

The role of AI and ICT in Education and translation: How will it reshape us?

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Abstract: Artificial Intelligence (AI) and machine learning are two interconnected concepts that have continued to reshape education, teaching, and research. This study explores how AI is being used to support students, improve teaching, and assist researchers and translators in their daily work. A survey was conducted with 200 participants, including educators, translators, engineers, and AI researchers, to better understand the impact of AI tools. Regarding research, many international and professional language interpreters have started to argue that AI is helping to make their lives easier. Similarly, the results show that AI is helping students with difficult tasks and is being used in many educational settings to make learning more personalized and accessible. In the field of translation, professionals report that AI is making their work easier, especially when human translators are not available or are too expensive. AI machine learning models can be used to address this situation, particularly in international conferences. The study concludes that AI is and will continue to be cost-oriented for many professionals in different fields; however, human input remains important to ensure quality, accuracy, and cultural understanding, especially in education and language translation.

Keywords: Artificial intelligence (AI), Education, ICT, Machine-learning, Translation.

1. Introduction

In today's digital age, artificial intelligence (AI) powered tools have become essential assets, profoundly influencing how we live and the way we think, even when most of us do not fully grasp how these systems function. Although some definitions, such as Martinez [1] portrayal of AI as "countless forms of advanced technology" (p. 1016), are overly broad, this study adopts a different approach. It redefines AI as a collection of advanced computational systems driven by advances in deep learning, machine learning, and natural language processing to execute cognitive tasks. These systems are not only designed to mimic human decision-making but, in many cases, are engineered to outperform human capabilities within specific domains, thereby offering measurable benefits in efficiency and problem-solving.

Despite the lack of a universally accepted definition, the rapid adoption of AI across industries is undeniable. The Stanford Annual AI Index Report Littman, et al. [2] has illustrated this surge, noting the increase in the number of start-ups that have been working on developing AI systems in the last two decades. This exponential growth, coupled with advances in machine learning, deep learning, and data availability, has enabled AI systems to even surpass human performance on certain benchmarks.

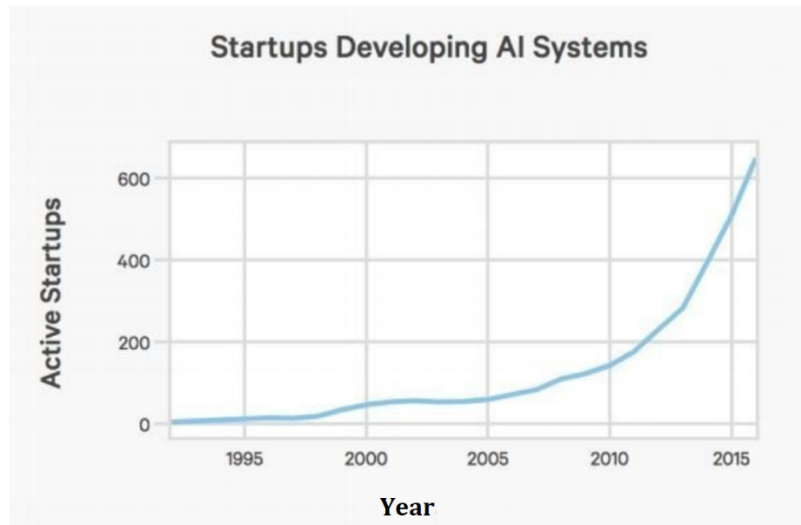


Figure 1.
Startups Developing AI Systems World Economic Forum [3].

More recently, the Stanford Annual AI Index Report Maslej, et al. [4] as illustrated in Figure 2, highlights that specific AI tools now outperform humans on tasks such as image classification, basic-level reading comprehension, English language understanding, and visual reasoning. These gaps underscore the necessity for further research in order to fully exploit AI's potential.

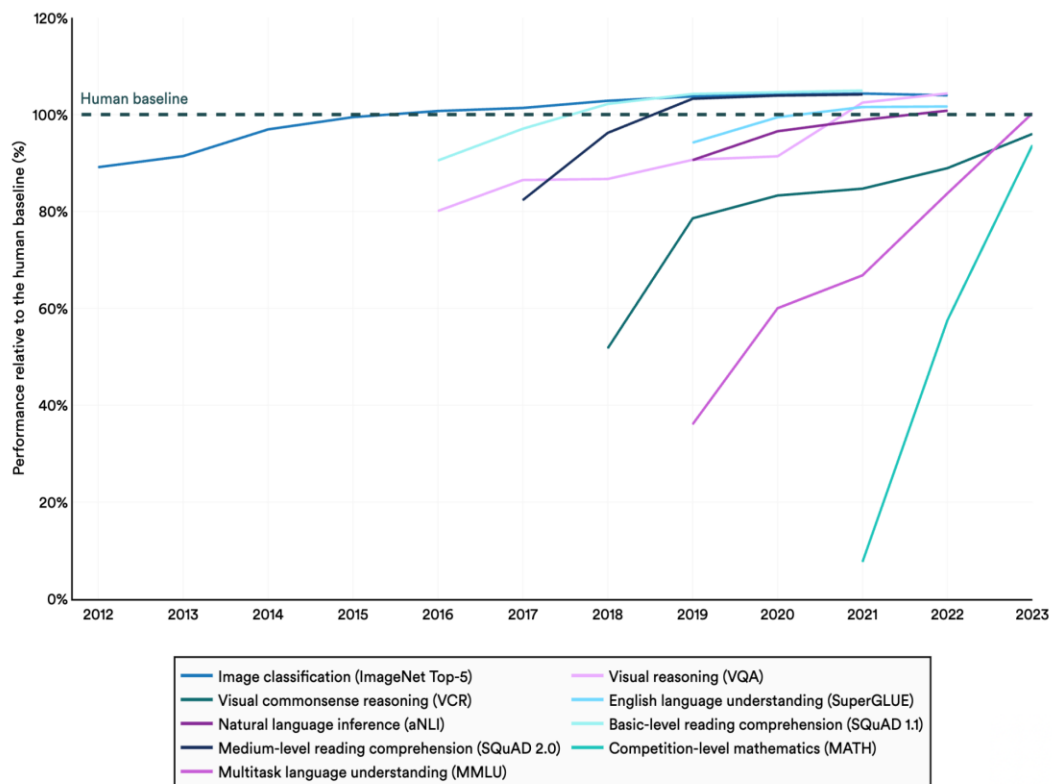


Figure 2.
AI technical performance vs. human performance (p. 81) Maslej, et al. [4].

Given these trends, it is important to examine how AI affects particular sectors, not only to assess its transformative potential but also to identify and address the unique challenges and opportunities it presents in each field.

In education, for example, the use of AI-powered tools has entirely transformed how schooling systems are perceived. According to Akgun and Greenhow [5] a growing variety of AI-driven tools are increasingly being deployed in classrooms and other educational settings. These tools are said to enhance learning environments through personalized learning platforms and intelligent tutoring systems. These tools not only assist lecturers and professors around the world in different universities and institutions in addressing the diverse needs of mixed-ability classrooms, but they also enable students to access educational resources specifically aligned with their learning needs and areas of study. This remains one of the most valuable applications of AI in supporting both students and educators. A report from the Institute for Ethical AI in Education [6] notes that the use of AI in mixed-ability classrooms is mainly done by enabling students to access diverse educational resources that are aligned to their specific learning needs and areas of study. Additionally, Akgun and Greenhow [5] further emphasize that AI-powered tools have the potential to help stakeholders in students' learning systems identify gaps in prior knowledge and customize learning tools and materials to support students' development. In addition to customizing content based on students' needs, AI-powered systems also assist many professors as well as students to have a properly adapted feedback control. This is particularly significant as it allows educators to move beyond traditional feedback methods and offer more scalable, consistent, and personalized responses. Venter, et al. [7] highlight that the use of large language models, particularly through the advances in natural language processing, offers new opportunities in educational feedback. Their study found that AI-generated feedback often aligns well with the principles of effective feedback, especially in large classes where individual feedback is difficult to manage. Similarly, Kasneci, et al. [8] point out that feedback generated by these models is timely and can be tailored to individual needs by identifying areas where students and pupils struggle. Furthermore, AI is reshaping the assessment process. It not only reduces the workload associated with traditional assessment but also allows educators to "monitor and assess learning over a long period of time to build up a representative picture of a student's knowledge, skills and abilities - and of how they learn" [6]. In doing so, these tools not only reduce the workload of the teachers and educators but also expand their capacity to be more productive and focus on more crucial tasks. Simultaneously, the advancements of AI-powered tools are expanding the accessibility of education beyond what was reachable until now. The latest innovations, specifically tools for communication skills or sensory perception such as speech recognition systems and tools for converting text-to-speech and speech-to-text, have made education more inclusive. These tools assist and allow learners with different learning styles, learning difficulties, and various impairments to be part of our schooling systems. Harkins-Brown, et al. [9] notes that such technologies play a vital role in aiding and supporting students facing various challenges. They enable more personalized learning paths and broaden access to education for a wider range of learners than ever before.

Concurrently, AI-powered technologies have significantly reshaped the translation process, enhancing the interpretation and understanding of languages. This has been particularly achieved through Machine Translation (MT) and Neural Machine Translation (NMT), through which we are able to translate any language pair, as well as, optimize translation processes. MT initially relied on rule-based and phrase-based translation approaches, which have provided limited accuracy and flexibility. However, recently, these traditional models have been replaced by NMT and their latest advancements, which use deep neural networks trained on large bilingual corpora to produce more fluent and contextually appropriate translations. These advancements have shown significant improvements in handling complex linguistic structures, and its capacity to process and learn from large datasets has enabled near real-time translation across a wide range of language pairs. However, even though AI has excelled in doing this for many languages, there are still challenges when it comes

to low-resource languages, not to mention achieving full accuracy in complex translations, as well as in translating idiomatic expressions, cultural references, and context-specific meaning, areas in which human translators traditionally excel. According to Lau, et al. [10] while AI can handle culturally sensitive terms, a human translator remains necessary to ensure that the translation meets the quality standards and complies with the country's specific norms. They noted a statistically significant gap in quality compared with human translation, with outputs from systems like ChatGPT described as "either comparable to or inferior to that of human translation" [10]. Despite AI's advantages in speed and cost, it consistently failed to capture the essential textual and cultural nuances that human translators provide. Similarly, Mohamed, et al. [11] noted that compared to AI systems, human translators possess a better ability to grasp context, cultural references, and idiomatic expressions. Liu and Liang [12] further demonstrated that humans outperformed machine translation systems when it came to cohesion, contextual awareness, and pragmatic competence. Thus, maintaining collaboration between artificial intelligence and humans ought to be essential, especially as the relationship between human and machine translation requires reevaluation in light of ongoing AI advancements. Despite studies revealing discrepancies among human, machine, and AI translation, particularly with NMT, significant improvements have nonetheless been realized. As Moneus and Sahari [13] point out, translation accuracy has reached new levels thanks to enhanced abilities in grasping context, nuances, and idiomatic languages. Looking ahead, promising advancements offer significant potential for enabling more inclusive and accessible communication. In summary, even though AI-powered translation systems have become more accurate and more fluent, human expertise is essential. A balanced approach is key to achieving clearer and more effective communication.

AI will continue to co-exist along with a machine learning engineering computerized model where many do take into account the fact that an overall systematic adopted method of an unknown scheme applied in the field of pedagogy which is well known to many as learn by doing is another mode that is being applied. That is why AI along with translational software can be used for certain deterministic purposes and dual long-time systematic and linguistic applied techniques.

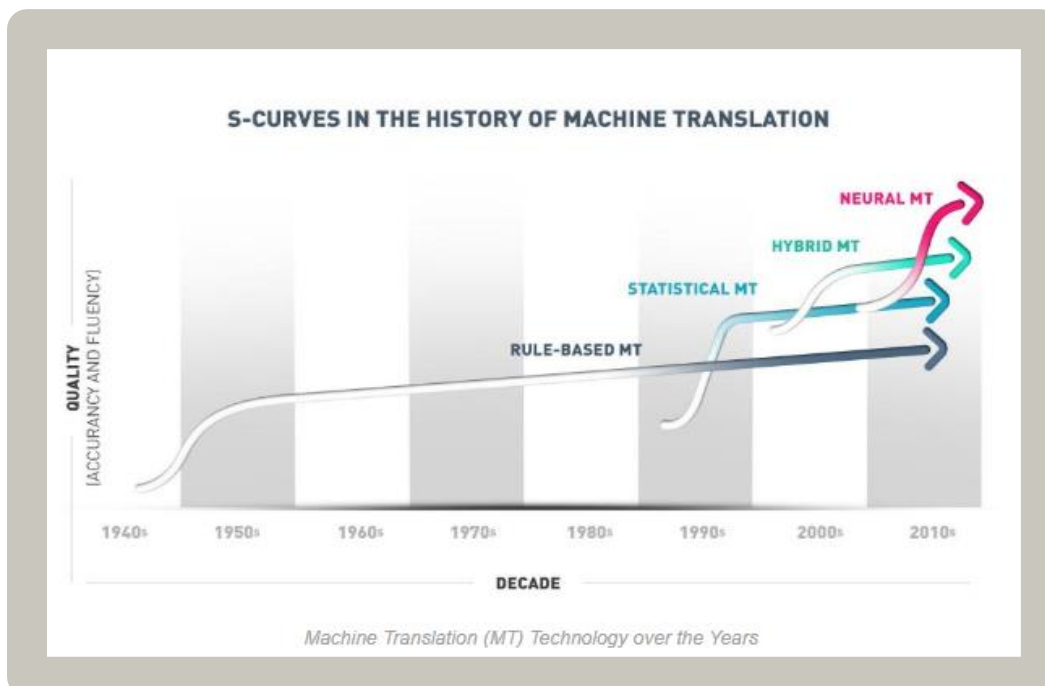


Figure 3.

The usage of MT technology over the years Artificial Intelligence Translation Software [14].

In conclusion, while AI continues to redefine efficacy and accessibility across various fields, from enhancing educational experiences to revolutionizing language translation, the role of human insight remains central. Embracing a collaborative approach between AI and human expertise is essential to navigate the challenges ahead and unlock AI's full potential.

2. Methodology

This study employs a quantitative research design based on a survey to gather data. In order to obtain a better understanding of the best possible outcome, we decided to have 14 consecutive questions where the research targets were educators, translators, software engineers, and machine learning researchers who had the opportunity to express their perspectives on the use and impact of AI. The survey was distributed online over a two-week period, with 200 individuals participating overall. The research target was informed of the purpose of the study in advance, and anonymity was maintained throughout the whole process.

The research study employs a statistical analysis approach, and it is purposely composed of three consecutive sections (comprising the general use of AI, its use in education, and its role in translation). Each section has a distinct mathematical-logical meaning, allowing us to come up with a reasonable conclusion on the social impact that it had.

2.1. Tests

Three different consecutive study tests were carried out from a criteria outcome (Table 1). The first study was to be able to identify the level of competency of AI. The second study focused on how the use of AI can help “reshape” the education system. Lastly, the third and final study questionnaire section was to compare human performance alongside the AI-regulated system use of translation.

Table 1.
Tests used in the study.

Question no.	Question	1st/2nd/3rd segment	Note
1	How useful is AI in general?	1	Intro question
2	Is AI easy to use?	1	Standard AI question
3	Is there a correlation between AI and education?	2	Standard AI question
4	Does AI help in teaching-learning processes?	2	Standard AI question
5	Can AI assess students and give feedback?	2	Standard AI question
6	Can AI act as a tutor and recommend personalized learning paths/content?	2	Standard AI question
7	Can AI facilitate the process of teaching students with special needs?	2	Standard AI question
8	Is education being endangered by AI?	2	Standard AI question
9	Does AI help in translation?	3	Deep learning question
10	How well does AI translate from source text to target text?	3	Deep learning question
11	Rate how well AI performs when dealing with context, creativity, and accuracy	3	Deep learning question
12	How does AI translation compare to human translation?	3	Deep learning question
13	Is the profession of translation going extinct because of AI?	3	Concluding question
14	Are you scared of AI?	1	Concluding question

3. Results

The results from the questionnaire have been illustrated and represented in pie charts and graph charts so that we can specifically identify them in accordance to their resulting outcome. Each distinct question has a color for its logical identification along with the response that each individual happened to have chosen.

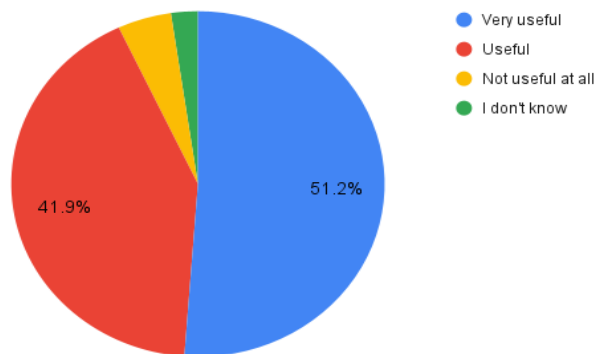


Figure 4.
How useful is AI?

Figure 4 represents the output results where the majority of the participants (93%) consider AI as useful to some extent (51.2% very useful, 41.9% useful). A small fraction (4.7%) believes that it is not useful at all, while only 2.3% is uncertain about its usage.

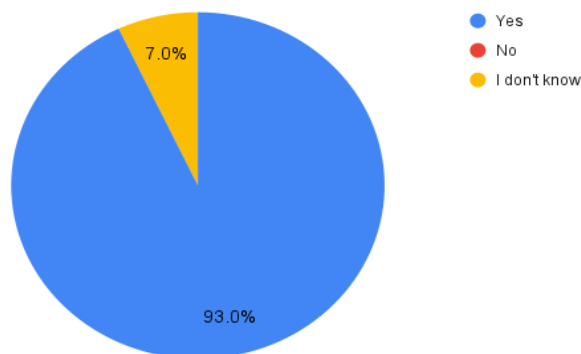


Figure 5.
Is AI easy to use?

Figure 5 shows the results where 93% of the respondents find AI particularly easy to use. On the other hand, only 7% of the target group appear unsure regarding its usage. No response claimed that AI is difficult to use.

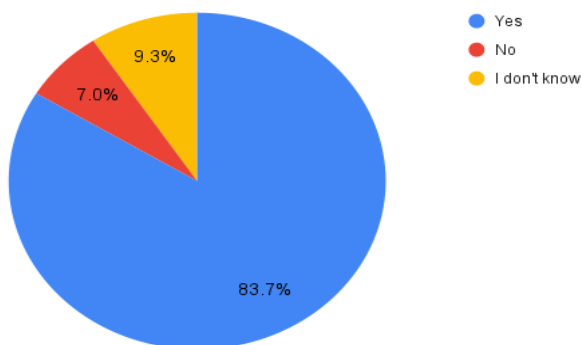


Figure 6.
Is there a correlation between AI and education?

According to Figure 6, which represents the data on whether there is a correlation between AI and education, it is shown that the majority of the respondents agree that there is a link between the two. A small minority (7%) disagree, whereas 9.3% are uncertain.

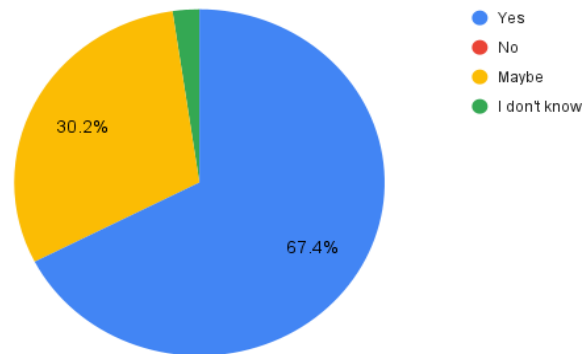


Figure 7.
Does AI help in teaching-learning processes?

From Figure 7, it can be seen that the majority of the target group (57.4 %) believe AI helps in teaching-learning processes, while 30.2% are uncertain about this potential effect in these processes. A small percentage 2.3% disagreed, and no respondents claimed a lack of knowledge.

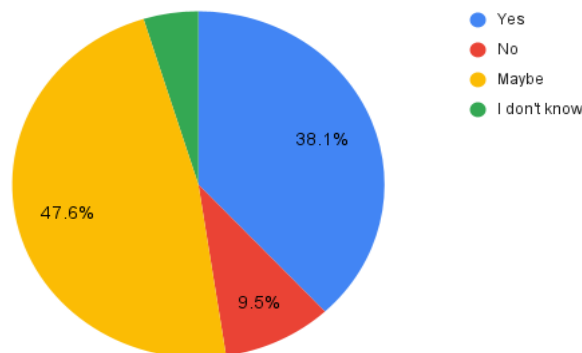


Figure 8.
Can AI assess students and give feedback?

Figure 8 demonstrates that while the majority of the respondents (47.6%) are unsure whether AI can assess and give feedback to students, a large part of the group (38.1%) are positive about this possibility. 9.5% disagree, while 4.8 % are unsure.

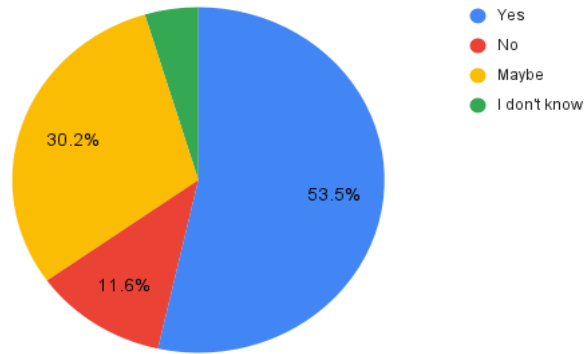


Figure 9.

Can AI act as a tutor and recommend personalized learning paths/content?

Figure 9 shows that more than half of the target group (53.2%) believe that AI can act as a tutor and can recommend customized learning content. 30.2% are unsure, 11.6% claim that this cannot be achieved, while 4.7% do not know about this possibility.

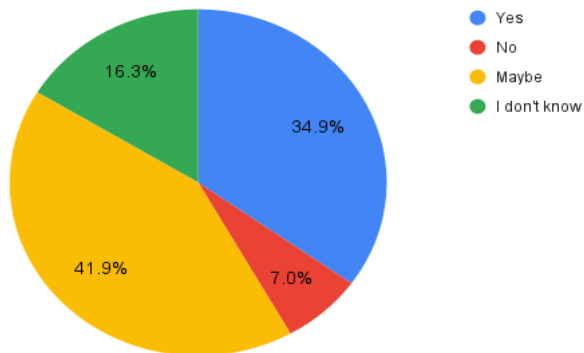


Figure 10.

Can AI facilitate the process of teaching students with special needs?

Figure 10 reveals the data on whether AI can facilitate the teaching process when dealing with students with diverse learning needs. The majority (41.9%) were unsure about this possibility, 34.9% agreed, 16.3% declared that they did not know, while 7% reported that AI cannot be helpful.

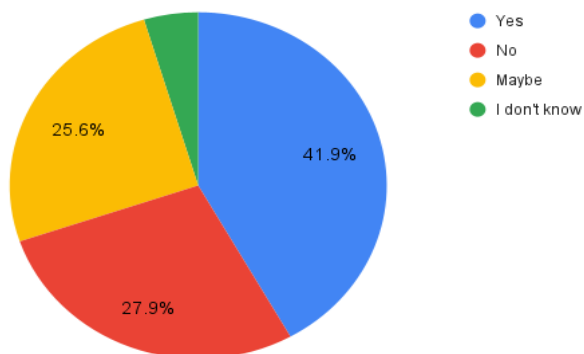


Figure 11.

Is education being endangered by AI?

Based on Figure 11, the output results show that the majority of the target group (41.9%) believe that the education system is being endangered by AI. A large portion (27.9%) disagree with this claim, while 25.6% are unsure regarding the possibility. Additionally, 4.7% do not know.

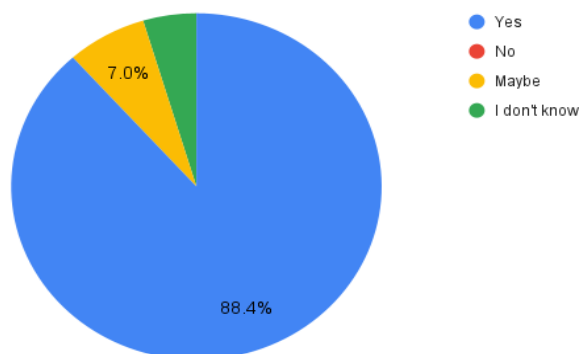


Figure 12.
Does AI help in translation?

In Figure 12, which represents data on whether AI can help in translation, the majority of the respondents (88.4%) agreed with the claim. On the other hand, 7% were unsure about this possibility, while 4.7% did not know. There were no responses contradicting this claim.

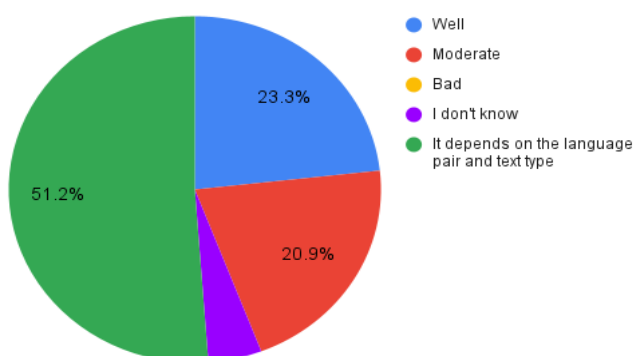


Figure 13.
How well does AI translate from source text to target text?

In Figure 13, when asked how well AI translates from source to target texts, the majority (51.2%) claimed that it depends on the language pair and text types. 23.3% reported that it translates well, and 20.9% rated it as moderate. There were no responses that rated it as bad, while only 4.7% were unsure about the quality.

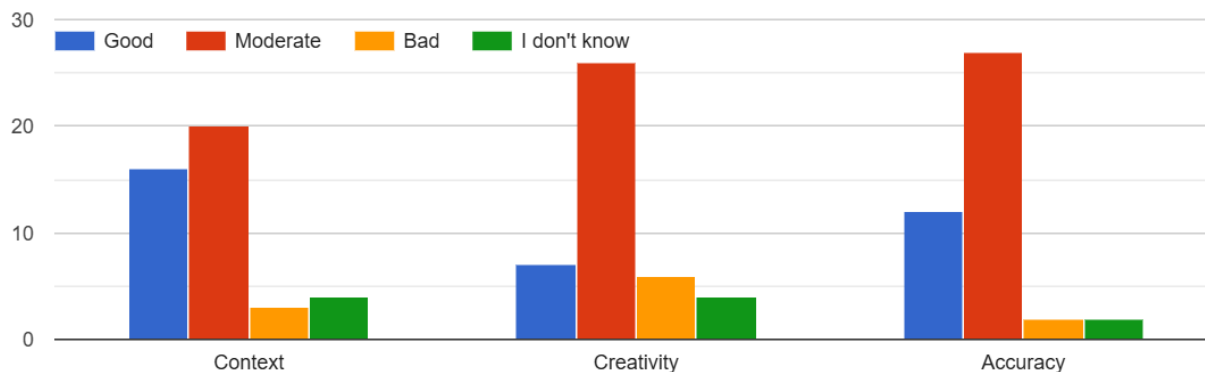


Figure 14.
Rate how well AI performs when dealing with context, creativity, and accuracy

Figure 14 shows the target group's perception of how well AI performs, in which the majority have rated AI as “Moderate” (46.51% context, 60.47% creativity, and 62.79% accuracy). There are positive ratings as “Good” in all categories (37.21% context, 16.28% creativity, and 27.91% accuracy), while negative ratings as “Bad”, even though present in all three categories, are considerably lower compared to the positive ones (6.98% context, 13.95% creativity, and 4.65% accuracy). On the other hand, there were also responses where the respondents were not sure about the performance of AI in any of the categories (9.3% context, 9.3% creativity, 4.65% accuracy).

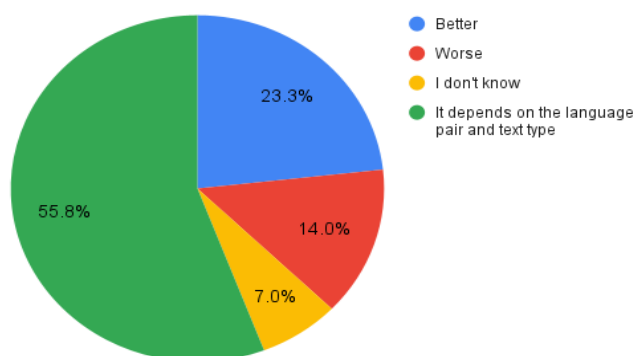


Figure 15.
How does AI translation compare to human translation?

Based on Figure 15, which displays how AI can be compared to human translation, the majority of the target group claimed that it depends on the language pair and text type. 23.2% think that AI is better, 14% claim that it is worse than human translation, while 7 % express that they do not know.

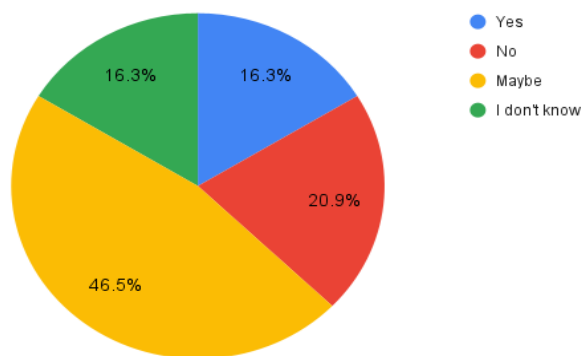


Figure 16.
Is the profession of translators going extinct because of AI?

In Figure 16, the data shows that only 20.9% of the target group do not think that AI will make translators obsolete, 16.3% think that translators can be easily replaced, while 16.3% do not know for sure. On the other hand, the majority (46.5%) think that there is the possibility of translators going extinct.

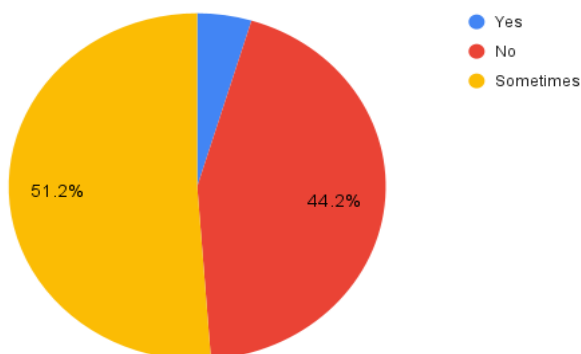


Figure 17.
Are you scared of AI?

Lastly, as depicted in Figure 17, most of the participants (51.2%) do not express fear toward AI, while a considerable amount (44.2%) report that they sometimes feel afraid. Only a low percentage (4.7%) indicated a consistent fear of AI.

4. Discussion

As education is different and has required a very conceptual way of teaching in different standard cultures, humanity has come to the conclusion that a one-to-one schooling model is much more effective than a one-to-many. This mode of teaching or schooling as it was considered predominantly in the Middle Ages, especially in the Far East, it turned out that students had a grand copy of the knowledge gained from the mentor at hand. This, however, was a very different form of teaching compared to some cultures that had a very different approach to education, and this was because only certain privileged individuals had the opportunity to attain education. With the implication of technology and ICT, education was completely reshaped, and it changed in a new era of full-time time perhaps homeschooling or schooling on the spot as some lecturers would consider. AI has not only provided us knowledge at hand point blank at a specific time and at a turning point in time, but we could easily use it rather than having to learn the basic background knowledge from different social science courses or at

least those who do not require a mathematical approach. According to our detailed questionnaire outcome, we could fully argue and agree both at the same chronological time that most emphasize that AI is a perfect example of a quick, essential, effective, and reliable way of having to learn and gaining knowledge at a fast pace in time. AI's capabilities are recognized by the majority of our target group and there is a general recognition of the role AI has and can have in educational practices and in our schooling systems. This includes, among many benefits, the possibility to assist in the process of assessment and evaluation, providing feedback, and tailoring content based on the learners' needs. Based on Kokaj and Maloku [15] particularly when the evaluation processes are involved, technological advancements can help develop detailed controlled models through which various feedback models for error and transparency analysis can be provided (p. 460). Similarly, Marouf, et al. [16] emphasize that the advancements in AI when integrated into Intelligent Tutoring Systems (ITS) can have the potential to "provide real-time feedback, adjust instructional content, and support diverse learning needs" (p. 15). Nevertheless, even though AI is being developed rapidly and it is a perfect way to have the one-to-one mentorship, its potential is not yet fully utilized when it comes to learners with disabilities or learning difficulties. The data retrieved from our questionnaire has shown that when it comes to teaching students with different/special learning needs, these tools are not being used to their full capacity. There are mixed opinions on whether this can be possible at all. However, various studies as Almufareh, et al. [17] and Harkins-Brown, et al. [9] have shown that various AI-powered tools, particularly the ones designated to improve communication and sensory skills play an essential role in supporting students with communication disabilities. Some of these tools which include speech-to-text or vice-versa systems, speech recognition ones, and simulators, are changing the way the majority perceives schooling systems. These tools not only foster inclusion for these students by meeting their unique needs and engaging them in hands-on learning experiences but also improve their educational outcomes.

On the other hand, unlike the education system, which has been conceptualized differently across cultures, translation has consistently been understood as a process of conveying meaning from one language to another. Yet, despite the rapid advancements in technology and AI, the fundamental purpose of translation remains unchanged. However, throughout the years and especially in the present day, these innovations have made translation more accessible than ever before, even outside the "noble" profession of translators/trained personnel. This perception has also been shown in our study outcomes. The greater part of our study group has claimed that the process of translation has been greatly enhanced by AI-powered tools, no matter which language pairs are involved. Tools like Google Translate and DeepL, among many others, have allowed to make this process to be seamless in real-time, while the workflows involved in the process have been tremendously shortened. However, although the process of translation has been greatly enhanced by the latest advancements, particularly with the new benchmarks used for testing machine translations in order to evaluate their quality and their performance, there are still gaps in these systems. The outcomes from our target group show that even though the process has become automated to certain extents, the expertise of human translators is still required, and the process of translation cannot be fully completed without any human touch. Texts or speeches can be automatically translated but with flaws. More than half of our respondents have declared that these flaws are particularly observed when certain language pairs or certain text types are involved. In addition to the involved language pairs and text types, the observed outcomes show that glitches are present even when context, accuracy, and creativity are involved. In general, our responses have shown that when the process of translation is fully performed by machine translation or any other AI-powered tool, the final outputs in these areas are rated as average. This allows us to infer that, despite the fact that AI tools are acknowledged for their efficiency in the overall process, they are still not capable of replacing humans. Consequently, this process ought not to be seen as a competition between human vs. machine translation, it ought to be thought of and perceived as a "symbiotic relationship" as Wang [18] emphasizes, where "machine-generated translations can serve as a preliminary step, providing a rapid framework that human experts can refine" (p. 24).

Overall, the data from our study shows that, apart from education and translation, the majority of our target group considers AI as beneficial to various degrees, which shows that these advanced technologies are recognized for their practical purpose and for their well-designated efficient workflow. Meanwhile, the observed low rate of responses that consider these tools as neither useful nor user-friendly may be due to a lack of ICT literacy, which might impact how these tools are perceived and how they can be applied for educational purposes. The importance of ICT tools has also been emphasized by Kokaj, et al. [19] as a necessity that has a great impact on how we perceive things in our daily basis as well as in the educational processes.

5. Conclusion

Online teaching has become a very important ongoing pragmatic method to feed different nations and continents, especially in places where only the so-called “electromagnetic waves” can reach. In regard to this, AI has had that substantial push into that ongoing backyard hardcore obsession. With that in mind, our research has come up with many remarks, advantages, and disadvantages, as well as, new traits that can reshape the way we think about AI and how we use it. Some of the key observed advantages of AI in education and translation, among many others, include the optimization of each involved process and the widespread accessibility it offers. However, these benefits come with certain drawbacks. A major concern is the effect that these tools have in our society, which gives us the impression that they are unmistakable. It is essential to remember that AI-powered tools and systems are trained on data that are initially written by humans, as well as, tested by benchmarks set by humans, which inherently undertake a certain margin of error. Apart from the impression of being infallible, two other key drawbacks that may affect how we will incorporate these tools into our educational and translation systems include the possibility of making us less self-reliant as well as losing our critical thinking, which are two crucial concepts that cannot be easily replicated or automated. This does not mean to say that we have to fully rely our full outcome source into AI. It would be partially incompetent to reiterate that AI is and will always be upgraded and will continue to play a very important role in our research, education and many other spheres of our lives, however, it is important to strike a balance between utilizing AI’s capabilities and maintain our human oversight in order to improve our social intellectual needs.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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