

Book review: Learning with AI

This book is described as 'the comprehensive K-12 teacher's guide to a new era of human learning'. The author, Joan Monahan Watson (2024) asked Claude, Anthropic's generative AI service, to create a jingle that teachers could use to incorporate AI literacy in their elementary classrooms. Her idea was that children would learn how to interact with the AI as if it were a 'class pet'. They would learn how to be polite, to be clear about the questions that they ask, and to ask the question in another way if they didn't get the information they were looking for. This is Claude's creation, sung to the tune of 'Twinkle, Twinkle, Little Star':

AI helper shining bright
How to ask you questions, right?
Speak politely, clear and true
Tell me what you'd like to do
If confused just ask again
AI's here, your learning friend.

Her book is largely concerned with text generation like this but the issues she raises—from school plagiarism policy to how to design assignments that cannot be satisfied by a simple AI prompt—have a wider application. She gives 40 prompts to illustrate her approach but omits the responses to make the book 296 pages long. Her approach can be readily extended to projects in science, problem-solving in mathematics and creating art works. She argues that AI needs to be integrated across the curriculum.

There are three sections: The New Context of AI, Teaching with AI and Learning with AI.

Following an introductory account of AI technology, she cites a 2024 study that found 70% of 1300 college-bound high school seniors have used generative AI tools because they are afraid that other students will have competitive advantage in applying for financial aid, careers

and entry to college. She speculates that 'collaboration with AI will change the nature of human thinking' and notes that educational technology companies see education as a potential market. The market is already becoming crowded with offerings such as Wolfram Alpha, Oak Academy AILA, LearnLM, ChatGPT Edu, Magic School, School AI, Grammarly, Khanmigo, My Essay Feedback and Brisk (Figure 1).

In the 'Teaching with AI' section, she suggests avoiding teacher burnout by delegating administrative and feedback activities to AI. She speculates that as AI makes innovation easier it will change the value of other types of human thinking because even the least creative person will be able to access many ideas. Refining and editing will become more important, and that may shift the skills we used to associate with 'creativity'. In 'flipped' lessons she proposes to shift Bloom's 'remember, understand and apply' activities so they take place outside the classroom (Figure 2). This means class time can be used for analysing, evaluating and creating. She goes on to discuss school policies for AI literacy, AI detection and dishonesty in detail.

The final section on 'Learning with AI' describes a framework for extracting and assigning value to human effort. This includes feedback and role play with AI. The book has a comprehensive bibliography.

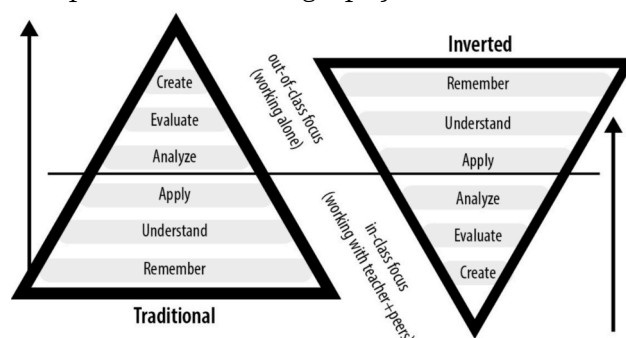


Figure 2. Revised and inverted models of Bloom's taxonomy for teaching, learning, and assessment (from Chapter 7).

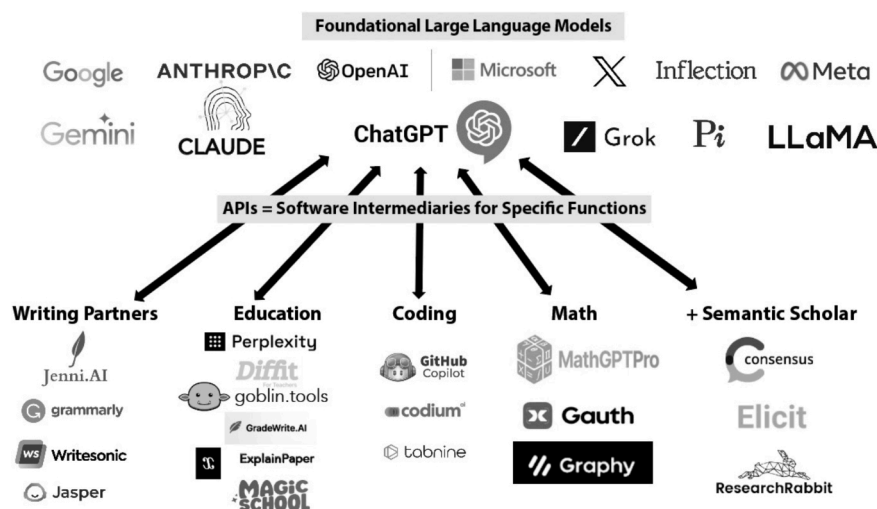
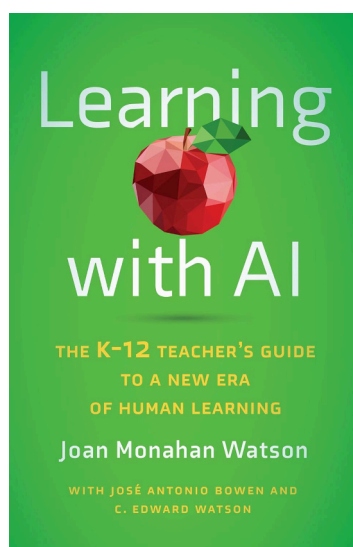


Figure 1. The top line shows different Foundational LLMs with some of the software apps that interface with them through APIs (from Chapter 1).

The educational implications of AI go beyond those presented in this book. Michael Casper-son (2022) remarked that the growing transfer of judgment from human beings to machines is a revolutionary aspect of informatics. For soci-eties to maintain or regain democratic control and supremacy over digital technology, in-formatics should be a distinct subject in gen-eral education: it has dual perspectives on both the possibilities and the implications of com-puting for individuals and society.

Mathematics shares a common logical founda-tion with informatics. It can provide a micro-world in which techniques of analysis and rig-orous thinking can be practiced and enhanced.

At a recent faculty meeting at Stanford, pro-fessor Dan Edelstein said that concentrating on the increased risk of cheating ignores ‘a real reckoning with the existential challenge AI presents to a liberal education.’ (Robinson-Shah, 2025). He noted that AI is disrupting the ability to write well and, therefore, think and speak critically. Political science professor Al-ison McQueen highlighted students’ worries about AI and its effect on their education, say-ing that ‘some of them do worry that they’re getting dumber.’

The author did not follow the advice of the de-velopers of AI systems (Gabriel et al, 2024) in creating her AI class pet: ‘exercise caution when integrating anthropomorphic features

into AI assistant user interfaces. ...AI assistants are not people.’

The transition to a new way of working should be co-designed with teachers in a gradual transition to a new model. This will be charac-terised by a teacher taking the attitude of a life learner, learning alongside and from their learners. In mathematics, this process can go in parallel with the inclusion of future teachers in the work of mathematics circles and pilot schools, where such a model is already being implemented.

References

- Caspersen, M.E. (2022). *Informatics as a Fundamental Discipline in General Education: The Danish Perspective* in Werthner, H., Prem, E., Lee, E. A. & Ghezzi, C. (eds.) *Perspectives on Digital Humanism*, Springer, p. 191-200, link.springer.com/chapter/10.1007/978-3-030-86144-5_26.
- Gabriel, I. et al. (2024). *Ethics of Advanced AI Systems*, Google DeepMind, <http://arxiv.org/abs/2404.16244>
- Robinson-Shah, S. (2025). Faculty deliberates implications of AI use, *The Stanford Daily*, <https://stanforddaily.com/2025/02/07/university-leaders-trump-orders/>
- Watson, J.M., Bowen, J.A. & Watson, C.E. (2024). *Learning with AI*, Johns Hopkins University Press.

Ian Benson is co-convenor of the ATM functional programming and computer algebra working group.

The attached document has been downloaded or otherwise acquired from the website of the Association of Teachers of Mathematics (ATM) at www.atm.org.uk

Legitimate uses of this document include printing of one copy for personal use, reasonable duplication for academic and educational purposes. It may not be used for any other purpose in any way that may be deleterious to the work, aims, principles or ends of ATM. Neither the original electronic or digital version nor this paper version, no matter by whom or in what form it is reproduced, may be re-published, transmitted electronically or digitally, projected or otherwise used outside the above standard copyright permissions. The electronic or digital version may not be uploaded to a website or other server.

Any copies of this document MUST be accompanied by a copy of this page in its entirety. If you want to reproduce this document beyond the restricted permissions here, then application must be made for express permission to copyright@atm.org.uk. The exception to the above is for the original author(s) who retain individual copyright.

ATM is a not for profit professional teaching association. The majority of funding used to produce and prepare the MT journal is procured through our membership subscriptions.

MT

Mathematics Teaching does not seek to conform to an 'official' view on the teaching of mathematics, whatever that may be. The editorial team encourages contributors to express their personal views on the teaching and learning of mathematics.

ATM is an association of teachers in which everyone has a contribution to make, experiences and insights to share. Whether practical, political, philosophical or speculative, we are looking for articles which reflect on the practice of teaching mathematics. We aim to publish articles that will be of interest to the breadth of our membership, from the Foundation Stage to Higher and Further Education; as well as a balance between those derived from research and from practical experience. Submitted articles are accepted for publication based on their clarity, topicality, the extent to which they reflect upon knowledge and understanding of mathematics teaching and learning, and their contribution to inspiring further development and research.



Join ATM at any time and receive twelve months of membership, including instant access to member discounts and resources. Spread the cost and pay in ten monthly instalments.

Membership Includes:

- Four copies of the ATM journal Mathematics Teaching (MT)
- A 25% discount on all shop items
- Considerable discounts at the hugely popular annual ATM conference
- Electronic access to thousands of online MT journal articles
- Access to all online member-only resources
- Professional support and enrichment – being part of a community where ideas are generated and shared
- Regular ATM e-newsletters, containing current news and activities
- A network of local branches offering regular meetings
- Accreditation - ATM is proud to offer members the opportunity to apply for the CMathTeach Designation, making ATM membership the route to Chartered Mathematics Teaching status
- Influence and having a voice - eligibility to vote on resolutions that shape the direction of ATM

Join ATM Today