ChatGPT in Education: Exploring Teachers' Perceptions on Using AI-based Chatbots for Educational Purposes

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Abstract. The integration of Generative Artificial Intelligence (GAI) into education has gained significant attention, with ChatGPT emerging as a prominent tool, offering personalized, interactive, and automated support. This article presents the results of an exploratory research on the best practices of using AI for educational purposes. Adopting a mixed-method approach, this study explores the attitudes and perspectives of Moroccan instructors towards ChatGPT's use for educational purposes. Quantitative data was collected through a web-based survey shared with 53 Moroccan instructors from diverse educational backgrounds. The survey shed light on instructors' usage patterns and their perceptions of ChatGPT's benefits and concerns in educational settings. For providing in-depth insights into instructors' experiences, concerns, and attitudes related to ChatGPT, qualitative data was collected by organizing semi-directed interviews with six participants. The findings of this study indicate that approximately 58% of participants consider ChatGPT to be moderately effective, recognizing its capacity to enhance personalized learning experiences and student engagement. However, a notable proportion of instructors also express reservations about the effectiveness of ChatGPT in educational contexts. Qualitative data further highlight instructors' confidence for ChatGPT's potential to enhance teaching and learning by offering personalized support and facilitating the generation of educational resources, voicing concerns about the need to address the challenges instructors encounter such as disinformation, over-reliance and lack of contextualized output. In addition to training instructors on prompt engineering for better usage of Generative AI models in education.

Keywords: Artificial Intelligence (AI), Generative Artificial Intelligence (GAI), ChatGPT, Teaching practices

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Introduction

Artificial Intelligence (AI) has become a trend concept recently. This new technology has revolutionized the way people work in varied domains. The educational sector is no exception. After the launching of Generative AI, especially that based on Generative Pre-trained Transformer (GPT) Model, this new and innovative technology has been used for educational purposes. GPT based chatbots have been able to engage with users in interactive and communicative conversations, offering personalized and unique answers to their queries. Yet, the effectiveness of AI integration in the teaching-learning processes depend on how educators perceive this technology and to what extent they incorporate it in their practices. So, what is Generative Artificial Intelligence and what are its applications in the field of education?

The purpose of this research study is to explore secondary English teachers' attitudes and perspectives regarding the integration of ChatGPT, an AI-based chatbot, in the teaching-learning process. We aim to gain deep insights regarding educators' perceptions of the advantages, challenges of incorporating ChatGPT as a tool to improve the quality of the learning experience. The results of the study will contribute to the current discussion on generative AI. Hence, they will help practitioners identify the best practices for better integration of technology in the educational context.

1. Background and significance of generative Artificial Intelligence

Nowadays, Artificial Intelligence is considered as part of the fourth industrial revolution leading technology with its ability to imitate human behaviour based on human-like intelligence. According to Sarker (2022), there are many types of AI that can be integrated in applications to solve real-life problems . These types include 'analytical, functional, interactive, textual, and visual AI' (Sarker, 2022, p. 1). Given the dynamic nature of our current interconnected world, each type is adopted to solve specific problems. Analytical AI extracts information from data to produce recommendations. Functional AI is used in application to take actions. Interactive AI ensures automated communication without compromising interactivity. Textual AI uses natural language processing for text recognition and content generation. The last type of AI ,visual AI, covers computer vision and augmented reality fields (Sarker, 2022). Generative AI is part of the interactive artificial intelligence. This latter is used by businesses and institutions to solve problems related to users' services. For instance, Generative AI chatbots (conversational Chatbots) such as GPT-3.5, GPT-4 and Google Bard

that are software programmes which utilise artificial intelligence to engage in human-like conversations (Rudolph et al., 2023; Zhong et al., 2023), can serve the purpose of facilitating interaction and communication between businesses and their customers. Companies are currently using generative AI to reach out to customers by offering customer services via AI based chatbots. ChatGPT is an example of this technology. Lund and Ting (2023) define it as a Natural Language Processing (NLP) model that was developed and released in November,2022 by Open AI, an AI research laboratory that focuses on the development of 'friendly AI' with the aim of benefiting the human kind as a whole (OpenAI, 2015). NLP is the branch of computer science that aims at "creating computer systems that can understand and respond to human speech or written text" (Aydin & Karaarslan, 2023) which grant the chatbot a conversational dimension that makes it able to offer a unique interactive and tailored experience (Aydin & Karaarslan, 2023). ChatGPT makes use of complex algorithms to produce human-like behaviour responding to users' queries, called prompts. Its "answers follow-up questions, admits its mistakes, challenges incorrect premises, and rejects inappropriate requests'' (OpenAI, 2023). This potential makes of it a good source of information for educators of all levels.

2. Generative AI applications in education

Traditional learning environment lack the ability to provide faster assessment and better engagement opportunities. On the other hand, digital learning tools and technology can remedy to this shortcoming (Haleem et al., 2022). Generative AI, especially the technology based on GPT Model has been used in different fields including education. For educational use, ChatGPT has proven its potential in revolutionising the teaching-learning practices (Halaweh, 2023). It offers a large spectrum of uses that can revolutionize the way students learn in the fourth industrial revolution world. First, GPT model-based chatbots can offer students a personalized learning experience. According to Halawech (2023), Chatgpt can provide learners with answers to their questions, help them with explanations of difficult concepts, provide ideas for writing. Etc. This chatbot's assistance in searching information can help learners get more engaged and motivated towards the learning experience. In a study by Sallam (2023), ChatGPT has proven to be efficient in assisting students who are specialized in computer science in programming with code generation. The chatbot can correct students' codes and spot any potential mistakes in the code script. This feature can save students energy and time. Moreover, it fosters their understanding of the subject matter. Second, ChatGPT, can serve as an

automated translator. Enhanced with AI, ChatGPT can provide accurate translation of text in different languages maintaining the meaning and the context of the original text. (Sallam, 2023). Besides, it can engage in human-like conversations and help students get more engaged in speaking activities. The results of a research on the utility of AI-based chatbots in developing student's speaking skills have revealed that AI-based chatbots served as English conversation partner and engaged students to a great extent in the speaking activity (Yang et al., 2022) . Furthermore, AI-based chatbots can assist in writing and editing assignments which may help learners develop their linguistic skills. Third, GPT Model-based chatbot has the potential to provide learners with feedback that it personalized and tailored to their needs. This personalized feedback can help students better know their weaknesses and strengths in order to remedy to the areas that need improvement (Tlili et al., 2023). Finally, students can use the generative AI based chatbots to produce practice activities and checklists for self-assessment (Herft, 2023). In a nutshell, GPT Model-based chatbots offer several effective applications to assist learners by offering a personalized and interactive learning experience that would improve their learning journey.

Generative AI chatbots do not only enhance students' learning experience but also facilitates the teaching mission for teachers as well, in the era of the education 4.0. ChatGPT has brought about many changes in educators' teaching practices. These practices can be related to different educational components such as content creation, educational activities and assessment. According to Herft (2023), there are many benefits to using ChatGPT in teaching. One key advantage of ChatGPT for teachers is assisting teachers create lesson plans that align with the syllabus goals. This chatbot has a great potential in generating lessons plans according to predefined objectives communicated via determined prompts. The generated lesson plans perfectly cater to the needs of the learners which makes the whole teaching-learning process more personalized and effective. The second advantage of AI based ChatGPT is its capability of generating slides and worksheets related to a specific subject matter. The generated material can help educators better explain ideas and guide learning (Herft, 2023). The third advantage of using this conversational chatbot by teachers is the creation of tasks and the generation of questions for students with different-ability level to practise the learning component (Fleming et al., 2023), reflecting on the assignments and applying the previously received feedback. Furthermore, teachers can use ChatGPT as an alley for their professional development. Conversational chatbots such as Large Language Models can aid teachers by providing

resources and explanations of new teaching methodologies, technologies, and materials, which enhances their teaching practices (Kasneci et al., 2023).

Despite the wide range of positive applications conversational chatbots offer, they perform poorly while responding to knowledge and reasoning-based tasks prompts (Gamble et al., 2023). Hence, educators and learners should exercise more caution while using Generative Pre-trained Transformer chatbots for educational purposes.

Method

1. Participants

This study aims to explore Moroccan teachers' perspectives on the use of AI-based chatbots for educational purposes. 53 teachers from different directorates participated in this study. In order to ensure a broad perspectives representation, the sample was distributed across the Oriental region, Morocco. Additionally, six teachers took part in the qualitative data collection process for gaining deep insights regarding the integration of AI based chatbots in educational settings.

2. Procedure

For qualitative data collection, an initial invitation was sent to participants in order to get their consent based on some inclusion criteria: number of teaching experience years and the familiarity with Generative AI tools. Upon obtaining participants consent, semi-structured interviews were conducted virtually via WhatsApp.

The semi-structured interview protocol consisted of the following areas:

1. Perceived benefits: Questions related to the advantages teachers perceive while using AI for educational purposes.
2. Challenges: Questions related to challenges were raised to have better understanding of teachers' perceptions towards the difficulties faced and the concerns they have regarding this new technology.
3. Future implications: Teachers were asked about their recommendations for better integration of the Generative AI tools in the Moroccan educational system.

For the sake of avoiding bias in the study results, Participants were recruited via a stratified sampling technique as all the participants share some similar characteristics. They are English teachers, exercising in public secondary schools.

In order to collect quantitative data, an online structured survey was shared with participants via online networks mainly via LinkedIn and WhatsApp. The survey consists of four sections. The first section is devoted to demographics as to help with excluding participants who do not meet the inclusion criteria. The second section aims to gather data about teachers' attitudes of Generative AI for educational purposes. The third section aims to identify teachers' perceptions of Generative AI applications in the teaching and learning processes. The last section tackled the ethical dimension of AI use and the challenges teachers might face while integrating GAI in the learning settings. The data collected via the online based-survey is complementary to the qualitative insights from the semi-structured interview for better exploration of teachers' perceptions of GAI tools integration in the Moroccan educational context.

Upon completion of data collection, qualitative data was analysed using Atlas ti software for Qualitative data analysis. The interview audio responses have been transcribed using Microsoft word transcription, and then uploaded to the Atlas ti for thematic analysis after making the necessary coding of the variables. Whereas, quantitative data was analysed using Excel software. Excel has been used for diagram and tables generation.

3. Data Analysis

In order to capture deep insights regarding the use of Artificial Intelligence for educational purposes, quantitative data was analysed using Excel software. While qualitative data was analysed using Atlas ti software for qualitative data analysis. This section presents the findings of our research.

Findings

Over 624 teachers in the sampling frame, 53 participants filled in the web-based survey. 48% completed all the sections of the survey, where as 52% completed two sections only: demographics and the perceptions about ChatGPT.

Teachers' familiarity with AI

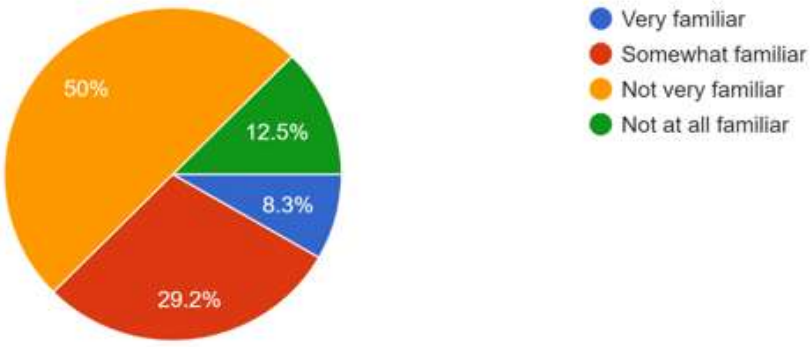

Fig. 1. Teachers' familiarity with ChatGPT

The figure above presents teachers' perception regarding their familiarity with ChatGPT chatbots. The examination of these results uncovers notable patterns. Firstly, it is worth mentioning that 50% of the participants expressed a lack of familiarity with this technology. This discovery raises apprehensions over the efficacy of integrating it into the educational setting, emphasising an urgent need for training and resources to enhance comprehension and utilisation of this technology. Furthermore, around 30% of instructors had a varying degree of familiarity, suggesting that they have some understanding of the technology but may not be using it to its full potential for educational purposes. Furthermore, the small percentage (8.3%) of instructors who assert a high level of familiarity with GPT Chat indicates that this technology is still extremely uncommon in contemporary teaching methods. The fact that 12.5% of instructors reported being completely unfamiliar with the technology emphasises the urgent need for clarification and assistance in order to successfully include GPT Chat into educational activities. These results emphasise the need of allocating resources to focused professional development programmes in order to fully use the educational potential of this new technology.

Training on AI-based chatbots

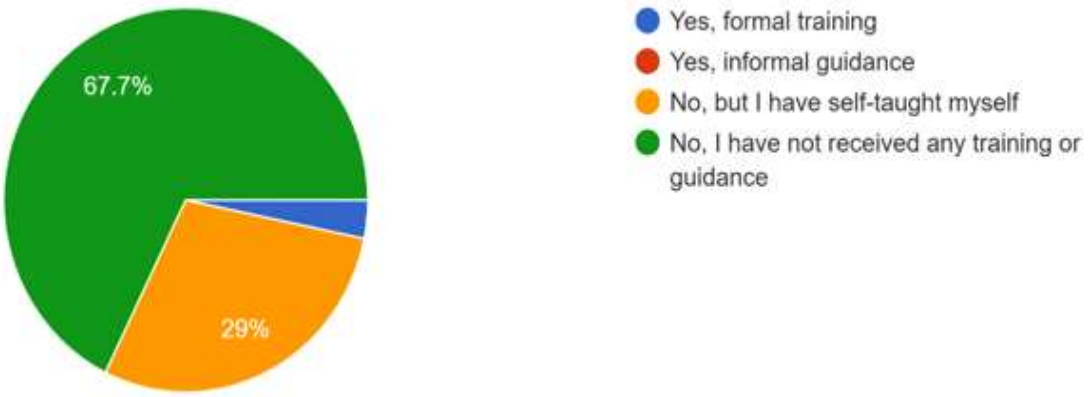

Fig. 2. Training and Self-Training Practices in the Use of Chatbots

The analysis of data related to the acquisition of training on the use of GAI chatbots reveals that a significant majority of participants (67.9%) did not receive any specialized training, indicating a lack of organized information on their effective use. However, 29% engaged in self-training, indicating a growing preference for self-education in these technologies. The use of this self-directed learning strategy may indicate people' inclination to adapt to technology advancements without relying on institutional courses. The remaining participants benefited from formal trainings, highlighting the need for specific proficiencies for chatbots. These findings emphasise the need for organizing formal trainings on the effective use of Generative Artificial Intelligence for educational purposes in order to maximize its integration in today's classrooms.

Validating chatbot output

Fig. 3. Validating Chatbot Responses in Educational settings

An examination of the data about the methods used to guarantee the appropriateness and precision of replies produced by chatbots in an educational setting uncovers a range of varied and illuminating viewpoints. Seventy percent of the participants said that they examine and modify the information produced by chatbots. This method emphasises the need of human assessment in order to guarantee that material aligns with educational goals. Furthermore, a notable proportion, 16%, indicated their awareness of the inherent constraints of chatbots, including the prudent use of ChatGPT and the need to acknowledge its deficiencies. This considerate mindset demonstrates an understanding of the moral and intellectual consequences linked to the use of conversational AI in an educational setting. Nevertheless, it is important to acknowledge that a portion of the participants voiced scepticism about this technology, believing it to be untrustworthy. This scepticism raises significant inquiries about the reliance put on automated technologies in education. In short, these results highlight the varied strategies adopted to ensure the quality and relevance of the responses provided by chatbots in the context of learning, as well as the various perspectives on the reliability of this technology.

The effectiveness of GAI chatbots

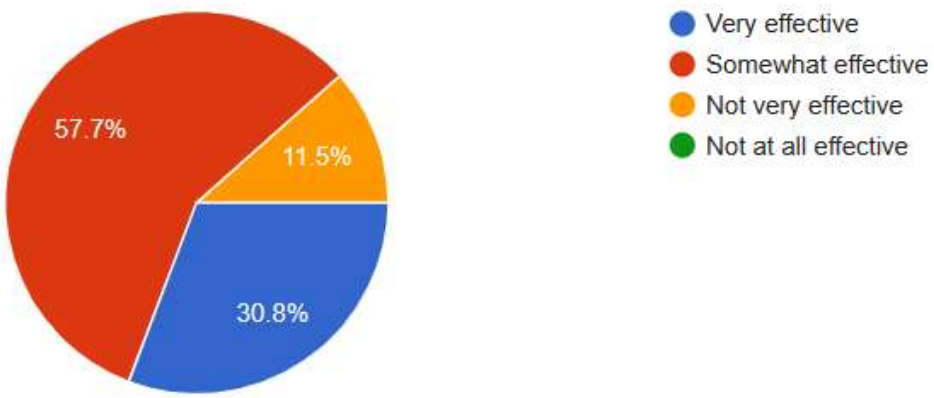

Fig. 4. The effectiveness of ChatGPT in education

The figure 4 shows the results related to the effectiveness of Generative Artificial Intelligence such as ChatGPT in education. The findings revealed that more than 57% of the participants perceive ChatGPT as somewhat effective. Approximately 39% of participants view this tool as

very effectives compared to only 11,5% that perceive ChatGPT as not very effective. These results show that all the participants have judged ChatGPT to be effective in education with different levels. Which makes us question the participants' practices integrating this emerging technology in education.

Qualitative data analysis

What do teachers use ChatGPT for?

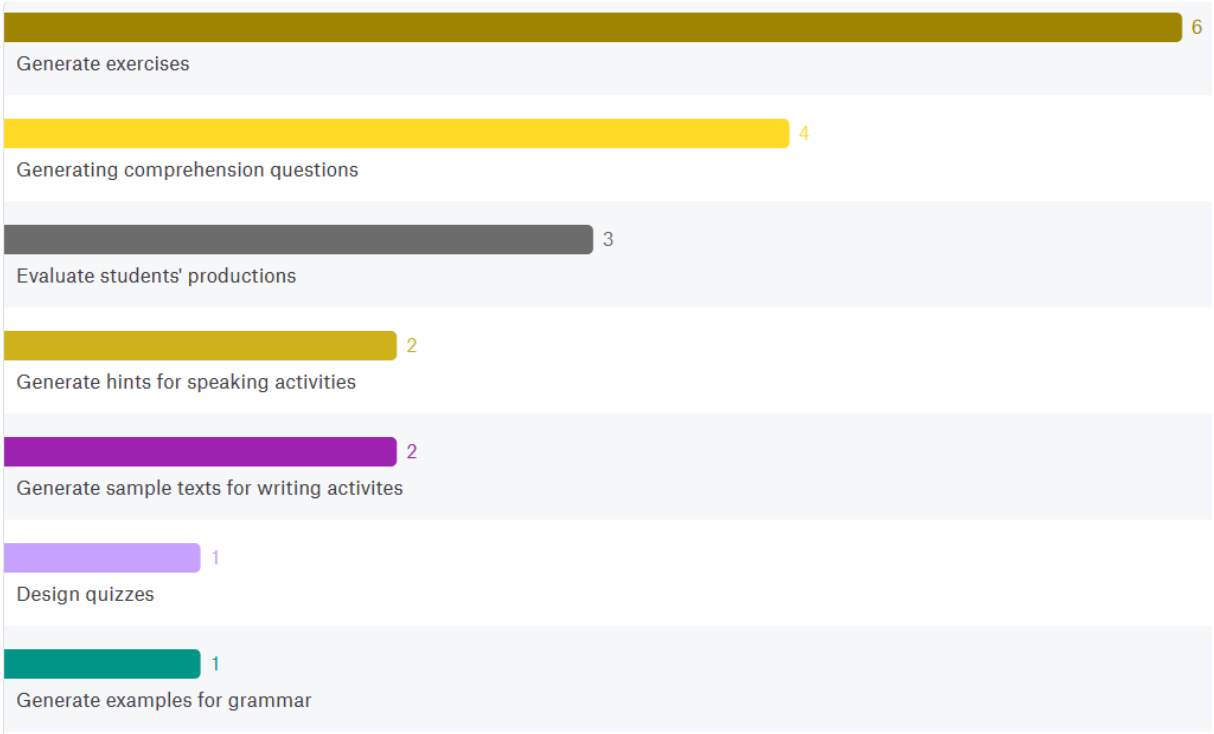

Fig. 5. The uses of GAI chatbots for educational purposes

The figure above presents the uses of ChatGPT by English educators. The findings demonstrate a wide range of teaching methods that make use of the functionalities of conversational artificial intelligence. Out of the participants, the generation of exercises is the most often used feature, with a 50% response rate. This technique aligns with the development of interactive activities designed to improve learners' language skills. Furthermore, the generation of reading comprehension questions is widely adopted, with a response rate of 33.3%. This emphasises the

use of ChatGPT in facilitating the understanding and examination of authentic texts. Moreover, the evaluation of student productions is a noteworthy use, as it has a response rate of 25%, which demonstrates the incorporation of AI into the process of both formative and summative assessment. In addition, 16.7% of respondents cited the generation of hints for both oral and written productions. This demonstrates how ChatGPT may be used to inspire creativity and help learners produce language. Finally, there are less common but nonetheless significant uses such as creating quizzes and generating dialogues and texts for teaching grammar communicatively, each having a response rate of 8.3%. The findings underscore the adaptability of Cha GPT in the context of English language instruction, presenting a wide range of opportunities for teaching English as a foreign language.

Challenges faced while using ChatGPT for educational purposes

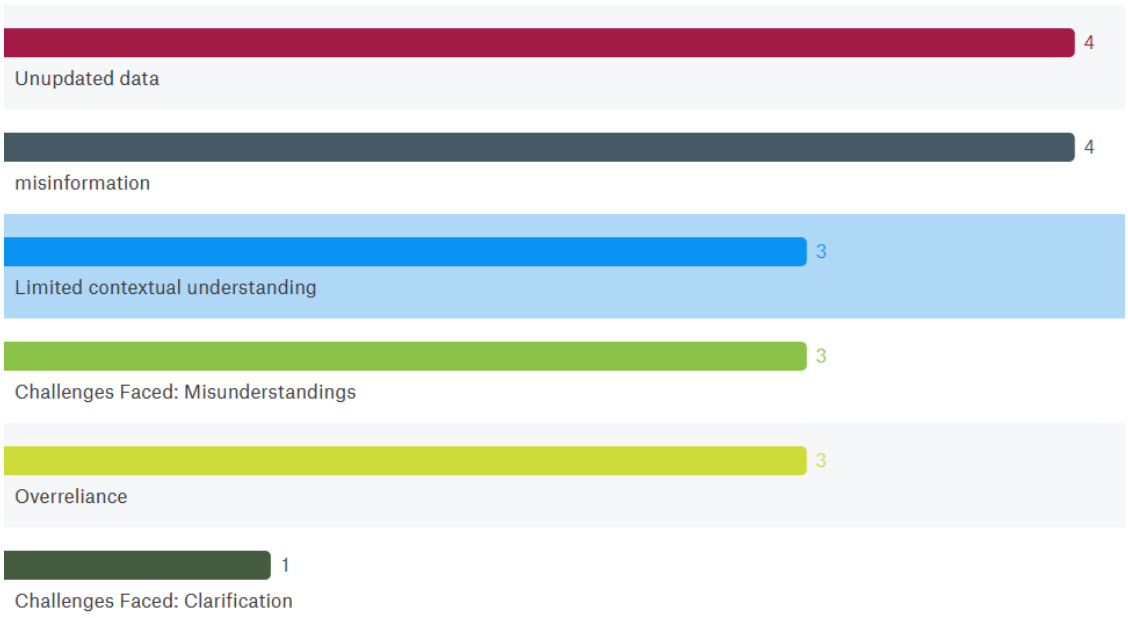

Fig. 6. Challenges faces while using GAI chatbots for educational purposes

The figure 5 illustrates the challenges faced by teachers while using ChatGPT for educational purposes. Among the respondents, 30.8% pointed to the issue of misinformation, highlighting the risks inherent in the generation of erroneous or inaccurate content by conversational AI.

Another significant challenge is the issue of unupdated information. The Chatbot provides information that is not accurate as the chatbot knowledge is currently limited to the period before 2021(free version). In addition, 23.1% of respondents cited limited contextual understanding as a major obstacle, illustrating the difficulties encountered by ChatGPT in accurately interpreting the specific context of educational tasks. Similarly, 23.1% of respondents expressed difficulties related to misunderstandings in interactions with ChatGPT, suggesting gaps in the AI's ability to adequately capture users' intentions and needs. A further 15.4 % identified a tendency to over-reliance on ChatGPT as a barrier, warning of the dangers of over-reliance on this technology in the teaching process. Finally, a few participants mentioned the need for clarification, highlighting the need for trainings on prompts engineering to help with providing clear prompts to overcome the barriers encountered. These results underline the substantial challenges faced by teachers in effectively integrating ChatGPT into their teaching practices, necessitating careful consideration of the issues involved.

Teachers' strategies for effective use of AI based chatbots

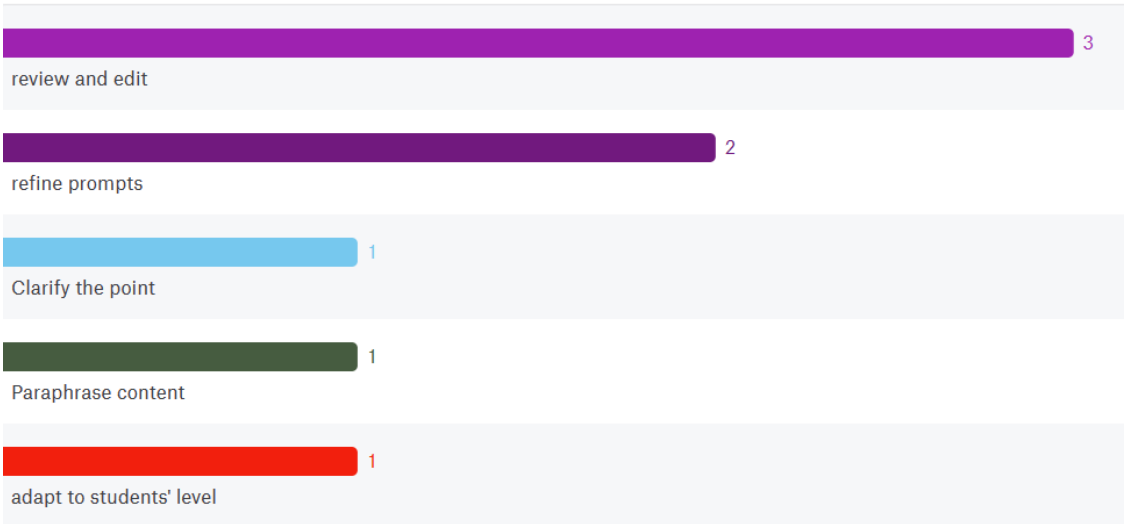

Fig. 7. Teachers' strategies for effective use of AI based chatbots

The analysis of the strategies adopted by teachers to ensure the accuracy of the content generated by ChatGPT reveals a range of thoughtful practices aimed at improving the quality and relevance of the teaching material produced. 37.5% reported the strategy of review and correction,

highlighting the importance of human intervention to rectify and refine AI-generated responses to make them more consistent with teaching objectives. In addition, a substantial number of respondents, 25%, mentioned the refinement of prompts as a common practice, highlighting the effort made to reformulate and clarify instructions in order to guide the chatbot in generating appropriate content. Similarly, other participants stressed the importance of paraphrasing the content generated, illustrating a strategy aimed at reformulating information in a more accessible way that is adapted to the target audience. Finally, some participants highlighted the adaptation of content to the level of the students, demonstrating a careful consideration for personalizing learning resources to meet the specific needs of their students. Overall, these strategies demonstrate the importance of human intervention in ensuring the accuracy of teaching materials.

The advantages of AI based chatbots

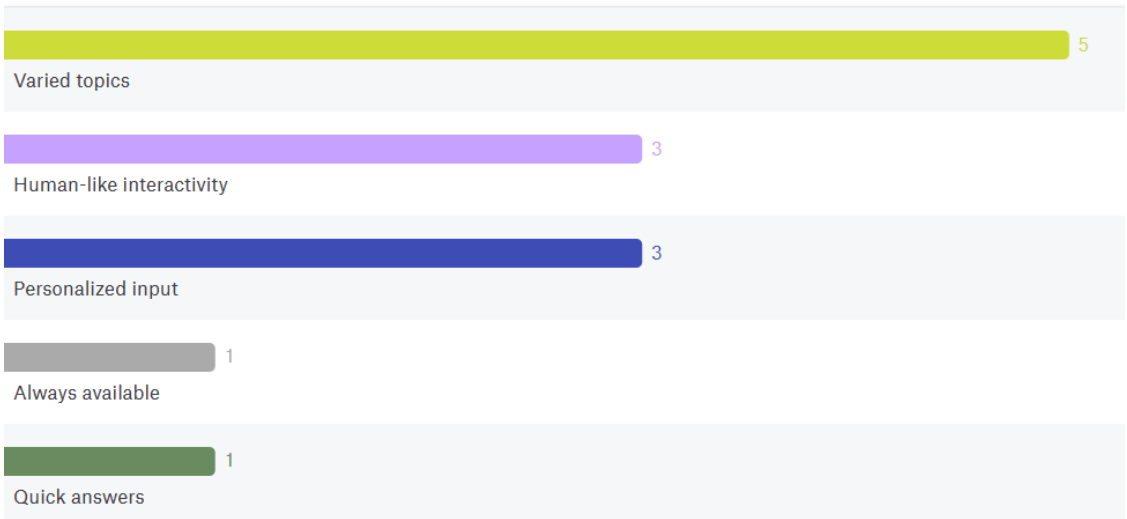

Fig .8. The benefits of using ChatGPT for educational purposes

The figure above highlights the advantages of using chatbots for educational purposes highlights a series of substantial benefits. A significant 55.6% of respondents highlighted the diversity of topics covered by chatbots, highlighting the ability of these systems to cover a wide range of educational topics, enriching the learning experience for students by providing access to a wealth of knowledge serving as a more knowledgeable tutor. One of the respondents stated:

> *"I guess it's like having someone who is more knowledgeable like a tutor who is available every time to clarify every concept. It is all the time at my disposal facilitating the research process for me"*

In addition, a notable 33.3% highlighted the human-like interactivity of chatbots, highlighting their ability to simulate natural interactions that promote learner engagement and participation. In addition, a similar proportion of respondents, 33.3%, highlighted the provision of personalised input by users, demonstrating the ability of chatbots to adapt to learners' individual needs, promoting a more individualised and effective learning experience. In addition, one respondent highlighted the constant availability of chatbots, emphasising their accessibility at all times, enabling learners to benefit from support and educational resources in a flexible manner. Finally, one respondent mentioned the speed of responses provided by chatbots, highlighting their ability to provide information quickly and efficiently, facilitating the learning process. These results underline the significant benefits that chatbots can bring to education, enriching the learning experience, engaging learners and providing personalised, accessible support. In order to maximize the use of GAI in education, participants recommended the organization of in-person trainings on the use of these chatbots for educational purposes, highlighting the importance of prompts engineering for effective use of chatbots along with adhering to the ethical standards on the use of AI in the teaching and learning processes.

Discussion

This study's results provide useful insights into the incorporation of Generative Artificial Intelligence (GAI) technologies, namely ChatGPT, in educational environments. It illuminates the attitudes and perspectives of Moroccan educators. The findings align with previous research, highlighting the advantages and challenges linked to the use of artificial intelligence in the field of education. The quantitative data demonstrates a range of familiarity levels among instructors with regards to ChatGPT, highlighting the need for thorough training programmes to improve comprehension and use of this technology. Furthermore, qualitative analysis explores how instructors use ChatGPT, emphasising its many uses such as suggesting activities, offering feedback, and aiding in content creation. While recognising the promise of AI technologies, instructors often voice worries about disinformation, contextual limits, and excessive dependence on these tools. Nevertheless, instructors use strategies such as review and correction, enhancing

prompts, and tailoring instructions to address these difficulties. Moreover, ChatGPT has many benefits such as its wide range of topics, human-like interaction, and customised input, which are consistent with the existing research and highlight its potential to enhance the learning process. These results add to the ongoing discussion about incorporating AI into education, highlighting the need to tackle the faced challenges while maximising the advantages of AI technologies to improve the quality of teaching and learning.

Conclusion

This research explores Moroccan instructors' perception towards integrating ChatGPT in educational settings. It highlights the need for extensive training and assistance to fully utilize AI technologies, while addressing issues like disinformation and excessive dependence. Teachers demonstrate innovative techniques to improve AI-generated information correctness. The study confirms the benefits of AI in education, highlighting its ability to enhance the teaching and learning processes in the era of Education 4.0. To fully utilize AI's capabilities, more research is needed, while ensuring ethical and responsible adoption of these technologies.

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