MACQUARIE SCHOOL
OF EDUCATION
Faculty of Arts

MACQUARIE University

Six reasons every teacher needs to talk to students about AI

ARTIFICIAL INTELLIGENCE (AI) EDUCATION FOR TEACHERS

Our suite of resources for teachers and students, based on the IBM AI Curriculum Framework, have been designed to provide AI learning experiences for all levels of teachers and students – from novices to experts. The idea is for learners to progress their knowledge and skill levels about AI and how it can be used for social good.

1. AI IS A TOOLKIT FOR SOLVING PROBLEMS – IT'S NOT JUST ABOUT CODING AND TECHNOLOGY

Using AI to solve problems requires skills and values which extend far beyond simply having knowledge of coding and technology. Students need to be able to identify an authentic problem that would benefit from an AI solution and to have adequate knowledge of different types of AI to determine which may apply to the identified problem. They need to be able to work collaboratively with others using design thinking, to creatively brainstorm possible solutions, and to ethically gather and use data to train a computer to help solve the issue. They need to be able to test the prototype with users and to critically evaluate and use feedback to create a better solution. This means that students need to be resilient and to view failures as instructive.

Students need to be resilient enough to view hurdles or problems as learning opportunities. AI provides a perfect context to begin developing those skills.

Human intelligence (HI) is the ability of humans to learn from experience, to adapt to new situations, to understand and handle abstract concepts, and to use knowledge to manipulate the environment. Artificial intelligence (AI) is the ability of machines to also behave in this manner. AI can be used to solve a wide range of problems, but HI is the catalyst.

2. AI IS ALREADY HERE: STUDENTS ARE INTERACTING WITH AI IN THEIR DAILY LIVES, IN SCHOOL AND AT HOME

The world is rapidly changing. Already, there are many AI applications with many more in the wings. Today's students are tomorrow's workers, who need to be able to use smart machines to enhance their capabilities, not feel that machines are 'the competition'. Students need early learning experiences about AI. In particular they need experiences around the ethical implications of AI

Students may have interacted verbally with AI **digital assistants** such as Apple's Siri, Google Now, Amazon's Alexa, and Microsoft's Cortana to help them perform a range of tasks such as searching for information on the web, asking for recommendations, or sending commands to another app. Students may have parents who have received infringement notices sent from a **traffic camera** trained to read licence plates, and while travelling in the car, **Google Maps** may have been used to propose the fastest route to a destination. Most students will have used **social networking** platforms such as Facebook, Instagram and SnapChat all of which use AI systems to target content and advertising. Students need to know that each of these systems collects data based on usage patterns and that they have the power to decide whether they are comfortable with this level of disclosure.

3. AI PROMPTS ETHICAL CONCERNS

Did you know that in 2018 researchers found that the underpinning algorithms in facial recognition and accompanying analysis systems used by IBM, Microsoft and Face++ were biased and misidentified people of colour, and women, more often than white men? In 2020, IBM acted on this research and other information by announcing they would not continue with the development of this type of AI technology. The company felt that the technology could be used adversely in practices such as mass surveillance, racial profiling, and violations of basic human rights and freedoms which did not align with their ethical guidelines around 'Trust and Transparency'. IBM's decision to abandon this type of AI technology has precipitated other companies to re-evaluate how their products are being used including Amazon and Microsoft.

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Machines (computers) do what they are 'told' through step by step instructions (algorithms) provided in a

language (coding) that they can understand. If the algorithms or coding are faulty or biased, then the machine will not perform as expected. People working with computers that can learn (machine learning systems) have a number of principles that they need to consider such as a focus on the wellbeing and privacy of users, the security of data, and transparency around when the system is being used.

4. AI IS RELEVANT TO EVERY PART OF THE CURRICULUM

AI systems vary depending on the data source, such as images, text or speech, and what they are programmed to do with the data. They are very good at processing copious amounts of data and recognising patterns. AI can be used in any school subject. For example, in History or English, let's suppose that you found an old book -with no identifying features such as a cover- and wanted to know when it might have been written. You could 'ask' an AI machine that had been trained in text recognition to analyse a passage from the book to identify the time period in which it was written. Similarly, in Visual Arts, machines can be taught to recognise images of paintings, and with many data samples could be taught to identify particular artists, as well as artistic genres. In Music, AI could provide feedback to students who are practising musical pieces, or students could train a machine to recognise examples of a particular musical pattern and to then identify examples in any given piece of music. This would enable students to understand not only how AI 'works' but that there are many instances where the particular musical pattern has been used.

5. AI EDUCATION FOSTERS THINKING SKILLS

When engaging with AI to solve problems, students inherently use the 21st century skills of critical and creative thinking, collaboration and communication. They also use the processes of design thinking and computational thinking and develop skills in data fluency and ethical decision making. Authentic problems are usually 'messy'. They do not have a single well-defined solution and therefore provide a perfect context for developing the suite of AI skills, values and knowledge outlined in the IBM AI Curriculum Framework.

6. AI LITERACY IS AN ESSENTIAL SKILL FOR THE FUTURE

By learning about AI, students may be able to have a better understanding of their strengths as humans, identify their values, develop the skills needed to solve real problems, and put AI to good use. The world into which our current students will enter when they finish their years of full-time education needs them to be 'lifelong learners' who continuously adapt and learn new skills in evolving workplaces. They will need to be digitally confident, global in their outlook, great problem-solvers, collaborators and communicators. AI provides a perfect context to begin developing these attributes.

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