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# ARTIFICIAL INTELLIGENCE – ASPECTS OF ITS USE IN FOREIGN LANGUAGE EDUCATION

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### Absztrakt

# A MESTERSÉGES INTELLIGENCIA ALKALMAZÁSÁNAK SZEMPONTJAI AZ IDEGEN NYELVEK OKTATÁSÁBAN

Jelen tanulmány a mesterséges intelligencia alkalmazásának lehetőségeit vizsgálja az oktatásban, különös figyelmet fordítva az idegennyelv-oktatásra. Bemutatja a mesterséges intelligencia különböző típusait, valamint azokat az előnyöket, amelyeket az idegennyelv-tanulásban való alkalmazásuk jelenthet. A cikk emellett ismerteti a technológia alkalmazásának új lehetőségeit, különösen a fordított osztályterem (flipped classroom) oktatási módszerében, amely új dimenziókat nyithat a nyelvoktatásban.

Kulcsszavak: mesterséges intelligencia, nyelvtanulás, fordított osztályterem, oktatási programok, ChatGPT, GROK

Diszciplinák: pedagógia, informatika

#### Abstract

The presented contribution addresses the topic of artificial intelligence and its use in education, with a particular focus on foreign language teaching. It discusses various types of artificial intelligence and defines the advantages it brings to foreign language education. It also describes some new opportunities for utilising this technology within the educational concept of the flipped classroom, which can significantly enrich this approach, especially in language teaching.

**Keywords:** artificial intelligence, language education, flipped classroom, educational programs, ChatGPT, GROK

Disciplines: pedagogy, IT

Digital technology is now an inseparable part of many areas of human activity. Education is one of the fields most profoundly impacted by it. Teaching without visual electronic presentations (including interactive graphs, images, or mind maps), educational online portals, mobile apps, or specific educational programs is now hard to imagine. Technology, however, continues to evolve, bringing new possibilities and, most importantly, innovative tools that both teachers and students can utilise in the classroom. The process of applying digital technologies in education dates back to the 1960s when the first technologies supporting foreign language teaching were introduced (primarily in the USA). At that time, educators believed that contemporary digital media (such as film projectors, overhead projectors, radios, and television broadcasts) would bring numerous advantages to education, such as increased student motivation, greater efficiency in the teaching process, new methods and procedures

for education, and faster acquisition of language competence. Another advantage identified in foreign language education was that digital media allowed for the implementation of real, authentic language from native speakers into the classroom. This made it possible to more effectively achieve the general goal of language education: to provide students with exposure to "live" language and, by extension, cultural aspects of the foreign country. Digital media were already considered an added value in education at that time (Lecke 2016: 45). Based on today's experiences with digital media in education, we can conclude that all the assumptions made back then have proven true.

Technological progress, however, has not slowed down; on the contrary, it is much more intense today than in the past. New and increasingly sophisticated communication technologies (e.g., specific educational applications, simulation programs, 3D virtual reality glasses, advanced computer technology, AI-based electronic assistants, etc.) are emerging, radically changing teaching methods and procedures. A significant milestone in the digitalisation of society is the commercialisation and accessibility of artificial intelligence technology for the general public. In November 2022, the American tech company OpenAI launched the website www.chatgpt.com, allowing everyone to communicate with an AI-powered electronic assistant and use it for their everyday needs. It helps users, for example, by searching for up-to-date information, explaining scientific phenomena and concepts, checking the accuracy of written texts, finding inspiration for solving problems, creating plans, learning, communicating in foreign languages, or simply engaging in informal discussions.

In the field of education, artificial intelligence offers various electronic tools for nearly every area (and discipline) of science. However, this paper will focus specifically on foreign language education and, in the following paragraphs, demonstrate the tools and possibilities of using artificial intelligence in this field. It should be noted that the potential of artificial intelligence in language teaching is vast and can bring, in addition to new educational procedures and methods, more comprehensive educational concepts. Evidence of this includes online language schools (Vista, Volis, the Goethe Institute's language school, and others) that offer online foreign language courses to their students and use many artificial intelligence tools (e.g., AI-based programs for practising lexical or orthographic structures of a language – Grammarly, Talkpal, or LanguageTool). All these facts explain why educators are increasingly focusing on research into the effectiveness of using AI tools in foreign language teaching.

# Artificial intelligence and its types in the context of foreign language education

Artificial intelligence (AI) is a technology that can be utilised in various ways in foreign language education. Based on the tools and functions that artificial intelligence offers, the German didactician Strasser distinguishes between what is known as weak and strong artificial intelligence. Weak artificial intelligence represents a set of electronic tools that help users solve specific problems – these tools focus only on one area and are subject to obsolescence. Examples of weak AI include voice assistants like Alexa, Siri, or even the Google Maps app.

On the other hand, strong artificial intelligence includes all tools or electronic assistants that attempt to imitate human neural systems and, therefore, the human brain (Strasser 2020:2). These tools can evolve and learn independently, continuously improving. Strong artificial intelligence is also referred to as "superintelligence". This form of intelligence can tackle complex problems with greater detail and contextual nuance. Strasser claims that this technology "imitates neural systems and the human brain and, therefore, can interpret emotions, feelings, and even cultural contexts" (Strasser 2020, online:2). AI programs like ChatGPT or Grok belong to this category.

In the context of foreign language education, Strasser (2020, online:3) distinguishes three basic types of artificial intelligence tools – these are as follows:

Assistive Tools: This group includes programs designed for targeted planning and management of the teaching process. Examples of such tools are learning management systems like Moodle and Edupage. Both of these programs function in a modular way – it is possible to create modules for direct language instruction, share educational materials, conduct online testing, as well as plan projects or assign tasks. These programs send messages and notifications to students about deadlines, events, presentation dates, and other assignments. While these tools are related to the organisation and planning of lessons, they can also be used, for example, for testing (in Moodle, electronic testing, filling out evaluation surveys, etc., can be conducted).

Augmented Reality Tools: These are tools that enrich analogue educational materials – such as printed materials, posters, textbooks, or workbooks – with multimodal content. As a result, the educational content becomes more interactive and autonomous (students can manipulate the digital content themselves or decide whether to engage with it at all). This type of artificial intelligence tool can be used, for example, through smartphones or tablets, although it is not always suitable for use on computers. A typical example of such a tool is the Austrian app "Areeka," as well as "Microsoft HoloLens" or "Zapaar" apps, which allow teachers to connect the content of paper textbooks (or other analogue materials) with digital content. The advantage of these applications is that educators can create their own digital content, allowing them to respond to the individual educational needs of their students and thus make the teaching process more personalised.

Autonomous Intelligence Tools: These are autonomous tools that largely replace certain tasks (or the overall role) of a teacher in education. Strasser also refers to this group of tools as "Superintelligences" ("Superintelligenzen"). These tools can be imagined as electronic assistants in various forms, such as language course assistants in mobile apps or computer programs or even as physical robots. These assistants guide students through the learning process and can even engage in conversation with them, providing arguments and opinions and serving as a specific ideological opponent (or partner). At the same time, they can assist students in acquiring language competence - explaining lessons (sometimes with visual aids), assessing their level of knowledge, or recommending literature for further study.

However, it should be noted that despite some programs like "Talkpal" (a mobile app for practising speaking skills autonomously managed by an electronic assistant), there is no electronic program today that offers a comprehensive foreign language teaching experience entirely led by an electronic assistant. The work and role of the teacher is a complex construct of activities that is not easily captured by algorithms. As Strasser points out, "...the process of foreign language teaching contains too many complex discursive dependencies for a self-learning algorithm to grasp..." (Strasser 2020, online:3). However, it is likely (considering technological progress) that developers will create algorithms in the future capable of doing so.

As seen from the previous part of this paper, educators today have access to a wide range of tools based on artificial intelligence. To properly implement these tools into their teaching process, it is necessary to have media, professional, and didactic competence. Moreover, educators must be able to combine all these competencies to create teaching procedures that reflect the individual learning needs of students, meet pedagogical goals, and enhance progress in acquiring language skills and competencies. The most significant benefits of implementing online tools that utilise artificial intelligence include the following:

Reflecting the Individuality and Educational Needs of the Student: A classroom is a heterogeneous group of students with different educational needs, challenges, interests, and learning styles. The teacher must manage the learning process in a way that maximises the educational potential of each student. However, the larger the class, the more challenging this task becomes (logically). By utilising educational language programs with electronic assistants (e.g., Lingvist or Duolingo), the teacher can assign tasks (exercises) to students, which are guided by the electronic assistant. The assistant takes on an instrumental role, effectively replacing the teacher. The teacher can then use the time gained to, for example, explain new material more clearly to students who need extra help or perform other activities (e.g., assisting students who are less technologically skilled with using the program).

High Degree of Interactivity and Autonomy in Teaching: Language teaching with applications or electronic assistants based on artificial intelligence is associated with a higher level of interactivity and autonomy in learning compared to traditional online portals (e.g., Klett or Hueber online exercise platforms) or commonly used tutoring programs in schools today (for iSLCOLLECTIVE.com example: or mein-deutschbuch.de). In these AI-powered systems, students do not just complete exercises electronically (such as in Wordwall or Kahoot!) but must arrive at the correct solution through communication with the electronic assistant (e.g., through ChatGPT or Grok). This also involves the use of external sources of information. For example, when working on a project about "travel," the student, guided by the electronic assistant, searches for information based on predefined

criteria (e.g., number of people, vacation preferences, maximum travel time, total cost, etc.) to determine which hotel to book, which destination is most suitable, how long the trip will take, and other relevant details. In this case, the student works entirely autonomously, choosing the sources of information to use and how to approach the project - while still collaborating with the AI assistant, who aids in completing the task. In this scenario, the teacher acts as an external figure who minimally interferes in the project process and only evaluates the final result. The teacher becomes more of a partner to the students, helping them gain knowledge through various technologies and resources.

Immediate Feedback: Educational programs, comprehensive programs, and constructive learning tools have introduced the concept of immediate feedback. As soon as an exercise is completed, the student is automatically assessed, with the feedback provided in the form of highlighting correct or incorrect answers, along with statistical data showing the number of mistakes, the total time taken to complete the exercise, and the percentage of success. This enables the student to identify which language structures they find challenging swiftly. However, the disadvantage of this type of feedback is that it does not help the student understand why the mistake was made or why the answers are incorrect. Therefore, this type of assessment is purely statistical (Table 1). In contrast, programs using artificial intelligence technology offer analytical feedback. This gives the student an analysis of their errors, helping them understand the specific language structure in which they made mistakes and the reasons behind them. This approach is far more constructive, as it aids in more profound understanding and learning, helping the student improve not just their accuracy but also their understanding of language patterns.

Assessment in different artificial Intelligence programs: The assessment in various artificial intelligence (AI) programs differs significantly. Their algorithms today allow for both statistical and analytical forms of evaluation. This means that, in addition to marking and summarising errors, AI programs can also explain where and why a mistake occurred, and they show the student the correct solution as well as the language structures that need to be reviewed. However, not every program provides such a detailed analysis. Programs with "weak artificial intelligence" (also referred to as narrow AI) provide summary assessments with error categorisation but without explaining why the student made the mistake. Typical examples include constructive programs such as Grammarly or LanguageTool. These programs are limited to error recognition and classification without offering in-depth explanations or corrective guidance. In contrast, programs with higher intelligence (referred to as superintelligence), such as ChatGPT or Grok,



Table 1: Evaluation on the online portal Mein.deutschbuch.de and in the Wordwall program. Sources: Net1 and Net2

include verbal feedback and explanations for why an error occurred and the correct solution. They also provide a step-by-step guide on how to arrive at the correct answer. This assessment method is much more informative for the student, as it reveals precisely what specific language structures the student is struggling with and teaches them by using their own mistakes – helping them understand how to form correct language structures in reallife linguistic contexts.

For comparison, Figures 1 and 2 show examples of error evaluations in the LanguageTool (weak AI) and ChatGPT (strong AI) programs. The feedback provided by LanguageTool is a simple categorisation of the error, whereas ChatGPT offers a detailed explanation of the error, its cause, and how to arrive at the correct solution, thus offering a more comprehensive learning experience.

number of correct answers)

New educational approaches and langu-age teaching methods: artificial intelligence technology allows educators to develop their own didactic potential creatively. It offers a variety of electronic tools to create new creative methods in foreign language teaching, which can even lead to the development of new foreign language teaching methods or more complex educational concepts. One of the didactic approaches where artificial intelligence can be highly appliedisthe pedagogical-didactic



Figure 1: Evaluation in LanguageTool. Source: Net3

Figure 2: Evaluation in ChatGPT. Source: Net4



approach called "flipped classroom." This approach relies on the integration of technologies into education – artificial intelligence can enhance and streamline its methods. Since this is a relatively new approach, it will be presented in more detail in the following section of this paper.

Continuous education and professional development of educators: New digital media and technological advancements continually compel educators to enhance their media and professional skills. Manv institutions aimed at the development and improvement of education, such as the state institution NIVAM (National Institute for Education and Youth), Raabe Academy, or universities specialising in pedagogy, now offer teachers from various types of schools the opportunity to attend training sessions, courses, or workshops focused on applying artificial intelligence technology in the teaching process. In these courses, educators develop their media, professional, and didactic competencies while gaining valuable insights into the functions and new possibilities of artificial intelligence. The important factor is the connection of these competencies and their proper (and correct) implementation into the educational process. In general, the deployment of modern digital technologies in teaching, without considering the educational needs of students, respecting didactic-pedagogical procedures, or following the curriculum does not result in an effect manifested in the form of more remarkable progress in

acquiring language competence. Only a well-thought-out and meaningful concept for applying this technology leads to more effective and higher-quality education. It is essential for institutions training future educators to provide diverse workshops or courses during their studies, enabling them to acquire relevant competencies and learn how to apply them effectively in didactic procedures.

Cross-curricular themes and the CLIL method: Artificial intelligence technology is excellently suited for language teaching through the CLIL (Content and Language Integrated Learning) method. Especially problem-based and project-based learning in a foreign language can be combined with the use of electronic assistants powered by artificial intelligence. These assistants can help students solve a problem or complete a project by searching for relevant information or suggesting methods for solving a particular issue. In this way, students learn to address problems (e.g., in biology) while simultaneously learning a foreign language (e.g., German). Cross-curricular themes have become one of the main pillars of didactic methods in foreign language education.

One of the main disadvantages of artificial intelligence technologies is the need for modern technical infrastructure (fast internet connection, modern computer hardware, and various accessories) as well as the acquisition cost (license) of some AI-based programs. This limits the full use of these tools in the educational process. However, we anticipate that in the future, these programs will become more affordable and will become an integral part of foreign language teaching. Another disadvantage is the high demand placed on the media competence of educators, which involves continuous education in this area, a process that can be time-consuming (and often financially demanding) for teachers.

# Flipped classroom and artificial intelligence

The term "flipped classroom" (or "inverted classroom" or "reversed classroom") (Rojo, 2015:5) represents the educational concept of the so-called "reversed classroom," in which a phase of self-education partially replaces the exposure phase of traditional teaching. Lage defines this concept as follows: "Flipping the classroom means that events that traditionally occurred in the school classroom now take place outside of it, and vice versa." (Lage et al., 2000:32).

Lagowska emphasises that today the flipped classroom concept is mainly applied in higher education (Lagowska, 2020:58). In this model, the exposure phase of teaching (lectures, theoretical presentations, or passive knowledge reception) is moved to out-of-school preparation. Students acquire all the necessary theoretical knowledge through self-study (e.g., via video lectures, interactive lessons, or pre-recorded lectures from their teachers on various platforms), which they then apply practically during in-person lessons at school (either individually or in group work) by solving specific problems (e.g., within project-based or problembased learning) (Huang et al., 2023:7). The advantage of this educational approach is the analytical approach students take to the knowledge they have gained and its practical application in real (and specific) life situations (Bachiller, Badía, 2020).

In the context of language education, this approach can be used, for example, in problem-based learning.

For example, students study vocabulary related to the topic of the environment at home, as well as basic phrases for expressing opinions and arguments. They watch an educational video discussing ways to protect the environment. Then, during the class, they search for solutions on how to reduce environmental pollution in their city (or region) and argue why their solutions are the best.

The advantage of this concept is the effective use of (in-class) time and the acquisition of practical experience, which can motivate students to continue studying. This is also because they can set their own pace and decide when they want to learn according to their own needs (Jiang et al., 2022:25). The result of this teaching method (as opposed to traditional forms) can be not only an improvement in practical skills but also theoretical know-ledge gained through experiential learning. Another advantage is the autonomous approach to learning and the new forms of learning strategies that respect the educational needs and interests of the student. Didactics expert Tomas emphasises that the flipped classroom model heavily relies on integrating digital media and various other technologies into the learning process (Tomas et al., 2019:25).

Artificial intelligence tools can accelerate the transfer of the flipped classroom concept into foreign language education (which, in our opinion, is still not fully utilised). Numerous educational platforms are available today, providing users with sections dedicated to learning various foreign language structures. Examples include platforms such as Lehrer-online (Net5), TechSmith (Net6) and various YouTube channels (e.g., DW – Deutsch lernen mit Videos (Net7), Daf-Lernvideos, etc.).

These platforms provide users with educational videos, lectures, and other interactive learning materials. Additionally, programs like MS Teams allow teachers to upload and share their lectures or other educational content. When students learn new knowledge in the home environment, the teacher gains in-class time for practical application in simulated communication situations. For this, students can use AIbased programs - for example, they can use the learned lexical structures in communication with the Talkpal program (an app with an electronic assistant for leading oral conversations) and engage in discussions or debates on various societal topics.

They can also participate in written debates, for example, with ChatGPT or Grok.

Technology is advancing at an everquickening pace, and artificial intelligence will undoubtedly enhance this progress even further. In the future (as we anticipate), AI-based programs will become an essential part of education in every area of human activity.

# Conclusion

Technologies based on artificial intelligence bring revolutionary possibilities into the educational environment, fundamentally changing the way teaching and learning occur. In addition to tools for more efficient organisation and planning of the teaching process, technologies are emerging that directly affect the acquisition of knowledge and skills. These tools provide students with analytical assessments of their progress, support the development of language competencies through simulations of real communication situations in foreign languages, help teaching methods, create new and motivate students to engage in active learning. Electronic assistants take over some traditional tasks of the teacher, such as instrumental roles, but they still cannot fully replace the teacher. The teacher's work is complex and includes tasks that artificial intelligence algorithms cannot fully address.

In today's educational process, the teacher is no longer the sole source of information. On the contrary, the teacher becomes one of many sources of knowledge, with their role shifting to that of a helper and partner who helps students navigate the flood of information and supports them in developing language competencies. In this context, artificial intelligence becomes a powerful tool that enables teachers to manage the educational process better and respond to students' individual educational needs and interests. The teaching process thus becomes more student-centred, providing targeted support to help students achieve their educational goals.

Artificial intelligence is also a part of modern educational approaches, such as flipped classrooms – an approach which is growing in popularity, especially in higher education. This model optimises the use of in-class time and allows students an analytical and practical approach to learn-Combining artificial intelligence ing. technologies and the flipped classroom approach opens up new possibilities in foreign language education, increasing its effectiveness and improving educational outcomes. We expect that this approach, with the help of artificial intelligence, will gradually be implemented in the field of language education at all levels - from language courses at universities to teaching at lower educational levels.

Given these trends, we can anticipate that artificial intelligence will become an integral component of foreign language education in the near future, profoundly impacting its structure and quality.

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