

Importance of Artificial Intelligence in Blended Learning

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Abstract:

Artificial Intelligence (AI) is a new and useful technology in education. It can help teachers teach better and help students learn better. Blended learning means learning through both classroom teaching and online learning. In blended learning, students learn with their teacher in the classroom and also use digital tools at home or outside the classroom. AI can make blended learning easier and more useful. It can help students learn at their own speed. It can help students learn at their own speed. It can give quick answers and feedback. It can provide extra questions and learning materials when students need more practice. AI can also help teachers understand the learning needs and difficulties of their students. It can support teachers in preparing learning activities and checking students' progress. AI can also make online learning more interesting and interactive. Students can use AI-based tools to ask questions, practice lessons, and revise topics. At the same time, teachers can use AI to give better support to different students. However, AI should be used carefully. It can sometimes give wrong information, and students may become too dependent on it. There can also be problems related to privacy, unequal access to technology, and misuse of AI. AI should be used as a supporting tool, not as a replacement for the teacher. When AI is used properly with classroom teaching, it can make blended learning more flexible, personalized, and helpful for students. Recent studies show that Artificial Intelligence (AI) can be useful in blended learning. Blended learning means learning through both classroom teaching and online learning. A review by Park and Doo looked at 30 research studies. The studies showed that AI was used in different ways in blended learning. AI was especially helpful in online learning and meeting the different learning needs of students. A 2025 study that combined the results of 21 studies and 2,873 students also found that AI had a positive effect on students' learning achievement in blended learning. The results were especially good when AI systems provided personalized learning. This means that AI can provide learning support according to the needs and level of each student. However, AI also has some problems. Students may face privacy issues, unequal access to technology, and incorrect information from AI tools. Some students may become too dependent on AI and stop thinking independently.

There can also be problems related to academic dishonesty, such as using AI to complete work unfairly. In addition, teachers need proper training and knowledge to use AI effectively. Therefore, AI should be used carefully and responsibly. It should support teachers rather than replace them. This paper explain the meaning, importance, benefits, challenges, and educational implications of Artificial Intelligence in blended learning.

Keywords: Artificial Intelligence, Blended Learning, Online Learning, Educational Technology, Digital Learning, AI in Education

1. INTRODUCTION

Education is an important part of human life because it helps students gain knowledge, develop skills, and learn how to solve problems. Teaching methods have changed with time. Earlier, teaching mainly depended on books, blackboards, teacher explanations, and classroom interaction. Today, technology has become an important part of education. Students can learn through computers, smartphones, tablets, online videos, digital books, educational apps, and online learning platforms. Learning is no longer limited to the classroom because students can also study at home or at other suitable places. Technology makes learning more flexible and provides students with more learning resources. It also allows students to learn and practice according to their needs. One important method that uses both traditional teaching and technology is blended learning. Blended learning combines classroom teaching with online learning and provides students with the benefits of both teacher guidance and digital learning.

Artificial Intelligence (AI) is developing very quickly and is becoming an important part of education. AI means computer systems that can perform tasks that usually require human thinking, such as understanding language, answering questions, finding patterns making predictions and creating content. In education, AI is used through chatbots, smart tutoring systems, personalized learning, automatic feedback, learning analytics, speech recognition and generative AI tools. When AI is combined with blended learning, it can make learning more flexible and useful. It can help teachers understand students' needs and provide suitable learning materials and feedback. It can also help students learn at their own pace and get quick support when they face difficulties. Thus, AI can make blended learning more personalized, interactive, and effective for both teachers and students. Artificial Intelligence (AI) can make learning more helpful students by giving them support according to their needs. If a student finds a topic difficult, AI can provide extra questions, simple explanations, examples and learning materials. This helps students understand difficult topics more easily and learn at their own speed. AI can also help teachers know how well students are learning. It can study information such as tests scores, class participation, completed tasks, and learning progress. This information helps teachers identify students who need extra help. However, AI alone cannot improve education. Its success depends on how teachers and students use it. Teachers should choose suitable AI tools according to learning goals. Students should also learn to use AI carefully, honesty, and responsibly. Therefore, AI should support teachers and students rather than replace the role of teachers.

UNESCO's 2024 AI Competency Framework for Teachers highlights the need for teachers to develop knowledge, skills, and values related to AI. It includes human-centred thinking, AI ethics, AI foundations and applications, AI pedagogy, and AI for professional learning. Therefore, understanding the importance of AI in blended learning is necessary for teachers, students, schools, colleges, researchers, and educational policy makers.

2. NEED AND SIGNIFICANCE OF THE STUDY

Technology is becoming an important part of education. Students use online resources for learning, revision, practice, communication and tests. However, every students has different abilities, interests, learning speeds and needs. Therefore, one teaching methods may not work equally well for all students. In a traditional classroom, a teacher has to manage many students, so it can be difficult to give personal attention to everyone. Artificial Intelligence (AI) can help by providing extra support through digital learning systems. AI can help students learn according to their own needs and pace. It can also make learning more flexible and useful. Therefore, studying the role of AI in blended learning is important for improving the learning experience of students.

1- Individual Differences among Students

Students are not the same. Some students understand a topic quickly, while others need more explanation and practice. AI can help provide different levels of learning material according to students' needs.

2- Importance of Timely Feedback

Feedback plays an essential role in the learning process. Students need to know whether their answers and work are correct or need improvement. AI-based learning systems can provide quick feedback during online activities and assessments their mistakes immediately and correct them without waiting for the teacher. Timely feedback also helps learners understand difficult concepts more clearly and improve their performance. Therefore, AI can make the feedback process faster, easier, and more effective in blended learning.

3- Importance of Personalized learning

Traditional classroom teaching generally follows the same lesson and activities for a group of students. However students differ in their learning abilities, interests, pace, and academic needs. AI can support personalized learning by providing learning materials, activities, and practice tasks according to each student's performance. It can identify areas where a student needs more support and suggest suitable resources. In this way, AI helps students learn at their own pace and makes blended learning more learner-centred and effective.

4- AI support for Teachers

Teachers are responsible for several important tasks , including lesson planning, progress. Managing all these responsibilities can require considerable time and effort. AI can assist teachers by handling some routine and repetitive tasks. This can reduce their workload and allow them to focus more on effective teaching and meaningful interaction with students. In blended learning, AI can therefore act as a useful support tool for teachers rather than replacing their role.

5- **Effective use of Learning Data**

Blended learning generates valuable information about students' learning activities and performance. AI can examine this information and identify and useful patterns in students' learning behavior. It can help teachers understand which areas students are performing well in and where they may need additional support. Such information can help teachers make better instructional decisions and provide appropriate learning support. Therefore, AI can contribute to more informed and effective teaching in blended learning.

6- **Enhancement of Digital and AI Competencies**

In the present digital age, students need strong digital and AI-related skills to meet the demands of modern life. Integrating AI into education can provide students with meaningful opportunities to develop these competencies through practical learning experiences. It can help them understand how to use digital technologies effectively, safely, and responsibly. Such experiences can increase students' confidence in using technology and prepare them for future academic and professional requirements.

7- **Preparing Learners for the Future of Education**

Artificial Intelligence is expected to become an increasingly important part of education and society. Therefore, educational institutions need to equip students responsible manner. Students should learn not only to operate AI tools but also to evaluate their usefulness and apply them appropriately.

3. **OBJECTIVES OF THE STUDY**

The main objectives of the present paper are:

1. To explain the meaning of blended learning.
2. To explain the meaning of Artificial Intelligence.
3. To understand the importance of Artificial Intelligence in blended learning.
4. To study the major benefits of AI in blended learning.
5. To identify the major challenges of using AI in blended learning.
6. To examine the role of teachers in AI-supported blended learning.
7. To understand the role of students in AI-supported blended learning.
8. To discuss the educational implications of AI in blended learning.

4. **RESEARCH METHODOLOGY**

The present paper is a descriptive and conceptual research paper. It is mainly based on secondary sources. Information was collected from research articles, systematic reviews, meta-analysis studies, books, and reports related to Artificial Intelligence, Blended learning, and educational technology. Recent research was given special attention because AI is a rapidly developing field. Park and Doo (2024) conducted a systematic literature review of AI applications in blended learning. Their review included 30 empirical studies published between January 2007 and October 2023. A recent meta-analysis by Wu et al. (2025) examined 21 studies involving 2,873 participants and investigated the effect of AI on learning achievement in blended learning. The information from these sources was

organized into major areas such as the meaning of blended learning, meaning of AI, importance, benefits, challenges, and educational implications.

This paper does not use primary data collected directly from students or teachers. Its purpose is to explain the importance of AI in blended learning.

5. MEANING OF BLENDED LEARNING

Blended learning is a teaching method that combines face-to-face classroom learning and online learning. In very simple words, blended learning means through both the teacher and digital technology. For instance, a teacher may introduce a science topic through a face-to-face classroom lesson. After the classroom session, students can continue learning through digital resources such as education videos, e-books, online quizzes, or virtual discussions. In the following class, the teacher can review students' questions, clarify difficult concepts, and provide additional support based on their online learning experiences.

Blended learning is more than simply using computers or smartphones during classroom teaching. It involves the planned and meaningful integration of face-to-face instruction with online learning. Both components should complement each other so that students receive a continuous and effective learning experience.

The major features of blended learning are:

- Face-to-face classroom teaching.
- Online learning activities.
- Use of digital learning materials.
- Flexible learning.
- Student participation.
- Self-learning opportunities.
- Online assessment
- Feedback.
- Teacher-student interaction.
- Use of technology to support learning.

Blended learning can provide students with opportunities to learn both with teachers and independently. It can also allow students to revise learning materials more than once. When AI is added to blended learning, the online component can become more personalised and interactive.

6. MEANING OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence, or AI, is a technology that enable computers and software systems to perform tasks that normally require human intelligence.

AI allows computers to process information, recognize patterns, understand questions, generate responses, and provide suggestions.

Some common examples of AI applications are:

- AI chatbots.
- Intelligent tutoring systems.
- Personalized learning systems.

- Automated feedback systems.
- Learning analytics.
- Speech recognition.
- Recommendation systems.
- Generative AI tools.
- Adaptive assessment systems.

AI as a Supportive Tool in Education:

Artificial Intelligence (AI) can support both students and teachers in many useful ways. For example, an AI- based learning system can identify areas where a student faces repeated difficulties, such as mathematics. It can then provide simpler questions, suitable examples, clear explanations, and extra practice according to the learner's needs. AI can also help students by answering basic questions and providing quick learning support. However, AI-generated information may sometimes contain errors, so important information should always be checked by students and teachers. AI should be used as a supportive tool rather than as a replacement for teachers. Teachers play an essential role because they understand students' emotions, motivation, social needs, classroom behavior, and individual differences. These human qualities cannot be fully replaced by technology.

UNESCO also highlights that AI is creating a new relationship among teachers, students need to develop new skills and competencies to use AI effectively and responsibly in modern education.

7. IMPORTANCE OF ARTIFICIAL INTELLIGENCE IN BLENDED LEARNING

1. Better Understanding of student performance –

AI can analyze student learning information. It can look at test scores, completed activities, mistakes, participation, and other learning data. Teachers can use this information to understand students' progress.

2. Better online Learning –

The online part of blended learning can sometimes become passive. Students may simply watch videos or read material. AI can make online learning more interactive by asking questions, giving feedback, providing hints and suggesting additional activities.

3. Development of Independent Learning –

Students can use AI- supported learning tools to practice and revise lessons independently. They can ask questions, request examples, and receive additional practice.

4. Better Connection Between Online and Classroom Learning-

AI can help teachers understand what students are doing during online learning. For example, if students perform poorly in an online activity, the teacher can use classroom time to explain that topic again. In this way, online learning information can support face-to-face teaching.

5. Support for Different Learning Levels –

AI can help provide learning activities for students with different levels of knowledge. A beginner may receive basic explanations and simple questions, while a more advanced student may receive challenging tasks.

6. Adaptive learning –

AI can change the level and type of learning activities according to a student's performance.

7. Easy Availability of Learning Support –

Students can receive explanations, examples, and practice materials whenever additional help is required.

8. Development of Critical Thinking –

AI can present different ideas and viewpoints that encourage students to analyze information and their own conclusions.

9. Recognition of Learning Gaps –

AI can identify areas in which students are facing difficulties and provide information that can help teachers offer suitable support.

10. Development of Problem-Solving Skills –

AI can provide practical problems and guided activities that encourage students to think logically and suitable solutions.

11. Regular Monitoring of Progress –

AI can help teachers and students understand learning progress by analyzing performance over time.

12. Improved Assessment –

AI can support the assessment process by analyzing students' responses and highlighting areas that need further improvement.

13. Language Assistance -

AI can simplify difficult concept and provide explanations in different languages, making learning easier for diverse learners.

14. Encouragement of Self-Learning –

AI can help students explore subjects, practice, independently, and take greater responsibility for their learning.

15. Effective Use of Time –

AI can help students organize their learning activities and focus more attention on topics that require improvement.

16. Assistance to Teachers –

AI can help teachers prepare teaching materials, questions, activities and assessments, reducing routine workload

8. BENEFITS OF ARTIFICIAL INTELLIGENCE IN BLENDED LEARNING

AI provides many possible benefits when it is used properly.

1. Saves Time –

AI can assist teachers with some repetitive tasks and help students find learning resources quickly.

2. Helps Weak Students-

Students who need more practice can receive additional learning materials.

3. Makes Learning Flexible-

Students can use online resources according to their time and needs.

4. Supports Modern skills –

Students can develop digital literacy, AI literacy, information evaluation, problem-solving, and critical thinking skills.

UNESCO's student framework also focuses on helping students understand AI, use it responsibly, and develop the ability to critically judge AI systems.

5. Increase Learning Opportunities –

Students can access learning support beyond normal classroom hours

9. CHALLENGES OF USING AI

Although AI has many benefits, it also creates some problems. These problems are –

1. Privacy problems –

AI systems may collect student information and learning data. This information must be protected carefully.

2. Incorrect Information –

AI can sometimes give wrong or incomplete answers. Therefore, students should not accept every AI answer without checking it.

3. Overdependence on AI –

Students may become dependent on AI for every question and assignment. If students always ask AI to provide answers, they may get fewer opportunities to think independently.

4. Academic Dishonesty –

Generative AI can be used to prepare assignments, answers, and other academic work. If students submit AI-generated work as their own without understanding it, it creates an academic integrity problems.

5. Cost –

Schools and colleges may need computers, internet facilities, software, technical support, and teacher training. These requirements can create financial challenges

6. Reduced Human Interaction –

Education is not only about information. It also involves relationship, communication, emotions, values, motivation, and social development. Too much use of technology can reduce meaningful interaction between teachers and students.

10. EDUCATIONAL IMPLICATIONS

The use of AI in blended learning has important implications for teachers, students and curriculum.

10.1 Implications for Teachers –

The teacher remains an important part of the learning process.

Teachers should : Understand basic AI concepts.

- Select suitable AI tools
- Check AI-generated information.

- Protect student privacy.
- Teach responsible AI use.
- Use learning data carefully.
- Encourage independent thinking.
- Maintain human interaction.

Teachers should not simply use AI because it is new. They should use it only when it supports the learning objective.

10.2 Implications for Students –

Students need to learn how to use AI responsibly.

- How AI works at a basic level.
- How to ask useful questions.
- How to check AI answers.
- How to identify possible mistakes.
- How to protect personal information.
- How to avoid academic dishonestly.

Students should develop critical thinking along with AI skills.

10.3 Implications for curriculum -

The curriculum should include opportunities for students to understand AI. Students should learn not only how to use AI tools but also about their advantages, limitations, ethical issues, and social effects.

11. CONCLUSION

Artificial Intelligence (AI) is becoming an important part of education. When AI is used with blended learning, it can make learning easier and more effective. Blended learning combines classroom teaching with online learning. AI can provide students with learning materials according to their needs and abilities. It can give quick feedback and help students understand difficult topics. Students can also practice lessons and learn at their own pace. AI helps teachers track students' progress and identify areas where they need support. It can make online learning more interactive and engaging. However, AI should be used carefully and with proper guidance. Overall, the combination of AI and blended learning can create more flexible, personalized, and effective learning experience. Research suggests that Artificial Intelligence can be helpful in blended learning. Studies show that AI can support both teaching and learning in different ways. It can help students learn better by providing personalized learning, quick feedback, and suitable learning materials. AI-based personalized systems have shown particularly positive results in improving students' learning. However, AI also has some limitations and risks. These include privacy concerns, wrong information, cheating, unequal access to technology, unfair results, too much dependence on AI. Therefore, AI should be used carefully and responsibly, along with proper guidance from teachers. The success of AI in blended learning depends on proper planning, teacher training, good technology, and responsible use. AI should support teachers instead

of replacing them. Students should learn to use AI carefully and check the information it provides. Their own thinking and creativity should always remain important. When used properly, AI can make learning more personalized, flexible, interactive, and accessible. It can help students learn according to their needs and support teachers in improving the learning process. Thus, AI can make blended learning more effective and student-centred. The future of education should not be AI instead of teachers. It should be teachers and students using AI wisely to improve learning

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