Artificial Intelligence as a Virtual Scaffolding: Experimentations on Italian as a Second/Foreign Language

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Abstract

In the last decade Artificial Intelligence has rapidly entered every dimension of instruction and education, including language learning and teaching.
Chatbots and AI-powered tools can deeply change how language teachers plan, implement, and assess teaching pathways in a foreign language: they can help conceive new worlds and new horizons.
Chatbots can act as artificial scaffolding for language learners, guiding them towards progression, thanks to the different advanced functions, such as text-to-speech, voice recognition, automatic feedback, grammar check, feedback on pronunciation and accuracy, etc.
The paper will illustrate the ongoing research at the University for Foreigners of Perugia, Italy, led by the author and related to the planning, training, and developing of a chatbot for Italian as a second/foreign language, named AIDI (Learning and Dialogue in Italian). It is a Large Language Model (LLM) specifically conceived by a research group at the University for Foreigners of Perugia, in cooperation with IUL University, intending to help international students familiarize themselves with the Italian language and culture prior to commencing their studies on Italian campus, or as an e-learning or blended learning experience.
The training and validation system of the different prompts is one the main ongoing tasks of the research, with reference to the Italian Language Profile and to the Syllabi of the University for Foreigners of Perugia.
The different functions of the chatbot will be briefly mentioned in the paper, even if the validation process is still ongoing and preliminary experimentations are being carried out with different samples of learners. In particular, the following functions will be illustrated:
- *Interactional scenarios (simulated learning scenarios to foster online, written, and oral interactions between the learner and AIDI)*
- *Automatic feedback on written production and automatic translation from Italian into English*
- *Interaction with learning material and faculty content to make more rapid access to information*
- *Visual literacy through the description of images and pictures*
- *Guide to the campus, to prepare international students for the different aspects of the residential campus, before coming to Italy.*

The preliminary results of this ongoing research will be reported in this paper, showing the benefits and the potential of chatbots and Large Language Models to empower language teaching and learning of Italian as a second/foreign language.

Keywords: *Artificial Intelligence, language learning, Italian L2.*

1. Artificial Intelligence for Language Learning

Chatbots and AI-powered tools have the potential to profoundly transform how we live and perceive the world, opening up new scenarios and possibilities [1].
Artificial Intelligence (AI) is becoming increasingly prevalent in education, influencing all areas of school curricula, including language learning and teaching. Among its many benefits, AI can support a multimodal approach, providing opportunities to practice both oral and written skills. This is achieved by fostering language practice through context-based conversations, boosting student engagement, and enhancing learning outcomes. AI also facilitates access to information, personalizes learning experiences, provides instant feedback, and guides learners throughout their educational journey.

Several methods can facilitate the integration of Artificial Intelligence into the educational process, particularly in online courses, presenting three paradigms for AI usage:

- AI-guided, where the learner is a passive recipient
- AI-assisted, with the learner as a collaborator
- AI-driven, with the learner as a leader.

These three paradigms illustrate the range of options available when incorporating AI, from an entirely AI-managed exercise system, through a more interactive model with learners, to full integration within the educational system, supported by digital tools and educators [1].

The third paradigm is recognized as the most comprehensive and impactful because, in addition to AI tools for learners, it integrates all aspects of the educational ecosystem to enhance it. For example, it features an active evaluation system for online courses that tracks student progress and development.

In language learning, AI-powered tools can be highly beneficial, creating a blend of self-study and classroom experiences. This fits well within the context of the online language courses delivered by the University for Foreigners of Perugia, where students benefit from blended learning, combining teacher-led sessions with self-study hours using course materials. The advantages include the potential to integrate Large Language Models (such as ChatGPT, Mistral, Claude) into the course's online platform [2]. AI supports a multimodal approach, offering students opportunities to practice both oral and written skills while engaging with contextualized dialogue and specific tasks, ultimately enhancing their participation and learning.
In the field of assessment and language testing, chatbot systems can help reduce the anxiety typically associated with evaluation and self-assessment processes. Interaction with an AI-based dialogue system makes users more likely to overcome psychological barriers that could otherwise hinder their performance.
Additionally, chatbots can reduce transactional distance between students and teachers in online learning environments. In fact, transactional distance refers to the potential psychological and communicative gap between instructors and students in online contexts, which can lead to misunderstandings and miscommunication. Minimizing this transactional distance can significantly enhance the learning experience.
In the field of language education, chatbots can act as tutors, reducing human intervention in repetitive tasks such as answering frequently asked questions (FAQ) [3]. They can also increase opportunities for language use, both spoken and written, in self-directed online courses, facilitating the consolidation of acquired language structures and promoting the development of linguistic-communicative skills.
Numerous studies have shown the effectiveness of second language teaching with a "focus on form" compared to approaches without this focus [4]. In online education, chatbots can provide immediate explanatory feedback, guiding learners toward metacognitive and metalinguistic reflection, highlighting areas for improvement.
As commonly known, learners' interlanguage evolves gradually when errors are identified and understood. Feedback becomes effective when delivered over a prolonged period and in a constructive, comprehensible way for students. Hattie's [5] studies have also highlighted the powerful impact of feedback on deep learning, metacognition, and reflection. Constructive feedback can be a valuable asset in defining authentic learning scenarios, as illustrated in the Common European Framework of Reference for Languages, Companion Volume (CEFRCV), also referring to the Action-Oriented Approach [6] proposed by the same framework, which views the learner as a social agent.
The role of AI-powered chatbots in managing complex linguistic tasks, beyond simply forming sentences can be crucial. Language involves more than sentence construction; it also includes maintaining coherence across discussions, continuing topics, referring to earlier parts of a conversation. These skills, often difficult to teach in second or foreign-language classes, can be enhanced using advanced dialogue systems.

2. The Research Project

University for Foreigners of Perugia, in cooperation with IUL Telematic University has created an AI-based system, named AIDI (Artificial Intelligence for Dialogue in Italian), trained using the language materials from the "Italian Language Profile" [7], according to CEFRCV. The research is in progress and is aimed at integrating AIDI into the online courses of Italian as a second/foreign language of the University for Foreigners of Perugia [8].
A preliminary study has highlighted key areas where AI can be leveraged to enhance learning within the framework of Universal Design for Learning (UDL), creating an inclusive and accessible online

learning environment. AI systems in this context aim to offer diverse engagement methods such as interaction, collaboration, self-study, varied representations, and multiple ways for learners to demonstrate their competencies.
The study, involving a group of Chinese students from Guangzhou Maritime University preparing for their studies in Perugia, is part of a wider research project examining AI's impact on learning Italian as a second/foreign language. The research focused on the students' interaction, participation, motivation and attitudes toward AI.
Students could ask AIDI questions about Italian art, culture, and campus life, enhancing their language skills. Activities included analyzing Italian artworks and participating in interactive tasks. Feedback from students showed positive results in motivation and engagement, with many preferring the AI platform for its interactive and playful approach to learning.

3. Main Functions of AIDI

The research project is in progress and the different functions of AIDI are being tested and validated by the research group[1] at the University for Foreigners of Perugia.
Here the main functions of AIDI will be mentioned:
- Interactional scenarios (simulated learning scenarios to foster online, written, and oral interactions between the learner and AIDI).
The learning scenarios currently provided are the following: "at the restaurant", "chatting with friends", "job interview".
Learners can practice the language interacting with the chatbot by texting or speaking, through the microphone. Suggestions for possible questions are also provided by the machine, so that the conversation flow will not stop.
- Automatic feedback on written production and automatic translation from Italian into English. The translation of the interaction with the machine is very helpful as an example of scaffolding tool: English can act as a lingua franca or as a bridge language, facilitating understanding and language improvement.
- Interaction with learning material and faculty content to make more rapid access to information. Students can revise content by "chatting" with the pre-defined material: it turns out to be an alternative way to content retention and revision.
- Visual literacy through the description of images and pictures: students can upload images and ask AIDI to describe them and provide the background for them. Describing is one of the most common language functions in language learning, which can be effectively enhanced by AI.

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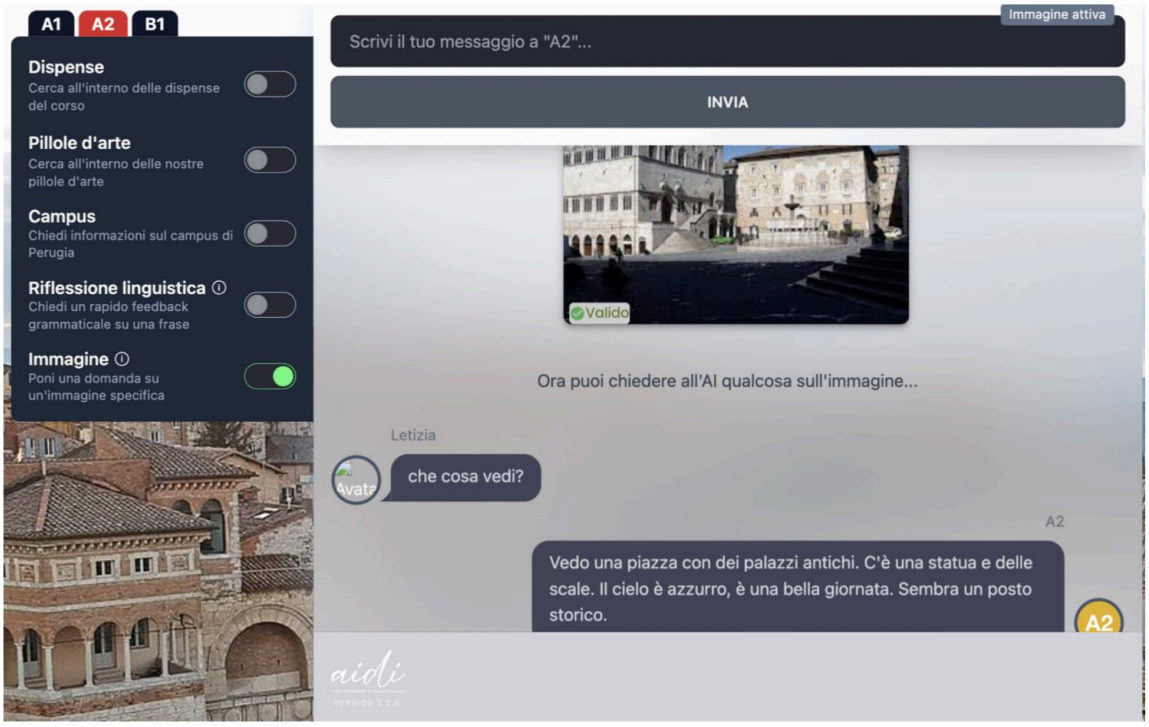

Fig. 1. AIDI – the "Image" function.

- Guide to the campus, to prepare international students for the different aspects of the residential campus, before coming to Perugia.

The immersive AI experience improved their understanding and interest, especially regarding art and cultural subjects, with the "Campus" function helping students familiarize themselves with university life, preventing anxiety and uneasiness.

3. The Preliminary Study

All students found it useful to interact with AIDI, particularly to increase opportunities for language practice and to improve their writing and reading skills. However, dialogue seemed to be less appreciated, likely due to Chinese cultural preferences and habits. The students were less inclined to speak, preferring instead reading, writing, and listening activities through the "text-to-speech" functionality.

They appreciated the "Image" function: they found it playful and engaging, as they could compare the description of the machine, stimulated by the teacher. It was perceived by the students as a very useful technique, especially for vocabulary expansion. The integration of AI and dialogue systems provided interactive and personalized opportunities for language practice, immediate feedback, and immersive conversational scenarios. The AI system acted as a reference, tutor, and partner throughout the learning process.

Preliminary results from this study demonstrated how an immersive AI-mediated approach could positively influence the overall effectiveness of student learning, enhancing their engagement, motivation, and interaction, as well as intercultural dialogue, especially in conversations and interactions on artistic and cultural topics, encouraging the exchange of ideas between distant cultures, such as Italian and Chinese.

Informal interviews with the students have shown their interest and participation: they really enjoyed comparing the output of the machine with the Chinese culture, also fostering intercultural dialogue and global competences.

AIDI turned out to be a tool for language practice, content revision, vocabulary expansion, social interaction, and communication, also from a game-based learning perspective.

The Chinese students found very useful to ask AIDI questions about the different aspects of the Campus in Perugia, as a preparation to their coming to the city. They were very curious and asked so many questions, such as questions about the lesson schedule, the canteen, the rooms of the different lessons etc.

4. Discussion, Limitations, and Conclusions

The experimentation described in this paper represents the first step in a broader, ongoing research project conducted at the University for Foreigners of Perugia. This project involves the continuous validation and testing of various features of AIDI, an Artificial Intelligence-based educational tool, with the goal of iteratively improving its functionalities to better support students' learning.

Preliminary findings indicate that Artificial Intelligence can serve as an effective support to the learning process, acting as a virtual scaffold that provides students with continuous and immediate feedback. These results align with existing literature, which highlights the potential of AI in enhancing educational experiences by offering real-time, personalized guidance.

Despite some limitations—namely the small sample size of participants and the short duration of the experimentation—these encouraging results underscore the importance of pursuing further research in this direction. Future work will involve additional exploration, iterative training, and validation of AIDI, along with expanded trials involving a larger and more diverse group of learners. This continued experimentation aims to refine AIDI's capabilities and examine its broader applicability in varied educational contexts.

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