HPF HIMES PETRARCA & FESTER CHTD

ARTIFICIAL INTELLIGENCE IN PUBLIC EDUCATION

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LEADERSHIP RETREAT

JULY 13, 2024

NMSBA NEW MEXICO SCHOOL BOARDS ASSOCIATION

PHILOSOPHICAL QUESTIONS

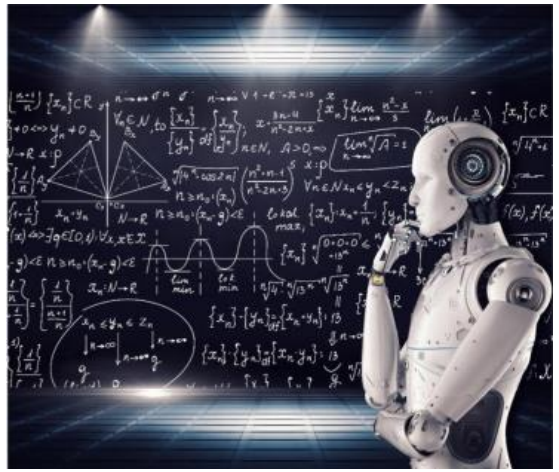
- What do we call intelligence?
  - Do teachers do more than provide data and processes to students?
  - Is teaching conveying intelligence?
  - What trains a student's brain?
- What are examples of intelligent tasks?
- Can an artificial being ever be considered "alive"?
- What does it mean to be "alive"?

NATURAL INTELLIGENCE

- Definition. *Intelligence* – inter ligare (Latin) – the capacity of creating connections between notions.
- Wikipedia: the ability to solve problems.
- WordNet: the ability to comprehend; to understand and profit from experience.
- Complex use of creativity, talent, imagination.
- Biology - Intelligence is the ability to adapt to new conditions and to successfully cope with life situations.
- Psychology - a general term encompassing various mental abilities, including the ability to remember and use what one has learned, in order to solve problems, adapt to new situations, and understand and manipulate one's reality.
- Nonlinear, non-predictable behavior.

ARTIFICIAL INTELLIGENCE

- Definition. The science of developing methods to solve problems usually associated with human intelligence.
- Alternate definitions:
  - building intelligent entities or agents;
  - making computers think or behave like humans
  - studying the human thinking through computational models;
  - generating intelligent behavior, reasoning, learning.



THINKING MACHINES

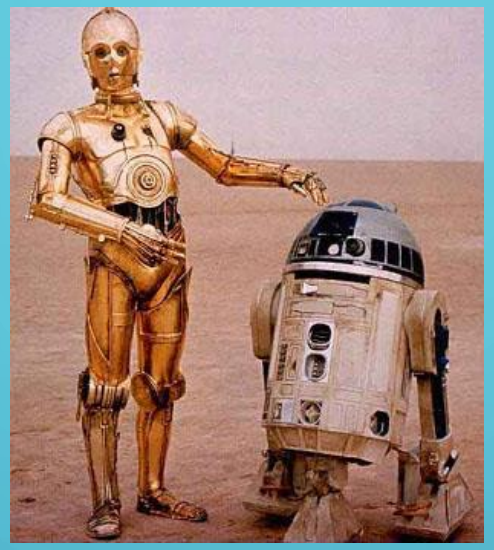
The study of computer systems that attempt to model and apply the intelligence of the human mind.

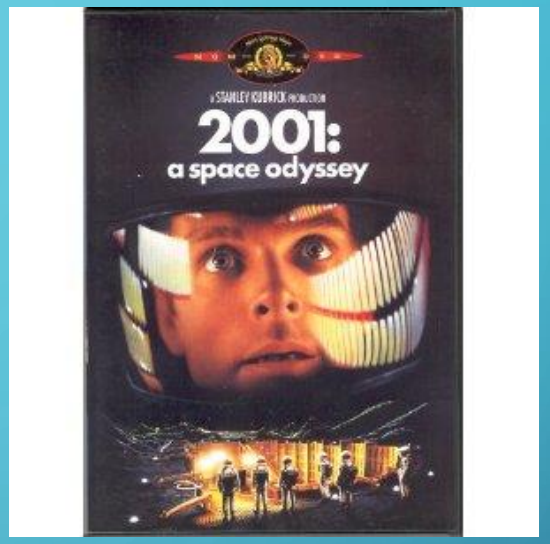
- AI is a belief that the brain is a form of biological computer and that the mind is computational so is AI

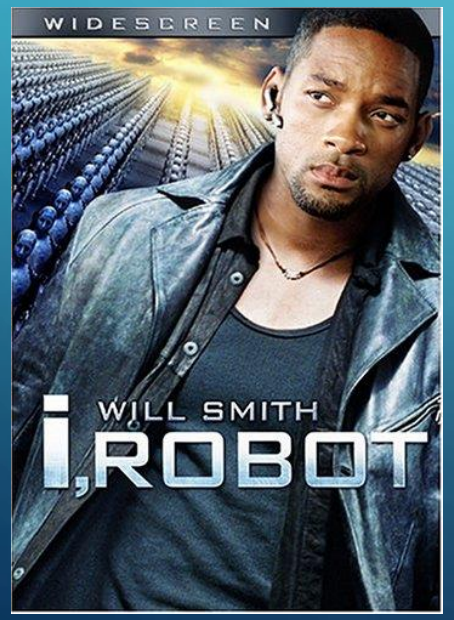
HOW AI WORKS

- Receives clues (questions) as electronic texts
- It then divides these texts into different keywords and sentence fragments and searches for statistically related phrases
- Quickly executes thousands of language analysis algorithms
- The more algorithms that find the same answer increase the AI's confidence of its answer and it calculates whether or not to make a guess

ARTIFICIAL INTELLIGENCE IN THE MOVIES







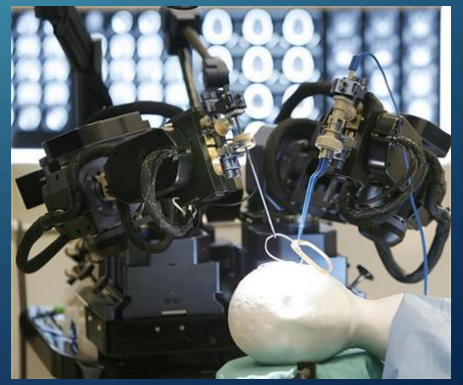
ARTIFICIAL INTELLIGENCE IN REAL LIFE

A young *science* (≈ 50 years old)

- Exciting and dynamic field, lots of uncharted territory left
- Impressive success stories
- "Intelligent" in specialized domains
- Many application areas

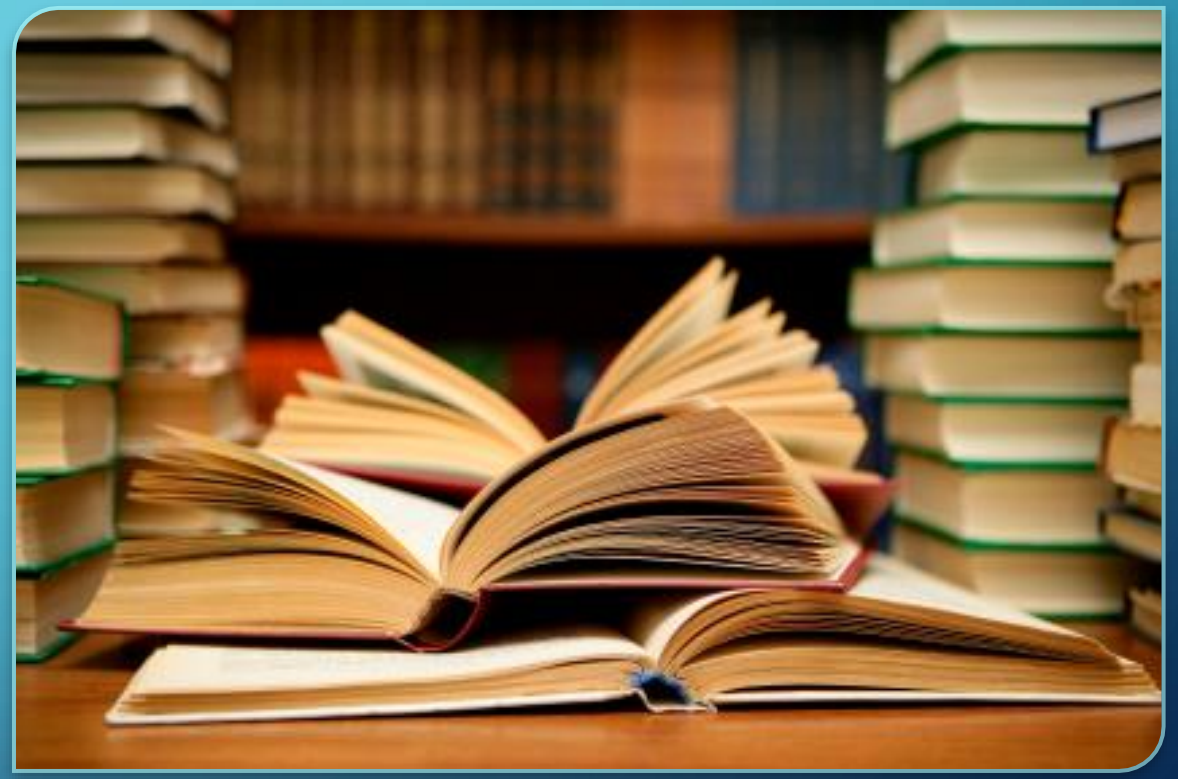
Face detection

Formal verification



SOURCES OF INFORMATION FOR ARTIFICIAL INTELLIGENCE

- Encyclopedias
- Dictionaries
- Thesauri
- Newswire articles
- Literary works
- Articles on websites (key word)
- Databases, catalogues and sets of characteristics in a subject matter and their relationships with each other.
- Wikipedia articles
- **Basically, anything on the Internet whether factual or not whether ethical or not**



THE FUTURE OF AI

- Computers that think like humans.
- Computers that act like humans.
- Computers that think rationally.
- Computers that act rationally.

- Is it a distinction between being intelligent and acting intelligently?
- Is it like being a human, or solving the same problems? However, solving the problem in not necessarily in the same way.

MAIN AREAS FOR THE USE OF AI

- Autonomous planning and scheduling
- Decision making
- Machine learning, adaptive methods
- Biologically inspired algorithms
- Game playing
- Autonomous control, robotics
- Natural language processing
- Public Education?
  - Academics?
  - Assisting teachers?
  - Assisting students?

STUDENTS WILL HAVE TO LEARN HOW TO NAVIGATE LIFE WITH AI

- Your students will deal with Artificial intelligence for the rest of their lives. Artificial intelligence will continue to get better and better.
- Consider that developers assert that ChatGPT is the weakest, most rudimentary artificial intelligence that your students will ever use as they grow up. It's the Macintosh/Commodore -- a technology that was revolutionary at the time but is now seen as antiquated and obsolete.
- Students will have to wrestle with **questions of humanity** -- what sets us apart as humans from AI? When should AI be used, and when shouldn't it be?
- They'll wrestle with **questions of obsolescence** -- what can I do that AI can't do? How can I do my best to be sure my work, my passions, my employment, my place in this world isn't replaced by artificial intelligence?
- They'll wrestle with **ethical questions** -- how can AI use be fair, equitable, unbiased, good? What happens if it gets in the hands of bad actors? How can I make sure I'm using it in an ethical way?

U.S DEPARTMENT OF EDUCATION ON THE USE OF AI

- AI can be described as enabling two broad shifts in the use of technology in schools in automating decisions about teaching and learning processes:
  - (1) from capturing data to detecting patterns in data and
  - (2) from providing access to instructional resources
- Use of AI will increase the level of responsibilities delegate to a computer system and away from humans.
- The process of developing an AI system may lead to bias and equity issues in how patterns are detected by the AI and unfairness in how decisions are automated regarding students.
- EDUCATIONAL LEADERS MUST CREATE POLICIES TO GOVERN HOW AI IS DEVELOPED FOR AND USED IN EDUCATION. Is that PED or school boards in New Mexico?

USE OF AI IN THE CLASSROOM

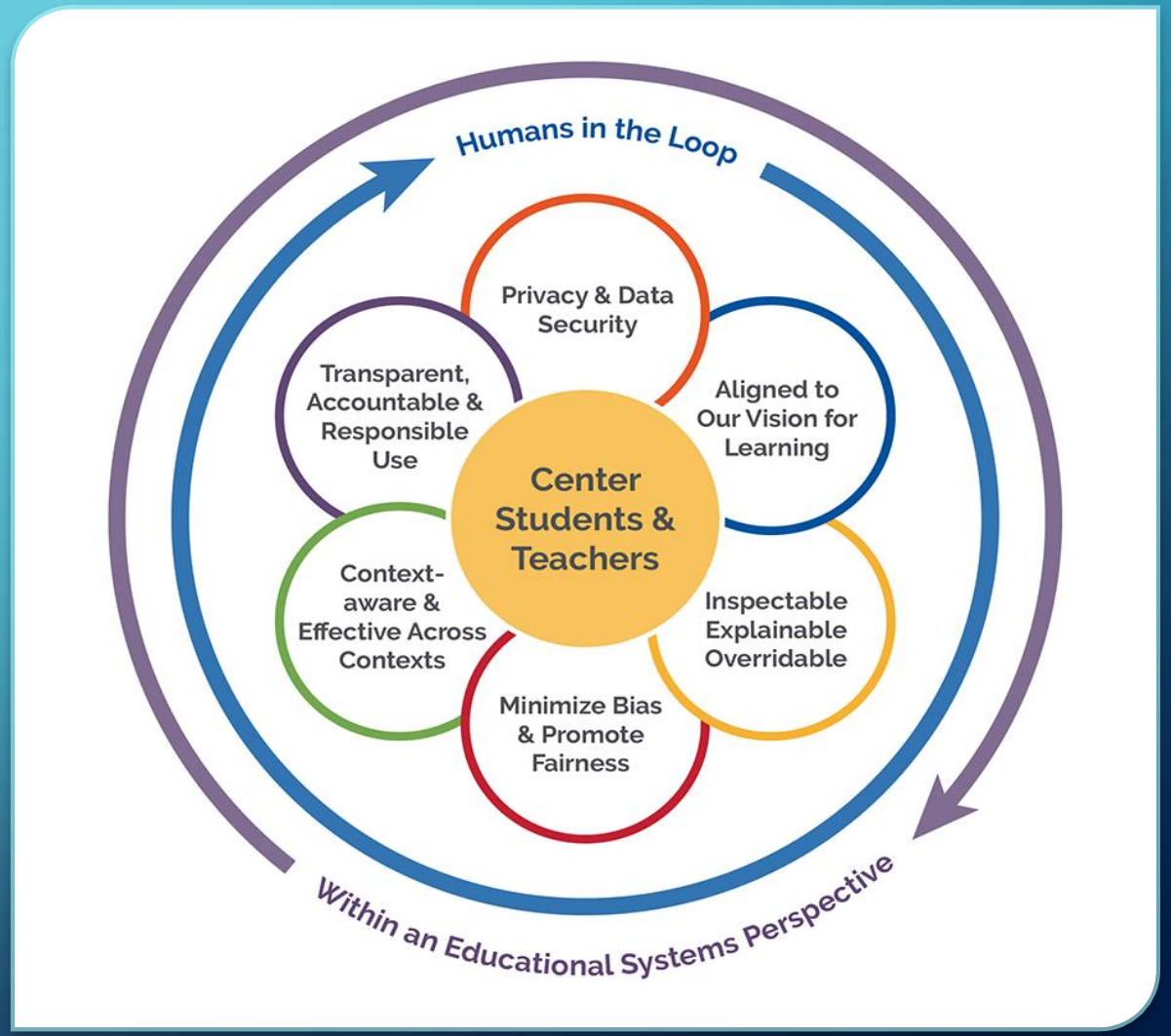
- AI enables new forms of interaction.
  - Students and teachers can speak, gesture, sketch, and use other natural human communication that will be able to interact with computational AI resources and vis-versa.
- AI can generate human-like responses with new forms of interaction that may provide supports to students with disabilities.
- AI can help educators address variability in student learning. With AI, curriculum designers can anticipate and address the many variations in how students can successfully learn—whereas traditional curricular resources were designed to teach to the middle or most common learning pathways.
  - For example, AI-enabled educational technology may be deployed to adapt to each student's English language abilities with greater support for the range of skills and needs among English learners.

USE OF AI IN THE CLASSROOM

- **AI supports powerful forms of adaptivity**. AI enables adapting to a student's learning process as it unfolds step-by-step, not simply providing feedback on right or wrong answers. AI can work with a student's strengths and working around learning obstacles.
- **AI can enhance academic feedback loops**. AI can increase the quality and quantity of feedback provided to students and teachers, as well as suggesting resources to advance their teaching and learning.
- **AI can support educators**. Educators can be involved in designing AI-enabled tools to make their jobs better and to enable them to better engage and support their students.
- **AI increases existing legal risks and introduces new risks yet to be considered**. AI increases risks already present in educational technology, especially data privacy and security.
- **AI adds new risks of algorithmic discrimination and inequity in education due to unwanted patterns in existing data and unfair automated decision-making**. For educational systems to benefit from the opportunities that AI can provide, the risks must be minimized and mitigated.
- **The blueprint for any AI policy is a sound starting place in investigating the potential risks in any particular AI systems, with specific understanding of risks that may arise in educational settings.**

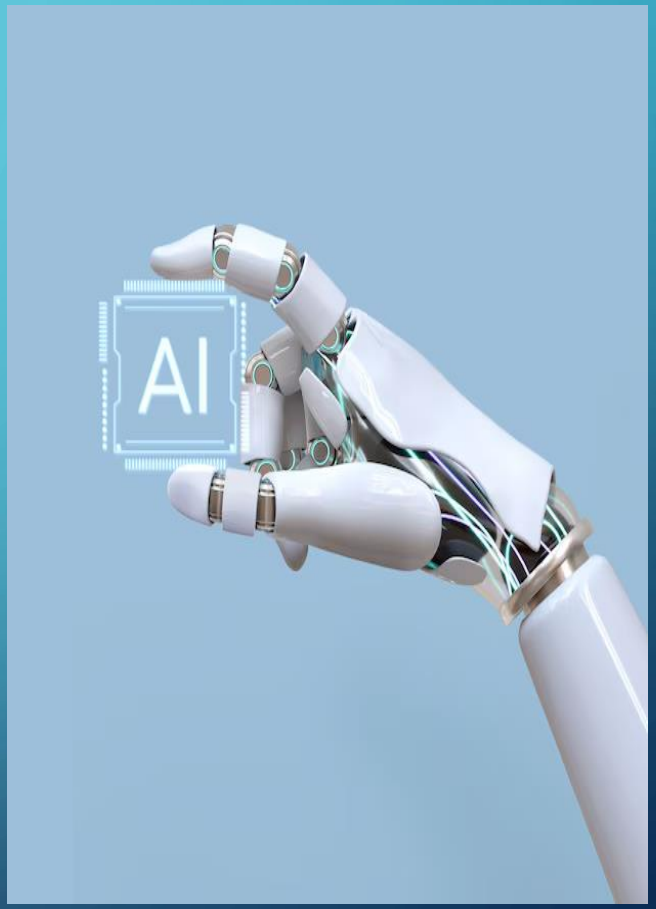
RECOMMENDATIONS FOR POLICY DEVELOPMENT

- **Emphasize Humans-in-the-Loop**. Reject the notion of AI as replacing teachers. Teachers and administrators must be "in the loop" whenever AI is applied to notice patterns and automate educational processes. Adopt a Humans-in-the-Loop as a key criteria in any policy development.
- **Align AI Models to the School District's Strategic Plan for Education**. The PED or the School Board along with researchers, and academic evaluators must determine the quality of an educational technology based not only on outcomes, but also based on the degree to which the models at the heart of the AI tools and systems align to a shared vision for teaching and learning.



RECOMMENDATIONS FOR POLICY DEVELOPMENT

- **Inform and Involve Educators.** Going beyond receiving notice and explanation of the use of AI, educational leaders must prioritize informing and involving educators so they are prepared to investigate how and when AI fits specific teaching and learning needs, and what risks may arise.
- **Develop Education-specific policies that are clear guidelines and gua**rdrails. Data privacy regulations already covers educational technology; further, data security is already a priority of school educational technology leaders. Modifications and enhancements to industry standards of cyber protections will be required to address the new capabilities alongside the risks of AI.
  - technology procurement checklists and
  - cyber security requirements so that we can achieve safe and effective AI for education.
  - PED regulations – unfunded requirements with accountability
  - Local Control – probably not.
- **Addressing data privacy is important, but strengthening public trust requires more than data privacy: educators need AI systems that can be inspected, explained, and provide a guide how humans can check, and override recommendations generated using AI.**

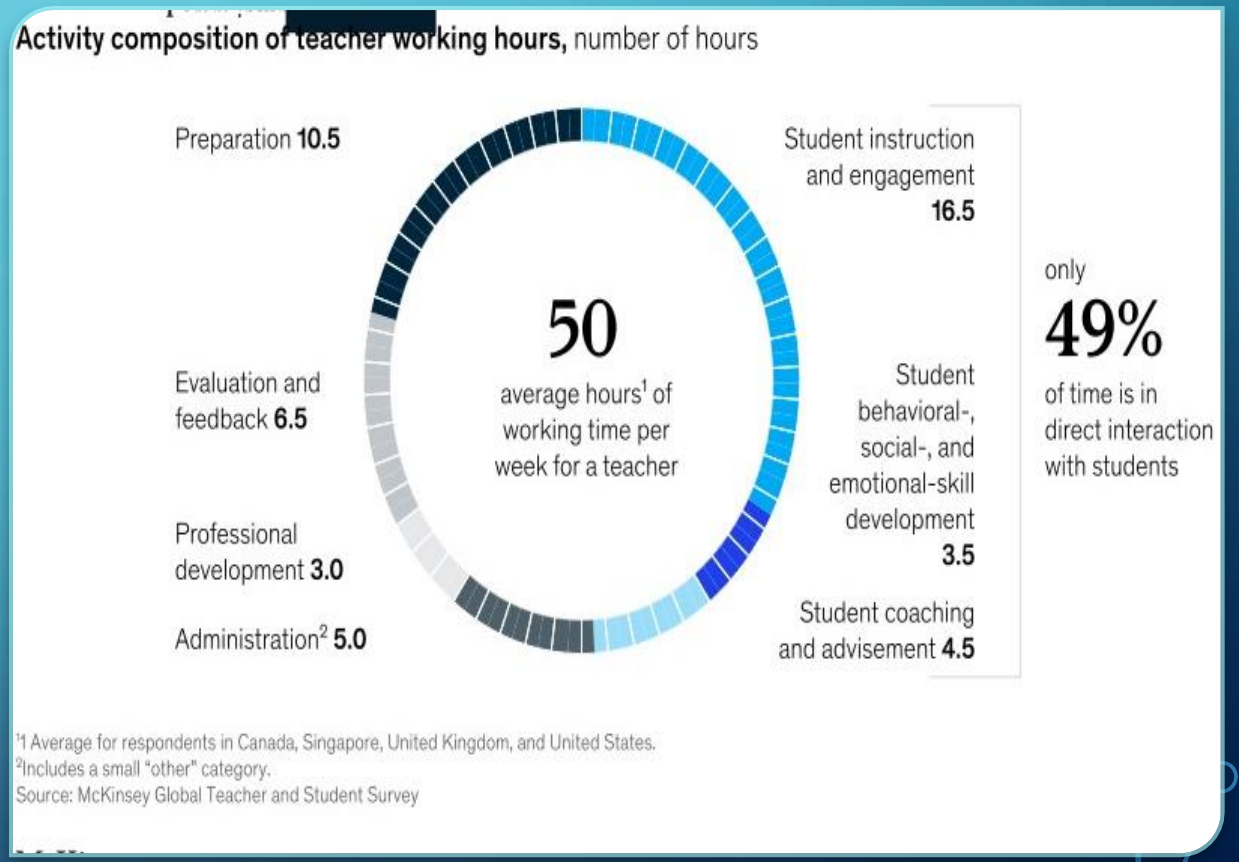


DATA PRIVACY AND CYBER PROTECTION

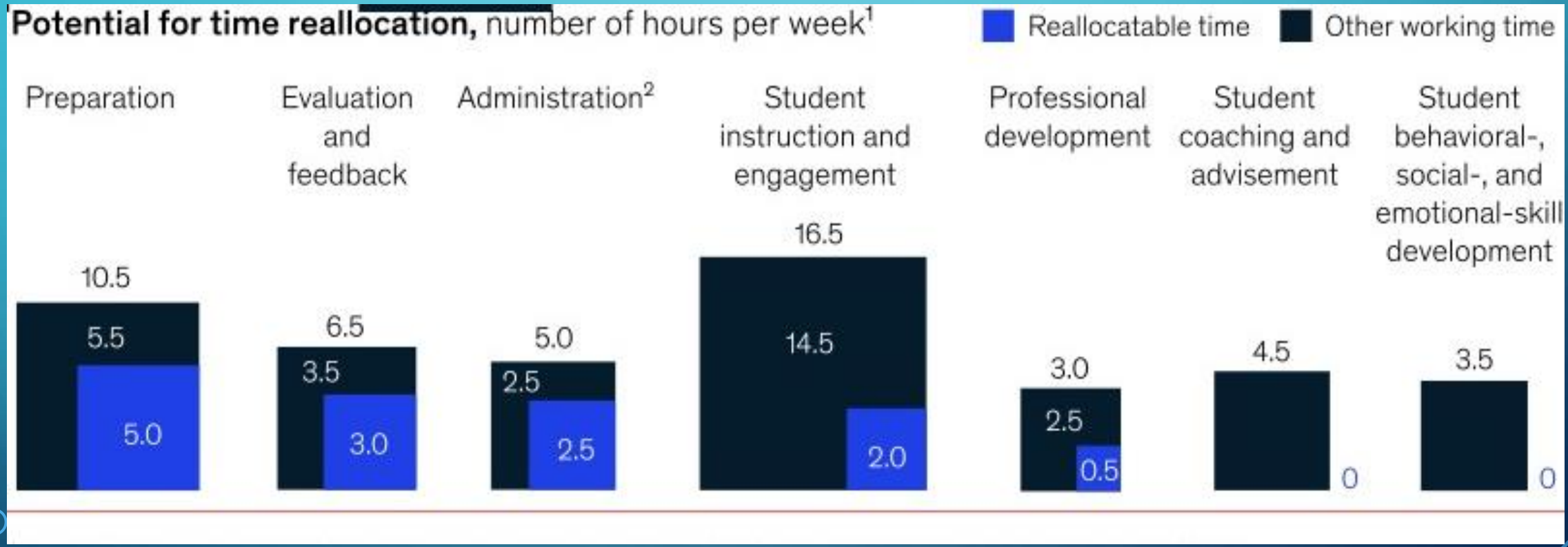
- Education-specific policies are needed to address new AI use opportunities and the challenges of doing so within existing applicable laws that take into consideration federal student privacy laws (such as the Family Educational Rights and Privacy Act, or FERPA), as well as the New Mexico Children's Code.
- AI also makes recommendations and takes actions automatically in support of student learning, and thus educators will need to consider how such recommendations and actions can comply with laws such as the Individuals with Disabilities Education Act (IDEA) and other federal and state equity and discrimination laws.

RECOMMENDATIONS FOR POLICY DEVELOPMENT

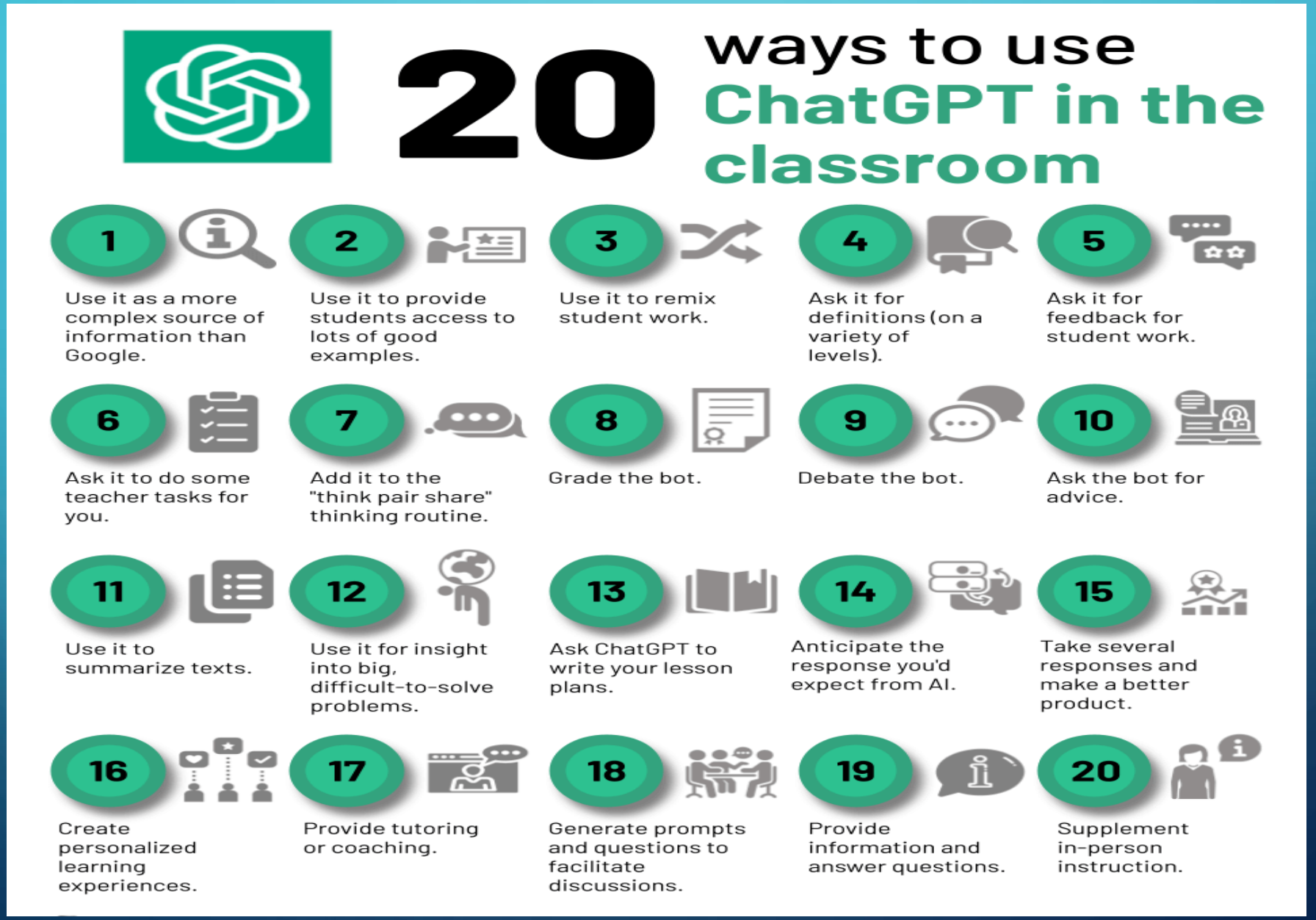
- Teachers make moment-to-moment decisions as they do the immediate work of teaching.
- Teachers prepare for, plan, and reflect on teaching, which includes professional development.
- Teachers participate in decisions about the design of AI-enabled technologies, participate in selecting the technologies, and shape the evaluation of technologies—thus setting a context for not only their own classroom but those of fellow teachers as well.



WHAT AI CAN DO FOR TEACHERS



EXAMPLES OF EDUCATIONAL USE OF AI



BIG ISSUES FOR EDUCATION

- Autonomous learning – frameworks for policies and regulations (lock-out of autonomous recommendations and academic action and countering cyberattacks and inequities in education)
- Future of employment and what you prepare students for – Which jobs will be hardest to automate. Many jobs that currently seem least likely to be automated have been racialized and gendered in ways connected to the service industry and immigration, and have rarely paid living wages; how do we revalue work and prepare a student for the future?
- Exacerbate inequality – digital divides; equal justice and equity in education as fast innovation leads to extreme economic inequality;
- Divided societies with bubbles in values and visions of government – challenges of populism (recommendations, news feeds, false news, manifestos, news as propaganda, etc.)

WHERE DO WE START?

- School Board must understand and verify the underlying student data quality to be used in any AI model to ensure fair and unbiased pattern recognition and decision-making in educational applications, based on accurate information appropriate to the pedagogical situation;

- School Board must engage in the examination of how particular AI technologies, as part of your educational systems, may increase or undermine equity for students; and take steps to safeguard and advance equity, including providing for human checks and balances and limiting any AI systems and tools that undermine equity.

DATA ANALYSIS AND EDUCATION

- Student data programs need to emphasize expertise from across the school district, and there will be a need to hire consultants such academic experts and technology contractors
- Ensure equity in education and work to address implicit bias;
- Social science / arts / humanities should be folded into all curriculum as any workforce in which students will enter and our humanity requires this; and
- Re-value and re-invest in vocational training, while broadening what that means now that AI is becoming more and more integrated into all arenas of society and the workplace (don't prepare a student for a job that will no longer exist).

QUESTIONS

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