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Capturing the Full Potential of Maltese Language Learning through ChatGPT



JACQUELINE ŻAMMIT 

University of Malta
jacqueline.zammit@um.edu.mt

Abstract

The Chat Generative Pretrained Transformer (ChatGPT) is a state-of-the-art artificial intelligence (AI) language model developed by OpenAI. It employs advanced deep-learning algorithms to generate text that mimics human language. ChatGPT, launched on November 30, 2022, has rapidly gained widespread recognition. Its influence on the future of technology and artificial intelligence is anticipated to grow even more, considering it has achieved such significance in less than two years since its release. This study investigated the potential of ChatGPT as a tool for enhancing the learning of Maltese for adult international students. This study involved 41 participants who embarked on a journey of exploration and employed ChatGPT for two weeks to support their Maltese learning. The study evaluated the effectiveness of ChatGPT through surveys and focus group discussions and revealed that while ChatGPT was convenient and accessible, its ability to provide accurate responses to students' questions and support Maltese grammar, vocabulary, and conversational practice was limited. The participants expressed frustration with the ChatGPT's limitations in understanding and responding to the Maltese language. This study emphasizes the need to fully unleash the potential of ChatGPT by improving its training on the Maltese language and collaborating with Maltese language and AI experts to better support Maltese language learning. These findings have important implications for the development of ChatGPT for less widely spoken languages such as Maltese.

Keywords: ChatGPT, Maltese language learning, artificial intelligence, computer-assisted language learning (CALL), student experience and perception, foreign language acquisition

Abbreviations

AI: artificial intelligence

ChatGPT: Chat Generative Pretrained Transformer

NLP: natural language processing

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Data Availability Statement: All relevant data are within this paper.

Introduction

The rapid advancements in artificial intelligence (AI) and machine learning technologies have revolutionized our interactions with technology. Among these advancements, the Chat Generative Pretrained Transformer (ChatGPT) is a remarkable example. With its ability to enhance natural language processing (NLP) systems, ChatGPT enables machines to understand human speech and engage in meaningful conversations with users (Khurana, et al., 2023).

The potential of AI extends beyond NLP improvements and encompasses the creation of intelligent personal assistants and the development of deep learning replicas (Corneliu, 2022). These applications hold the promise of enhancing the accuracy and capabilities of machine learning models. In the realm of education, AI can revolutionize the teaching and learning process, offering new avenues for personalized and adaptive learning experiences (Seo et al., 2021).

As AI and machine learning technologies such as ChatGPT have gained popularity, they have the power to transform various aspects of our lives. One such area that stands to benefit is language learning. Mastering a foreign language often requires practice, feedback, and immersive experiences, which can be challenging to provide in traditional classroom settings. Leveraging the capabilities of ChatGPT presents an opportunity to unlock the full potential of language learning (Farrokhnia, et al., 2023). While this is particularly noteworthy in the context of less commonly taught languages such as Maltese, it is equally applicable to a wide range of languages.

ChatGPT's advanced capabilities make it a powerful tool for language learning. Its ability to understand and generate text in various languages can be particularly beneficial for learning languages with unique characteristics, such as Maltese. While the rich history and unique features of Maltese are discussed in detail later, it's important to note that the integration of AI, like ChatGPT, can significantly enhance the learning experience. By harnessing the power of the ChatGPT, it may be possible to create interactive and engaging environments where learners can improve their proficiency in Maltese. However, it is crucial to examine the effectiveness, limitations, and ethical implications of incorporating AI technologies in language learning.

This study aimed to delve into the potential of the ChatGPT in revolutionizing Maltese language learning. By conducting empirical research, gathering learner feedback, and analyzing the impact of AI-assisted language learning, this study seeks to uncover valuable insights. This research hopes to contribute to the ongoing discourse surrounding the role of AI in language learning and shed light on the untapped opportunities in Maltese language learning.

Statement of the Problem

Maltese, spoken by approximately half a million people in Malta, is a language with a rich linguistic heritage and a long history of use among the Maltese population. However, despite its significance to local culture, Maltese is considered a minority language. In recent years, there has been a trend of declining usage, particularly among the younger generation (Burstrom et al., 2021).

The challenges faced by the Maltese language are further exacerbated by the lack of digital resources available for teaching and learning purposes (Żammit, 2022a). As technology continues to advance, the potential for AI and NLP in the development of language learning applications is being increasingly recognized. NLP techniques enable computers to understand and manipulate human language, encompassing tasks such as machine translation, cognitive dialogues, information retrieval, and natural language generation (Pruneski et al., 2023).

Key advancements in NLP, such as bidirectional encoder representations from transformers (BERT) and generative pretrained transformers (GPTs), have significantly improved the accuracy of NLP tasks (Özçift et al., 2021). GPT, in particular, has garnered attention as a powerful tool for language acquisition (Burström et al., 2021). ChatGPT, a deep learning-based NLP system built upon the GPT-3 language model, has emerged as a promising application for language learning.

ChatGPT, which functions as a chatbot and can be powered by different versions of the GPT model (like GPT-4), offers conversational practice for language learners, assesses language proficiency, and provides targeted feedback (Kohnke et al., 2023). Its capabilities extend to tasks such as language translation and text analysis, allowing learners to engage in personalized, interactive, and efficient language learning experiences (Haleem et al., 2022). By leveraging the vast amount of text data available in the target language, AI models such as ChatGPT can facilitate the development of language proficiency and enhance language acquisition outcomes.

Given the unique characteristics and challenges associated with the Maltese language, there is a significant opportunity to leverage AI and NLP technologies, such as ChatGPT, to address the limitations and improve the effectiveness of Maltese language learning resources. By exploring the integration of the ChatGPT in the context of the Maltese language, this study aimed to reveal the full potential of language learning and provide valuable insights for educators and language learners alike.

Research Questions

The following are the three research questions for this study:

1. To what extent does the integration of ChatGPT enhance the effectiveness of Maltese language learning for adult international students?
2. What are the perceived benefits and challenges faced by participants in using ChatGPT as a tool for learning the Maltese language?
3. How can the limitations and challenges of ChatGPT in understanding and responding to the Maltese language be addressed to unlock its full potential for language learning?

Aims of the Study

The primary objective of this study was to evaluate the effectiveness of AI and machine learning technology, specifically ChatGPT, in facilitating the acquisition of the Maltese language. This study aimed to assess the potential benefits and challenges associated with integrating ChatGPT into Maltese language learning and to understand its impact on the overall language learning experience of adult learners.

By pursuing these aims, this study seeks to determine the role that ChatGPT can play in advancing Maltese language learning and overcoming language barriers. These findings will contribute to our understanding of how AI and machine learning technologies can be effectively utilized to enhance the acquisition and proficiency of the Maltese language, providing valuable insights for educators, language learners, and developers of language-learning resources. Ultimately, this study aimed to uncover new opportunities and strategies for harnessing the full potential of ChatGPT in the realm of Maltese language learning.

Literature Review

With the emergence of large language models such as ChatGPT, AI and machine learning technologies have witnessed remarkable growth in their applications in language processing. These advancements

have opened new possibilities for language learning, but the benefits and drawbacks of using ChatGPT for language acquisition have been the subject of scholarly debate.

AI and machine learning can enhance the precision of NLP tasks, including text-to-speech, machine translation, and automatic text summarization (Seo et al., 2021). They enable the identification of sentence boundaries, spelling errors, and words with multiple meanings, leading to improved performance in language-related applications (Firat, 2023; Kasneci et al., 2023). AI also has the potential to analyze text data, detect sentiment, and assist in understanding the composition of texts (Firat, 2023; Moore, 2019). However, the implementation of large language models such as ChatGPT comes with risks, such as model bias, interpretability challenges, and vulnerability to adversarial attacks (Shen et al., 2023).

Research has explored the use of ChatGPT in various language-related domains. Baidoo-Anu and Owusu Ansah (2023) highlighted the potential benefits of ChatGPT in delivering personalized learning experiences, increasing student engagement, and providing access to diverse language data. Topsakal and Topsakal (2022) demonstrated the effectiveness of a language teaching framework that integrated AR, voicebots, and ChatGPT for improving language proficiency among students. However, Biswas (2023) reported that ChatGPT is not yet capable of fully replacing traditional writing methods.

Pedagogical Implications of Integrating ChatGPT in Language Classrooms

The integration of ChatGPT in language classrooms has profound pedagogical implications that can enhance language teaching and learning (Kohnke et al., 2023). A significant pedagogical implication is the enhancement of interactivity and engagement. According to Farrokhnia et al. (2023), ChatGPT enables dynamic and interactive conversations, promoting active participation and motivation among learners. Through chat-based interactions, learners can engage in meaningful dialogues, ask questions, seek clarifications, and receive immediate responses, thus promoting engagement and interactivity. This interactivity fosters active participation and motivation and creates a more immersive language learning experience.

Kohnke et al. (2023) state that another advantage is the opportunity for real-time language production and feedback. Learners can practice their language skills by producing written responses in chat-based interactions. ChatGPT can provide instant feedback, correct errors, suggest alternative expressions, and facilitate language improvement in a timely manner. This immediate feedback mechanism can help learners refine their language skills effectively.

ChatGPT can offer individualized learning experiences by adapting to learners' needs and preferences. Chinonso et al. (2023) claim that ChatGPT tailors the content, difficulty level, and pace of interactions based on learners' proficiency, allowing them to focus on specific areas of improvement and progress at their own pace. This customization ensures that learners receive targeted support, promoting more efficient language learning.

El Shazly (2021) states that ChatGPT provides an error-tolerant environment that encourages learners to experiment with language without fear of judgement or embarrassment. This can reduce anxiety and create a relaxed atmosphere, enabling learners to take risks, make mistakes, and learn from them. The error tolerance feature can promote a positive and supportive learning environment.

The continuous availability and scalability of ChatGPT make it accessible at any time and accommodate many learners simultaneously. This scalability allows learners to access language practice and support whenever needed, irrespective of geographical or time constraints (Partha Pratim, 2023). The availability of ChatGPT promotes flexibility and widespread adoption in language learning settings.

Integrating ChatGPT in language classrooms promotes learner autonomy, as learners can interact with ChatGPT as a virtual language tutor, accessing language practice and support anytime and anywhere (Kohnke et al., 2023). This autonomy empowers learners to engage in self-directed language learning activities and receive continuous guidance and support.

According to Partha Pratim (2023), the integration of ChatGPT enables multimodal learning possibilities. Educators can combine ChatGPT with multimedia resources such as images, audio, and video, creating diverse language learning activities. This multimodal approach can enrich the language learning experience and provide learners with different modalities to engage with the language.

Kasneji et al. (2023) claim that integrating ChatGPT in language classrooms requires teacher training and professional development. Educators need to acquire the necessary knowledge and skills to effectively incorporate ChatGPT into their teaching practices. Ongoing professional development can support educators in harnessing the potential of ChatGPT to enhance language teaching and learning.

Therefore, the integration of ChatGPT in language learning and classrooms offers advantages such as enhanced interactivity and engagement, real-time language production and feedback, individualized learning experiences, error tolerance, continuous availability, and scalability. It also has profound pedagogical implications, including the enhancement of interactivity and engagement, access to authentic language use, promotion of learner autonomy, multimodal learning possibilities, and the need for teacher training and professional development. By leveraging these benefits and considering appropriate pedagogical strategies, educators and learners can optimize language learning outcomes and promote effective communication skills.

Limitations of ChatGPT in Language Learning

While ChatGPT has shown promise, there are challenges to consider in its application for language learning. Hwang and Chang (2021) noted that ChatGPT's generated language may be inaccurate or inappropriate for learners, lacking contextualization and support. Frances and Zimotti (2023) highlighted potential limitations in the sophistication and quality of language generated by ChatGPT, which may impact learners' understanding and usage.

A significant limitation is the lack of contextual understanding. While ChatGPT can generate coherent and contextually relevant responses, it operates on statistical patterns rather than on deep contextual comprehension (Lund et al., 2023). Consequently, it may struggle to grasp the nuances, ambiguities, and subtleties of language that heavily rely on context. This limitation can result in occasional misinterpretations and less accurate responses, particularly in complex or context-dependent language situations.

Another limitation is the potential for inaccuracies and errors. Despite its impressive language generation capabilities, ChatGPT is not infallible. It can occasionally produce grammatically incorrect sentences, offer incorrect information, or generate responses that may sound plausible but are factually incorrect (Sejnowski, 2023). Relying solely on ChatGPT for language accuracy may lead to the internalization of incorrect language patterns or misinformation, hindering learners' language development.

ChatGPT also has limitations in terms of sociocultural and pragmatic knowledge. A deep understanding of cultural references, idiomatic expressions, or social norms, which are crucial for effective language use, may not exist (Cao et al., 2023). Consequently, learners using ChatGPT may find it challenging to develop the communicative competence and pragmatic language skills necessary for natural and contextually appropriate language production.

Furthermore, according to Lin (2023), ChatGPT's text-based, asynchronous mode of operation reduces face-to-face interaction. Language learning involves more than just written communication, and learners may miss out on critical aspects such as body language, intonation, and facial expressions that contribute to effective communication. The absence of real-time, synchronous interactions may impact the development of speaking and listening skills, which are vital components of language proficiency.

Another limitation is the dependency on pre-existing language proficiency. ChatGPT functions as a language enhancement tool rather than a comprehensive language learning solution. Learners who do not possess a solid foundation in the target language may find it challenging to fully benefit from ChatGPT, as it may not provide sufficient guidance and scaffolding for beginners or learners with limited language skills (Javaid et al., 2023). A strong language foundation is necessary to optimize the use of ChatGPT.

Ethical and safety concerns are also important limitations to consider. Partha Pratim (2023) claims that ChatGPT generates content based on the data it has been trained on, which may include biased, offensive, or inappropriate language. Ensuring the ethical and safe use of ChatGPT in language learning requires careful monitoring, content filtering, and oversight. Educators must exercise caution and implement safeguards to mitigate potential risks associated with content generation.

Furthermore, there is a risk of overreliance on ChatGPT. Kohnke et al. (2023) state that while ChatGPT can serve as a valuable tool for language practice, an excessive dependence on it as the primary source of language interaction may discourage learners from seeking authentic language interactions with native speakers or other language learners. Developing proficiency in a language involves engaging in meaningful conversations with diverse individuals, and an overreliance on ChatGPT may limit exposure to authentic language use and impede the development of real-world communication skills.

Understanding these limitations is crucial for educators and learners to make informed decisions about the integration and appropriate use of ChatGPTs in language learning. By acknowledging these constraints, educators can implement strategies to address these limitations and create a balanced learning environment that maximizes the benefits of ChatGPT while supplementing it with other language learning activities and authentic language interactions.

In evaluating the advantages and disadvantages of using ChatGPT for language learning, researchers emphasize the need for careful consideration and evaluation of its utility. Allouche (2023) emphasized the importance of weighing the benefits of access to language data and personalized feedback against the challenges of inaccuracies, cultural context, and language quality assessment. Learners must make informed decisions based on their specific needs and goals (Allouche, 2023).

Methodology

To investigate the effectiveness of ChatGPT in facilitating the acquisition of the Maltese language, mixed methods were employed in this study. Purposive sampling (Saunders et al., 2012) was used to select 41 international students who were learning Maltese at an intermediate level (CEFR B1) in individual or group evening courses. These participants were between the ages of 21 and 76 years, multilingual, and represented diverse countries such as Morocco, India, Pakistan, Serbia, Russia, Ukraine, Somalia, Kenya, Libya, Venezuela, and Colombia.

Ethical approval (EDUC-2023-00680) for the study was obtained from the University Research Ethics Committee (UREC) at the University of Malta. After receiving approval, the participants were asked

to use ChatGPT for two weeks before data collection. This timeframe allowed them to become familiar with ChatGPT and provided sufficient exposure to assess its impact on their Maltese language learning.

The data collection process involved two stages, combining quantitative and qualitative approaches. In the first stage, quantitative data were collected through a survey administered to the participants. The survey consisted of structured questions designed to measure the participants' overall satisfaction with ChatGPT, its comprehension and response capabilities in the Maltese language, and the quality of its output. These quantitative data provided a systematic and standardized way to assess the participants' attitudes, experiences, and opinions regarding the use of ChatGPT.

In the second stage, qualitative data was collected through an online focus group discussion conducted via Zoom, with all 41 participants taking part. The focus group discussion was conducted entirely in English, eliminating the need for translation. This discussion aimed to collect more in-depth feedback and insights from the participants regarding their experiences with ChatGPT in learning the Maltese language. The focus group discussion allowed for open-ended questions, enabling the participants to share their perspectives, challenges, and suggestions related to the use of ChatGPT.

The quantitative and qualitative sets of data were analyzed and compared using statistical tests in SPSS and qualitative data analysis software, such as NVivo. This mixed-methods approach allowed for triangulation of the results, enhancing the validity and reliability of the findings (Żammit, 2022b). By integrating quantitative and qualitative data, this study aimed to gain a comprehensive understanding of the complex relationships among variables, experiences, and the use of ChatGPT in Maltese learning.

The analysis of the data involved identifying patterns, trends, and themes within the responses provided by the participants. The quantitative data provided statistical insights, while the qualitative data provided rich and detailed information about the participants' experiences and perspectives. The mixed methods approach, integrating both types of data, provided a nuanced understanding of the research problem, surpassing the insights from either method alone (Żammit, 2022b). This comprehensive examination of ChatGPT's effectiveness for accessing the Maltese language, allowed for drawing robust conclusions and generating valuable insights for Maltese educators and learners.

Analysis and Discussion

Quantitative Results

The quantitative results of the study provided valuable insights into the participants' experiences and perceptions regarding the use of ChatGPT for learning the Maltese language. In the context of this study, "always" and "consistently" are used to describe the frequency and regularity of the participants' usage of ChatGPT for learning the Maltese language during the two-week period. Clarification of these terms:

"Always": This term is used to indicate that the participants engaged with the tool every time they had a learning session during the two-week period. It does not necessarily imply daily use, but it does suggest that the tool was utilized whenever the participants engaged in their language learning activities.

"Consistently": This term refers to the regular and steady use of ChatGPT by the participants. Those who used the tool "consistently" likely integrated it into their regular learning routine, using it frequently throughout the two weeks.

It is important to note that the exact frequency (e.g., daily, every other day) is not specified in the study because the participants did not give enough information to determine the exact frequency.

As shown in Table 1, all participants had access to ChatGPT, particularly during the study’s two weeks, but the frequency of access varied. Table 1 reveals that 73.2% (30 participants) consistently accessed ChatGPT during the two weeks of learning the Maltese language. However, 26.8% (11 participants) reported not always using ChatGPT during this period.

How Easy was it to Use ChatGPT for Learning the Maltese Language?

Despite having access to ChatGPT, some participants experienced difficulty learning Maltese with AI. This study aimed to determine the ease with which learners use ChatGPT to learn the Maltese language. The results are depicted in Figure 1 below.

Figure 1 illustrates the ease of use of ChatGPT for learning the Maltese language as reported by the participants. According to the Figure, 23 participants found it very easy to use ChatGPT for learning Maltese, while 16 participants found it somewhat easy. Two participants were neutral, indicating that they found it neither easy nor difficult. Importantly, none of the participants found the tool to be somewhat difficult or very difficult to use for learning Maltese.

Table 1 Consistency of ChatGPT usage during the two weeks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	30	73.2	73.2	73.2
	Not always	11	26.8	26.8	100.0
	Total	41	100.0	100.0	

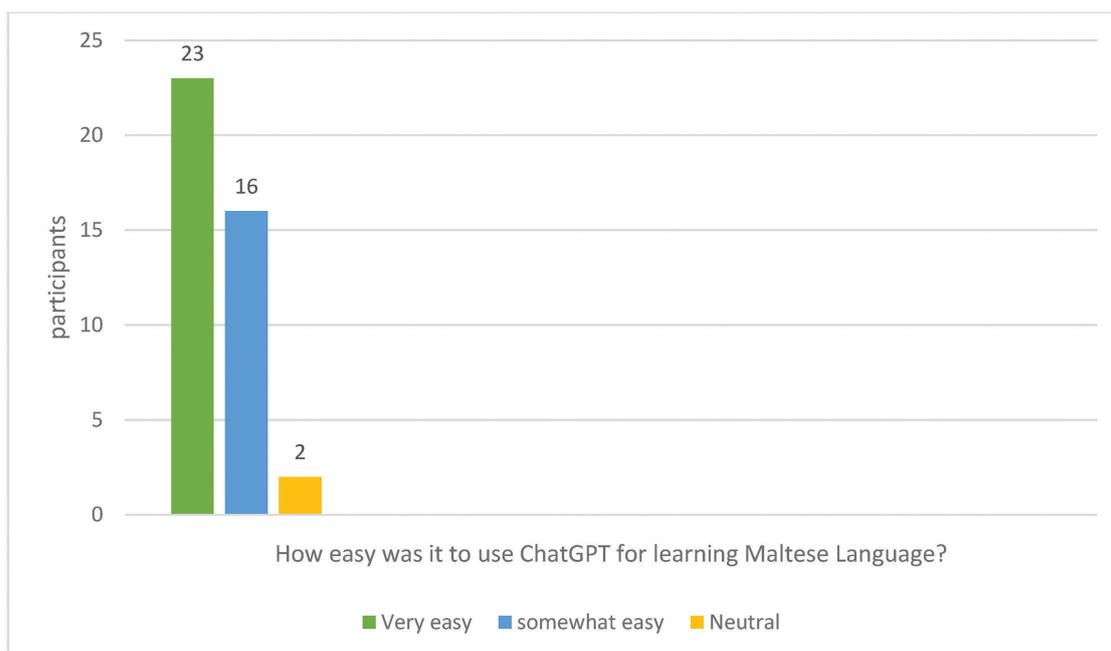


Figure 1 ChatGPT’s ease of use for learning the Maltese language.

The Accuracy of ChatGPT Responses

The results presented in Figure 1 confirm that the participants generally found it easy to use ChatGPT for learning Maltese. Additionally, the study investigated the accuracy of ChatGPT's responses concerning vocabulary, grammar, cultural context, and conversational practice while learning Maltese. The results are shown in Table 2 and Figure 2 below.

Figure 2 presents the participants' perceptions of ChatGPT's accuracy in responding in the Maltese language. The majority of the participants (59%, or 24 out of 41) reported that ChatGPT's responses were mostly inaccurate. In contrast, a small fraction (6%, or 5 participants) found ChatGPT's responses to be accurate most of the time. A single participant (1%) reported that ChatGPT's responses were consistently accurate. The remaining 14% of the participants held neutral views on ChatGPT's accuracy. These results highlight a significant room for improvement in ChatGPT's handling of the Maltese language.

Table 2 *The accuracy of the responses provided by ChatGPT*

		Frequency
Valid	Yes, always	1
	Yes, most of the time	5
	Neutral	11
	No, most of the time	24
	Total	41

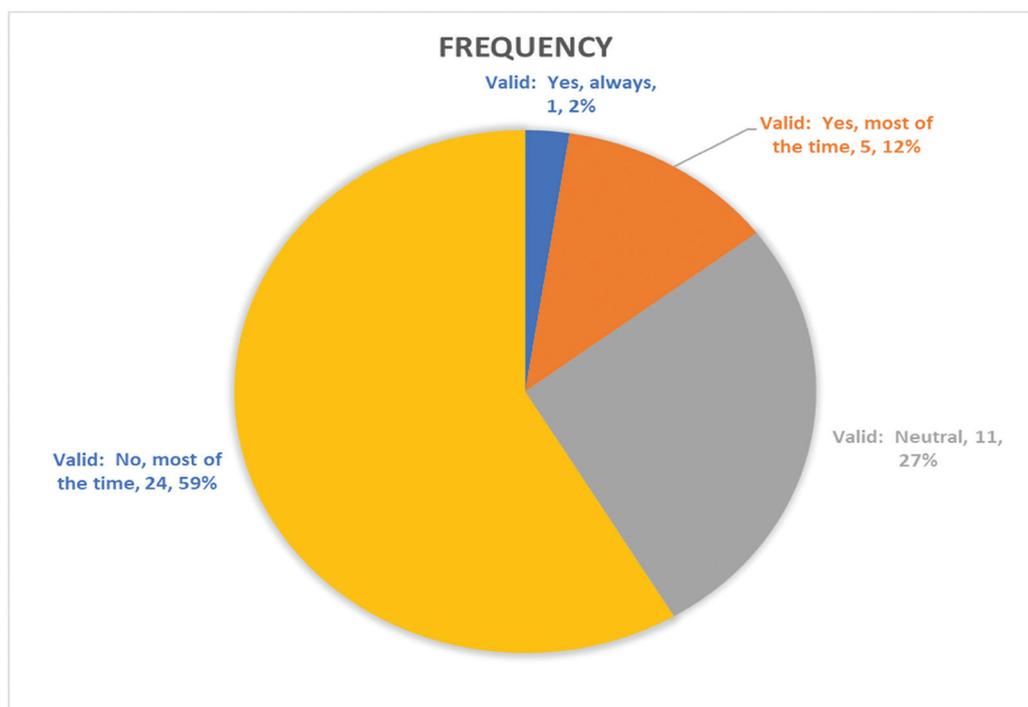


Figure 2 *The Frequency of using ChatGPT.*

According to the findings presented in Figure 3, the helpfulness of ChatGPT for learning the Maltese language is as follows:

- Somewhat Helpful: 13 participants
- Helpful: 7 participants
- Somewhat Unhelpful: 17 participants
- Not Helpful at All: 4 participants

These numbers accurately reflect the distribution of responses among participants regarding the efficacy of ChatGPT in aiding their learning of the Maltese language.

Additionally, Figure 3 confirms that most participants agreed that ChatGPT provided inaccurate answers concerning the Maltese language. Moreover, in terms of the usefulness of the information provided about the grammar and vocabulary of the Maltese language, the majority of participants indicated that ChatGPT was not helpful.

The pie chart in Figure 4 shows that 61% of the 41 respondents indicated that they would not recommend ChatGPT to other foreign language learners. However, 39.02% of the others agreed with the recommendation of ChatGPT to other Maltese learners. Figure 4 illustrates that 39% of participants perceived ChatGPT as helpful, while 61% did not find it helpful. These findings are consistent with the results presented in Figure 4, indicating that ChatGPT was not deemed helpful in terms of grammar, vocabulary, conversational practice, or cultural context. Since the responses were not helpful, 60.98% of the participants deemed recommending ChatGPT to other Maltese language learners inappropriate.

The study's findings indicate that while ChatGPT has been recognized as a beneficial learning tool in various contexts (e.g., El Shazly, 2021; Haleem et al., 2022; Kasneci et al., 2023), its effectiveness in the context of the Maltese language remains limited. Although ChatGPT is user-friendly and accessible, its applicability for learning Maltese is hindered by inherent limitations.

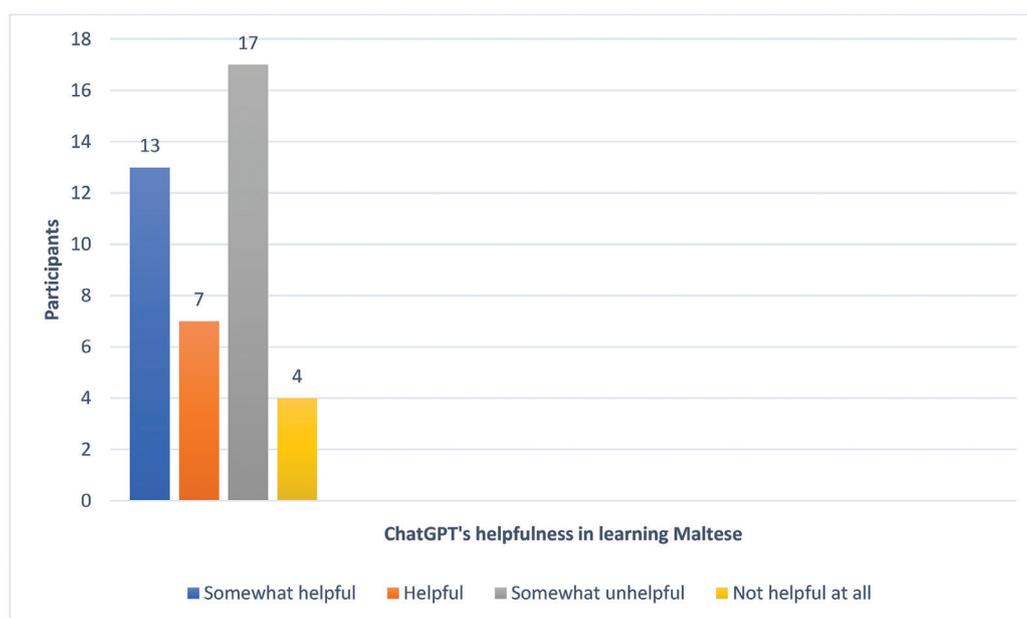


Figure 3 The helpfulness of ChatGPT for learning the Maltese language.

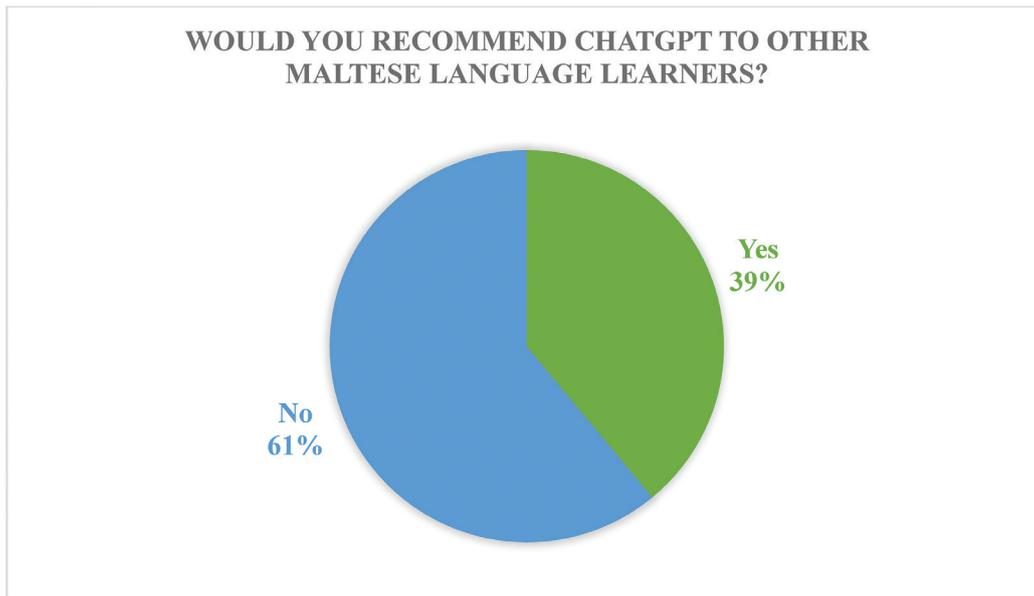


Figure 4 Recommendation of ChatGPT to other Maltese language learners.

The challenges observed in the study cannot solely be attributed to user inexperience or lack of guidance. Rather, the primary issue lies with ChatGPT itself, particularly its inadequacy in handling the nuances of the Maltese language. Despite being utilized independently by participants over two weeks, with varying levels of engagement, ChatGPT's shortcomings were evident across multiple aspects, including conversational practice, vocabulary, grammar, and cultural context.

Of the thirty-seven participants who expressed frustration with ChatGPT's limitations in responding to Maltese language queries, it is evident that the tool's deficiencies significantly impacted their learning experience. Consequently, recommending ChatGPT for international learners seeking to learn the Maltese language is not advisable due to its unreliable accuracy and suitability.

Therefore, while participant experience and engagement varied, the root cause of the observed problems predominantly stems from ChatGPT's inability to effectively support learning in the context of the Maltese language, rather than solely from user unfamiliarity or lack of guidance. Thus, using ChatGPT as a learning aid for a less commonly taught language like Maltese proves to be impractical and inconvenient.

The participants' willingness to recommend ChatGPT to other Maltese learners reflects their overall experiences. While a majority expressed reluctance, citing observed limitations in accuracy and helpfulness, a smaller portion was open to recommending it, likely influenced by positive experiences or specific features. Exploring the rationale behind these recommendations would offer valuable insights into ChatGPT's areas of potential.

Qualitative Analysis Using NVivo

In this qualitative analysis, the focus group transcripts were analyzed by using NVivo to identify themes and codes related to the participants' experiences with ChatGPT for learning the Maltese language. The appendix presents the themes and codes emerging from the transcripts about the use of ChatGPT3 for learning the Maltese and English languages.

Discovery of ChatGPT

The theme “Discovery of ChatGPT” reflects the different ways in which the participants became aware of ChatGPT as a language learning tool. Thirty-three participants mentioned various sources through which they learned about ChatGPT. These sources included “recommendations from friends”, “personal research on AI and language technology”, “reading articles about OpenAI and its projects”, “podcasts about AI and machine learning”, “web searches for language models”, “recommendations from professors” and “discussions on cutting-edge AI technology”.

I discovered ChatGPT through a friend's recommendation and delved into AI research, read about OpenAI projects, and searched for language models. A professor's recommendation further intrigued me. Now, ChatGPT is an indispensable tool for my English language learning process, but I cannot say the same thing for my Maltese language learning.

Participant 14

Likes and Dislikes of ChatGPT

Thirty-eight participants expressed their opinions about what they liked and disliked about using ChatGPT for language learning. The positive aspects of these studies included the convenience of “practicing English language skills”, receiving “instant feedback”, and “expanding vocabulary and comprehension of the English language”. The negative aspects of ChatGPT included “inaccurate responses for Maltese”, “limited understanding of Maltese context”, “unnatural language”, “difficulty in understanding their questions in Maltese”, and “preference for other resources rather than ChatGPT”. These codes captured the participants’ evaluations of the strengths and weaknesses of ChatGPT in supporting language learning. A participant’s feedback emphasized the contrast between their positive experience using ChatGPT for learning English and the challenges encountered when using it for learning Maltese, shedding light on the tool’s performance discrepancy across languages.

I really liked using ChatGPT for learning English. It was so convenient for practising my English language skills and getting instant feedback. It helped me expand my vocabulary and comprehension of English. However, I faced some issues with the ChatGPT's responses in Maltese; they were inaccurate and lacked an understanding of the context. The language also felt unnatural, and sometimes it was difficult to make ChatGPT understand my questions in Maltese. It also came up with many non-existent words. Therefore, I preferred using other resources instead of ChatGPT for learning Maltese.

Participant 6

Challenges of Using ChatGPT

The participants discussed the challenges they faced while using ChatGPT to learn Maltese. The challenges included difficulties in “understanding responses”, “lack of accurate answers”, “trouble communicating in Maltese”, “confusion caused by the user interface”, and “limited motivation” due to the perceived lack of improvement in Maltese language skills. These codes highlighted the specific areas where the participants encountered difficulties or limitations when using ChatGPT. Participant 13’s feedback further underscores these challenges:

Participant 13 said, “Using ChatGPT for learning Maltese was challenging. Understanding responses and obtaining accurate answers were difficult. Communicating in Maltese with the system was a struggle due to the confusing user interface.”

The Impact of the ChatGPT Scale on English Language Learning

The participants recounted their experiences using ChatGPT for learning English as a foreign language. The majority of respondents (87%) reported notable enhancements in vocabulary, pronunciation, fluency, personalized responses, feedback on strengths and weaknesses, as well as a deeper understanding of English culture and traditions. This theme underscores the positive influence of ChatGPT on participants' English language learning endeavors, highlighting its effectiveness in facilitating language acquisition and cultural comprehension.

This emphasis on ChatGPT's efficacy in English language learning serves to contrast the participants' experiences with the tool when attempting to learn the Maltese language. The absence of comparable benefits in the context of learning Maltese suggests a discrepancy likely attributable to the limited availability of data in minor languages like Maltese, thereby hindering its effectiveness for such purposes.

Overall Perception of ChatGPT as a Maltese Language Learning Tool

All 41 participants provided their overall assessment of using ChatGPT as a tool for learning Maltese over two weeks. The participants' responses varied, with 7 participants expressing confidence in the effectiveness of the intervention, while 34 participants expressed doubts or mixed opinions. Among these, 39% found ChatGPT useful for learning Maltese, particularly for basic words and translation purposes. However, the majority (61%) did not view ChatGPT as beneficial for Maltese language learning.

The participants' feedback highlighted a range of perspectives. Some acknowledged ChatGPT's convenience for practicing English and receiving instant feedback, which significantly enhanced their vocabulary and comprehension. However, several participants encountered challenges with ChatGPT's responses in Maltese, citing issues such as unnatural or nonexistent language output, such as Participant 24.

I appreciate ChatGPT's convenience in practicing English and receiving instant feedback. It significantly developed my vocabulary and comprehension. However, I encountered some challenges with its responses in Maltese, and sometimes, it felt unnatural or nonexistent.

Participant 24

Dialogues and Conversational Practice

Thirty-nine participants who found ChatGPT helpful for creating dialogues in English highlighted its benefits in practicing conversation and improving speaking and comprehension skills.

ChatGPT was a game changer for me when it came to creating dialogues in English. It provided a seamless platform for practising conversations, which immensely improved my speaking and comprehension skills. The instant feedback and varied dialogue scenarios made it an invaluable tool for honing my English language abilities. I can confidently say it has taken my English learning journey to new heights. I wish it could do the same for Maltese language learning!

Participant 33

The section about dialogues and conversational practice in English is included to provide context for participants' experiences with ChatGPT in a language-learning context. English is mentioned here because the participants specifically highlighted their positive experiences with ChatGPT for practicing English conversation and improving their English speaking and comprehension skills. This quote from Participant 33 emphasized the effectiveness of ChatGPT in facilitating English language learning through dialogues and conversation practice. However, Participant 33 also expressed a desire for similar benefits in learning the Maltese language, highlighting the potential for ChatGPT to enhance language learning across different languages.

Comparison to Other Maltese Learning Tools

Thirty-four participants compared ChatGPT to other language-learning tools they had used in the past. Four of them found ChatGPT to be more effective, while thirty participants preferred other resources for their structured approach, comprehensive materials, or specialized focus on Maltese language learning.

Personally, I found ChatGPT to be slightly lacking compared to other language-learning tools I've used in the past, such as dictionaries, textbooks and grammar books. While it's interesting to interact with an AI, I value a more structured approach when it comes to learning a language. The other books include grammar exercises and vocabulary lists and a specialized focus on daily conversations and practical usage of the Maltese language. These resources were essential for learning Maltese. Although a few colleagues may have found ChatGPT effective for basic words, the majority of us preferred other resources because of their practicality and tailored approach to mastering the Maltese language, and they did not have non-existent Maltese words such as ChatGPT.

Participant 8

Incorrect Responses and Trust Issues

Twenty-one participants mentioned receiving incorrect responses from ChatGPT, which affected their trust in the tool. For example, one participant encountered a situation where ChatGPT provided inaccurate grammar corrections, leading to confusion about proper language usage. Another participant mentioned asking ChatGPT for translation assistance but received a response that did not accurately convey the intended meaning, causing frustration and doubt about the tool's reliability. Some participants expressed concerns about blindly trusting ChatGPT's answers and the difficulty of identifying incorrect information, especially at lower language proficiency levels. This code reflects the participants' experiences of receiving inaccurate responses and the subsequent impact on their trust and reliance on ChatGPT for language learning.

Suggestions for Improvement

All participants provided suggestions for how ChatGPT could better support Maltese language learning. The recommendations included incorporating "more comprehensive" materials and resources, improving "response accuracy", integrating "interactive and engaging" features, providing "personalized feedback" and "progress tracking", supporting "multiple languages", including minor languages such as Maltese, and including "pronunciation feedback". These codes highlighted the participants' insights and desires for enhancing the functionality of ChatGPT as a language learning tool.

I believe that the ChatGPT has great potential as a language learning tool for Maltese, but there are some areas where it could be improved to better support learners, such

as me. First, I would like to see more resources integrated into the system. It would be helpful to have grammar lessons, vocabulary exercises, and cultural insights that are specific to the Maltese language. Second, I noticed that the accuracy of the responses could be enhanced. There were times when the AI misunderstood my queries or provided incorrect translations, which can frustrate learners trying to grasp the language accurately. To make the learning experience more enjoyable and effective, it would be fantastic if ChatGPT had language games or conversation simulations to practise real-life scenarios, which would be beneficial, for instance, ‘Second Life’ in Maltese. Personalized feedback and progress tracking are essential for me to understand my strengths and areas for improvement. In this way, I will be motivated and continue practising and advancing my Maltese language skills. It would be unrealistic if ChatGPT supported multiple languages, including Maltese. This approach would not only encourage us from various linguistic backgrounds but also contribute to the preservation and promotion of smaller languages. Finally, pronunciation feedback is crucial, especially in languages with unique sounds such as Maltese. Having the AI analyze and provide feedback on our pronunciation would be immensely valuable in perfecting our Maltese speaking skills.

Participant 10

Participant 10’s comment suggests that they believe ChatGPT has great potential as a language learning tool for Maltese, but they also provide suggestions for improvement. Their phrase “It would be unrealistic if ChatGPT supported multiple languages, including Maltese” indicates that the participant feels it may be too ambitious or impractical to expect ChatGPT to effectively support multiple languages, including Maltese, simultaneously. They may be expressing skepticism about the feasibility of such a feature given the complexity and specificity of language learning needs. Instead, they propose focusing on enhancing ChatGPT’s support for Maltese specifically, suggesting improvements such as integrating more resources, enhancing response accuracy, and incorporating features like language games and pronunciation feedback tailored to Maltese learners’ needs.

Recommendations for the Pedagogical Implications of ChatGPT in Maltese Language Classes

According to the participants, the integration of ChatGPT into Maltese language classes has promising implications for enhancing Maltese learning experiences and outcomes. To maximize the benefits and address potential challenges, the participants in this study provided several recommendations.

The assumptions about teachers’ knowledge and training needs stem from the recommendations and insights provided by the participants in the study. Fifteen participants explicitly suggested that teachers should undergo comprehensive “training and familiarization with ChatGPT” to effectively incorporate it into Maltese classes. They stressed the importance of teachers understanding both the “capabilities and limitations” of ChatGPT, enabling them to guide students appropriately and provide the necessary support. This informed approach would facilitate the seamless integration of ChatGPT into the existing Maltese curriculum and pedagogical methodologies, thereby enhancing the overall language learning experience for students.

I think it’s essential for teachers to be trained properly on how to use ChatGPT in our Maltese classes. They should understand its capabilities and limitations so they can guide us effectively.

Participant 41

Thirty-two participants recommended that “clear learning objectives” be crucial when incorporating ChatGPT into Maltese classes. They suggested that teachers establish specific objectives that align with the curriculum and address Maltese language skills such as “vocabulary development”, “grammar comprehension”, “conversational practice”, and “cultural understanding”. These participants emphasized that clearly defined objectives should help both teachers and students track progress and evaluate the effectiveness of ChatGPT in achieving the desired learning outcomes. For example, Participant 22 said, “It would be great if teachers set clear learning objectives for us when we use ChatGPT. In that way, we know what we’re supposed to achieve regarding Maltese.”

Thirty-five participants highlighted that designing scaffolded activities and tasks is essential for the effective integration of ChatGPT into Maltese classes. They suggested that teachers can provide “structured tasks” that guide students’ interactions with ChatGPTs, gradually increasing “complexity and autonomy” as students’ language proficiency improves. These participants mentioned that scaffolded activities can include “dialogues”, “role plays”, “language games”, or collaborative tasks where students engage with ChatGPT to practice and reinforce their Maltese language skills. For instance, Participant 3 explained, “I really liked the activities we did with ChatGPT while learning English. The dialogues and role-plays were fun, and I felt like I was really learning while interacting with AI.”

Participant 3’s comment about enjoying the activities with ChatGPT while learning English can indeed be connected to the potential transferability of similar activities to the context of learning Maltese. By engaging in dialogues and role-plays with ChatGPT, participants not only found the activities enjoyable but also felt that they were genuinely learning while interacting with AI. This positive experience highlights the potential for incorporating similar interactive activities into the learning process for Maltese language acquisition. It suggests that similar engagement strategies with ChatGPT could be beneficial for learners of other languages, including Maltese, fostering active participation and effective learning outcomes.

According to thirty-eight participants, explicit instructions on AI language models, including ChatGPT, should be included in Maltese classes. The authors recommended that students need to understand how these models work, their limitations, and the ethical considerations surrounding their use. The participants believed that providing this “background knowledge” would foster critical thinking skills and empower students to make informed decisions when using ChatGPT as a Maltese learning tool. Participant 14 said, “We should learn about AI language models like ChatGPT and how they work. It’s important to be informed about the technology we’re using for learning Maltese.”

Thirteen participants stressed the importance of continuous monitoring and “assessment” as crucial components of integrating ChatGPT into Maltese classes. They suggested that teachers should employ a combination of formative and summative assessments to track students’ Maltese language development and evaluate the effectiveness of ChatGPT. The participants noted that this feedback loop allows teachers to adjust instructional strategies and provide targeted support where needed. Participant 5 suggested, “Having regular assessments and feedback on our progress with ChatGPT will be helpful. I am sure it will motivate me to improve and let me know where I need more practice.”

To provide a comprehensive language learning experience, twenty-seven participants recommended integrating ChatGPT with authentic resources. They encouraged teachers to prompt students to explore authentic “Maltese texts, videos, podcasts”, and cultural materials alongside their interactions with ChatGPT. The participants believed that this integration could help students develop a more authentic understanding of the Maltese language, cultural nuances, and real-world Maltese language use. In fact, Participant 6 said, “I will love it if our teacher encourages us to explore authentic Maltese resources alongside ChatGPT. It will make our learning experience more well-rounded and interesting.”

According to thirty-one participants, collaboration between language educators and “Maltese language experts” is essential when integrating ChatGPT in Maltese classes. They mentioned that “language experts” can contribute their knowledge of the language’s unique features, idiomatic expressions, cultural context, and pronunciation to refine ChatGPT training. The participants emphasized that this collaboration could ensure that ChatGPT’s responses are accurate and culturally appropriate, enhancing its effectiveness as a Maltese learning tool. Participant 7 stated, “The collaboration between language educators and Maltese language experts is a great idea. This will ensure that ChatGPT understands Maltese and will come up with the right and existent words and phrases.”

This study also explored the integration of ChatGPT as a language learning tool in Maltese classes, aiming to assess its effectiveness in supporting students’ language acquisition. The primary goal is to enhance students’ understanding and proficiency in the Maltese language through innovative technological interventions. Central to this endeavor is the collaboration between language educators and Maltese language experts, as emphasized by Participant 7’s feedback. By leveraging the expertise of language specialists, we seek to refine ChatGPT’s capabilities and ensure its alignment with the specific linguistic and cultural nuances of the Maltese language. This collaborative approach is essential for optimizing ChatGPT’s utility as a pedagogical tool, ultimately enhancing the learning experience and outcomes for Maltese language learners.

Furthermore, Participant 7’s endorsement underscores the importance of this collaborative effort in ensuring ChatGPT’s proficiency in understanding and generating accurate responses in Maltese. This synergy between educational practitioners and language specialists is pivotal for achieving our overarching goal of empowering learners to develop their language skills effectively.

Twenty-six participants recommended that teachers encourage reflective practices among students when using ChatGPT. They suggested creating opportunities for students to reflect on their interactions with ChatGPT, “discuss their experiences”, “strengths”, and areas for improvement. The participants believed that this would help students refine their Maltese language skills and enhance their use of ChatGPT as a learning tool. According to these twenty-six participants, collaboration between language educators and Maltese language experts is essential when integrating ChatGPT into Maltese classes. They emphasized that language experts can contribute their expertise in the language’s unique features, idiomatic expressions, cultural context, and pronunciation to refine ChatGPT’s training. This collaboration could ensure that ChatGPT’s responses are accurate and culturally appropriate, enhancing its effectiveness as a Maltese learning tool.

Additionally, the participants highlighted the importance of incorporating regular feedback mechanisms into the learning process to further support students’ Maltese language development. By leveraging ChatGPT’s capabilities, teachers can provide timely and personalized feedback to students, complementing traditional feedback from both teachers and peers. This integrated approach not only enhances students’ language learning experience but also fosters a supportive learning environment conducive to continuous improvement

Participant 12 claimed, “Reflecting on my learning journey, I found that practicing with ChatGPT offered valuable opportunities to engage with the Maltese language. However, I encountered challenges in certain areas that hindered my progress. For instance, I struggled with understanding grammar rules and cultural nuances specific to Maltese. Moving forward, I hope to see improvements in these areas to enhance my learning experience with ChatGPT.”

According to thirty-three participants, ethical use and digital citizenship should be emphasized in Maltese classes. They recommended that teachers foster discussions on the “responsible use” of

AI language models such as ChatGPT, promoting ethical considerations and responsible digital citizenship. The participants urged that students be encouraged to critically examine the implications of relying solely on AI-generated content and “strike a balance” between technology and authentic human interactions. Participant 9 said, “We should talk about ethics and responsible use of ChatGPT. It’s essential to understand when to rely on ChatGPT and when to seek real human conversations for language learning.”

Twenty-five participants emphasized that ongoing ‘research’ and development, encompassing various efforts and activities aimed at refining ChatGPT for Maltese language learning, are necessary. The term ‘research’ is used here in a broad sense to denote the collective endeavors and investigations undertaken to enhance ChatGPT’s suitability for the Maltese language.

These 25 participants recommended expanding the dataset used to train ChatGPT on Maltese language resources, addressing specific language challenges, and further tailoring ChatGPT to meet the unique needs of Maltese language learners. These participants stressed that collaboration among researchers, language educators, and AI experts is vital for ensuring the ongoing improvement and adaptation of ChatGPT in Maltese language classes. For instance, Participant 10 stated, “I hope the experts will continue to improve ChatGPT for Maltese. The more tailored it becomes to Maltese, the more beneficial it will be for our learning.”

By incorporating the participants’ recommendations and considering their feedback, the integration of ChatGPT into Maltese language classes has the potential to offer students a more enriching and effective language learning experience. As a result, Maltese classes could effectively utilize ChatGPT as a valuable learning tool, with the potential to enhance students’ Maltese language skills, promote engagement, and provide new opportunities for personalized language learning experiences.

This study’s qualitative analysis using Nvivo revealed a range of experiences, opinions, suggestions, and recommendations concerning the use of ChatGPT for learning the Maltese language. The themes and codes derived from the transcripts provided a comprehensive understanding of the participants’ perspectives, highlighting both the positive aspects and challenges associated with ChatGPT as a language-learning tool. The analysis also shed light on areas for improvement and potential enhancements to better support Maltese language learners.

Limitations of the Study

This study investigated the potential of ChatGPT as a tool for enhancing the learning of Maltese students among international adults, but several limitations need to be considered. First, the sample size was relatively small, consisting of only 41 participants. Although this sample size may be suitable for initial exploration, it may not fully capture the diverse experiences and perspectives of language learners using ChatGPT for Maltese language learning. Therefore, the findings should be interpreted with caution and may not be representative of the broader population of language learners, especially for Maltese learners at beginner (CEFR A1) or elementary (CEFR A2) levels.

Second, the duration of the study was limited to two weeks. This short timeframe may not provide sufficient time to fully explore the long-term effects and potential benefits of using ChatGPT for language learning. Language acquisition is a complex process that requires consistent practice over an extended period of time. The brevity of the study limits the ability of researchers to assess the sustained impact of ChatGPT on participants’ language skills and learning outcomes.

The study relied on self-reported measures for evaluating the effectiveness of ChatGPT. Surveys and focus group discussions were used to collect participant feedback, which is subjective and may be subject to biases. Self-report measures may not always accurately reflect the participants' actual experiences or learning outcomes. The reliance on self-reported measures alone may limit the robustness and objectivity of the study's findings.

While this study acknowledges the limitations of ChatGPT in understanding and responding to the Maltese language, it is important to note that teachers were not involved in guiding the students' use of ChatGPT. This absence of teacher guidance could have impacted the effectiveness of ChatGPT as a learning tool and should be recognized as a limitation. Additionally, the study does not explicitly mention collaboration with Maltese language experts or AI specialists to address these limitations. Involving language and AI experts in refining the training of ChatGPT on the Maltese language and developing tailored approaches to support Maltese language learning could have enhanced the study's validity and potential applicability.

Although this study acknowledges the potential of ChatGPT for supporting Maltese language learning, it falls short in providing specific recommendations or strategies for optimizing its effectiveness in this context. A recommendation that emerges from the reviewer's feedback is for teachers to take proactive steps to familiarize themselves with the capabilities and limitations of ChatGPT for Maltese learning. By equipping themselves with the necessary skills and knowledge, teachers can effectively guide students in utilizing ChatGPT as a supplementary learning tool. However, the long-term implications and practical steps for enhancing the effectiveness of ChatGPT for less widely spoken languages such as Maltese remain underexplored. This highlights the need for further research and development efforts aimed at tailoring ChatGPT to the specific linguistic and cultural nuances of the Maltese language or other minority languages, thereby maximizing its utility as a learning aid.

Considering these limitations is important when interpreting the findings of the study. Further research with larger sample sizes, longer durations, objective measures of learning outcomes, and collaboration with language and AI experts is necessary to comprehensively explore the effectiveness and potential of ChatGPT as a Maltese language learning tool for diverse languages and learner populations.

Recommendations

To address the limitations identified in the study and explore the potential of ChatGPT for enhancing the learning of Maltese as a foreign language, several recommendations for future research can be made. Firstly, expanding the sample size would strengthen the study's findings and ensure a more representative participant pool. Including a larger and more diverse sample encompassing individuals with varying language proficiency levels and backgrounds would provide a more comprehensive understanding of the effectiveness and usability of ChatGPT for learning Maltese.

Additionally, conducting a longitudinal study with an extended timeframe is recommended to allow for a deeper analysis of the long-term effects of ChatGPT on Maltese learning outcomes. Tracking participants' progress over an extended period would shed light on the sustainability and impact of ChatGPT on language proficiency and skills development. To further enhance the rigor of the study, future research should incorporate control groups to enable a more robust assessment of the tool's effectiveness. Comparing the performance and progress of learners using ChatGPT to those relying on traditional language learning methods would provide a clearer understanding of the added value and impact of ChatGPT.

Moreover, future studies should incorporate objective assessments of learning outcomes by utilizing standardized Maltese language proficiency tests or performance-based tasks to provide a more reliable evaluation of the impact of ChatGPT on participants' language skills. Collaboration with language and AI experts is highly recommended to address the limitations identified in the study, improve ChatGPT training on the intricacies of the Maltese language, and develop tailored approaches aligned with the specific needs of Maltese language learners.

Iterative training and fine-tuning of the Maltese language data by ChatGPT should be pursued, incorporating additional linguistic resources, native speaker input, and specific language features unique to Maltese to enhance its ability to understand and generate accurate responses. To better support learners in understanding Maltese culture and contextual nuances, training should include specific cultural references and situational awareness. Exploring the integration of multimodal features, such as audio and video components, is recommended to enhance learner engagement and provide a more comprehensive language learning experience.

Improving the user interface and natural language generation capabilities of ChatGPT is essential for enhancing usability and user experience. Conducting comparative studies that directly compare ChatGPT to other language learning tools can provide insights into its strengths, weaknesses, and unique contributions, thereby advancing the development of tailored language learning solutions for diverse languages and learner populations. By implementing these recommendations and building upon the existing study, researchers can gain a more comprehensive understanding of the potential of ChatGPT as a Maltese language learning tool, contributing to its improvement and the advancement of language learning solutions.

Conclusion

This study investigated ChatGPT's potential as a tool for enhancing Maltese language learning among 41 adult international students. While ChatGPT offers convenience and practice opportunities, its effectiveness is hampered by limitations in accurately understanding and responding to the nuances of the Maltese language. Among the 41 participants, 23 found ChatGPT very easy to use for learning Maltese, with 16 finding it somewhat easy, and 2 remaining neutral on its ease of use. These findings underscore both the accessibility and challenges associated with integrating ChatGPT into language learning contexts. Moving forward, efforts to address these limitations and enhance ChatGPT's effectiveness for Maltese language acquisition are essential to unlock its full potential as a language learning tool.

This study emphasizes the importance of further research and collaboration to improve ChatGPT's training on Maltese and enhance its usability. Despite its limitations, ChatGPT has implications for language learning tools for less widely spoken languages such as Maltese, provided appropriate integration into pedagogical practices is ensured. The participants' feedback on the ease of use suggested that, with continued development, ChatGPT holds promise in supporting and enriching learning experiences for learners of the Maltese language and culture. Efforts to address the accuracy of ChatGPT in responding to the Maltese language will be crucial in maximizing its effectiveness as a Maltese language learning tool. By incorporating the participants' recommendations and considering their feedback, ChatGPT's potential as a valuable tool for learning Maltese can be further harnessed, offering a more enriching and effective Maltese language learning experience for international students.

Ultimately, the integration of ChatGPT into Maltese language classes can open new avenues for personalized language learning experiences, promote engagement, and contribute to the preservation and appreciation of the Maltese language and culture. As language education continues to evolve with

technology, ChatGPT represents a promising step toward enhancing language learning in a rapidly changing digital landscape.

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