

ARTIFICIAL INTELLIGENCE

ESSENTIAL VOCABULARY

AI Term	What it means	How it can apply to education
ALGORITHM	A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.	AI algorithms can uncover patterns in students' performance and can help teachers optimise their teaching strategies/methodologies to personalise learning and improve outcomes.
AUGMENTED REALITY (AR)	AR is an interactive experience where real-world environments and objects are supplemented by computer-generated 3D models and animated sequences which are displayed as if they are in a real-world environment. AR environments can employ AI techniques.	AR creates opportunities for teachers to help students grasp abstract concepts through interaction and experimentation with virtual materials. This interactive learning environment provides opportunities to implement hands-on learning approaches that increase engagement and enhance the learning experience.
AUTOMATION	The computer system performs a function that normally requires human involvement. A system that can perform tasks without needing continuous human supervision is described as autonomous.	Schools and teachers can use software to perform many repetitive and time-consuming tasks like timetabling, attendance, and enrolment. Automating such tasks can allow teachers to spend less time on routine tasks and more time with their students.

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BIAS	<p>Bias is an inclination of prejudice towards or against a person, object, or position. Bias can arise in many ways in AI systems. For example, in data-drive AI systems, such as those produced through machine learning, bias in data collection and training can result in an AI system demonstrating bias. In logic-based AI, such as rule-based systems, bias can arise due to how a knowledge engineer might view the rules that apply in a particular setting. It does not necessarily relate to human bias or human-driven data collection. It can arise, for example, through the limited contexts in which a system is used, in which case there is no opportunity to generalise it to other contexts. Bias can be good or bad, intentional or unintentional. In certain cases, bias can result in discriminatory and/or unfair outcomes (i.e. unfair bias).</p>	<p>Assumptions made by AI algorithms, could amplify existing biases embedded in current education practices i.e., bias pertaining to gender, race, culture, opportunity, or disability status. Bias can also arise due to online learning and adaptation through interaction. It can also arise through personalisation whereby users are presented with recommendations or information feeds that are tailored to the user's tastes.</p>
BIG DATA	<p>Datasets so large that they cannot be collected, stored and analysed using traditional data processing applications. Big data refers not only to the volume of data but also to the capacity to search, aggregate, and cross-reference large data sets.</p>	<p>Through big data analysis, educators can potentially identify areas where students struggle or thrive, understand the individual needs of students, and develop strategies for personalised learning.</p>

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CHATBOT	A program that communicates with people through text or voice commands in a way that mimics human-to-human conversation.	Chatbots can be virtual advisors for learners and in the process adapt to their learning pace and so help personalise their learning. Their interactions with students can also help identify subjects with which they need help.
DATA MINING	The analysis of a large volume of data to bring out models, correlations and trends	Educational Data Mining (EDM) based systems can use data mining, machine learning, and statistics to better understand learners and the settings in which they learn.
DATASET	A collection of related data points, usually with a uniform order and tags.	Datasets in education are mainly provided and used to support new educational research, and in the sharing and application of existing research.
DATABASE	A computer file containing a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means.	School administration systems contain databases of student information in including personal profiling and learning attainment data. These are sometimes linked timetabling, assessment and learning management systems.
DEEP LEARNING	Deep learning techniques are part of machine learning methods and are based on artificial neural networks. They are applied in different tasks, e.g., to recognize objects in images or words in speech.	Deep learning AI systems have the potential to predict minute aspects of educational performance which can aid in the development of strategies for personalised learning.

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INTERNET OF THINGS (IoT)	A network of interconnected physical objects— (things) that are embedded with sensors, software, and other technologies so that they can connect and exchange data with other devices and systems over the internet.	IoT connected devices can provide learners better access to everything from learning materials to communication channels and provides teachers with the ability to measure student learning progress in real-time.
LEARNING ANALYTICS	Learning analytics involves the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.	Learning management systems record data on student interaction with course materials, their interaction with teachers and other peers, and how they perform on digital assessments. Schools can use analysis of this data to monitor student performance, predict overall performance and facilitate the provision of support through personalized feedback to each student.
MACHINE LEARNING	The ability of a computer system to learn, extract patterns and change in response to new data, without the help of a human being.	Machine learning is a form of personalised learning that is used to give each student an individualised educational experience. Learners are guided through their own learning, can follow the pace they want, and make their own decisions about what to learn based on system prompts.
MACHINE TRANSLATION	The translation of text or voice data by an algorithm in real-time and without any human involvement.	Machine translation tools are used in language teaching to help learners improve their understanding and pronunciation and can enable teachers to devote more time to the content and communicative aspects of a language.

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METADATA	<p>Metadata is information used to describe, reference, contextualise or characterise a data file such as a web page, image, video, document, or file. It is data that describes data, but it isn't the data itself.</p>	<p>Through the use of metadata teachers can source and evaluate teaching and learning resources more easily so they have more choice in the material they choose for their learners. This can help to direct each student to content at their ability or readiness level.</p>
NATURAL LANGUAGE PROCESSING	<p>Natural language processing is a form of AI that helps computers read and respond by simulating the human ability to understand everyday language.</p>	<p>Virtual tutoring system can use speech recognition to identify problems in a student's reading ability and can provide real-time, automatic feedback on how to improve as well as helping to match the student with reading material that's best suited to them.</p>
NEURAL NETWORK	<p>A computer system that is designed as a collection of units and nodes, inspired by biological neural neurons in animals, connected in a way to transmit signals.</p>	<p>A neural network can be trained to learn a new skill or ability by using the repetition method of learning.</p>
OPTICAL CHARACTER RECOGNITION (OCR)	<p>OCR is the conversion of images of text (typed, handwritten, or printed) into machine-encoded text.</p>	<p>Optical character recognition can help students with literacy difficulties by allowing them to listen to text rather than read it. It can also create a searchable digital document which enables students to look up the definition of a word more easily, or to bookmark different parts of the text.</p>

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PERSONAL DATA	Information relating to an identified or identifiable natural person, directly or indirectly, in particular by reference to one or more elements specific to that person.	Schools accumulate substantial amounts of personal information about students, parents, staff, management, and suppliers. Schools, as data controllers, are required to store data which they process confidentially and securely and need to have appropriate policies and procedures in place for the protection and proper use of all personal data.
PREDICTIVE ANALYTICS	The use of statistical algorithms and machine learning techniques to make predictions about the future using current and historical data.	Predictive analytics can provide insight into which students require additional support, not only based on their current and historical performance, but their predicted future performance.
ROBOTICS	Robotics is the design, construction, and operation of robots that can help and assist humans with a variety of tasks.	Educational robotics and simulators allow students to learn in different ways in science, technology, engineering, and mathematics (STEM) subjects, with the objective to facilitate students' skills and attitudes for analysis and operation of robots. Such activities can include design, programming, application, or experimentation with robots
SUPERVISED LEARNING	This is a type of machine learning where structured datasets, with inputs and labels, are used to train and develop an algorithm.	Supervised Learning systems are defined by their use of labelled datasets to train algorithms to classify data or predict outcomes accurately. They can help teachers identify at-risk students and target interventions. They can also improve the efficiency of teaching, assessments, and grading by helping to personalise learning.

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TEXT TO SPEECH	Text-to-speech is the generation of synthesised speech from text. The technology is used to communicate with users when reading a screen is either not possible or inconvenient.	Text-to-speech technology allows learners to focus on the content rather than on the mechanics of reading, resulting in a better understanding of the material, better retention and increased confidence and motivation.
TRACE DATA	Trace data refers to records of activity such as mouse clicks, data on opened pages, the timing of interaction events, or key presses undertaken through an online information system.	Trace data, in conjunction with metadata and predefined datasets, provide a wealth of contextual information on learning efficacy and student performance, which can in turn shape strategies for personalised learning.
TRAINING DATA	The data used during the process of training a machine learning algorithm.	Machine learning algorithms learn from data. They find relationships, develop understanding and make decisions from the training data they are given. In an educational context this data can be used to make learning more efficient, adaptable, and personalised by providing detailed analytics of past and predicted future achievement.
UNSUPERVISED LEARNING	This is a form of training where an algorithm is programmed to make inferences from datasets that don't contain labels. These inferences are what help it to learn.	Unsupervised learning is conducted to discover hidden and interesting patterns in unlabelled data. These patterns are valuable for the prediction of students' performance analysing a range of contextual information like demographics and how these relate to overall attainment.

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<p>VIRTUAL PERSONAL ASSISTANT (VPA)</p>	<p>A virtual personal assistant is an application that understands natural language voice commands and completes tasks for the user like dictation, reading text or email messages aloud, scheduling, making calls and setting reminders.</p>	<p>Virtual personal assistants can enable interaction with technology using voice only thus saving time by providing instant access to information. Students can access class schedules, information and resources and communicate with teachers and peers. VPAs are also used by teachers to prepare lessons, set assignments, and provide feedback.</p>
<p>VIRTUAL REALITY (VR)</p>	<p>Virtual reality is a computer-generated scenario that simulates a real-world experience that can be interacted with using special electronic equipment, such as a VR headset or gloves fitted with sensors.</p>	<p>Learners explore and interact with computergenerated objects in a 3D space and see everything as if it was in front of them such as a walk-through of an art gallery or an ancient monument.</p>

SOURCE: ETHICAL GUIDELINES ON THE USE OF ARTIFICIAL INTELLIGENCE