AI EDUCATION THROUGH STORYTELLING

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Abstract

Primary and secondary school curricula in many countries are integrating AI education across subject areas, with a focus on AI applications, societal implications, and ethics. However, this is a recent phenomenon, so there is a gap in available resources to support such curricula. In this paper, we share our approach to designing story-based resources for teaching and learning about AI.

Storytelling

Storytelling is not a frill. It is not simply entertainment. Boyd (2009) notes that our appeal and necessity for storytelling developed through evolutionary adaptation. Bruner (1986) identified two distinct (yet complementary) modes of thought: the *narrative*, concerned with meaning-making through storytelling, and the *paradigmatic*, concerned with truth through logic. Story makes us human and adds humanity to teaching and learning. Boyd (2001) adds that good storytelling involves solving *artistic* puzzles of how to create situations where the audience experiences the pleasure of surprise and insight. Anthropologist Ellen Dissanayake (1992) wrote of the human biological necessity to experience, share and learn from surprising events and stories.

The artistic puzzles we endeavoured to solve involved creating graphic stories that: (1) immerse students in the application and impact of AI; and (2) help students understand how AI works. Below we discuss a sample of these graphic stories and their potential for AI education.

Application and Impact of AI

The graphic story *Meehaneeto* (Hughes and Gadanidis, 2021), shown in Figure 1, explores the potential social, economic and environmental consequences of AI's unchecked development and uncritical use, like social isolation and behaviour manipulation. A video reading of this story is available at https://eduapps.ca/community/#AI. The story engages students to consider which

of today's technologies that may keep or abandon, if they had a choice. This choice is made possible by the story plot, which starts with a society that centuries ago abandoned all its technology. As chance would have it, a young girl discovers the old technology and starts bringing some of it back, including Panopteeto, which is a fictional technology analogous to the AI driven social media in our society.

One study (Butler-Ulrich and Hughes, 2025), which used *Meehaneeto* with grades 6-8 students in an AI camp setting, notes:

> The graphic novel *Meehaneeto* played a central role in shaping students' thought processes, serving as a framework for examining their lives and society. Participants reflected on how technology and AI influenced the characters' lives, drawing parallels to their own experiences with AI. *Meehaneeto* acted as a thematic anchor, engaging participants and distilling complex ethical AI concepts into an accessible narrative, enhancing critical and complex thinking through the process of meaning-making. Narrative-based learning, recognized for fostering meaning-making in students (Pantaleo, 2016), added significant value by promoting deeper understanding and critical thinking. The findings are organized to provide a clear and contextualized discussion of key outcomes related to each research question. (p. 101).

Another story that we plan to use for the same purpose is *AI Farm* (Gadanidis and Hughes, 2021), shown in Figure 2, which is a retelling of George Orwell's (1944) *Animal Farm*. This story presents a dystopia that results once agbots (agricultural robots) gain intelligence and dominate humans.

Figure 2

AI Farm Story

How AI Works

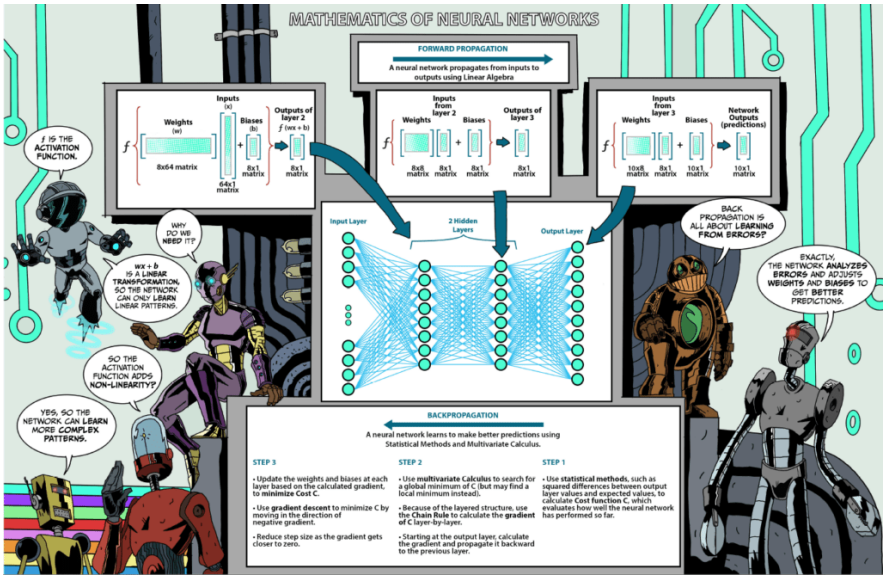
Jurisdictions focusing on educating students on how AI works and how AI is developed are realizing that a lot of AI development – a lot of the "intelligence" of AI – relies heavily on mathematical algorithms (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2022). Through an AI education outreach project through Western University (see https://ai-ed.ca) we developed a set of resources to help students conceptualize neural networks and even engage with some of the underlying mathematics.

The infographic shown in Figure 3 (available at https://ai-ed.ca/nn-math) shows how a neural network uses matrices to store and linear algebra to manipulate data (forward propagation) and statistical methods and multivariate calculus to refine its predictions (back propagation).

We have also developed graphic stories to help students as young as grade 4 engage with matrices in familiar contexts.

Figure 3

Neural Network Mathematics

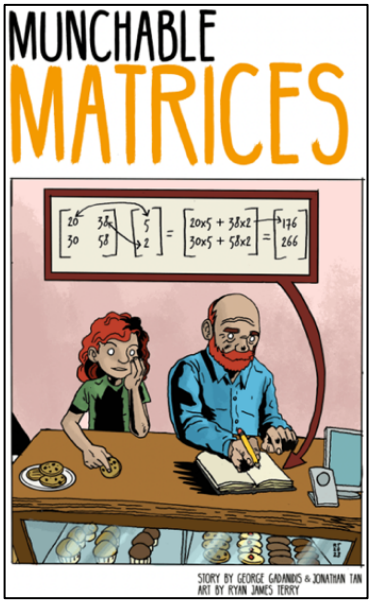


Data Management with Matrices

Around grade 4, students learn about collecting and storing data in frequency tables. Below are some tasks and dialogues from the children's story *Munchable Matrices* (Gadanidis & Tan, 2024) (Figure 4), which is freely available at https://ai-ed.ca/matrices-1. Data from the story helps prepare students to make sense of matrix operations in the forward propagation processes of neural networks (Gadanidis et al., 2024).

Figure 4

Munchable Matrices Story Cover



The context for the story is a small pastry shop, open only on Fridays and Saturdays, which is introducing cookies and muffins to its product line. It uses frequency tables to keep track of sales, as displayed in Tables 1 and 2.

Table 1

Week 1 Cookie and Muffin Sales

WEEK 1 Sales	6 Cookie Bundle ($5)	1 Muffin ($2)
Friday	8	15
Saturday	12	22

Table 2

Week 2 Cookie and Muffin Sales

WEEK 2 Sales	6 Cookie Bundle ($5)	1 Muffin ($2)
Friday	12	23
Saturday	18	36

"Nice frequency tables, Dad," says his daughter as she opens a package of cookies.

"Why don't you use matrices?" she adds.

"Huh?" he replies.

"Like this, Dad," she smiles. "Then we can add them together."

$$\begin{bmatrix} 8 & 15 \\ 12 & 22 \end{bmatrix} + \begin{bmatrix} 12 & 23 \\ 18 & 36 \end{bmatrix} = \begin{bmatrix} 20 & 38 \\ 30 & 58 \end{bmatrix}$$

"You can even multiply the result with the price matrix!"

$$\begin{bmatrix} 20 & 38 \\ 30 & 58 \end{bmatrix} \begin{bmatrix} 5 \\ 2 \end{bmatrix} = \begin{bmatrix} 20x5 + 38x2 \\ 30x5 + 58x2 \end{bmatrix} = \begin{bmatrix} 176 \\ 266 \end{bmatrix}$$

The way father and daughter work through the matrices is depicted in Figure 5 and Table 3.

Figure 5

Munchable Matrices Story Images and Excerpt

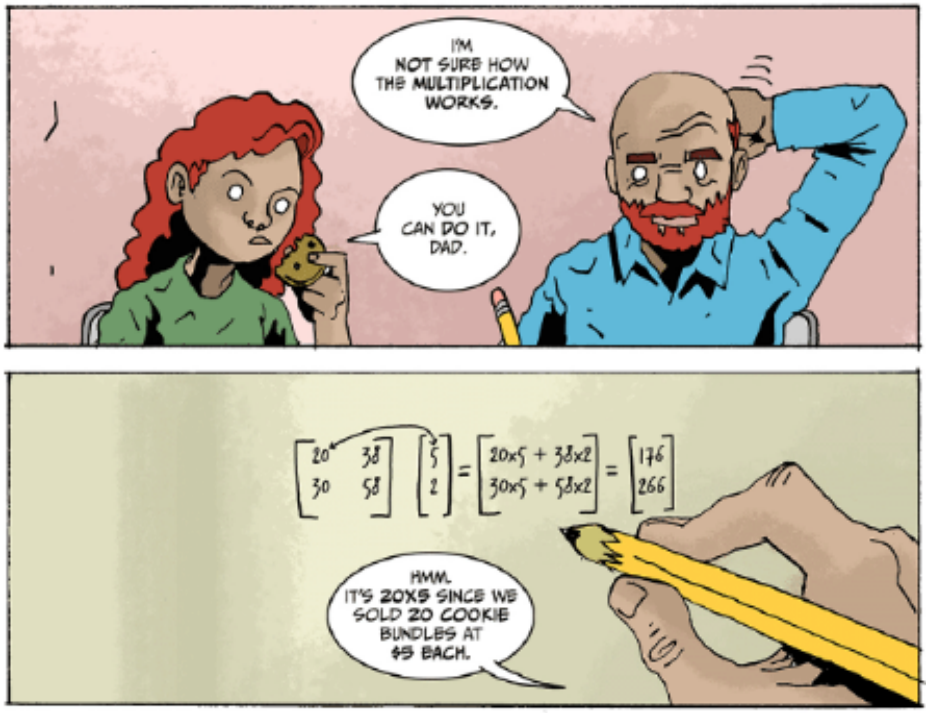


Table 3

Week 3 Cookie and Muffin Sales

WEEK 3 Sales	6 Cookie Bundle ($5)	1 Muffin ($2)
Friday	25	45
Saturday	42	65

"Perfect, Dad. Here, add the third week's sales as well. I started it for you."

$$\begin{bmatrix}20 & 38\\30 & 58\end{bmatrix}+\begin{bmatrix}25 & 45\end{bmatrix}=\begin{bmatrix}\quad & \quad\end{bmatrix}$$

$$\begin{bmatrix}\quad & \quad\end{bmatrix}\begin{bmatrix}5\\2\end{bmatrix}=\begin{bmatrix}\quad\end{bmatrix}=\begin{bmatrix}\quad\end{bmatrix}$$

Such a dialogue places students in the position of solving puzzles of making sense of how matrices are multiplied. Danesi (2020) notes that puzzles "are as intrinsic to human nature as are humor, language, art, music, and all of the other creative faculties that distinguish humanity from other species" (p. 197).

Concluding Remarks

AI is becoming pervasive in our society. At the same time, how AI works and what may be its impact are not well understood. Graphic stories may help situate and contextualize AI in ways that engage attention, anchor abstract concepts to concrete experiences, and help students develop a robust and critical understanding of AI.

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