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Nursing students' attitude and perception toward machine translation for learning English medical terminologies

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ABSTRACT

Nursing students must learn English medical terminologies since they must read and follow them to deliver patient care. Arab students highly use machine translation (MT) to understand those terminologies. Therefore, this study aimed to reveal the attitude and perception towards MT for learning English medical terminologies among undergraduate nursing students in Saudi Arabia. This study used an exploratory study design and comprised all final-year nursing students of the undergraduate nursing program in Abha (n=80) and Muhayil (n=80) female campuses of King Khalid University (KKU), Saudi Arabia. Those students (N=160) were administered a self-structured online questionnaire, and 132 responded to the questionnaire. More than 95% agreed that MT tools were easy to use, fast, and saved time. Though, 81.1% required more training in using MT tools. Furthermore, 97.7% perceived that MT helped them learn English medical terminologies. More than 90% reported that MT helped them understand and memorize English medical terminologies. Most nursing students stated that MT boosted their confidence (94.7%) and improved the quality of learning (96.2%) concerning English medical terminologies. Nursing students of KKU presented a positive attitude and perception toward MT for learning English medical terminologies. Saudi nursing schools should provide adequate training in using MT tools to enhance their students' learning of English medical terminologies, which would help them in clinical practice.

Contribution/Originality: This study is unique as it examines the nursing students' perception of machine translation (MT), especially for learning medical terminologies in Saudi Arabia. The findings would be particularly useful to the policymakers in designing and offering adequate training programs for nursing students in utilizing MT tools in learning English medical terminologies for their clinical practice.

1. INTRODUCTION

Medical terminology is observed as one of the most challenging languages among all the other specialized languages in diverse arenas. It is a specific language used by health science students, consultants, and other healthcare professionals. Among health science students, nursing students need to learn medical terminologies since those terminologies are observed to be the unique language used by healthcare professionals (Hassoun, 2019). Nurses must read and follow the medical terminologies to implement their interventions and perform patient care in clinical settings (Ahmed, 2022). However, medical terminologies comprise long and complicated terms which seem difficult to sound, spell, remember, and even understand (Hassoun, 2019). Moreover, Arab students with

English as a foreign language (EFL) frequently have snags in understanding medical terminologies as they have weaknesses in their comprehension of non-specific vocabulary (Heming & Nandagopal, 2012). The term "EFL" means the study of English by the people of non-native English-speaking nations where the English language is a non-dominant one (Nordquist, 2020). In focus with Saudi Arabia, English is the medium of instruction in medical and health science colleges whereas, the medium of teaching is Arabic at the school level. Such conflict leads to more obstacles in developing English for specific purposes (ESP) (Mukhtar, 2018). Accordingly, nursing students in Saudi Arabia must learn medical terminologies to meet their future job demands (Ahmed, 2022).

Rushwan (2017) stated that Arab medical students face more difficulties grasping ESP terms and texts and opt for machine translation (MT) to comprehend medical terminologies and text as their level of English proficiency is low. MT is a tool that hastens language learning, design formation, and current understanding of several extents of language and communication grounded on persons' qualitative comprehension of secondary resources (Ali, 2022). It is a subcategory of "computational linguistics". Moreover, it is coined as "the procedure that utilizes computer software to interpret the text in the natural language to another language" (Alawneh & Sembok, 2011). Its application on digital devices has increasingly stretched in different backgrounds due to its free cost, ease, closeness, competence, and multilingualism," irrespective of some of its deficits (Lee, 2020).

Furthermore, Arabic-speaking personalities usually anticipate translating texts from English to the Arabic language or vice versa through MT tools, regardless of the consciousness of their deficits. The reason for such usage could be because they may require to save time, cost, and effort. However, MT tools can perform more accurate translations than others (Ali, 2020). It is evident that the quality of MT outputs vary according to the tools and languages (Fiederer & O'Brien, 2009). Notably, MT usage among EFL students is inevitable. The potentials and applicability of MT are vital, and its necessity is continually high, particularly in Arab nations, where MT is beneficial to understand medical terminologies (Ali, 2022). MT tools such as Google Translate (GT) or Bing Translator are used by the students of the English language department for translation texts (Halim, 2019). Notably, GT is the well-known MT service established by Google and commonly utilized by the global public to translate texts from their native language to different languages (Amilia & Yuwono, 2020).

Concerning the Saudi Arabian context, Alhaisoni and Alhaysony (2017) reported that Saudi EFL students of the English language department often used GT for learning vocabulary, writing, reading, and translation. Rushwan (2017) studied the use of translation (including MT) in ESP medical classes from the perspectives of faculty members and ESP learners of various medical disciplines at a Saudi university. It is concluded that the proper use of translation in an ESP medical class is a positive teaching tool and will also facilitate the learning process. Recently, Ali (2022) studied English language students' perception of MT in a Saudi higher education environment. Ahmed (2022) also recently studied the use of learning strategies for medical terminologies among nursing students in a Saudi university. Those students preferred to use verbal and written repetition and bilingual dictionary strategies. However, the author failed to discuss MT for learning medical terminologies. While reviewing this literature, no studies have revealed the nursing students' perception towards MT for learning medical terminologies. Hence, this study intends to discover the final-year nursing students' attitudes and perceptions toward MT for learning medical terminologies.

2. LITERATURE REVIEW

MT is a technology-assisted translation of text information without human support. MT tools needed to be equipped with knowledge of language rules. However, those translated by scrutinizing vast volumes of text in language sets. Moreover, MT could aid in analyzing and understanding medical-related information, clinical findings, medical records, and treatment procedures. Technology devices such as mobiles, the internet, and web tools can be applied to enhance the delivery of MT services for medical purposes. Using MT in translating medical texts can have an excessive potential of confirming the paybacks to patients and the public who do not recognize

the language of the nation in which those need medical assistance. Better access to several medical information can be more beneficial for healthcare professionals (HCPs), clinical researchers, and patients (Wołk & Marasek, 2015). A previous study examined the use of GT for learning English among Arab students. It revealed that those students used GT regularly to comprehend concepts educated in their classes and utilized it mostly while preparing reports, projects, and assignments (Kumar, 2012). Another study concluded that more translation accuracy and the use of crucial evaluation standards would boost the deployment of MT in the healthcare environment (Dew, Turner, Choi, Bosold, & Kirchhoff, 2018). Concerning human translation, Ali (2022) stated that MT is the process of utilizing artificial intelligence to mechanically translate a text from one language to another with no human participation. Furthermore, human translation is carried out by the translator who has adequate knowledge and skills in the two languages to be translated and translate the text to the required language after comprehending the meaning. The human translation accuracy is generally higher than that of MT (Gardi, 2020; Li, Ning, & Fang, 2021). Human translation accuracy relies on the level of translators, the extent of expression of the original content, time, industry, etc. On the other hand, MT's accuracy hinges on the quality of the original content, industry, language, and training corpus and model (Lihua, 2022). However, the convenience of MT is far better than that of human translation. This observation might be because MT can overcome the limitation of human translators. It performs the translation rendering to the prearranged correspondence of database words without the demand of a master in the translated language (Gardi, 2020). The drawback of human translation is that the quality of translated content primarily relies on the translators' knowledge and skills. The translator easily affects the meaning of the translated texts (Andrabi & Wahid, 2022). Besides, human translation involves the translator who interprets the content and conveys the same meaning in the required language rather than a direct literal translation. The translator knows the creative use of language during translation. In contrast, MT has less processing time and faster processing than human translation. It also knows multiple languages and completes the translation in different languages compared to human translation. Though, the accuracy is questionable (Lihua, 2022). A study by Daniele (2019) evaluated a free online translator's performance in translating English version medical texts into the Italian version. The occurrence of errors during the translation of original medical research abstracts indicated the translation efficacy. Moreover, it investigated the association between errors and lexical density. It observed GT's good and exemplary performance while translating extremely theoretical literature, viz., "medical abstracts." It determined that an active translation is an actual connection between native and target language terms. Besides, an earlier study also stated that nursing staff required continuing education and adequate training to use MT tools efficiently, encouraging their adoption (Anazawa, Ishikawa, & Takahiro, 2013).

Moreover, Renato et al. (2018) stated that an MT system for medical terms (M-SMT) showed much better performance in translating medical terminology from Spanish to Portuguese than the general-purpose ones. Similarly, MT can support nursing students in translating English medical terminologies to their native language (i.e., Arabic). In Saudi Arabia, the English language is the medium of instruction in healthcare institutions. However, the Arabic language is the medium of teaching in Saudi schools. This difference results in more difficulties using ESP (Mukhtar, 2018). Hence, Saudi nursing students learn medical terminologies to fulfill their future job requirements (Ahmed, 2022). Further, Arab medical students possess low English language skills and experience more obstacles in understanding ESP terms; hence, those utilize MT to grasp medical terminologies (Rushwan, 2017). In addition, suggested applying advanced comprehension pedagogical actions to progress students' critical thinking and awareness of both language and disciplinary knowledge.

Besides, Al-khresheh and Almaaytah (2018) observed the linguistic barriers facing MT while translating English terms into Arabic. The GT usage showed a prerequisite for more correctness and lucidity because of the offensive creation of word connotations Ali (2020) compared the outputs of translating the contents from English into Arabic through MTs, namely, Microsoft Bing, GT, and Ginger. The best translation was found in Microsoft Bing. The least accurate translation was observed in GT because of more intelligibility and fidelity errors noted in

its translation output. Nevertheless, the quality of Ginger's translation was less precise than Microsoft Bing. However, it is oddly better than Google's translation. The results indicate that these MT tools can be executed to translate English into Arabic to obtain the comprehensive gist of source content; however, an intensive post-editing procedure is required for better comprehension of English into Arabic output. Further research is warranted to endure the quality of MT to determine its weak points, and a strategic plan should be applied to tackle them.

3. METHODOLOGY

3.1. Study Design

This study adopted an exploratory design to determine final-year nursing students' attitudes and perceptions toward MT for learning English medical terminologies. It was conducted during the academic year 2021-2022. The study population (N=160) comprises all final-year students of the undergraduate nursing program in the Abha (n=80) and Muhayil (n=80) campuses of King Khalid University (KKU), Saudi Arabia. Those students are female and Saudi nationals.

3.2. Questionnaire

This study administered a self-structured online questionnaire to the study population (N=160). The questionnaire comprised two sections with 13 items. One section revealed the nursing student's attitude toward machine translation tools (5 items). Another section captured their perception of learning English medical terminologies through MT (8 items). The response on each item was recorded through a five-point Likert scale, i.e., Strongly Agree-5, Agree-4, Neutral-3, Disagree-2, Strongly Disagree-1. The participants were asked to respond to the questionnaire after submitting informed consent. The obscurity and privacy were assured before gathering the responses from the participants. A pre-specified timeline was given to the participants to fill out the questionnaire.

3.3. Statistical Analysis

The reliability and validity of the questionnaire were determined using the Cronbach alpha (α) reliability test, and the confirmatory factor analysis, respectively. The descriptive statistics were applied to reveal the mean score and cumulative percentage (i.e., Agree-4 and strongly agree-5) of the responses toward items. This study used Statistical Package for Social Science (SPSS) version 20 (Chicago, II, USA) to perform the data analysis at a 5% level of significance.

4. RESULTS

In this study, 132 participants responded to the questionnaire (out of 160 participants), and the response rate was 82.5%. A previous study described the Cronbach's alpha coefficient value as "Excellent" – α > 0.9, "Good" - α > 0.8, "Acceptable" - α > 0.7, "Questionable" - α > 0.6, "Poor" - α > 0.5, and "Unacceptable" - α < 0.5 (George & Mallery, 2003). This study observed the overall Cronbach's alpha value of the questionnaire as 0.906 (Table 1), which denotes that the questionnaire was "Excellent" and reliable. Further, the total variance observed in factor analysis using the varimax rotation showed the sum of squared loadings of 74.425 percent.

Table 1. Reliability and Validity of the questionnaire.

Reliability		
Variables	**Cronbach's alpha**	**No. of items**
Attitude	0.836	5
Perception	0.920	8
Overall	0.906	13
Factor Analysis		
Factor Loading	74.425	

Table 2. Nursing students' attitude toward learning English medical terminologies using machine translation (N=132).

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Machine translation tools are easier to use	-	1 (0.8)	5 (3.8)	24 (18.2)	102 (77.2)
Machine translation tools save students' time	-	2 (1.6)	4 (3.0)	24 (18.2)	102 (77.2)
Machine translation is fast	-	-	3 (2.2)	29 (22.0)	100 (75.8)
Machine translation tools can replace human translation	-	-	9 (6.8)	26 (19.7)	97 (73.5)
I need more training in using machine translation tools	2 (1.6)	12 (9.1)	11 (8.2)	41 (31.1)	66 (50.0)

Table 3. Mean score and cumulative percentage for nursing students' attitude toward learning English medical terminologies using machine translation.

Items	Mean ± Standard deviation	Cumulative percentage (%)
Machine translation tools are easier to use	4.72±0.570	95.4
Machine translation tools save students' time	4.71±0.599	95.4
Machine translation is fast	4.73±0.492	97.8
Machine translation tools can replace human translation	4.67±0.601	93.2
I need more training in using machine translation tools	4.19±1.027	81.1

Table 2 shows the responses on the items regarding nursing students' attitudes toward learning English medical terminologies using MT. More than 70% of nursing students strongly agreed that MT tools were easier to use, faster, saved their time, and could replace human translation. Only a very few nursing students (1.6%) strongly disagreed that those required more training in using MT.

Table 3 shows that more than 95% of nursing students agree that MT tools are easier to use (mean score = 4.72), MT is fast (mean score = 4.73), and it saves their time (mean score = 4.71). Further, 93.2% recognized that MT could replace human translation (mean score = 4.67). 81.1% require more training to use MT tools (mean score = 4.19).

Table 4. Nursing students' perception towards learning English medical terminologies using machine translation. (N=132)

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Machine translation helps me to learn medical terminologies	-	2 (1.5)	1 (0.8)	28 (21.2)	101 (76.5)
Machine translation help me to learn about the proper pronunciation of medical terminologies	-	1 (0.8)	3 (2.2)	27 (20.5)	101 (76.5)
Machine translation helps me to understand English medical terminologies	-	1 (0.8)	6 (4.5)	29 (22.0)	96 (72.7)
Machine translation helps me to memorize English medical terminologies	1 (0.8)	2 (1.5)	6 (4.5)	30 (22.7)	93 (70.5)
Machine translation helps to learn about the proper uses of medical terminologies	1 (0.8)	1 (0.8)	5 (3.7)	31 (23.5)	94 (71.2)
Machine translation helps me to boost my confidence in learning medical terminologies	-	1 (0.8)	6 (4.5)	38 (28.8)	87 (65.9)
Machine translation increases my creativity in learning medical terminologies	-	2 (1.5)	2 (1.5)	34 (25.8)	94 (71.2)
Machine translation improves my quality of learning of medical terminologies	-	1 (0.8)	4 (3.0)	29 (22.0)	98 (74.2)

Table 5. Mean score and cumulative percentage for nursing students' perception towards learning English medical terminologies using machine translation.

Items	Mean ± standard deviation	Cumulative percentage (%)
Machine translation helps me to learn medical terminologies	4.73±0.554	97.7
Machine translation helps me to learn about the proper pronunciation of medical terminologies	4.73±0.540	97.0
Machine translation helps me to understand English medical terminologies	4.67±0.601	94.7
Machine translation helps me to memorize English medical terminologies	4.61±0.718	93.2
Machine translation helps to learn about the proper use of medical terminologies	4.64±0.669	94.7
Machine translation help me to boost my confidence in learning medical terminologies	4.60±0.616	94.7
Machine translation increases my creativity in learning medical terminologies	4.67±0.588	97.0
Machine translation improves my quality of learning of medical terminologies	4.70±0.565	96.2

Table 4 shows the items' responses regarding nursing students' perception of learning English medical terminologies through MT. More than 70% of nursing students strongly agreed that MT helped them to understand, learn, and memorize English medical terminologies along with proper pronunciation. Those also strongly agreed that MT aided them to learn the proper use of English medical terminologies and improved their quality and creativity regarding the learning of those terminologies. Notably, 65.9% strongly agreed that MT boosted their confidence in learning English medical terminologies.

Table 5 exhibits that most nursing students (more than 97%) perceived that MT helped them to learn English medical terminologies (mean score = 4.73), especially with proper pronunciation (mean score = 4.73), and increased their creativity in learning English medical terminologies (mean score = 4.67). More than 90% stated that MT supported them in understanding (mean score = 4.67) and memorizing (mean score = 4.61) English medical terminologies. 94.7% said that MT helped them to learn the proper use of English medical terminologies (mean score = 4.64) and boosted their confidence in learning those terminologies (mean score = 4.60). 96.2% perceived that MT improved their quality of learning English medical terminologies (mean score = 4.70).

5. DISCUSSION

As MT helps HCPs understand and learn medical terminologies, this study revealed the attitude and perception towards MT for learning English medical terminologies among undergraduate nursing students. Concerning the nursing students' attitude, most nursing students (>95%) recognized that MT tools were easier to use, faster, and saved their time while learning English medical terminologies. Earlier studies observed that the English language students of Saudi Arabia showed a positive attitude toward GT, a commonly used MT tool, since it is easy and free to use and faster in translating text. The students perceived that GT is appropriate to use and valuable to learn English and particularly new terminologies. Those also stated that the quality of translated texts was better compared to their own translation. However, students relying profoundly on GT failed to read English texts and were unable to predict the correct meaning of unfamiliar terminologies (Alhaisoni & Alhaysony, 2017). Those students also believed that MT tools saved time and effort (Ali, 2022). However, the students in those studies belonged to the English language program rather than health science. Another study stated that MT saves money and time; however, it generally leads to patchy translations with syntactic, semantic, and lexical errors that a human translator never does (Al Khatim, 2022). Furthermore, in this study, 93.2% agreed that MT could replace human translation, which is aligned with the findings of a recent Saudi-based study conducted on English language

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students (Ali, 2022). Contrarily, a recent study concluded that MT could replace human translation in some facets under the impact of artificial intelligence, but it cannot replace human translation (Lihua, 2022).

Nevertheless, 81.1% of nursing students required more training in using MT tools for learning English medical terminologies. In line with this result, Saudi EFL students perceived insufficient training in GT. Such training needs to be integrated into teaching methods for EFL courses though students frequently use GT to learn the language (Alhaisoni & Alhaysony, 2017). A recent study stated that appropriate strategies, including training and technology support to ensure teaching and learning continuity even during the pandemic (Dayagbil, 2023). Ningsih, Suherdi, and Purnawarman (2022) stated that the instructors also positively sensed the tendencies and practices of mobile technology in and outside the language learning environment. For them, perceived motivation is a crucial driver to incorporating mobile technology. The policymakers should offer the instructors adequate training on technology use that helps them know the technological characteristics of foreign language learning. Such training on technology use can be extended to the students for learning the English language. Hence, nursing schools in Saudi Arabia should support their students by focusing on enough training and education concerning using MT tools for learning English medical terminologies. Such effort would improve the nursing students' quality of learning and academic and clinical performance. Based on the findings, nursing students showed their attitude with a mean score of more than 4.1 out of 5 for all items. This outcome denotes nursing students' positive attitude toward learning English medical terminologies using MT. Alhaisoni and Alhaysony (2017) stated that Saudi EFL students demonstrated a positive attitude toward GT since it is suitable to use and aid them in learning English, particularly new terminologies. Jolley and Maimone (2015) examined the use and perception of GT and similar free online MT tools among Spanish students and faculty members. It is observed that the students and faculty members had positive views of using MT tools. It is recommended that appropriate training is essential to improve the effectiveness of GT and similar MT tools.

Moreover, this study revealed the nursing students' perception of learning English medical terminologies using MT. About 97% reported that MT helped them to learn English medical terminologies, especially with proper pronunciation, and enhanced their creativity in learning those terminologies. In line with these findings, Tuzcu (2021) concluded that GT could be an active learning instrument in enhancing creativity in the writing activities of low-proficient EFL learners. Besides, most nursing students (>90%) reported that MT supported them in understanding and memorizing English medical terminologies. These findings are supported by an earlier study stating that Arab students use translation to understand English terms and recall them in their mother language (Al-Musawi, 2014). Previous studies stated that Saudi English language students used MT to reveal the meanings of unfamiliar terms and learn them (Ali, 2022) MT enhanced independent learning skills among students and increased their motivation and confidence in language learning (Lee, 2020). In this study, most nursing students (94.7%) reported as MT assisted them in learning the proper use of English medical terminologies and boosted their confidence in learning those terminologies. Additionally, 96.2% perceived that MT improved their quality of learning English medical terminologies. This finding is supported by the previous literature, which stated that GT is a popular MT device that assists students in their learning process (Wirantaka & Fijanah, 2021). Those students using GT could become independent learners and obtain the skill of independence concerning language learning (Bernardini, 2016). Also, the present study showed that nursing students showed positive perception, with a mean score of more than 4.6 out of 5 for all items. This finding indicates that nursing students perceived MT as it helped them to learn English medical terminologies. Most Saudi EFL students perceive the positive effect of GT in language learning, and they always use it for translation (Alhaisoni & Alhaysony, 2017). From the Saudi English language students' perspectives, MT produced satisfactory translations and improved their academic writing. However, its translation outputs showed adverse facets, including issues in choosing the equivalent meaning of some terms, grammatical errors, and the need for review and post-editing (Ali, 2022). Furthermore, Alhaisoni and Alhaysony (2017) stated that GT might fail to translate all terms correctly and occasionally provides inappropriate

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word meanings. Hence, the students should verify the meaning in the dictionary to ensure it or get support from their peers or faculty members. Accordingly, nursing students should also consider these points while using MT to learn English medical terminologies effectively.

5. CONCLUSION

Nursing students of KKU presented a positive attitude towards MT for learning English medical terminologies. Most agreed that MT tools were easy to use, fast, and saved time. However, they required more training in using MT tools. Furthermore, they perceived that MT is helpful in understanding, memorizing, and learning English medical terminologies. MT also boosted their confidence and improved the quality of learning concerning English medical terminologies. Besides, Saudi nursing schools should provide adequate training programs in using MT tools to improve their students' learning of English medical terminologies. Such effort would improve their knowledge of English medical terminologies, which would help them in clinical practice.

Regarding limitations and recommendations, this study was restricted to the female nursing students of a single public university in Saudi Arabia with a smaller sample size. Nevertheless, further research can be conducted across Saudi universities by including a large sample size of nursing students, which aids the generalization of the findings. Saudi nursing students' attitudes and perception of using MT for learning English medical terminologies can be compared with those in other Arabic-speaking nations. Furthermore, the faculty members' attitudes and perception towards using MT for teaching English medical terminologies can be conducted across Saudi universities in future studies.

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