags associated with each English term, the researchers were able to gauge the popularity and frequency of these terms on Instagram. This information provided valuable insights into the visibility and engagement of specific technical terms within the platform.

2. **Effectiveness of Translation Strategies:** The recorded data on hashtag counts for each translated term allowed the researchers to evaluate the effectiveness of different translation strategies. They could analyze which strategy resulted in terms that were more widely used or recognized on Instagram, providing insights into the most effective approach.

3. **Validation of Translation Choices:** The examination of hashtag counts served as a validation metric for the chosen translation strategy. Consistently higher hashtag counts for terms translated using a particular strategy indicated its effectiveness in the context of Instagram.

4. **Insights into User Engagement:** The number of hashtags associated with each term provided insights into user engagement. Terms with a higher number of hashtags suggested greater user interaction or interest, influencing the determination of the most suitable translation

strategy that would resonate with the Instagram community.

5. **Correlation with Technical Content:** Analyzing the hashtag counts allowed researchers to correlate the popularity of terms on Instagram with their technical content. This correlation was crucial in ensuring that the chosen translation strategy aligned not only linguistically but also contextually with the technical subject matter, providing a comprehensive and accurate translation.

6. **Data-Driven Conclusions:** The meticulous recording and examination of hashtag counts contributed to data-driven conclusions. By drawing insights and making informed decisions based on the quantitative data obtained from Instagram, the researchers could derive meaningful conclusions regarding the most effective translation strategy for technical terms on the platform.

7. In order to facilitate comprehension for readers, the authors supplemented the article with a figure that visually represented the findings.

### Data Analysis

A total of 300 terms were scrutinized, out of which 20 examples are presented here to provide a glimpse into the entire corpus.

Three symbols were commonly used to indicate numerical values. the notation "+" indicates a number greater than the specified number, typically denoted as a positive increment (e.g., +100). Conversely, the symbol "-" denotes a number smaller than the stated number, representing a negative decrement. Additionally, the letter "K" is used as a shorthand to represent one thousand.

**Table 1**

**Energy hub: +1000 posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	قطب انرژی	منبع انرژی مرکب	هاب انرژی	منبع انرژی
Index volume	-100	+100	-100	+1000
Best strategy				☑

**Table 2***Demand response: +1000 posts*

	<b>Literal</b>	<b>Modulation</b>	<b>Borrowing</b>	<b>Adaptation</b>
Translation	پاسخگویی بار	تعامل بار	دیمند ریسپانس	هوشمند سازی
Index volume	-100	0	0	130K
Best strategy	<input checked="" type="checkbox"/>			

**Table 3***Generate: 55K posts*

	<b>Literal</b>	<b>Modulation</b>	<b>Borrowing</b>	<b>Adaptation</b>
Translation	تولید	مصرف نیرو	جنریت	نیروگاه
Index volume	863k	-100	+100	11k
Best strategy				<input checked="" type="checkbox"/>

**Table 4***Decentralized method: -100 posts*

	<b>Literal</b>	<b>Modulation</b>	<b>Borrowing</b>	<b>Adaptation</b>
Translation	روش نامتمرکز	روش متمرکز	دیسنترالایزد متود	خودمختاری
Index volume	0	-100	0	+1000
Best strategy		<input checked="" type="checkbox"/>		

**Table 5***Photovoltaic: 303K posts*

	<b>Literal</b>	<b>Modulation</b>	<b>Borrowing</b>	<b>Adaptation</b>
Translation	نیروزی نوری	نیروزا	فتوولتائیک	پنل خورشیدی
Index volume	0	+1000	+1000	36.5k
Best strategy				<input checked="" type="checkbox"/>

**Table 6***Load control: +1000 posts*

	<b>Literal</b>	<b>Modulation</b>	<b>Borrowing</b>	<b>Adaptation</b>
Translation	کنترل بار	کنترل تقاضا	لود کنترل	بهینه سازی مصرف
Index volume	+1000	-100	-100	+100
Best strategy	<input checked="" type="checkbox"/>			

**Table 7***Distribution Generation: -100 posts*

	<b>Literal</b>	<b>Modulation</b>	<b>Borrowing</b>	<b>Adaptation</b>
Translation	تولید پراکنده	تولید متمرکز	دیسنتریبیوشن جنریشن	توربین بادی
Index volume	-100	-100	-100	+5K
Best strategy	<input checked="" type="checkbox"/>			

**Table 8****Power Factor: +100 posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	ضریب توان	توان ظاهری	پاور فکتور	فاکتور توان
Index volume	+100	-100	-100	-100
Best strategy	<input checked="" type="checkbox"/>			

**Table 9****Capacitor: 106K posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	خازن	باتری	کاپاسیٹور	برق گنجان
Index volume	50.5K	167K	-100	0
Best strategy		<input checked="" type="checkbox"/>		

**Table 10****Converter: 63K posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	میدل	برگردارنده	کانورٹر	الت تبدیل
Index volume	28K	-100	+1000	0
Best strategy	<input checked="" type="checkbox"/>			

**Table 11****Peak shaving: +100 posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	اصلاح پیک	کاهش مصرف	پیک شیوینگ	مدیریت مصرف
Index volume	-100	+1000	0	+1000
Best strategy	<input checked="" type="checkbox"/>			

**Table 12****Impedance: +1000 posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	جلوگیری رهنندی	مقاومت مرکب	امپدانس	مقاومت صوری
Index volume	41.9 K1	0	+500	0
Best strategy			<input checked="" type="checkbox"/>	

Note. In the majority of posts, the term "جلوگیری" is utilized with a different connotation, rendering it an unsuitable equivalent for the intended meaning of the studied hashtag. Consequently, its use as a translation for this hashtag would fail to guide the reader to the same conceptual index, thereby obstructing their comprehension of the intended meaning.

**Table 13****Power plant: 5K posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	نیروگاه	نیروگاه سیکل ترکیبی	پاور پلنت	منبع انرژی
Index volume	67K	5K	-100	2K
Best strategy		<input checked="" type="checkbox"/>		

**Table 14***Detuning: -1000 posts*

	Literal	Modulation	Borrowing	Adaptation
Translation	کاهش قدرت	ترانس کاهشده	دیتونینگ	افزایش قدرت
Index volume	-100	+100	0	7K
Best strategy		<input checked="" type="checkbox"/>		

**Table 15***Voltage source: +100 posts*

	Literal	Modulation	Borrowing	Adaptation
Translation	منبع ولتاژ	نیروگاه	ولتاژ سورس	شبکه قدرت
Index volume	-100	67K	0	+100
Best strategy				<input checked="" type="checkbox"/>

**Table 16***Polycrystalline: 3K posts*

	Literal	Modulation	Borrowing	Adaptation
Translation	چند بلوره چند بلوری	پنل خورشیدی	پلی کریستال	ریز شبکه
Index volume	0	36K	-1000	-100
Best strategy			<input checked="" type="checkbox"/>	

**Table 17***Latch up: -100 posts*

	Literal	Modulation	Borrowing	Adaptation
Translation	قفل شدگی	اتصال کوتاه	لچاپ	مدار مجتمع
Index volume	-100	4K	0	-1000
Best strategy	<input checked="" type="checkbox"/>			

**Table 18***Arrester: 3K posts*

	Literal	Modulation	Borrowing	Adaptation
Translation	برقگیر	مقره	ارستر	زمین کردن
Index volume	+3K	+4k	+1 k	-100
Best strategy	<input checked="" type="checkbox"/>			

**Table 19***Guard ring: +2K posts*

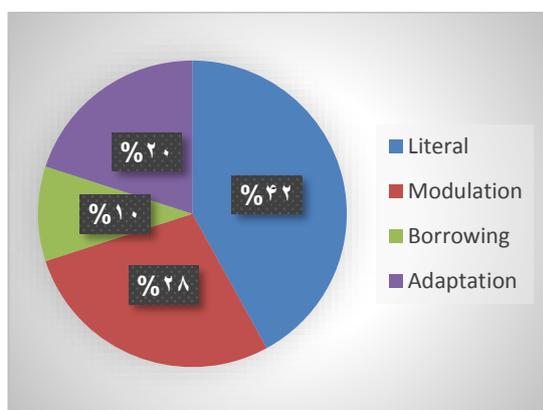
	Literal	Modulation	Borrowing	Adaptation
Translation	حلقه محافظتی	لامپ الکترونیکی	گارد رینگ	میدان الکترونیکی
Index volume	-100	-100	-100	1000
Best strategy				<input checked="" type="checkbox"/>

**Table 20**  
**Power loss: 2K posts**

	Literal	Modulation	Borrowing	Adaptation
Translation	تلفات توان	کمبود انرژی	پاور لاس	انتقال توان
Index volume	-100	-1000	0	-100
Best strategy		<input checked="" type="checkbox"/>		

## Results

Upon the careful selection of technical terms, they were subjected to translation procedures employing the aforementioned strategies. Subsequent to the translation process, the transformed terms were converted into hashtags for further analysis. A meticulous search was undertaken, delving into the realm of translated hashtags prevalent on the Instagram platform. The primary objective of this exercise was to assess the degree of usability associated with each translation strategy, thereby discerning the specific contexts in which they exhibited optimal efficacy. The results of this investigation suggest that out of the 300 terms subjected to analysis, Literal translation emerged as the most suitable strategy for 126 terms, while Modulation proved effective for 84 terms. Borrowing, on the other hand, proved to be the optimal course of action for 30 terms, while Adaptation was deemed the most appropriate approach for 60 terms. Consequently, it can be deduced that Literal translation constituted 42% of the cases, with Modulation accounting for 28%. Borrowing was found to be applicable in 10% of the cases, while Adaptation prevailed in 20% of the instances. For a more comprehensive and coherent understanding of these findings Figure 1 is provided below.



**Figure 1**  
**Frequency of each Strategy**

## DISCUSSION

Effective conveyance of technical terminology on Instagram presents unique challenges and opportunities in the realm of translation and hashtag usage. Technical terminology plays a crucial role in facilitating communication among professionals in the industry, allowing for the exchange of ideas and information. With the proliferation of the Internet and social media platforms, translation has become increasingly significant in facilitating knowledge transmission between diverse linguistic backgrounds. Instagram offers various options for translation, including user-provided translations within captions or comments and the platform's built-in translation feature powered by machine learning technology. These translation options have enabled cross-cultural communication, expanding the reach of businesses and individuals to new audiences. Hashtags play a vital role in categorizing and discovering content on social media platforms, including Instagram. They enhance visibility, engagement, and identity for brands and individuals. However, translating or adapting hashtags for bilingual communication requires careful consideration of cultural differences to avoid misinterpretations. Hashtags, similar to hypertext, connect user-generated content, enabling diverse interpretations and connotations. Translating hashtags also involves adjusting indexing for the target audience. It requires a new perspective on equivalence, focusing on thematic similarity and functional indexing rather than formal equivalence. A successful translation considers the popularity and indexing rates of topics to ensure engagement and relevance. Translators working on social media content must understand the connotations of hashtags and stay informed about popular topics to provide viable solutions. According to the study findings, it was observed that among the 300 terms analyzed, Literal translation was

identified as the most appropriate strategy for 126 terms, while Modulation was found to be effective for 84 terms. Additionally, Borrowing was deemed suitable for 30 terms, and Adaptation was considered the optimal approach for 60 terms. As a result, it can be concluded that Literal translation represented 42% of the cases, with Modulation accounting for 28%. Adaptation prevailed in 20% of the instances and Borrowing was applicable in 10% of the cases. Some of the strategies employed in this study align with the self-translation techniques discussed by Anselmi (2021). However, it is worth noting that the terminology used to describe these strategies differed. This observation emphasizes the need for a comprehensive understanding of the various translation methodologies employed across different contexts. Gotti et. al. (2014) found that 80% of multiword hashtags in tweets from Canadian government agencies were accurately translated and incomplete translation directives led to mistranslation in some cases. This highlights the importance of carefully managing hashtag content and translation strategies for social media which was the main focus of the present study. In a related study conducted by Carter et. al. (2011), the authors shed light on the use of hashtags as a shorthand convention adopted by microblog users. This practice allows individuals to categorize their posts within a broader corpus of messages on the same topic, particularly on platforms like Twitter. Remarkably, this phenomenon extends to other social media platforms such as Instagram. As highlighted by Hamilton and Lavallée (2012), brevity is a crucial factor to consider when translating tweets, as the character limit serves as a constraint. Similarly, this principle extends to the translation of hashtags on Instagram, where longer hashtags often correspond to a narrower scope of relevance. Furthermore, they emphasized the significance of using appropriate hashtags within translations. This aspect plays a pivotal role in ensuring accurate categorization and effective communication within the target audience.

## **CONCLUSION**

Translation of hashtags plays a crucial role in facilitating knowledge transmission and promoting

intercultural exchange on social media platforms like Instagram. By translating hashtags from English to Persian, users can bridge linguistic barriers and connect with individuals from diverse linguistic backgrounds, thereby expanding their reach and fostering a sense of inclusivity. Investigations have highlighted the significance of hashtags as powerful tools for categorizing user-generated content and enabling users to discover and share relevant posts. One important aspect discussed was the challenge of translating hashtags accurately. The translation process goes beyond a mere translation of the signifier or signified and requires an understanding of the rationale behind the selection of certain hashtags over others. Translators must consider the target audience when translating hashtags to ensure they effectively index the translated posts. Failure to do so may result in a mismatch between the content and the translated hashtag, potentially impacting views and engagement. Overall, effectively conveying technical electrical engineering terminology on Instagram requires a deep understanding of both languages, technical nuances, and the dynamics of social media platforms. By employing best practices in translation and hashtag usage, professionals can bridge linguistic barriers, promote technical exchange, and foster mutual understanding in the digital age.

The investigation examined 300 terms and identified suitable translation strategies. Literal translation emerged as the most fitting strategy. While Borrowing and Transliteration are commonly used for translating technical terms into Persian, they were not as effective, particularly for compound nouns and terms. Modulation and Adaptation also proved useful in certain cases. These findings challenge the prevailing assumption about the most effective translation strategies for technical terms in Persian and shed light on the complexities involved in hashtag translation.

While the study provided valuable insights into the translation of technical electrical engineering terminology on Instagram, there were certain limitations to consider. The research focused specifically on the translation of English hashtags into Persian, and the findings may not be generalizable to other language pairs or technical fields. On the other hand, it is

important to note that the number of hashtags used and their popularity can vary over time.

The findings of this study reflect the specific period during which the data was collected and analyzed. As social media trends and user preferences evolve, the number of hashtags being used and their corresponding index volume may change. Therefore, it is essential to consider the dynamic nature of social media platforms like Instagram and acknowledge that the results obtained in this study may not remain static. Future research could explore the translation of hashtags in different languages and examine the impact of translations on engagement and audience reach.

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