



# Advancing Education through Technological Integration (AI in Primary, Secondary and Collegiate Education and in Language Learning)

**Smt. Madhuri Kiran Godkhindi**

Assistant Professor, Department of English Sri Krishna Degree College, ITI layout, BSK 3<sup>rd</sup> stage, Bengaluru - 560085.

## Abstract

Every minute technology undergoes constant change. Technology has been a persistent tool used by educational institutions to adapt their curricula. Improved teaching-learning environment is a sign of effects in many institutions. In order to enhance the learning process, most of the institutions have used many smart teaching tools. The summary of this article focuses and shows us the influence of technology in the field of education.

The use of technology has increased to pace up with the speed in teaching in most of the countries. The teaching and learning process has been more successful with the new experimental education model. Students have benefited much by experimenting with the knowledge that their lecturers have imparted to them through their regular activities. However, there are challenging instances where using technology in teaching and learning is beginning to pay off.

This progress can be effectively achieved when highly qualified educators in any field, regardless of gender, demonstrate their capacity to support students. According to the study, artificial intelligence (AI) would significantly alter the educational landscape. AI has both advantageous and harmful impacts. The results highlight some recommendations for the application of AI and the avoidance of potential issues. While the majority of participants appear to have favorable opinions on AI, there are some negative aspects as well, which academics and instructors have brought to light specifically with regard to the future of education. While engineers view AI as a tool to improve quality and benefit everyone in the education sector, lawyers and jurists frequently concentrate more on the legal justifications for AI in education and potential future issues.

**Keywords:** AI in different fields, AI Influences, AI influences on Education, Impact on Teaching Practices, Challenges and Considerations, AI Tools in language learning:

## **Introduction**

The ability of machines or computers to think and behave like humans is known as artificial intelligence (AI), and it refers to the efforts made to create computerized systems that can mimic human thought and behavior. In this sense, instruments or programs that are skilled at mimicking human thought processes or behavior can be considered the fundamental definition of artificial intelligence. The idea that artificial intelligence will be included into household computers may be a product of the current system. AI can enter into our lives in different forms and from different directions.

The new electricity of this day is artificial intelligence. Given its ability to ensure economic prosperity, artificial intelligence is a strong contender to be positioned as the fundamental building element of the fifth industrial revolution. The added value and worldwide effects of artificial intelligence are better understood in light of these statistics, particularly with regard to the future of education in our instance, which in turn shapes the workforce and economy and sets the stage for the next industrial revolution.

Deeper research and development into artificial intelligence will have an impact on a wide range of issues, including the administration and teaching processes in classrooms and schools as well as the general reorganization of the social order. Among the key organizations that might be most impacted by the advancement of artificial intelligence are schools, which are expected to adjust to the digital world and incorporate 21<sup>st</sup> century skills into their core curricula. As new technologies become more and more integrated into our lives and enthrall our children, schools may find themselves forced to accommodate them.

This study focuses on how stakeholders from the fields of law, business, education, and engineering view this development and anticipate the use of artificial intelligence in education. According to the perspectives of the participants from various sectors, the aim of this study is to investigate what is the use of artificial intelligence in education means and what sort of implications it can disclose for the future of education.

## **Applications of AI in different fields can be observed as below**

### **1. AI in Astronomy**

Helps in learning the process of the universe and makes it easy to solve Universe related problems

### **2. AI in Automotive Industry**

Automobile industries use AI for innovation and experimentation of the vehicles and bring better performances. Many industries are putting their efforts in developing their products and also towards the security.

### **3. AI in Gaming**

AI helps in programming machines which can play games along with the human beings. The machines are programmed to make logical thinking and process.

### **4. AI in Transportation**

The travel industries include many facilities for helping the travelers to enjoy their trips and tours. To provide these amenities, the industries have opted AI technology. It has increased the demand for AI. By providing, flights details, best routes, hotels and other available amenities in the localities, the travel industry has benefited the people. There is also an advancement in the travel and transport industries by using chat bots.

### **5. AI in Healthcare**

Health is the major aspect that has to be looked after first. Artificial intelligence is playing a good role in this field too. Its becoming more advantageous in the health and hygiene of the people. AI is used to diagnose quickly to get the proper treatment. The medical field is using AI to bring improved help to the patients. The Doctors are now finding it easy to take a quick decision on the health condition of the patients and provide a proper health care techniques. Last few years have seen the effect of AI in the health care and medical field.

### **6. AI in Security of Data**

Any and Every company will have its own system of data security. It has become very crucial for the companies and industries to keep an eye on their data security. Nowadays, Cyber attacks are increasing very fast. Since there is rapid growth in the digital world, there is an effect of cheating in this field. So every industry is working to install a secured safety system. AI plays a very good role to safeguard the data of the companies. AI helps to find software bugs in an efficient way.

### **7. AI in Robotics**

Robots are considered as the assistants of human beings. The robots of the initial stage were programmed to handle particular tasks. They needed programs to proceed with any task. AI has made it possible that the present robots can think like humans and work like humans. AI has the credit of creating robots which can complete any tasks without any programs but the experiences. Humanoid Robots are the best examples for AI robotics. We have examples of Erica and Sophia who were humanoid Robots which were developed to work and think like human beings.

### **8. AI in Finance**

Finance is an essential element for any task or business. There are several financial industries to guide and help the people utilize and complete their tasks. AI and Finance industries are like best coordinators to each other. There is an implementation of several technological aspects which are making the finance industries grow faster. The chat bots, algorithm trading, adaptive intelligence and machine learning into this industry. This has brought drastic development in financial proceedings.

## **9. AI in Entertainment**

Entertainment acts as a stress buster and relaxes the minds of the people. The modern generation enjoys social media entertainment, like watching videos in YouTube, Facebook etc. With the help of AI, the entertainment industry has succeeded in attracting a larger audience. It has a special role to play in the economy.

## **10. AI in E-commerce**

E-commerce is an invention of the modern world. The stress of any successful business has been reduced by AI. In this competitive world there are a lot of requirements for new techniques to reach out to the customer and develop the business. With the help of AI, the shoppers are finding it easy to get the products they want. They are getting products with recommended brands, colors and sizes. This is a great leap of the world towards development.

## **11. AI in Agriculture**

The Agricultural field needs proper resources to develop and give sufficient output. For this there is need of human resources, finance and sufficient time. The modern generation is leaping towards the digitized method of agriculture. AI is with us to do this task. There are agricultural robotics which can work effortlessly and provide solid and enormous crops. AI helps farmers to analyze the condition and cultivate quality crops.

## **12. AI in Social Media**

Social Media is an effective platform for quick communication and reach of the information. At the same time it has lot many hindrances which keep the users in tension. Such as Facebook, Snap chat, Twitter and many other sites have the profiles of uncountable numbers of users. There is a serious need of safeguarding these accounts. Not only accounts but also sensitive data which should not reach bad hands. AI is playing a good role in protection work, and helping the users to proceed with their usage without any pressure. AI helps in searching any data and analyzing it the way the users want. Help to know the latest trends and hashtags for the users.

## **How AI influences Education**

### **1. Helps in grading the activities of the students**

Although AI grading may never be able to completely replace human grading, it is getting very close. Almost all forms of multiple choice and fill-in-the-blank tests can currently be graded automatically by teachers. Although essay grading software is still in its early stages and not very good, marking homework and exams for lengthy lectures in college can be a laborious task, especially if teaching assistants divide it up amongst themselves. Teachers frequently experience that grading consumes a large amount of time-time that could be better spent engaging with students, getting ready for class, or pursuing professional development.

## **2. Student friendly by fulfilling their needs**

By emphasizing particular topics more, repeating lessons that students haven't understood, and generally assisting students in working at their own pace, these systems adapt to the demands of the learner.

Education across the country has already benefited greatly from adaptive learning, particularly from initiatives like Khan Academy. As artificial intelligence (AI) develops over the next several years, these kinds of systems should only get better and more widespread.

## **3. Helps in fields of improvement**

It's possible that lecturers and instructional materials have gaps that cause students to become confused about specific concepts. Artificial intelligence presents a solution to address such issues. This is already being used by the large provider of open online courses, Coursera. The system notifies the teacher when a significant portion of students turn in incorrect homework answers, and it provides subsequent students with a personalized message that provides pointers for the right answer. This kind of method makes sure that every student is developing the same conceptual basis and fills in any explanation gaps that may arise in a course. Students receive instant feedback that helps them learn a subject and remember how to do it right the next time, instead of having to wait for a response from the lecturer.

## **4. Extra Support to students**

In the future, more students may receive tutoring from tutors who only exist in zeros and ones, even though there are undoubtedly benefits that human tutors can provide that computers cannot—at least not now. There are now several artificial intelligence-based tutoring applications available that assist kids with writing, basic math, and other disciplines. While these programs are capable of teaching pupils the fundamentals, they are not yet the best at assisting students in developing higher order thinking and creative skills, which are still best taught by teachers in the real world. That doesn't, however, mean that AI instructors won't be able to accomplish these tasks in the future. With the speed at which technology has grown over the previous few decades, advanced tutoring systems might not be unattainable.

## **5. Timely feedback**

Artificial intelligence (AI) systems are being used by some universities, particularly those that provide online courses, to track students' progress and notify instructors when there may be a problem with their performance.

These AI technologies enable teachers to identify areas where they may enhance their instruction for students who might struggle with the subject matter and enable them to get the help they need. But these colleges' AI programs offer more than just guidance on specific courses. Some are developing tools to assist students in selecting their majors according to their areas of strength and weakness.

## **6. Provides alternative choices while decision making**

AI actually plays an important role when we interact professionally and personally. They change according to the needs of the users. Being very effective in channelizing the information.

The effect of AI depends on how a user uses it, for interacting with an AI tool. This plays a huge role in connecting human thoughts to AI tools for personal and professional purposes, in schools and academia as well. Over the past few decades, AI-based systems have already radically changed how we interact with information, and with newer, more integrated technology, students in the future may have very different experiences conducting research and finding information. Almost all web ads are tailored to your interests and shopping preferences. Google changes its results based on the location of the users and successfully provides the required info. adapts results to users based on location. Amazon makes recommendations based on previous purchases. Siri takes your commands and act according to your needs.

## **7. Teachers' Role Change**

As we've already covered, AI can replace human teaching in the real world, help students learn more effectively, and even take over responsibilities like grading. However, AI might also be applied to a wide range of other teaching-related tasks. Artificial intelligence (AI) systems have the ability to replace professors for very basic course topics by being configured to provide knowledge and act as a place where students can search information and ask questions. However, AI will typically replace the teacher's job with that of a facilitator.

Instructors will add to AI teachings, help challenging students, and give students opportunities for hands-on learning and human connection. Many of these changes in the classroom are already being driven by technology, particularly in online or flipped learning environments.

## **8. Tension free learning**

Artificial intelligence creates a safe environment for the students who want to experiment and learn required answers with a free environment which is not a judgmental one. AI tutors help to get the solutions but without prejudice. In fact, AI is always a perfect format for those who want to learn something which has no prejudice. AI systems always update themselves and learn new aspects by a trial-and-error method.

## **The Role of Technology in Advanced Education**

### **Personalized Learning Adaptive Learning Systems**

Platforms like Dream Box and Knewton analyze students' responses and adjust the difficulty of questions in real-time, providing a personalized learning experience. This approach helps in addressing the diverse learning paces and styles of students, ensuring that each learner receives content suited to their level of understanding.



## **Learning Management Systems (LMS)**

LMS such as Canvas, Blackboard, and Moodle facilitate personalized learning by allowing educators to design courses that can adapt to students' progress. These systems enable the distribution of resources, submission of assignments, and tracking of student performance, which can be used to personalize feedback and learning paths.

## **Enhanced Engagement and Collaboration Interactive Content**

Technologies like interactive whiteboards, virtual labs, and educational games engage students more deeply than traditional methods. For instance, the use of interactive whiteboards allows teachers to present content dynamically, incorporating multimedia elements that make lessons more engaging. Virtual labs, such as those provided by Labster, offer hands-on experience in a simulated environment, which is particularly beneficial for subjects like chemistry and biology.

## **Collaborative Tools**

Tools such as Google Classroom, Microsoft Teams, and Slack facilitate collaboration among students. These platforms allow for real-time communication, file sharing, and collaborative projects. For example, Google Classroom enables teachers to create assignments that students can work on collaboratively, promoting teamwork and peer-to-peer learning.

## **Access to Global Resources and Expertise Open Educational Resources (OER)**

OERs like Khan Academy, Coursera, and edX provide free or low-cost access to a vast array of educational materials. These platforms offer courses, allowing students to learn from experts regardless of their geographical location. For instance, Coursera provides courses from universities such as Stanford and Yale, enabling learners to gain knowledge and credentials that would otherwise be inaccessible.

## **Virtual Exchange Programs**

Virtual exchange programs and online collaborations with students and educators from different countries broaden learners' perspectives and foster global understanding. Projects like the Soliya Connect Program bring together students from diverse cultural backgrounds to engage in meaningful dialogue and collaborative problem-solving, enhancing intercultural communication skills.

## **Impact on Teaching Practices**

### **Professional Development Online Training Programs**

Technology provides teachers with continuous professional development opportunities through online training programs and webinars. Platforms such as Edutopia and Coursera for Teachers offer courses on the latest educational strategies and technologies, helping educators stay current with educational trends and improve their teaching practices.

## **Professional Learning Communities (PLCs)**

PLCs facilitated through social media platforms like Twitter, Facebook, and LinkedIn enable educators to share resources, strategies, and experiences. Hashtags like #EdTech and #EdChat on Twitter provides access to a global community of educators, fostering professional growth through shared knowledge and collaboration.

## **Data-Driven Instruction Student Analytics**

Learning analytics tools collect and analyze data on student performance and engagement, providing insights that help educators tailor instruction to meet students' needs. Systems like **Tableau and Power BI** can visualize student data, identifying trends and areas for improvement. For instance, if a significant number of students are struggling with a particular concept, the teachers can modify their approach or provide additional resources to address the issue.

## **Feedback Mechanisms**

Technological tools facilitate timely and constructive feedback. Platforms like Turnitin and Google Forms allow for quick assessment of assignments and quizzes, enabling teachers to provide feedback that students can use to improve their understanding and performance.

## **Examples of Technological Integration in Education Case Study**

### **Flipped Classroom Model**

The flipped classroom model, where students engage with lecture content at home via videos and complete assignments in class, exemplifies effective technological integration. Sal Khan, the founder of Khan Academy, has pioneered this approach widely across various International Educational institutions. This model allows teachers to spend class time on interactive activities and personalized support rather than traditional lectures, leading to improved student engagement and understanding.

## **Challenges and Considerations**

### **Digital Divide**

The advent of technology has indeed created opportunities to democratize education by making learning resources more accessible, interactive, and personalized. However, the digital divide-the gap between those who have easy access to the internet and digital devices and those who do not-remains a significant challenge. This divide can stem from various factors, including socioeconomic status, geographic location, and infrastructure availability.

Access to high-speed internet and modern devices is not uniform across all regions, leading to disparities in educational opportunities. Efforts to bridge this gap, such as providing low-cost devices and improving internet infrastructure, are crucial to ensuring equitable access to advanced education.



## **Data Privacy and Security**

The increasing use of digital tools in education raises concerns about data privacy and security. Schools and educational platforms must implement robust measures to protect students' personal information and comply with regulations such as the General Data Protection Regulation (GDPR) and the Family Educational Rights and Privacy Act (FERPA). Educators and administrators need to be aware of the risks and best practices for safeguarding data.

## **Teacher Training and Support**

Effective integration of technology in education requires comprehensive teacher training and ongoing support. Educators must be equipped with the skills to use technological tools effectively and integrate them into their teaching practices. Professional development programs and technical support services are essential to help teachers navigate and utilize new technologies.

Technological integration in advanced education offers numerous benefits, including personalized learning, enhanced engagement, and access to global resources. Successful implementation of technology in education requires addressing challenges such as the digital divide, data privacy, and the need for teacher training. As technology continues to evolve, its potential to transform education and improve learning outcomes is immense. By embracing these advancements, educators can create more inclusive, effective, and innovative learning environments that prepare students for the future.

To recapitulate, the review seeks to find answers to the uses of AI in language teaching and learning.

Four themes are found in relation to the research question that is posted at the beginning of the review. These themes are:

### **To identify effective instruction, AI incorporates classroom flipping**

Artificial intelligence (AI) is applied in combination with the method of flipped learning in a single initiative that includes instructing English. It is within the blended learning setting where AI and flipped education come combined.

Students exhibit greater confidence in learning English particularly when it comes to their sense of self-worth. The experimental group's youngsters do better in listening over the control group's students. Students' extrinsic motivation will always be higher than their internal incentive considering the former, i.e., the desire to gain rewards, prompts pupils to be motivated to learn English rather than just to finish the pronunciation and listening activities.

### **AI enhances the language of instruction's effectiveness and efficacy**

In accordance with a study on applications of artificial intelligence, the tool could improve English language education and instruction. It assists instructors in problems related to directions, especially when transcribing projects. Artificial intelligence (AI) enabled English

language instructors to enhance their listening comprehension and provide students an environment for conversation that is comparable to their native tongue. Actually, it appears that the tool may additionally indirectly enhance the remaining two language skills, that include writing and reading. Thus, incorporating AI into classroom instruction in English allows students to express themselves and expands their horizons in the context of learning. In actuality, it might encourage the professional development of teachers who teach the language in a constructive manner.

### **AI serves in assessing speech**

AI is found to be submitted in human conversation in the context of writing concerning a language learning application for Web speech technology. In other words, individuals can start interacting with computers without the need for artificial intelligence (AI). When computer-mediated communication was employed to communicate between two individuals, it was formerly interaction between humans. However, people may now communicate with computers in a manner identical to that of people attributable to the employment of AI. One instance of artificial intelligence (AI) is chatbots, or artificial conversational ethics, in which people may communicate with one another via a machine. It uses a keyword matching technique to hold intelligent discussions. A human might ask a Chatterbot, "What's your name?" for example, and the AI would respond appropriately based on the responses it has in its database.

### **AI Tools in language learning**

Imagine having a personal language tutor available to you 24/7, patiently guiding you through grammar rules, vocabulary, and pronunciation, all at your own pace. That's the promise of AI tools in language learning. These tools are designed to be your supportive companion on your language-learning journey, offering a blend of interactive exercises, real-time feedback, and personalized study plans.

Picture this: you're practicing your speaking skills with a virtual language partner who not only corrects your mistakes but also encourages you with positive reinforcement, just like a real conversation. And when you're puzzling over a tricky grammar concept, you can turn to an AI-powered language assistant that breaks it down for you in clear, understandable terms, without judgment or impatience.

Moreover, these AI tools can adapt to your learning style and preferences, offering customized lessons and recommendations based on your progress and interests. It's like having a language mentor who knows you inside and out, always ready to help you overcome challenges and celebrate your victories. With AI by your side, learning a new language becomes not just efficient, but also enjoyable and empowering.

### **A few examples of AI tools in language learning**

1. **Duolingo:** Duolingo is a popular language-learning app that uses AI algorithms to personalize lessons for each user. It offers a variety of exercises to practice vocabulary, grammar, listening, and speaking skills. Duolingo's AI system tracks your progress and

adapts the difficulty level of the exercises based on your performance, ensuring that you're continually challenged.

2. **Rosetta Stone:** Rosetta Stone utilizes speech recognition technology powered by AI to help learners improve their pronunciation. The software listens to your spoken responses and provides feedback on your accuracy, helping you refine your accent and intonation. Additionally, Rosetta Stone's AI engine analyzes your learning patterns and suggests personalized review sessions to reinforce your understanding of difficult concepts.
3. **Lingodeer:** Lingodeer is another language-learning app that incorporates AI to create an interactive learning experience. It offers gamified lessons and quizzes to engage users and reinforce language skills. Lingodeer's AI system tracks your progress and adjusts the difficulty of the exercises based on your performance, ensuring a customized learning experience tailored to your needs.

## Conclusion

AI is transforming language learning and teaching by providing immersive, personalized, and adaptable learning environments. Although AI has drawbacks, including ethical issues and technological obstacles, its potential to improve educational outcomes, advance inclusion, and encourage lifelong learning is indisputable. Through using AI's transformative potential, educators, developers, and policymakers can establish a language education environment that is more equal, accessible, and productive for students worldwide.

AI-powered platforms facilitate personalized learning in language education through the analysis of learner data, identification of unique learning requirements, personalization of learning pathways, delivery of adaptive content, provision of personalized feedback and support, enhancement of motivation and engagement, and promotion of long-term language skill retention. By tailoring the learning process to each individual student, this individualized approach produces better results and increases target language competency.

Language skills, improve cultural competency, and participate in real-world communication exchanges are made possible by immersive simulations driven by AI technology. Immersion simulations transform language instruction and hasten learners' progress toward linguistic competency and cultural fluency by providing tailored learning experiences, multisensory engagement, error correction, role-playing possibilities, and cultural immersion.

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