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**Artificial Intelligence and Technology  
Implementation in Teaching Translation in  
Universities.**

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Submitted by

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## “Artificial Intelligence and Technology Implementation in Teaching Translation in Universities.”

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**ABSTRACT:** As a field of study within in-class context, translation has always been profoundly subjected to language learning and teaching strategies. With the integration of technology into language learning in general and the translation industry in particular, translation methodologies and practices have witnessed significant developments to cope with the required level of competence demanded by market. Since then, the question of “How can university students majored in translation master translation competence?” has been a topic of debate. For quite some time, students have been receiving Traditional Translation Teaching (TTT) approaches; within the usual classroom settings. However, they had to seek the required translation training and knowledge about Computer Aided Translation (CAT) tools, Machine Translation (MT), and Neural Machine Translation (NMT) from actual localization and interpretation providers. But with the emergence of human-machine interactive models such as ChatGPT, Artificial Intelligence has become a prominent method for Generating Content (AIGC). The present study aims at investigating the best teaching methods and curriculum designs to help educators embed such technologies in teaching translation. Also, it sheds light on the necessity of Teaching Translation With Technology (TTWT) in universities’ classrooms for students to develop the required translation competence.

**Keywords:** Teaching translation, translation technologies, AI, translation competence, machine translation.

### توظيف الذكاء الاصطناعي والتكنولوجيا في تدريس الترجمة بالجامعات

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ملخص : يشهد العالم في سنواته الأخيرة ثورة تكنولوجية كبيرة ظهرت آثارها بقوة في قطاع التعليم عامة وتدريس اللغات خاصة. ونظرا لارتباط تدريس الترجمة بتدريس اللغات، أصبح تدريس الترجمة بالجامعات يواجه تحديات كبيرة بالنظر إلى هذه التطورات التكنولوجية خاصة الذكاء الاصطناعي، وينبغي مراعاة هذا في تدريس الترجمة حتى يكون المحتوى المقدم للطلاب مفيدا ومواكبا للتغيرات التكنولوجية وبالتالي سوق العمل المتقلب بشدة. لذا بات من الضروري تدريس مواد الترجمة بشكل نظري وتطبيقي حتى يتعلم الطلاب المهارات المطلوبة ويتثنى لهم فهم جدوى العنصر البشري ومدى أهميته في عصر الذكاء الاصطناعي والترجمة الآلية والايها وبرمجياتها. ومن هذا المنطلق اصبحت هناك ضرورة قصوى لدمج أحدث التكنولوجيات في عملية تعليم الطلاب من أجل تزويدهم بالمعرفة التقنية المطلوبة والعمل على المامهم بكافة الأدوات وبرامج الذكاء الاصطناعي من أجل تعزيز كفاءتهم كترجمين محترفين. ومن هنا انطلقت هذه الدراسة لتحري أفضل وأنجع سبل لتوظيف أحدث التكنولوجيات والذكاء الاصطناعي من أجل دمجهم في مناهج وطرق تدريس الترجمة بالجامعات للعمل على إعداد كوادر طلابية تحظى بمستوى عال من الاحترافية والكفاءة للمنافسة في سوق العمل.

الكلمات المفتاحية: تدريس الترجمة، تكنولوجيات الترجمة، الذكاء الاصطناعي، كفاءة الترجمة، الترجمة الآلية.

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## 1. Introduction

The present study aims at investigating the implementation of AI and technology in translation education in Egyptian universities and higher institutes. It examines the best teaching methodologies that can allow educators integrate translation technologies into their translation classrooms. The researcher uses the term *translation technologies* to refer to: Computer Aided Translation (CAT) tools, Machine Translation (MT), Neural Machine Translation (NMT), human-machine interactive models such as ChatGPT, and Artificial Intelligence Generating Content (AIGC) such as Gemini. The present study provides an extensively comprehensive discussion on the relation between Translation Competence (TC) and Teaching Translation with Technology (TTWT). Also, she argues that implementing Translation Technologies in translation education crucially relies on joint collaboration between both; Languages and Translation Institutes, and Computers and Artificial Intelligence Institutes.

### 1.1 Context of the Study

Spanning the past few decades, AI and technology have been playing a crucial instrumental role within the field of translation. Their impact has spread to an extraordinary prime highpoint; that requires meticulous assessment and evaluation of translation education, as an integral aspect to mainly assist translators reach the required level of competence; demanded by market. According to Kiraly (2000):

Translator competence does not primarily refer to knowing the correct translation for words, sentences or even texts. It does entail being able to use tools and information to create communicatively successful texts that are accepted as good translations within the community concerned.

(Kiraly, 2000, p.13)

A substantial need for a qualified generation of competent translators is arising out of the ever-growing demand for translation services. And with the emergence of AI and technology into the translation industry, translation technologies' training has become a rapidly growing field of interest. For quite some time, traditional methodologies of teaching translation has been applied in classrooms. Unfortunately, that has not helped in meeting the translation market demanded requirements. Consequently, this has allowed translation services providers to offer fresh graduates unpaid job training vacancies; in exchange for a translation technologies training expertise. Upon

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such circumstances, integrating AI and technology into teaching translation for students specialized in languages and translation has become an essential in-class teaching methodology.

The present study applies a Miscellaneous Approach within a Project-Based Monitor Comparable Corpora; to further discuss the integration of translation technologies in university classrooms on translators' professional competence.

## **1.2 Objectives of the Study**

The present study investigates the impact of in-class teaching translation with technology on students' translation competence and to what extent this would feed into their development and acquisition of translators' competence. The present study adopts a monitor corpora to assess and evaluate the accuracy and precision of students' translations, before and after using the many AI and translation technologies in order to:

- First; investigate the most reliable artificial intelligent translation technologies.
- Second; examine the best teaching methodologies to help educators embed such technologies.
- Third; shed light on the effectiveness of teaching translation with technology (TTWT) in universities.

## **1.3 Research Questions**

This research attempts to answer one major question with two subsidiary ones:

- To what extent can Teaching Translation with Technology (TTWT) in universities affect students' translation competence?
  - a) What are the most reliable artificial intelligent translation technologies for teaching translation with technology in universities?
  - b) What are the most effective teaching methods and curriculum designs for teaching translation with technology in universities?

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## 1.4 Significance of the Study

Evidence based upon previous research merely addresses the relation between teaching translation with technology and students' translation competence, from an empirical perspective. Rather, they previewes its literature from a theoretical point of view without suggesting any skill instantly related to the market. (e.g. Bell, 1991; Schaffner, 2000; Rydning, 2002) Also, translation education and training has not always been subjected to the markets' required competence. (Kiraly, 2005) Hence, the present study is intended as an attempt to bridge the gaps between translation education and the market's required skills by employing a Miscellaneous Approach within a Project-Based Monitor Corpora to analyze translation products and translators' performance.

## 2. Literature Review

This section reviews the literature that deals with the notions of translation competence in relation to teaching translation with technologies in classrooms. Many studies highlight the significance of translation competence and its role in developing translators' performance. Yet, few of them discuss the translation technologies competence required by the market.

### 2.1 Translation Competence

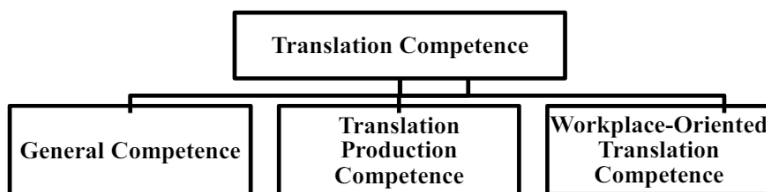
Chomsky (1965) is the first linguist to draw a distinction between competence and performance. He believes that competence is the system of linguistic knowledge, while performance is how the language system is applied in communication. On one hand, Baker (1992) explains that a competent translator must have knowledge about the semantics and lexical rules of the source language. On the other hand, Madkour (2018) refers to cultural competence as the awareness that develops out of the experience of culture (Madkour, 2018, p. 99).

Schaffner (2000) explains translation competence in terms of performance. She defines it as "a complex notion which involves an awareness of and conscious reflection on all the relevant factors for the production of a target text (TT) that appropriately fulfills its specified function for its target addressees" (p. 146). EMT (2009) defines translation competence as "the combination of aptitudes, knowledge, behavior, and know-how necessary to carry out a given task under given conditions. This

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combination is recognized and legitimized by a responsible authority (institution, expert)” (p. 3).

### 2.1.1 Model of Translation Competence



*Figure 1.* Translation Competence

Ali (2017) suggests the above Comprehensive Model of Translation Competence. In his model he explains that the general competence includes linguistic and intercultural competence, ability to use all kinds of resources, specialist knowledge, and general background knowledge (of the source text). While the Translation Production Competence tends to include skill to perform language transfer, capability to bargain collectively with different texts, and full awareness of the many translation theories and issues. To have a career and reputation of a competent professional translator in the industry, one needs the workplace-oriented translation competence. It has to do with the level of professionalism a translator possess. For example, satisfaction of their clients. Ali adds that these three competences are inseparably overlapping for any translation and translator.

### 2.2 Translation Technologies Competence

Most literature found on the translation technologies is related to learners’ attitudes towards such technologies. Others investigate to what extent the curricula of translation programs in Arabic-speaking countries could meet the job market requirements. (Al-Batineh & Bilali, 2017) Although integrating AI and technologies into translation pedagogy is considered one of the recent methodologies in translation education, no evidence on research addressing its training and practices in the Arab world translation classrooms in general, nor in Egyptian translation classrooms in particular, is found.

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### 2.3 Teaching Translation With Technology

Previous research on teaching translation with technology has shed light on several teaching methodologies, curriculum designs, and the integration of AI-based translation technologies into the university translation classrooms. The main outcome of such investigations highlights the potential benefits and the predicted obstacles of implementing technology in translation instruction. Despite the gap in the literature found on teaching translation with technology, there is a few evidence regarding the opinions of AI experts and language educators on how to integrate technology improvements into the translation curricula (khasawneh, 2022c). Previous studies have primarily focused on design principles for curricula, instructional strategies, and conceptual frameworks (Huet et al., 2019). Earlier investigations on TTWT provide insightful data, however they inadequately ignore the attitudes, assessments, evaluations, and involvement of the field's specialists and educators, who play the role of thump in the process of designing and applying the translation teaching curricula. Understanding AI capabilities and technology developments in the translation industry; cannot be perceived without professionals' thoughts and experiences. Moreover, language educators have the required knowledge and the needed expertise when it comes to the pedagogical, instructional, and practical issues that arise when AI and technology are integrated into a teaching translation curriculum. Since implementing AI and technology in teaching translation curricula is a bit new in-class methodology in universities, there aren't many empirical research that investigates the various viewpoints of translation services providers, nor its professionals. To enhance and develop both; students' translation competence, and technology competence, teaching translation curricula have to get improved by incorporating all the needed AI and translation technologies tools. Language educators and computer AI specialists must collaborate and cooperate in creating a more developed curricula for integrating technology into translation teaching programs.

### 3. Methodology

This section deals with sources of data, how data is selected for the study, and the procedures of data analysis. Moreover, it provides the research methods adopted and the reasons behind choosing them.

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### 3.1 Theoretical Background

In the present study, a Comparable Corpus is adopted within a Project-Based Translation Training following a miscellaneous approach to help researcher assess and evaluate students' performance development. A comprehensive bilingual corpus from both English to Arabic, and Arabic to English, is built within a TTWT curricula. The researcher believes that incorporating corpus-based translation teaching methodologies within a teaching translation with technology curriculum tends to allow translation students to develop the market's required competence.

#### 3.1.1 Corpora in Translation Studies

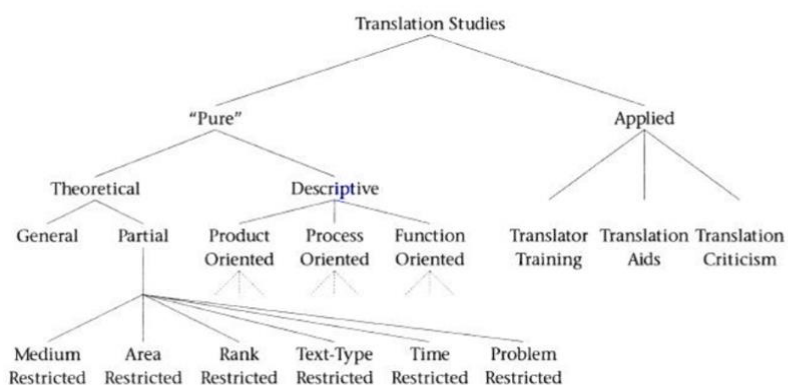


Figure. 2 The Holmes-Toury map of translation studies (Toury, 1995, p. 10)

Corpus-based translation studies allows for a justified explanatory comparisons between source texts (ST) and target texts (TT). Corpora in translation research usually involves a precisely accurate methodology with a set of comprehensive design criteria (KreinKühle, 2003), it offers a better contextualized and controlled set of the texts to be investigated and provides accredited generalizations and reliable research findings. Corpus-based translation research sets out to identify the distinctive features of the final product, not by comparing TT to their ST, but rather to arbitrate texts in the target language. The main concern here is based upon the identification and examination of the so-called “universals of translation,” which are defined as “linguistic features which typically occur in translated texts and are thought to be the almost inevitable by-products of the process of mediating between two languages” (Laviosa, 2002, p. 43).

Corpora have always been adopted in translation research. In the early 1990s, its main focus were on examining professional translations to investigate translation



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universals, style, and language features. Number of studies tended to extract parallel data from non-parallel resources, mainly comparable corpora of data (Fung and Cheung, 2004; Hewavitharana and Vogel, 2011; Smith et al. 2010; Stefanescu et al. 2012). In the case of Arabic, most corpus-based studies such as The Translational English Corpus (Baker 1993, 1999) and the Information Technology Translational Arabic Corpus (Izwaini 2003) have been on multilingual corpora in which Arabic was one of the languages available.

Few English–Arabic parallel corpora are available that deal with research on lexicography, machine translation, and contrastive linguistics. One of which is the English–Arabic United Nations Texts (EAPCOUNT), a corpora comprised of United Nations annual reports (Rafalovitch & Dale 2009; Salhi 2013). The Open Parallel Corpus (OPUS) is another resource that provides different parallel texts collected from the web (Tiedemann 2012). Moreover, the Arabic–English Parallel Corpus (AEPC) that was built to enhance translation training and to improve language teaching (Alotaibi 2017).

Other English–Arabic parallel corpus are confined either in their availability or their size, such as the Kuwait University English–Arabic Parallel Corpus, which is only available to the university’s staff and students (Al-Ajmi 2004) and the Linguistic Data Consortium GALE Corpus that consists of only 42,089 words (Li et al. 2013). Further, An-Nakel El-Arabi1 Translate-Net, 800- Translate, and TRAD are examples of restricted Arabic–French corpora that were supported by different institutions and companies: CIMOS, Responsive Translation, and the French Ministry of Defense, respectively. A wider mainstream of Arabic parallel corpora is required.

The English–Arabic Parallel Corpus of United Nations Texts (EAPCOUNT) is one of the merely available Arabic parallel corpora, a parallel corpus of 5,392,490-word comprised of the annual reports of United Nations (UN) to support research on linguistic (Rafalovitch & Dale 2009; Salhi 2013). The Open Parallel Corpus (OPUS) is another accessible resource, which offers variant parallel texts gathered from the web to sustain research on machine translation (Tiedemann 2012). Similarly, the Arabic–English Parallel Corpus (AEPC) is developed to improve language teaching and translation training (Alotaibi, 2017).

Over the last decade, research on building learner translator corpora has extended, due to the “systematic computerized collections of texts produced by language learners” (Granger 2002). In such corpora, computerized texts developed by translation students are compiled. Bowker and Peter (2003) discuss that “Student

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Translation Archive (STA) and student translation tracking system” are both used for storing, retrieving, and analyzing students’ translations.

Recently, translation studies have focused on both; descriptive research investigating translators’ attitudes and their products, and empirical research that offers comprehensive explanations allowing for predictive models of the process of translation (e.g., Jakobsen, 2011; Carl and Dragsted, 2012; Mesa-Lao, 2014; Carl et al. 2015). Tanslog is the first keystroke computational logging technology to provide objective behavioral data of the process of translation (Jakobsen and Schou, 1999; Carl 2012). Research on translation studies has been adopting this tool to examine drafting patterns, cognition, and other psychological elements identified in the translation process (e.g., Hansen, 2002; Carl et al., 2012).

### **3.1.2 Corpora in Translation Teaching**

Adopting corpora in translation teaching is more recent than its theoretical investigations. Bernardini, Stewart and Zanettin (2003) attempt to apply the corpus-based translation theoretical work, and the use of corpora, as learning aids in the translation classroom. They define this as the “applied corpus-based translation studies.” (Bernardini, Stewart & Zanettin 2003, p. 1) hence corpora can be employed in translation education and can be used as a valuable resource intrinsically, with direct relevance to the empirical practices of translation. Implementing corpora in translation education over translation traditional teaching methods allows for a more student-oriented classroom which in turn tend to enhance translation students’ documentation skills and help improving their performance (Rodríguez Inés, 2009, p. 131). Furthermore, corpora as a teaching methodology alter classroom roles for both; the teacher and the student. Teachers in such classrooms play the role of an information facilitator rather than information providers (Rodríguez Inés, 2009, p. 130, p. 133), they help students gain declarative knowledge by providing them with the needed procedural knowledge that later allows for their self-reliance.

### **3.1.3 Integrating Technology in a Translation Curriculum Design**

To effectively integrate technology, particularly AI based translation tools, into teaching translation curricula, a range of educational techniques have been investigated. The blended learning paradigm is a teaching strategy that combines both; digital elements and conventional in-person training (Chapelle, 2003). By applying blended learning in classrooms, students tend to engage in technologically advanced activities while still obtaining the benefits of face-to-face interaction with

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their class teachers and classmates. Bergmann and Sams (2012) discuss that flipped classroom teaching strategy includes AI-based translation tools and course materials accessibility beyond the classroom, allowing for in-class time for group discussions, projects, and personalized feedback. Recent research have looked at many translation teaching strategies for incorporating AI-based translation technologies into teaching translation curricula, where students are allowed to practice translation technologies in a more controlled, utilized, and actual context, for example, via simulation activities (Doherty, 2021). Huertas-Barros (2020) illustrates that collaborative translation projects promote peer learning and classroom cooperation with translation technologies being employed for efficiently developed translation operations. In addition, interactive online platforms offer a wide range of user-friendly and engaging tools and ways for students to get engaged with translation technologies, amongst others is virtual translation environments (Biel et al., 2019). Learning objectives synchronizing with the incorporation of translation technologies in classrooms is one guiding concept (Gambier et al., 2020). This demands specifying both; teaching and learning objectives in detail and making sure that the application of translation technologies in classrooms help reaching these objectives effectively. Vygotsky's (1978) in his discussion of the scaffolding principle suggests to build a teaching translation curriculum using technologies. Scaffolding provides students with the needed help and direct them as they develop their skills and learn to utilize technology successfully. To ensure translation technologies implementation would improve the in-class learning experiences and enhance students competence rather than substitute their abilities, students-centered methods are essential (Toral et al., 2020). Comprehensive translation education must balance between human capabilities such as critical and analytical thinking, cultural awareness, and innovation, as well as the application of translation technologies.

For an effectively successful outcome to such implementation, educators' competence of the subjects and syllabus must be put into consideration. They must possess the necessary professional expertise (Doherty, 2021). Educators must get trained on utilizing translation technologies effectively and must learn how to assist their students to use these tools. Professional development courses and activities would help educators to keep up with the technology changes (Dragsted, 2019). For effective integration of technology into teaching translation curricula; educators are attributed to collaboration to exchange the best practices through professional networks (Koskinen, 2019). Although it may seem crucial to provide an accredited and accessible technological infrastructure, some institutions and universities offer

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access to the necessary gear, software, and internet connection. Some educators as well provide assistance and resources to guarantee that all students have equal knowledge to these tools (Huet et al., 2019). It is crucial to carefully assess and evaluate pedagogical approaches, teaching methodologies, curriculum design corpora, obstacles, and teacher professional development, when offering translation technologies to the teaching translation curricula table. Moreover, it is a must to address the many ethical issues, cultural consequences, and learner-educators attitudes.

### **3.2 Data and Data Processing**

Corpus linguistics is a methodology to investigate and classify ‘naturally-occurring’ linguistic structures (Neselhauff, 2011). As Hanks (2012) suggests, corpus linguistics is mainly interested in analyzing and understanding observed language to arrive at reliable explanations on patterns in both; word meaning and syntactic composition.

A corpus is ‘a large collection of authentic texts that have been selected and organized following precise linguistic criteria’ (Sinclair, 1991, 1996; Leech, 1991; Williams, 2003). In a corpus, data is systematic as both; its contents and structure are governed by a group of principles, amongst others are: the mode of discourse, subject, genre, and variety of language (Neselhauff, 2011), corpus authenticity arises from its capability to join up hundreds of thousands of written and/or spoken texts samples of ‘maximally representative’ examples of actual language (Mcenery and Wilson, 1996; Dobric, 2009, Bowker and Pearson, 2002). In addition to the general corpora, which in their vast range principally aim at investigating language as a whole (Hunston and Laviosa, 2000), there are multiple other types of corpora each of which has a particular scope and purpose. A specialized corpora within a specific field (newspaper editorials, students’ essays, or science papers, etc.); varieties of language or different languages (such as indigenized Englishes or localized) may be compared using parallel and comparable corpora respectively; a diachronic corpus that regularly samples a type of discourse may be employed to track language change and development over time.

The researcher classifies the present study’s participants into two main groups, each of which represents an academic class: Undergraduate Students Group and Postgraduate Students Group. Each of which is subdivided into minor groups. The first group is divided into four groups: First Year Students, Second Year Students, Third Year Students, and Forth Year Students. The second group is divided into

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three groups: Postgraduate Preliminary Group, Master's Group, and PhD Group. Each minor group under the first main group contains an approximate number of 30 students, while each minor group under the second main group contains 7 students. So, analysis is conducted with an approximate number of 141 students.

For the corpus, texts are selected from different scopes: literature, mythology, art, law, medicine, philosophy, history, and a combination of all. They are identified and collected from different sources: books, articles, journals, documents, movies, talk shows, conferences, and online resources such as websites and blogs. Corpus categorizes texts based on their source and target languages, topic, and date. Each text is annotated with metadata such as language, title, date, and genre.

The corpus is used to structure a course of four-module curriculum spanning 20 weeks. Each module is taught over four weeks (sixteen hours), so that the total period of modular instruction is sixteen weeks. The residual four weeks are dedicated to course orientation and practical workshops. Two basic learning strategies are used for each module: Learning by discovery, through exploratory exposure to a bilingual translation corpus collected by the researcher, and learning by doing through conducting translation exercises in class and assigning homework tasks. Students should receive a total number of one hundred and sixty hours; thirty two hours translating from Arabic ST, another thirty two lectures translating from English ST, and sixteen hours that aims to discuss the learning outcomes and further hands-on training based on the knowledge and experience acquired during the course. Four texts per week should be read, explored, discussed, and translated in class. Two of which are manually translated, and the other two are post edited after using MT. The four modules must include a display of illustrative chunks from the researcher's collected corpus. The First two weeks are dedicated to course orientation, in which educators should define and explain:

- Translation as a process and as a product.
- The translator (a bridge builder or a second author?)
- Competence.
- Normalizing the translated text: Source Language analysis, and Target Language post-editing and proofreading -with illustrative examples and hands-on training on post-editing strategies and editorial issues-
- CATtools -including a comparison of different CAT tools-
- Machine Translation, its types, its evaluation system, and its evolution
- ChatGPT, and Artificial Intelligence Generating Content (AIGC)

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## **1. Module 1: Key concepts in translation and Translation Technologies:-**

- a. How the cognitive process -in terms of comprehension and world knowledge- effect on the linguistic and textual product.
- b. Major Types of translation: documentary translation, instrumental, literal, inter alia -Defining each type briefly while skimming a text that illustrates each-
- c. Analytic skills -exposure to corpus chunks reflecting some problems of structural and semantic ambiguity in English text and some strategies to solve them in the target text-
- d. Writing skills -providing chunks of translated texts involving a comparison of an initial draft and a final rewritten draft-
- e. Transfer skills: Defining bilingual links between source language and target language with illustrations and drills to consolidate concepts.
- f. Meaning in translation: Propositional meaning, Expressive meaning, and Pragmatic aspects of meaning.
- g. Text and context: Defining text and context from a translational perspective while skimming some translated texts.
- h. Words and terms: Explaining the difference between words and terms and how drawing a proper distinction between them affects the quality of translation.

## **2. Module 2: Contemporary theories of translation:-**

- a. Functional approaches, descriptive approaches, and discursive approaches.
- b. How can theory inform practice? -including exposure to textual chunks reflecting the three approaches. A hands-on translation is given in the form of applying the functional approach to a translated text in order to determine how the function of the source text affects the translation.-
- c. Combining different translation types and approaches in the same target text. Showing students how communicative and semantic approaches can coexist in the translation of the same text.
- d. Gender issues in translation

## **3. Module 3: Translation as an interdisciplinary activity:-**

- a. Translation and culture, Cultural equivalence, and Cultural substitution.
- b. Translation and linguistics, levels of linguistic analysis.
- c. Translation, lexicology and lexical semantics: Explaining lexical semantic-ambiguity and polysemy and how to deal with them while translating

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- d. Difference between term equivalation and term translation, and the use of semantic features in translation.
  - e. Translational features: Contrastive analysis.
  - f. Translation strategies, Shift strategies: mandatory and optional shift, and Correspondence strategies.
  - g. Logic in translation.
  - h. Use of subordinate logic (and/or), and predicate logic (some, any etc)

#### **4. Module 4: Professional contexts of translation:-**

- a. Working as a translator: types of employment.
- b. Working as a translator: Major Fields of translation.
- c. Client relations, pricing and contracts.
- d. Legal translation, and translating official documents.
- e. Subtitling and Localization.
- f. Translation for International Organizations.
- g. Aspects of translation quality: Accuracy, Fluency and normalcy.
- h. Transcreation in literary translation and in non-literary translation (poetry)
- i. Domestication and Foreignization

An evaluation of students' manual translated texts, and students' post-edited MT texts, is to be held. Two weekly assignments are given to each group. Students are provided with instructions and training on time management while having a translation task in hand. They are instructed and trained on integrating both; the translation theory and the translation technology. Also, they are introduced to the ethics and morals of implementing such technologies in their practices. The curriculum integrates AI and translation technologies into the classroom settings by offering students access to a number of tools, such as Computer Aided Translation (CAT) tools, Machine Translation (MT), Neural Machine Translation (NMT), Artificial Intelligence Generating Content (AIGC). (*ChatGPT, Gemini, SDL Trados, Memsource, memoQ, DeepL, Microsoft Translator, Google Translate, etc.*)

Corpus is then organized and analyzed by separating post-edited texts from translated texts for each of the two main groups.

### **3.3 Procedures of Data Analysis**

To answer the research questions fulfilling the methodology, data analysis is conducted from two perspectives for a comprehensive and reliable outcome. First, the *adaptation* perspective, from which the researcher investigates and explains the process of Implementing Technologies in the Translation Teaching Curricula.

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Second, the *Effectiveness* perspective, from which she assesses and evaluates the effectiveness of Technology Implementation on students' Translation Competence.

#### **4. Analysis and Discussion**

As a first step, the researcher illustrates the process by which she integrates AI and Technology in Teaching Translation curricula. The implementation process is based upon what she calls the five axes of implementing technology in teaching. These five axes fall under what she calls 'TTWT curricula adaptation'.

##### **4.1 TTWT Curricula Adaptation:**

It refers to the application of TTWT curricula in universities' classrooms; in line with the teaching translation institutional mission and vision in terms of: objectives, content, teaching, teaching materials, learning environment, and assessment; to bridge between translation theory and translation practice. In order to do so, the below five axes must be effectively achieved.

###### **1. Curriculum Designing:**

It is concerned with designing the university pedagogical curricula to meet its institutional objectives. Under this axis, curricula designers make decisions about educational course outlines. In the present study, the researcher seeks cooperation with AI and technological institutions to reorganize the course delivery process to facilitate installing and accessing the many translation technologies needed for the teaching translation curricula.

###### **2. Curriculum Planning:**

Its role of thump is to identify and organize the instructional materials that the course would follow based on frameworks that are collaborative, communicative, critical, and innovative. It sets the framework educators have to follow inside their translation classrooms integrating AI and translation technologies. The researcher adopts a bilingual translation corpus to ease both; the manual translation process and the post-edited MT process for students. A bilingual corpus helps creating a student-centered classroom learning experience, that in turn, encourage their critical and analytical thinking capabilities.

###### **3. Curriculum Management:**

It is related to monitoring classrooms to ensure the alignment between the TTWT designed curriculum, the TTWT planned curriculum, and the actual taught curriculum. It tests to what extent educators and students are aware of the content and structure of the course in relation to its objectives. In the present study, a



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monthly survey for students is held, to ensure learners' awareness of their course content and objectives, and to investigate to what extent their educators are providing them with the needed cooperation and coaching. Another monthly survey is held for educators, to examine students' willingness to follow course instructions and to what extent do they interact with and respond to teacher's feedback.

#### **4. Curriculum Evaluation:**

It is an essential phase in the TTWT curricula adaptation through which courses are being evaluated and assessed to make sure they are fulfilling their purpose and objectives, for both; educators and learners. It is a continuous process that evaluates the teaching-learning satisfaction and achievements. In the present study, the researcher holds two in-class assessments, the first assessment is held immediately after the orientation, while the second assessment is held at the end of the course. Also, four group meetings are held separately, to further explore attitudes of students and educators towards the course experience respectively. The first two meetings are held after the first two modules, while the other two are held at the end of the course.

#### **5. Curriculum Development:**

It is a deliberately thoughtful axis that ultimately tends to enhance the quality of both; the teaching experience, and the learning experience. Its main goal is to link between the current translation teaching-learning experience and the actual practices demanded by markets. The researcher believes that a lot of research has to be maintained to sustain the increasingly demanding ever-changing nature of the market. This may be done by regularly gathering information about the market's requirements and demands from translation services providers, clients, and freelance translators.

#### **4.2 TTWT Effectiveness on Students' Translation Competence:**

A quantitative analysis is held to assess and evaluate students' development. Analysis is based upon five factors: frequency of lexical correction, frequency of structural correction, time spent in translation, translation performance development, and students' response to feedback. A total grade of 50 marks is distributed evenly on these five factors for each; the manually translated texts, and the post-edited machine translated texts.

## 4.2.1 Undergraduate Students' Group (*Manual Translation*)

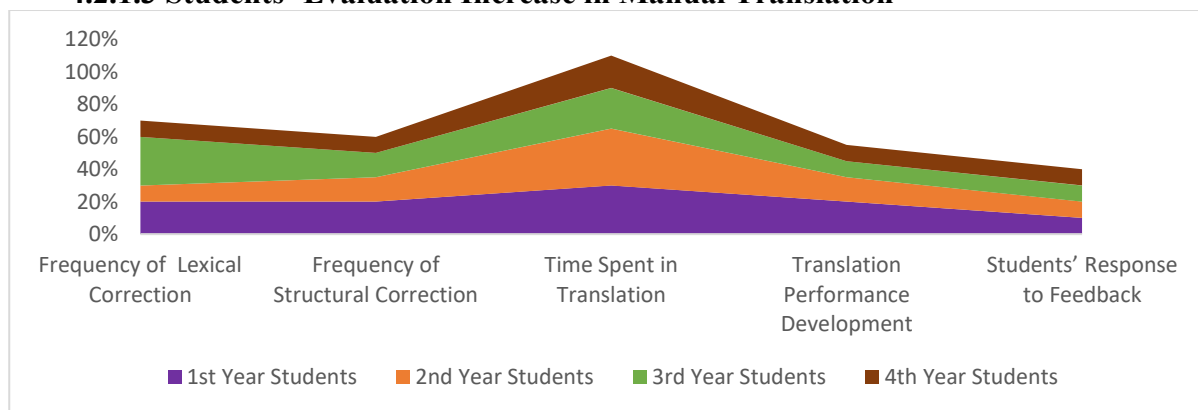
### 4.2.1.1 Students' Average Evaluation Marks after the Orientation

Undergraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
1st Year Students	40%	40%	30%	55%	90%
2nd Year Students	60%	50%	30%	65%	90%
3rd Year Students	30%	50%	30%	70%	90%
4th Year Students	60%	60%	50%	70%	90%

### 4.2.1.2 Students' Average Evaluation Marks at the End of the Course

Undergraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
1st Year Students	60%	60%	60%	75%	100%
2nd Year Students	70%	65%	65%	80%	100%
3rd Year Students	60%	65%	55%	80%	100%
4th Year Students	70%	70%	70%	80%	100%

### 4.2.1.3 Students' Evaluation Increase in Manual Translation



## 4.2.2 Undergraduate Students' Group (*Post-Edited MT*)

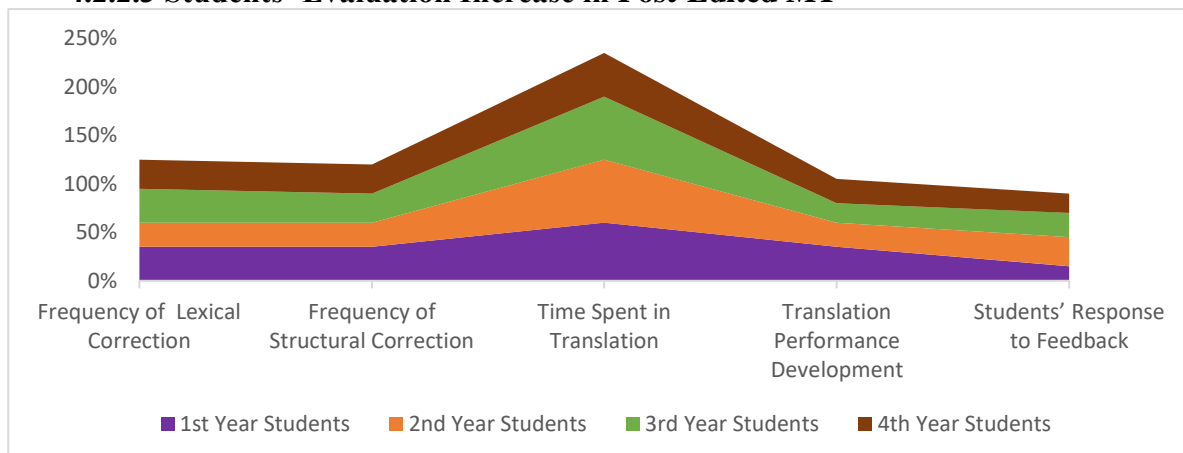
### 4.2.2.1 Students' Average Evaluation Marks after the Orientation

Undergraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
1st Year Students	50%	50%	30%	55%	80%
2nd Year Students	65%	65%	30%	65%	70%
3rd Year Students	50%	60%	30%	70%	70%
4th Year Students	60%	60%	50%	70%	80%

### 4.2.2.2 Students' Average Evaluation Marks at the End of the Course

Undergraduate Student Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
1st Year Students	85%	85%	90%	90%	95%
2nd Year Students	90%	90%	95%	90%	100%
3rd Year Students	85%	90%	95%	90%	95%
4th Year Students	90%	90%	95%	95%	100%

### 4.2.2.3 Students' Evaluation Increase in Post-Edited MT



### 4.2.3 Postgraduate Students' Group (Manual Translation)

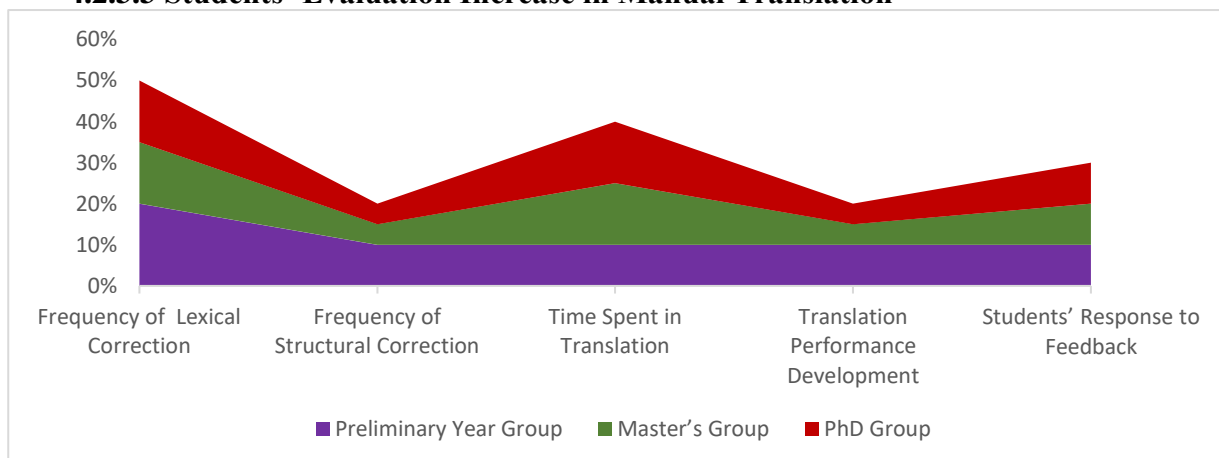
#### 4.2.3.1 Students' Average Evaluation Marks after the Orientation

Postgraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
Preliminary Year Group	60%	70%	60%	75%	90%
Master's Group	70%	75%	60%	75%	80%
PhD Group	70%	80%	70%	80%	80%

#### 4.2.3.2 Students' Average Evaluation Marks at the End of the Course

Postgraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
Preliminary Year Group	80%	80%	70%	85%	100%
Master's Group	85%	80%	75%	80%	90%
PhD Group	85%	85%	85%	85%	90%

#### 4.2.3.3 Students' Evaluation Increase in Manual Translation



## 4.2.4 Postgraduate Students' Group (Post-Edited MT)

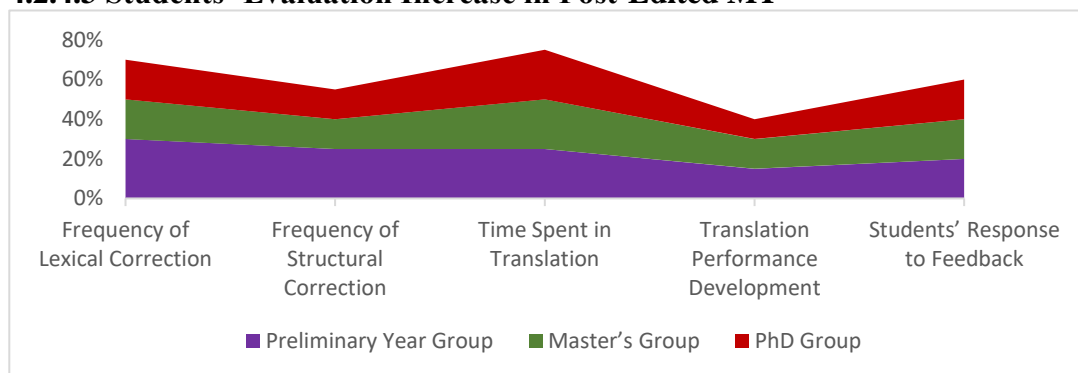
### 4.2.4.1 Students' Average Evaluation Marks after the Orientation

Postgraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
Preliminary Year Group	65%	70%	65%	80%	80%
Master's Group	70%	80%	65%	80%	70%
PhD Group	70%	80%	70%	85%	70%

### 4.2.4.2 Students' Average Evaluation Marks at the End of the Course

Postgraduate Students' Group	Frequency of Lexical Correction	Frequency of Structural Correction	Time Spent in Translation	Translation Performance Development	Students' Response to Feedback
Preliminary Year Group	95%	85%	90%	95%	100%
Master's Group	95%	95%	90%	95%	90%
PhD Group	95%	90%	95%	95%	90%

### 4.2.4.3 Students' Evaluation Increase in Post-Edited MT



## 5. Conclusion

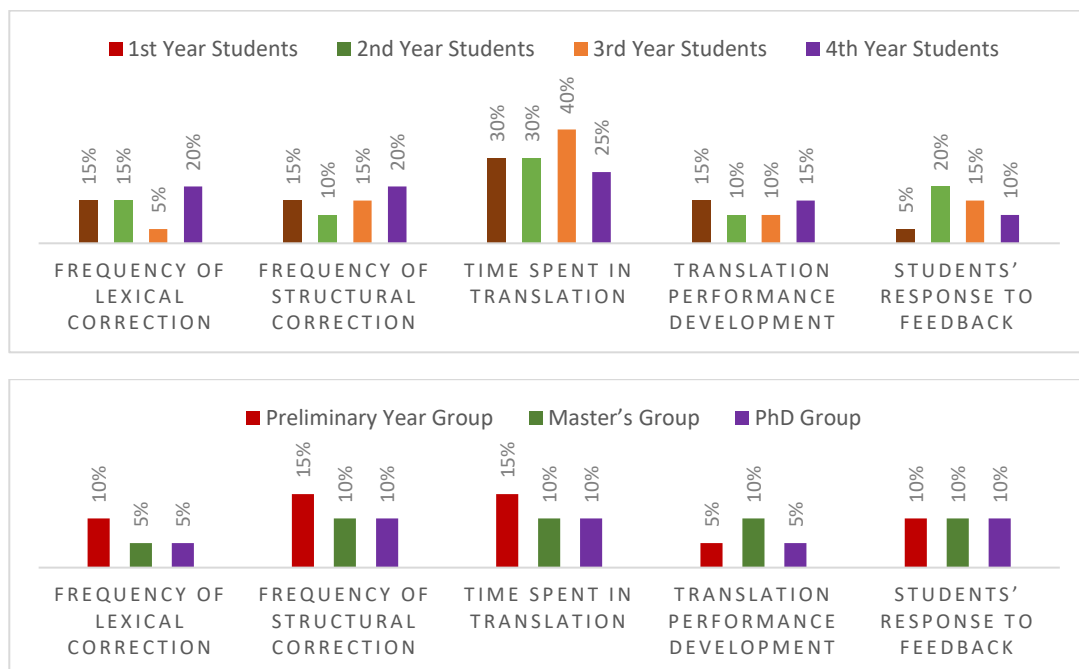
This study investigates the effectiveness of implementing AI and technology in teaching translation in the Egyptian universities. The present study participants are a representative sample of the institutional translation education in Egypt. This section aims to summarize the findings of the corpora adopted to find out to what extent the analysis findings give answers to the research questions raised earlier in the introduction.

### 5.1 TTWT and Translation Competence

- **To what extent can Teaching Translation with Technology (TTWT) in universities affect students' translation competence?**

The findings indicate that the post-editing process results in a significant improvement in quality, as compared to the manual translations. This is apparent in the below charts that reflect a significant increase after integrating MT into the classroom environment. The evaluation reveals higher efficiency in both;

terminology and structure. It also conveys the high tendency of post-editing techniques in consuming time, compared to the manual translation techniques. It is also found that students' manual translation involves notable usage of different translation memory systems that provide free access to terminology, and other machine translation features. It is worth mentioning that these results are linked to both; English and Arabic, as the Target Languages.



As previously mentioned, translation education has to bridge between translation theory and practice. And since most, if not all, translation service providers and clients view translator's competence through their commitment to deadline, and to continuous learning (Ali, 2017, p. 322), it became essential for translators to be updated with all the technologies allowing themselves to better time manage their production.

- **What are the most reliable artificial intelligent translation technologies for teaching translation with technology in universities?**

Under the present study main research question, the researcher further discusses two subsidiary questions. The first question about the most reliable artificial intelligent translation technologies is raised in relation to translators' competence. ATA website describes translator's competence, among other components, as "Translators ethical obligations". Translators must commit themselves to ethics including both; accuracy and confidentiality. Which in turn

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calls for raising student translators' awareness towards untrusted third party platforms, and also help eye open their vision to protect privacy of both; their clients and products.

Translation students tend to integrate free machine translation tools such as Google translate, Reverso Context Translation, Deepl, etc. Which in fact provide an acceptable alternatives to the paid tools and services. However, integrating AI and technology into their curricula raises their awareness towards the distinctions between CAT tools and MT, which allows them to use their translation theoretical knowledge and expertise in a cloud-based translation management systems (TMS) that combines both; the accuracy and consistency of CAT tools with the speed of MT engines. Listing the reliable artificial intelligent translation technologies for in-class translation teaching would present an experienced generation of translators, who are fully educated and prepared to take on the localization and interpretation market.

The above discussion leads to discussing another question, which is related to the ways and methods of integrating AI and technology into the teaching translation curricula.

- **What are the most effective teaching methods and curriculum designs for teaching translation with technology in universities?**

As previously discussed in the introduction of the present study, TTWT in universities needs both; the technological competence, as well as the translation competence. And for universities and institutions to supply localization and interpretation markets with a new generation of competent translators, a collaboration between Languages and Translation professionals, and Computers and Artificial Intelligence professionals, must be fulfilled.

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