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Research Article

Defining Artificial Intelligence: A DeepSeek-Assisted Synthesis of Contemporary Definitions

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ABSTRACT

The rapid proliferation of Artificial Intelligence (AI) across virtually all educational, industrial and consumer domains is undeniable and well-documented. It has become a transformative force across all sectors of society, driving innovation in healthcare, finance, manufacturing, and communication. In education, AI increasingly influences teaching, learning, and educational leadership, reshaping pedagogy and knowledge access. Despite widespread adoption, the term remains variably defined across disciplines, creating conceptual ambiguities. This study aimed to develop a definition of AI, aided by the AI chatbot DeepSeek, by synthesizing definitions and descriptions from various authors from purposively selected peer-reviewed journals and to systematically describe the core conceptual parts that comprise the synthesized definition of AI, and to critically examine how the corresponding scholarly references theoretically corroborate each of the constituent elements. To achieve the objectives of the study, the researchers conducted a purposive literature search and analysis of the definitions and/or descriptions of Artificial Intelligence, then used the AI chatbot DeepSeek to develop the synthesized definition. Additionally, the researchers reviewed the parts of the synthesized definition alongside their corresponding published references to verify their alignment and validity. AI refers to a computational systems that perform cognitive tasks—including learning, reasoning, problem-solving, perception, and natural language understanding—typically associated with human intelligence. These systems operate through algorithmic processing of data and models, and with varying degrees of autonomy, adapt to environments, make predictions or decisions, and pursue goal-oriented behavior. Moreover, valid related references support each part of the synthesized definition. Consequently, based on the results of the study, the researchers emphasize the importance of establishing clear, synthesized definitions for key educational concepts—particularly the term artificial intelligence—which is critical for effective instruction. Remarkably, the synthesized definition of AI provides a strong conceptual foundation for advancing relevant and impactful teaching and learning in all levels.

Keywords: Artificial Intelligence (AI), AI tools, Chatbot, Defining Artificial Intelligence, DeepSeek, Synthesized definition

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Introduction

There is no denying that Artificial Intelligence (AI) is becoming a part of every human endeavor across all groups and layers of the modern society. “AI, which is one of the main components of industry 4.0 (artificial intelligence, internet of things, autonomous robots, cloud computing, big data, augmented reality, cyber security), is a technology that has a great importance today” (Cioffi et al., 2020; Gupta, 2017; Gode & Kalkan, 2023). Moreover, according to UNESCO (<https://www.unesco.org/en/artificial-intelligence/recommendation-ethics?hub=195885>, retrieved on March 26, 2026) “the rapid rise in artificial intelligence has created many opportunities globally, from facilitating healthcare diagnoses to enabling human connections through social media and creating labour efficiencies through automated tasks” (para 3).

Like other technological disruptions and emerging advanced technological applications, AI tools are driving rapid changes in the educational landscape requiring that educators at all levels and different areas or fields of expertise need to keep upskilling and updating the competencies they need to cope with the evolving demands of their profession (Sabijon, 2024).

Specifically, in order to fulfill their roles as proficient facilitators of the teaching and learning process, educators must stay updated with the important education topics and terms, especially about the very relevant *Artificial Intelligence (AI)*. Sustaining quality education in line with the 17 United Nations Sustainable Development Goals (UNSDGs) depends on this awareness and commitment for continuous professional growth. Since *quality education*—the UNSDG 4—gives people the tools to overcome poverty and promotes wider societal growth, it is recognized as the key that enables the achievement of many other UNSDGs (The Global Goals, Quality Education, n.d., as cited in Sabijon, 2021).

The educators’, as stakeholders and facilitators of quality education, precise understanding and use of a term, specifically the significant term like *artificial intelligence* (henceforth, *Artificial Intelligence* or *AI* in singular form; and *Artificial Intelligence* tools or *AI* tools for the plural form, respectively) is critical, particularly when talking about complex and

significant ideas that could affect students’ learning outcomes in all courses. This rule applies to both scientific discourse and terms that relate to education contexts. According to Shipman (2013, as cited in Sabijon, 2024), the improper use of technical terms can create vagueness and make communication process more difficult. This problem is particularly with how the term *artificial intelligence*, a significant term in the teaching-learning process, is used.

What is artificial intelligence? According Russel and Norvig (2020, as cited in Sheikh et al., 2023) “defining AI is not easy; in fact, there is no generally accepted definition of the concept” (p. 15). Moreover, “numerous different ones are used, and this can easily lead to confusion. It is therefore important to clarify our use of the term” (Sheikh et al., 2023, p. 15). Hence, to answer the preceding question, there is a need of a focused study to define the term artificial intelligence to provide a better and correct response based on identified context. It suggests a critical analysis of the relevant literature about AI, specifically its many definitions that are relevant and important towards a deeper and better understanding of the term.

Gode and Kalkan (2023) revealed that “there are many type [sic] of definitions for AI” (p. 25). And, according to John McCarthy, one of the pioneers of AI, “AI is to develop machines that act as if they are intelligent” (Ertel, 2018, as cited in Gode & Kalkan 2023, p. 25). Moreover, Gignac and Szodorai (2024) reported the “...diverse definitions of artificial intelligence in computer science” (p. 1) and “many definitions of artificial intelligence have been proposed, as documented in comprehensive reviews” (Legg & Hutter, 2007a; Monett & Lewis, 2018, as cited in Gignac & Szodorai, 2024, p. 3). The aforementioned literature reveal the absence of a synthesized definition of artificial intelligence, hence, this study.

Why do teachers, students, parents, government officials, school administrators, and other interested parties in education should have a better and essentially common understanding of AI? The UNESCO (in <https://www.unesco.org/en/digital-education/artificial-intelligence>) reported that “Artificial Intelligence (AI) has the potential to address some of the biggest challenges in education today, innovate teaching and learning

practices, and accelerate progress towards SDG 4” (p. 1, para. 1).

In particular, the use of AI, specifically AI tools play a crucial role in contemporary education by offering teachers and students vital resources needed to facilitate instruction and academic research processes. The divergent definitions by many authors about the term, however, reflect its complexity and broadness, thus, the researchers aimed to develop the synthesized definition of the term, which is the main objective of this study, and used the popular generative Artificial Intelligence (AI) chatbot, specifically the “DeepSeek, which was founded in China in May 2023...” (Al-Obaydi & Pikhart, 2026, p. 3). It is a “Chinese artificial intelligence (AI) startup and has rapidly gained global attention for delivering high performance large language models (LLMs) at a significant lower cost” (Xu et al., 2025, p. 536).

Specifically, “in late 2024, a Chinese AI company called Hangzhou DeepSeek Artificial Intelligence Basic Technologic Research Co. Ltd., focused on research and development in the field of Artificial Intelligence (AGI) and based in Hangzhou, Zhejiang, in China, created their LLM DeepSeek. DeepSeek has fascinating capabilities, one of which is writing detained computer code.” (Koylu, 2025, p. 3)

In January 2025, DeepSeek “gained international notoriety after it was said to be comparable to one of OpenAI’s most recent models, bringing in over 11.79 million new users per month (DeepSeek, 2024, as cited in Al-Obaydi & Pikhart, 2026, p. 3). Particularly, Generative AI (GenAI), and Large Language Models (LLMs), like the DeepSeek chatbot, “...is a type of AI that is trained on a large amount of text data and can generate new text. It is used in applications such as language translation, text summarization, and content creation” (Koylu, 2025, p. 2).

The primary aim of this study was to develop a *synthesized definition* of artificial intelligence. A *synthesized definition* is a unified definition derived by interpreting and reconciling existing definitions from various authors or sources. It was derived, specifically by *explication*, a “systematic process of clarifying, unpacking, and justifying the constituent elements of a proposed definition” (DeepSeek,

personal communication, May 22, 2026, p. 1), with the assistance of DeepSeek.

The definition was synthesized by the researchers, with the assistance of the AI chatbot DeepSeek, from various definitions and /or descriptions published by different authors in selected scholarly journals. Specifically, this study sought to answer the following questions:

- 1) What is a synthesized definition of artificial intelligence?
- 2) What are the conceptual components of the synthesized definition of AI, and how do the corresponding references support each part of the definition?

Methodology

The following activities were followed by the researchers (aligned with Dankasa’s, 2015, p. 65 study; as cited in Sabijon, 2024) to answer the objectives of the study:

- 1) After finalizing the research objectives, the researcher conducted various searches to look for research articles about and related to the term *artificial intelligence*. Search terms such as *artificial intelligence*, *defining artificial intelligence*, *artificial intelligence defined*, *artificial intelligence definitions*, *what is artificial intelligence?*, and *artificial intelligence* were used to identify relevant literature and publications conducted in this research area. Electronic search engines such as the Google, Google Scholar, and other institutional library databases were used in the search for materials. The major sources of data that were used in this research article were journal articles. There were more than 70 journal articles that were retrieved because of their relevance to the scope of the study;
- 2) Then, the researchers comprehensively reviewed and analyzed the various research references and purposively selected 22 journals, which published 37 definitions and/or descriptions by 33 authors or group of authors (see Table 2) in order to achieve the objectives of the study. There was no limit set for the year of publication of the sources. It was noted, however, that the “old” article that published a definition of instructional materials was published in

- 2021, while the most current was published in 2025;
- 3) To answer the research questions, specifically to develop a *synthesized definition* of the term artificial intelligence, the assistance of the popular large language model (LLM) DeepSeek (Koylu, 2025), specifically DeepSeek-V3 (DeepSeek, personal communication, May 22, 2026, p. 1; Liao et al., 2025),
 - 4) More specifically, to answer the questions: a) "What is a synthesized definition of artificial intelligence?" and b) "What are the conceptual components of the synthesized definition of AI, and how do the corresponding references support each part of the definition?", the researchers developed the prompt (see Table 1), based on the prompt framework from Pennsylvania State University Library published in Koylu (2025), and, aided by DeepSeek, provided answers to the aforementioned questions, and
 - 5) Lastly, the lead researcher/author reviewed the generated texts and validated the outputs using his knowledge and expertise as a full-professor of education at his home university.

Table 1. The Prompt, Based on the P.R.O.M.P.T. Framework published in Koylu (2025), that was Used in the Study

P.R.O.M.P.T.	Label/Name	Description	The Prompt Used in the Study
P	Persona	Assign a role. Example: "You are a [literacy critic/compliance officer/patent attorney/etc.]."	You are an expert in conceptual analysis, philosophy of science, and artificial intelligence, specifically skilled in synthesizing complex multidisciplinary concepts into clear, precise definitions. You work as an expert senior research fellow contributing to a high-impact academic publication.
R	Requirements	Define the parameters for output. Examples: "Topical content to include /exclude, number of responses, word count/limit, reading level, standards compliance, etc."	Using the provided collection of existing Artificial Intelligence definitions and/or thematic findings, synthesize a new, robust, and contemporary definition of "Artificial Intelligence." Your synthesized definition must: 1. Integrate the most essential and enduring attributes identified across the source material. 2. Be applicable across major AI sub-fields (e.g., machine learning, symbolic reasoning, robotics, natural language processing). 3. Be self-contained, requiring no external context to be understood by a multidisciplinary academic audience. 4. Be concise and suitable for citation in a scholarly paper (aim for 1-3 sentences). 5. Avoid allegiance to a single paradigm, anthropomorphic exaggeration, and unwarranted hype. 6. Be followed immediately by a detailed explication: unpack the

P.R.O.M.P.T.	Label/Name	Description	The Prompt Used in the Study
			definition's constituent parts, explaining the deliberate choices behind key terms and phrases. This explication must explicitly reference the source definitions that influenced each element.
O	Organization	Describe the structure of the output. Examples: "Alphabetical, chronological, table, bulleted or numbered list, step-by-step instructions, etc."	Structure your response in exactly this order using the following headings: Synthesized Definition: the definition itself, presented in bold. Explication: A paragraph-by-paragraph breakdown of their definition's key components. Genealogy of the Definition: A bullet list mapping core definitional elements to their source material or thematic origin. Do not include any additional sections, summaries, or concluding remarks outside this structure.
M	Medium	Describe the format of the output. Examples: Prose, social media post, computer code, spreadsheet, website, slide deck, audio/visual, recipe, dialogue script, survey, interview, etc.	Deliver your response in plain Markdown, formatted strictly for direct inclusion in an academic manuscript. Use only standard scholarly English, without emojis, casual asides, or conversational markers.
P	Purpose	Identify the rhetorical purpose and intended audience. Examples: Explain, summarize, pitch, entertain, college students, English language learners, investor, first date, etc.	The purpose of this synthesis is to produce a definitive, citation-ready definition of Artificial Intelligence that captures the evolving concept's core while reflecting contemporary scholarly consensus. This definition will serve as the conceptual anchor for a published research article titled "Artificial Intelligence: A DeepSeek-Assisted Synthesized Definition."
T	Tone	Specify the tone of the output. Examples: Academic, professional, snarky, funny, inspirational, sentimental, foreboding, etc.	Maintain a formal, authoritative, and intellectually humble tone. Write with the precision expected of a top-tier journal article. While the definition should be declarative, the explication must Acknowledge nuance, divergent perspectives, and the deliberate nature of the synthesis process.

Result and Discussion

The study's findings are organized according to the research questions. The data are likewise grouped and presented based on each specific question. This approach ensures that the results directly address the key questions of the study.

What is a Synthesized Definition of Artificial Intelligence?

Table 2 shows the 37 definitions of the term artificial intelligence by 33 authors, whose names were arranged alphabetically, and from 22 research journals. Specifically, these journals are:

AG Editor; American Journal of Education and Information Technology; Arbor Journal; Computers and Education: Artificial Intelligence; Frontiers in Education; Information Technologies and Learning Tools; International Journal of Accounting, Finance, Auditing, Management & Economics (IJAFAME); International Journal of Educational Technology in Higher Education; International Journal of Information and Education Technology; International Journal of Research and Technology (IJRT); International Scientific Journal; Internet Reference Services Quarterly; Investigation in Health, Psychology and Education; Journal of Educational Technology & Online Learning; Journal of Information Technology Case and

Application Research; Journal of Medical Internet Research; Multimodal Technologies and Interaction, Nepalese Journal of Development and Rural Studies, Proceedings of the 32nd International Conference on Computers in Education, Serdica Journal of Computing; TechTrends; and the UNESCO Education Sector.

Additionally, the data in Table 2 show that while various authors or researchers have provided diverse definitions of artificial intelligence, there are important core definitional elements or constituent components that are evident across some, if not in all of these definitions.

Specifically, based on the synthesis of the definitions from 33 authors (see Table 2), assisted by DeepSeek, and using the prompt (see Table 1), artificial intelligence (AI) refers to—computational systems that perform cognitive tasks—including learning, reasoning, problem-solving, perception, and natural language understanding—typically associated with human intelligence. These systems operate through algorithmic processing of data and models, and with varying degrees of autonomy, they adapt to environments, make predictions or decisions, and pursue goal-oriented behavior. (DeepSeek assistance, personal communication, May 22, 2026).

Table 2. The Definitions and/or Descriptions of Artificial Intelligence According to Various Authors

Source No.	Author & Year	Name of the Journals/Sources	Definition and Description of Artificial Intelligence
1	Abbasi (2021, p. 74)	<i>Arbor Journal</i>	"Artificial intelligence (AI) refers to the replication of human intelligence in computers, which are specifically designed to imitate human thinking and behavior."
2	Aggarwal (2018, as cited in Celik et al., 2022)	<i>TechTrends</i>	AI is a general term that refers to diverse analytical methods. These methods can be classified as machine learning, neural networks, and deep learning.
3	Akgun and Greenhow (2021, as cited in Aljemely, 2024)	<i>Frontiers in Education</i>	Akgun and Greenhow (2021, as cited in Aljemely, 2024) explained that artificial intelligence comprises advanced technologies, including natural language processing (NLP), machine learning, and algorithms.

Source No.	Author & Year	Name of the Journals/Sources	Definition and Description of Artificial Intelligence
4	Baker & Smith (2019, p. 10, as cited in Celik et al., 2022)	<i>TechTrends</i>	Baker and Smith (2019, as cited in Celik et al., 2022) pointed out that AI does not refer to a single technology but is defined as “computers [that] perform cognitive tasks, usually associated with human minds, particularly learning and problem solving” (p.10).
5	Baker & Smith (2019, as cited in Khatri & Karki, 2023, p. 2)	<i>Nepalese Journal of Development and Rural Studies</i>	Baker and Smith (2019, as cited in Khatri & Karki, 2023) provide an extensive definition of artificial intelligence (AI): ‘Computational systems that exhibit cognitive functions, commonly associated with human intelligence, particularly focused on learning and solving complex problems.’
6	Bond et al. (2024); Gruetzemacher & Whittleston (2022); Sánchez-Prieto et al. (2020); Zheng et al. (2019, as cited in Dumagay et al., 2025)	<i>AG Editor</i>	Its applications spanned critical areas such as healthcare, national defense, business, and education, demonstrating its ability to enhance precision, efficiency, and innovation.
7	Brown et al. (2020); Marcus & Davis (2019, as cited in Dumagay et al., 2025)	<i>AG Editor</i>	AI expanded to include advanced machine learning, deep learning, and natural language processing, which allowed systems to analyze, predict, and adapt to complex environments.
8	Cayak (2024, p. 368)	<i>Journal of Educational Technology & Online Learning</i>	“Artificial intelligence describes machine-based systems that make predictions, recommendations, or decisions that affect real or virtual environments in line with human-determined goals.”
9	Dobrev (2022, p. 2)	<i>Serdica Journal of Computing</i>	“What is the definition of AI? We will define AI as a policy. An agent who follows this policy will cope sufficiently well. This is true for any world, provided however that there are not any fatal errors in that world. If a fatal error is possible in a given world, the agent may not perform well in that particular world, but his average performance over all possible worlds will still be sufficiently good.”
10	Dumagay et al. (2025, p. 2)	<i>AG Editor</i>	“Artificial intelligence (AI) evolved from speculative ideas about machine intelligence into one of the

Source No.	Author & Year	Name of the Journals/Sources	Definition and Description of Artificial Intelligence
			most influential technologies that shaped contemporary life.”
11	Ertel (2025, as cited in Garzon et al., 2025)	<i>Multimodal Technologies and Interaction</i>	Artificial intelligence (AI) is transforming education. Defined as the ability of machines to acquire knowledge and make decisions using algorithms.
12	Fetzer & Fetzer (1990, as cited in Dong et al., 2025)	<i>Computers and Education: Artificial Intelligence</i>	Nowadays, AI is the simulation of human-like intelligence through computer systems that use algorithms and data, enabling machines to perform tasks that typically require human cognition.
13	Fitria (2021, p. 135, as cited in Aljemely, 2024)	<i>Frontiers in Education</i>	Fitria (2021, as cited in Aljemely, 2024) defined it more comprehensively as a “process of modeling human thinking and designing a machine so that it can behave like humans or other terms called cognitive tasks, namely how machines can learn automatically from programmed data and information” (p. 135).
14	Hassen (2025, p. 83)	<i>American Journal of Education and Information Technology</i>	“AI can democratize access to information. It can provide instant feedback. It can create immersive simulations that make abstract concepts tangible. These tools have the potential to make learning more engaging, efficient, and equitable.”
15	High-Level Expert Group on Artificial Intelligence of the European Commission (2019, p.1, as cited in Arees et al., 2025)	<i>Investigation in Health, Psychology and Education</i>	AI can be described as “systems that display intelligent behaviour by analyzing their environment and taking actions—with some degree of autonomy—to achieve specific goals” (High-Level Expert Group on Artificial Intelligence of the European Commission, 2019, p. 1, as cited in Arees et al.).
16	Huang (2018); Lodhi et al. (2018, as cited in Mustafauglu & Alkan, 2025)	<i>Information Technologies and Learning Tools</i>	Artificial intelligence (AI) is defined as systems possessing human-like abilities such as memory, perception, and language comprehension.
17	Jaboob et al. (2024); Markauskaite et al. (2022, as cited in Garzon et al., 2025)	<i>Multimodal Technologies and Interaction</i>	AI emulates human cognitive processes.

Source No.	Author & Year	Name of the Journals/Sources	Definition and Description of Artificial Intelligence
18	Kaplan & Haenlein (2019, p. 15, as cited in Nah et al., 2023)	<i>Journal of Information Technology Case and Application Research</i>	AI has been defined as “a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation” (p. 15).
19	Kok et al. (2002, as cited in Mustafauglu & Alkan, 2025)	<i>Information Technologies and Learning Tools</i>	This technology stands out as a field of computer science aimed at developing systems capable of mimicking human cognitive functions, such as learning, reasoning, and self-correction.
20	Loder and Nicholas (2018, p. 11, as cited in Dai & Ke, 2022)	<i>Computers and Education: Artificial Intelligence</i>	A more recent definition of AI can be stated as “computers which perform cognitive tasks usually associated with human minds, particularly learning and problem-solving” (p.11).
21	Mariani & Borghi (2021, as cited in Sekaki et al., 2025)	<i>International Journal of Accounting, Finance, Auditing, Management & Economics (IJAFAME)</i>	The ability of machines to execute human intelligence tasks like learning and reasoning and problem-solving and language understanding defines Artificial Intelligence (AI) which drives substantial changes in modern science and industry according to Mariani & Borghi (2021, as cited in Sekaki et al., 2025).
22	McCarthy et al. (2006, as cited in Dhombres et al., 2022)	<i>Journal of Medical Internet Research</i>	The foundations of artificial intelligence (AI) as a discipline were established in the 1950s, under the hypothesis formulated by John McCarthy as “Every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.”
23	McCarthy et al. (2006, p. 2, as cited in Miao et al., 2021)	<i>UNESCO Education Sector</i>	The term ‘artificial intelligence’ was first used at a 1956 workshop held at Dartmouth College, a US Ivy League university, to describe the “science and engineering of making intelligent machines, especially intelligent computer programs” (p. 2).
24	McCarthy et al. (2006, as cited in Dong et al., 2025)	<i>Computers and Education: Artificial Intelligence</i>	The term “artificial intelligence,” introduced by Emeritus Professor John McCarthy of Stanford University in 1955, is defined as a system that uses science and engineering to create intelligent machines.

Source No.	Author & Year	Name of the Journals/Sources	Definition and Description of Artificial Intelligence
25	Ouyang and Jiao (2021, as cited in Hassen, 2025)	<i>American Journal of Education and Information Technology</i>	AI is a suite of technologies capable of performing tasks that traditionally require human intelligence. These tasks include learning, reasoning, and creativity. AI includes adaptive learning platforms that tailor curricula to individual student needs. It also includes generative AI models that can produce human-like text. AI is no longer a futuristic concept. It is a present-day reality in classrooms, libraries, and homes worldwide.
26	Paudel & Ghimire (n.d., as cited in Khatri & Karki, 2023)	<i>Nepalese Journal of Development and Rural Studies</i>	Artificial intelligence (AI) can be defined as the ability of man-made agents to successfully perform tasks that are generally associated with human intelligence.
27	Popenici et al. (2017, p. 2, as cited in Crompton & Burke, 2023)	<i>International Journal of Educational Technology in Higher Education</i>	A current definition of AI is “computing systems that are able to engage in human-like processes such as learning, adapting, synthesizing, self-correction and the use of data for complex processing tasks” (p. 2).
28	Popenici & Kerr (2017, p. 2, as cited in Moundridou et al., 2024)	<i>Computers and Education: Artificial Intelligence</i>	While the literature offers several alternative definitions of AI, an integrative definition proposed by Popenici and Kerr (2017, as cited in Moundridou et al., 2024) describes AI as ‘computing systems that are able to engage in human-like processes such as learning, adapting, synthesizing, self-correction, and use of data for complex processing tasks’ (p. 2).
29	Russel & Norvig (2010, as cited in Giray et al., 2024)	<i>Internet Reference Services Quarterly</i>	Though the concept of AI is not novel for it dates back to the mid-twentieth century when researchers began exploring the idea of machines that could “think” and perform task that normally require human intelligence.
30	Russell & Norvig (2020, as cited in Sekaki et al., 2025)	<i>International Journal of Accounting, Finance, Auditing, Management & Economics (IJAFAME)</i>	The technology includes multiple capabilities which range from basic data collection and management to advanced predictive analytics and natural language processing and image recognition and autonomous decision-making.

Source No.	Author & Year	Name of the Journals/Sources	Definition and Description of Artificial Intelligence
31	Sarker (2022, as cited in Sibug et al., 2024)	<i>Proceedings of the 32nd International Conference on Computers in Education</i>	AI, a branch of computer science, focuses on developing intelligent machines that mimic human intelligence.
32	Shah (2025, p. 511)	<i>International Journal of Research and Technology (IJRT)</i>	“Artificial intelligence (AI)—a set of algorithmic methods that facilitate prediction, pattern recognition, natural language processing, and content creation—is transforming education in various ways: tailored instruction, automated evaluations, teacher-assistance tools, and extensive learning analytics.”
33	Tapalova & Zhiyenbayeva (2022); UUnona & Goosen (2023, as cited in Sibug et al., 2024)	<i>Proceedings of the 32nd International Conference on Computers in Education</i>	Artificial intelligence (AI) presents an innovative approach to education that is more personalized, adaptable, inclusive, and engaging.
34	Ventura & Lopez (2024, p. 1136)	<i>International Journal of Information and Education Technology</i>	“Artificial Intelligence (AI) is a branch of computer science that seeks to create intelligent agents capable of learning, reasoning, problem-solving, and decision-making, mimicking human cognitive abilities.”
35	Yan et al. (2024); Abulibdeh et al. (2024, as cited in Garzon et al., 2025)	<i>Multimodal Technologies and Interaction</i>	In educational contexts, AI is a branch of computer science that can perform tasks such as reasoning, decision-making, and learning, which are traditionally associated with human intelligence.
36	Zeide (2019, as cited in Lukianets & Lukianets, 2023)	<i>International Scientific Journal</i>	Initially, artificial intelligence was designed as an attempt to create machines that can do things possible only through human cognition.
37	Zhong (2006, p. 90, as cited in Miao et al., 2021)	<i>UNESCO Education Sector</i>	To give just one example, Zhong defined AI as “a branch of modern science and technology aiming at the exploration of the secrets of human intelligence on one hand and the transplantation of human intelligence to machines as much as possible on the other hand, so that machines would be able to perform functions as intelligently as they can” (p. 90).

What are the Conceptual Components of the Synthesized Definition of AI, and How Do the Corresponding References Support Each Part of the Definition?

Figure 1 shows the conceptual components and the processes (described in the methodology) used to develop a synthesized definition of Artificial Intelligence based on various authors.

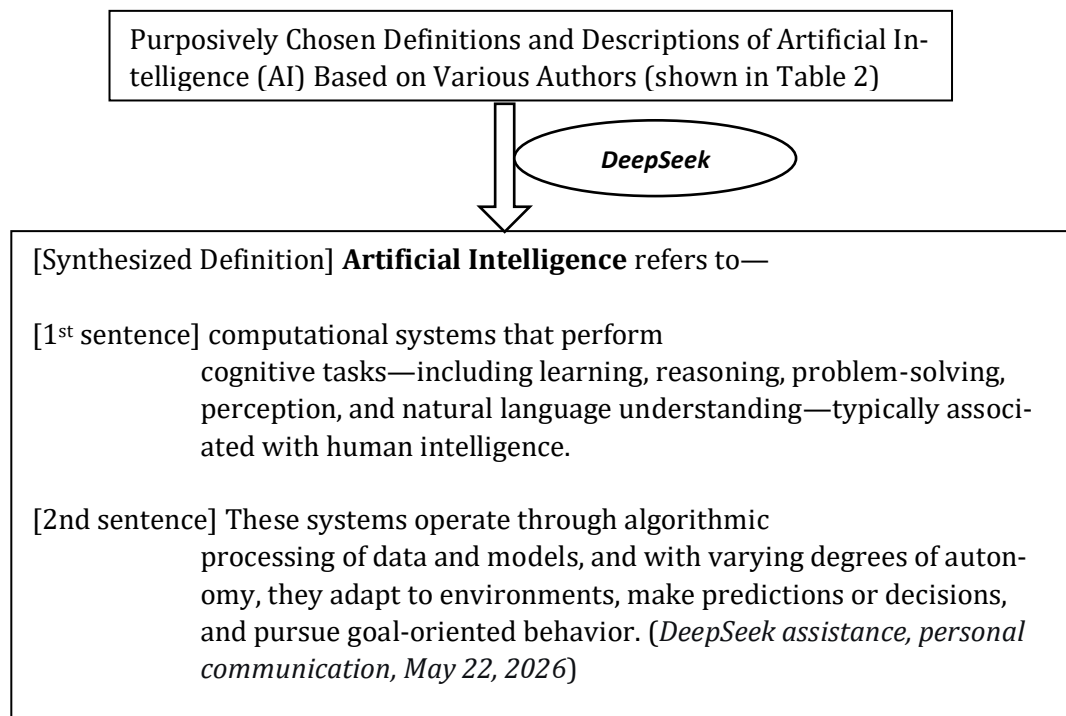


Figure 1. A Diagram Showing the Conceptual Components of a Synthesized Definition of Artificial Intelligence that was Developed Based on the Definitions and/or Descriptions of Artificial Intelligence

Aided by DeepSeek and validated/reviewed by the researchers, these answers were advanced:

The first sentence establishes AI as belonging to *computational systems* rather than to a specific technical paradigm (e.g., neural networks or symbolic engines). This formulation draws on definitions that explicitly use “computational systems” (Baker & Smith, 2019, as cited in Khatri & Karki, 2023) or “computing systems” (Popenici et al., 2017, p. 2, as cited in Crompton & Burke, 2023; Popenici & Kerr, 2017, p. 2, as cited in Moundridou et al., 2024) while avoiding reductive references to “machines” or “agents” that might imply unnecessary ontological commitments. The phrase *perform cognitive tasks* is directly indebted to Baker and Smith’s (2019) characterization of AI as “computers [that] perform cognitive tasks” (Baker & Smith, 2019, p. 10, as cited in Celik et al., 2022) and Loder and Nicholas’s

(2018) similar phrasing (Loder & Nicholas, 2018, p. 11, as cited in Dai & Ke, 2022). The enumerated tasks—*learning, reasoning, problem-solving, perception, and natural language understanding*—reflect the most frequently recurring functional attributes across the source material. Learning, reasoning, and problem-solving appear together in multiple definitions (Aggarwal, 2018, as cited in Celik et al., 2022; Kok et al., 2002, as cited in Mustafauglu & Alkan, 2025; Mariani & Borghi, 2021, as cited in Sekaki et al., 2025; Ventura & Lopez, 2024, p. 1136); perception and language comprehension are explicitly named as human-like abilities in Huang (2018) and Lodhi et al. (2018, as cited in Mustafauglu & Alkan, 2025) and as natural language processing in Akgun and Greenhow (2021, as cited in Aljemely, 2024), Brown et al. (2020) and Marcus and Davis (2019, as cited in Dumagay et al., 2025), and Russell and Norvig (2020, as cited in Sekaki et al., 2025).

The qualifier *typically associated with human intelligence* serves two purposes: it acknowledges the historical and conceptual link to human cognition (McCarthy et al., 2006, as cited in Dhombres et al., 2022; Russel & Norvig, 2010, as cited in Giray et al., 2024; Zeide, 2019, as cited in Lukianets & Lukianets, 2023; Zhong, 2006, p. 90, as cited in Miao et al., 2021) while avoiding anthropomorphic claims of replication, imitation, or emulation (Abbasi, 2021, p. 74; Fetzer & Fetzer, 1990, as cited in Dong et al., 2025; Jaboob et al., 2024 and Markauskaite et al., 2022, as cited in Garzon et al., 2025; Sarker, 2022, as cited in Sibug et al., 2024). This choice deliberately sidesteps the “strong AI” implication that systems actually possess human-like minds.

The second sentence specifies the operative mechanisms and behavioral characteristics of AI systems. *Operate through algorithmic processing of data and models* synthesizes definitions that emphasize algorithms (Ertel, 2025, as cited in Garzon et al., 2025; Fitria, 2021, p. 135, as cited in Aljemely, 2024; Shah, 2025, p. 511), data (Fetzer & Fetzer, 1990, as cited in Dong et al., 2025; Kaplan & Haenlein, 2019, p. 15, as cited in Nah et al., 2023), and the use of models (implicit in machine learning; Aggarwal, 2018, as cited in Celik et al., 2022). This phrase is intentionally inclusive of both symbolic AI (rule-based algorithms) and sub-symbolic AI (statistical learning). *Varying degrees of autonomy* is adopted almost verbatim from the European Commission’s High-Level Expert Group, which describes AI systems as acting “with some degree of autonomy” (High-Level Expert Group on Artificial Intelligence of the European Commission, 2019, p.1, as cited in Arees et al., 2025); this acknowledges that autonomy is not binary but a spectrum. *Adapt to environments* captures the dynamic, context-sensitive capability noted in definitions that mention “analyzing their environment” (High-Level Expert Group on Artificial Intelligence of the European Commission, 2019, p.1, as cited in Arees et al., 2025), “adapt[ing] to complex environments” (Brown et al., 2020; Marcus & Davis, 2019, as cited in Dumagay et al., 2025), and “flexible adaptation” (Kaplan & Haenlein, 2019, p. 15, as cited in Nah et al., 2023). *Make predictions or decisions* is directly drawn from Cayak’s definition of AI as “machine-based

systems that make predictions, recommendations, or decisions” (Cayak, 2024, p. 368) and from Russell & Norvig’s mention of “autonomous decision-making” (Russell & Norvig, 2020, as cited in Sekaki et al., 2025), and finally, *pursue goal-directed behavior* reflects the teleological dimension present in multiple sources: “to achieve specific goals” (High-Level Expert Group on Artificial Intelligence of the European Commission, 2019, p.1, as cited in Arees et al., 2025), “to achieve specific goals and tasks” (Kaplan & Haenlein, 2019, p. 15, as cited in Nah et al., 2023), and the notion of a “policy” for an agent to “cope sufficiently well” (Dobrev, 2022, p. 2). This phrasing avoids the stronger claim that AI systems have intentions or purposes in a human sense, instead describing goal-directedness as a design feature.

In summary, based on the synthesized definition and across the 37 definitions of AI, artificial intelligence is consistently characterized as a computational system—rather than a single technology—that performs cognitive functions typically associated with human intelligence, including learning, reasoning, problem-solving, perception, and natural language understanding. Secondly, its emphasis on algorithmic processing of data and models, which enables these systems to adapt to environments, make predictions or decisions, and exhibit varying degrees of autonomy. And, finally, the definitions converge on describing AI as goal-directed: its operations are oriented toward achieving specific objectives, whether through flexible adaptation, policy following, or the pursuit of human-determined goals.

Limitations of the Study

In this study, the researchers purposively selected and utilized only 37 definitions and/or descriptions of the term artificial intelligence by various authors that were published in 22 refereed research journals.

In terms of relevance and recentness, the most recent definition selected and utilized by the researchers in this study was published in 2022, while the least recent was published in 1990, respectively.

Particularly, while acknowledging the importance, relevance, and novelty of the generative Artificial Intelligence (AI) chatbot DeepSeek used in this study, the researchers

also acknowledge its strengths, advantages, and limitations, including the ethical concerns related to the use of AI tools in conducting academic research. Consequently, to address these concerns—especially the ethical issues—proper citations and acknowledgments were observed in this study.

Conclusion

In this paper, the researchers emphasize the importance of establishing a synthesized definition for key but broad and ambiguous educational concepts, particularly the term artificial intelligence, which is critical for effective teaching-learning process. Precise synthesized-definitions serve as a foundation for enhancing the overall teaching and learning process. The researchers draw the following key conclusions:

Based on the synthesized definition of AI, three conclusions are advanced:

First, because AI is defined as computational systems that perform cognitive tasks typically associated with human intelligence—yet without requiring replication of human consciousness—AI should be understood as a functional, task-oriented tool rather than as a sentient or autonomous agent in the human sense.

Next, the definition's inclusion of varying degrees of autonomy, adaptation to environments, and goal-directed behavior implies that AI systems are inherently situated and interactive: their performance cannot be fully specified in isolation but emerges from dynamic transactions between algorithms, data, and specific environmental contexts.

Finally, since AI encompasses both algorithmic processing and cognitive functions such as learning, reasoning, and decision-making, the definition entails a sharp distinction between narrow AI (systems designed for specific, bounded tasks) and the speculative notion of general intelligence, thereby affirming that contemporary AI remains a domain of engineered capabilities rather than artificial general intelligence.

Recommendations

In view of the findings and conclusions of this study, these recommendations are given:

First, AI users, like teachers, students, and other stakeholders should treat AI application as a tool, not a (human) mind. They should use only clearly designed AI tools for specific tasks and avoid ones that pretend to have feelings or consciousness. They should review how the answers or outputs have been derived and they should have the competence to validate and easily override these tools. More importantly, they should consider AI outputs as rough drafts or tentative outputs—never as final outputs.

Second, teachers and instructional leaders in all levels of educational institutions should use AI to support continuous-formative assessments to gather immediate and relevant feedback on teaching-learning performance. They should not limit assessments to types that easily measure quantifiable data; instead, should focus on deep understanding and development of higher order and critical thinking skills. They should teach learners to spot and challenge unfair algorithmic decisions based on data generated using AI tools.

Then, educational leaders and managers should consider AI literacy and governance as essential, not optional in the educative process. All stakeholders involved in the process should have the needed level of awareness and understanding of how AI works, its limits and its ethical risks. More importantly, the learning institutions must embed human-in-the loop structures with transparent process and records, bounded automation, and secured human oversight so that learning outcomes, not just efficiency, stay valid and in control.

Finally, instructional leaders and curriculum planners should use immersive AI models and simulations as supplements that strengthen human connection, not replace it. They should use or treat them as bridges for low stakes practice among learners, and prepare teaching-learning personnel, specifically classroom teachers and facilitators, to link every model-based and simulated encounters back to empathy, collaboration, and context that only real human interaction can create.

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