

MSTEM

LESSON PLAN : ARTIFICIAL INTELLIGENCE

METAVERSE-BASED STEM EDUCATION FOR A SUSTAINABLE AND RESILIENT FUTURE 2023-1-FR01-KA220-SCH-000151516



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Purpose of Lesson:

Artificial Intelligence (AI) is revolutionizing numerous industries, such as education, medicine, and entertainment. This lesson aims to expose students to the basic concepts of AI, its relationship with STEM, and how it contributes to the development of virtual spaces such as the Metaverse. By learning about the strengths and weaknesses of AI, students will be able to develop a critical mind regarding the future of digital technology.

Description of Lesson:

This lesson introduces students to the fundamental concepts of Artificial Intelligence (AI) and its role in shaping virtual environments like the Metaverse. Students will explore AI's key components, including Machine Learning, Neural Networks, Natural Language Processing (NLP), and Computer Vision. Real-world applications, such as AI-powered virtual assistants, self-driving cars, and adaptive learning systems, will be examined to highlight AI's growing impact on daily life. The lesson will also address the role of AI in the Metaverse, with emphasis on AI making virtual interactions more life-like through realistic NPCs (Non-Player Characters), customized experience, and automated world generation. Ethical issues, including AI bias, privacy threats, and automation of jobs, will be addressed to promote critical thinking.

Lesson Teaching Method:

This lesson is delivered through an informative teaching method providing a clear, structured, and visually engaging way to introduce AI concepts. This method ensures that students receive consistent and well-organized information, making it easier to understand complex topics related with AI in the Metaverse. Additionally, the format of the lesson itself allows students to learn at their own pace, therefore students are able to review the material as needed. While primarily informative, this method can be supplemented with discussions and reflective exercises to enhance engagement and comprehension. This lesson also includes a discussion session encouraging student engagement, as well as a group activity encouraging collaboration and diverse perspectives.





Lesson Objectives:

By the end of this lesson, students will be able to:

- Define Artificial Intelligence (AI)
- Define Artificial Intelligence key components.
- Identify real-world applications of AI in different industries.
- Explain AI's role in the Metaverse and adaptive learning environments.
- Discuss the ethical challenges of AI in the metaverse.
- Apply critical thinking to analyze the implications of AI in everyday life.

The objectives of the lesson are achieved through a structured and informative approach, ensuring students grasp key AI concepts and their applications.

Lesson plan:

1.Introduction: (10-15 minutes)

- Engagement Activity: Ask students to share their experiences with AI-powered tools (e.g., Siri, Google Assistant, ChatGPT).
- Brief Explanation: Define AI and its core functions.
- Discussion: Explain how AI differs from traditional programming and introduce its major components (Machine Learning, Neural Networks, NLP, and Computer Vision).

Main Lesson (25-30 minutes)

2.Al in the Real World:

Showcase examples of AI in daily life (virtual assistants, self-driving cars, healthcare, chatbots).

Discuss how AI improves efficiency in different industries.

3.Al in the Metaverse:

Explain how AI generates virtual environments, NPC interactions, and personalized experiences.

Introduce adaptive learning systems and AI-driven virtual classrooms.







4. Ethical Considerations:

- Discuss AI biases, privacy concerns, job automation, and over-reliance on AI.
- Encourage critical thinking by asking students how they would regulate AI in virtual spaces.

5. Practical Exercise: AI Capabilities and Limitations(15-20 minutes)

- In this activity, the teacher will present a set of statements about AI's abilities and ask students to decide whether each statement is true or false. The teacher will guide students through the reasoning behind each answer, providing real-world examples to illustrate AI's strengths and limitations.
- Display the statements on the board or read them aloud.
- Ask students to decide which tasks AI can and cannot perform.
- Discuss each statement, explaining why AI excels in certain areas (e.g., data analysis, facial recognition) but has limitations (e.g., lacking human-like creativity and deep emotional understanding).
- Provide examples from real-world applications, such as AI-powered virtual assistants, self-driving cars, and AI-generated art.
- This exercise will engage students in critical thinking and help them develop a deeper understanding of AI's practical applications and boundaries.

6.Conclusion (10 minutes)

- Recap key takeaways.
- Open discussion: "What excites or concerns you most about AI's future?"





Lesson table

Lesson Plan	
 Introduction: Learning objectives "Share your experience" Discussion Definition of Artificial Intelligence 	10-15 minutes
 Key components of Al Machine Learning Neural Networks Natural Language Processing Computer Vision Al in the Real World Personal Assistants Self-driving Cars Healthcare Al Chatbots 	15 minutes
 Al's Role in the Metaverse Realistic NPCs (Non-Player Characters) Personalized Experiences Automated World Creation Al-Enhanced Learning Adaptive Learning in Virtual Classrooms Real-Time Adjustment Custom Learning Paths Automated Grading & Feedback 	15 minutes









Lesson table

Lesson Plan	
 Ethical Challenges of Al in the Metaverse: Bias and Fairness Privacy and Data Security Job Automation Over-Reliance on Al 	10 minutes
Conclusion and Practical Exercise	15 minutes





Lesson resources

- Presentation slides on AI concepts and applications.
- Videos demonstrating AI in action (e.g., AI in self-driving cars, virtual assistants, NPCs in gaming).
- Online articles and reports on AI's impact in different industries.
- Internet access for group research.

Resources used to create the lesson:

- Benjamins, R., Rubio Viñuela, Y., Alonso, C.: Social and ethical challenges of the metaverse: opening the debate. AI Ethics (2023). <u>https://doi.org/10.1007/s43681-023-00278-5</u>
- The basic components and branches of AI. (2023, July 14). SOCi. <u>https://www.soci.ai/knowledge-articles/branches-of-artificial-intelligence/</u>
- Navigating the ethical landscape of the metaverse: Challenges and solutions. (n.d.). The UK's technology trade association. <u>https://www.techuk.org/resource/navigating-the-ethical-landscape-of-themetaverse-challenges-and-solutions.html</u>
- The role of AI in shaping the Metaverse: Bridging the virtual and real worlds. (2025, February 21).
 Dataleon AI Powered Data Automation & Identity Verification. <u>https://www.dataleon.ai/en/blog/the-role-of-ai-in-shaping-the-metaverse-bridging-the-virtual-and-real-worlds</u>
- Valliani, J. (2024, October 30). Learn AI: Guide to understanding artificial intelligence | Atlassian. Work Life by Atlassian. <u>https://www.atlassian.com/blog/artificial-intelligence/learn-ai</u>
- Virtual classrooms & adaptive learning: Modern education. (n.d.). Giggle Academy.
 <u>https://www.giggleacademy.in/virtual-classrooms-and-adaptive-learning-modern-education</u>
- What are the components of AI? (2024, January 11). Ellow Talent. https://ellow.io/components-of-ai/

Individual Work and Homework Assignments

During Lesson:

- 1. Students analyze an AI application and present its pros and cons.
- 2. Group discussions on Al's ethical challenges in virtual spaces.

Homework:

- 1. Research an AI system and write a one-page summary on how it impacts society.
- 2. Create a short presentation on an AI innovation that could improve virtual learning environments.





Evaluation and indicators

Assessment will be conducted through student participation in discussions, accuracy in analyzing AI applications, and engagement in the practical exercise. Success indicators include the ability to correctly identify AI capabilities and limitations, articulate AI's role in the Metaverse, and critically assess ethical challenges. Homework assignments and group presentations will also be evaluated based on clarity, depth, and application of concepts.

Evaluation and Indicators Specifics		
Expected Outcomes	Students should demonstrate a clear understanding of AI fundamentals, its role in the Metaverse, and ethical implications	
Assessment Methods	 Participation in discussions and group activities. Quality of AI application analysis and scenario-based responses. Clarity and depth in homework assignments. 	
Success Indicators	 Ability to explain AI concepts and applications accurately. Critical evaluation of AI's role in society and virtual environments. Thoughtful engagement in ethical debates on AI. 	





Overview of the lesson

This lesson is an in-depth exploration of Artificial Intelligence (AI) and its uses in the Metaverse. Students will explore the fundamentals of AI and its most significant components such as Machine Learning, Neural Networks, Natural Language Processing, and Computer Vision. Through engaging discussions and real-world examples, students will discover how AI is being utilized in various sectors such as healthcare, education, and virtual worlds. It dedicates a lot of the lesson to the impact of AI on the Metaverse where it provides value to users' experience through realistic Non-Player Characters (NPCs), user-specific experiences, and procedural world generation. Ethical concerns that accompany the application of AI are also accorded consideration in the lesson, and they encompass bias, privacy concerns, automation of work, as well as over-reliance on Al-driven systems. To reinforce their knowledge, students will undertake an interactive practical activity in which they examine AI capabilities and constraints. By the end of this session, students will have attained a well-rounded grasp of AI applications, ethical implications, and prospects, enabling them to critically evaluate the contributions of AI in designing our digital environment.



