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Dare to know

Artificial Intelligence Literacy

AI literacy complements information literacy, data literacy, digital literacy, open access, and research data management.

AI literacy is crucial for teaching students about AI writing generators.

Long-Magerko AI Literacy Model

Duri Long and Brian Magerko (Georgia Institute of Technology) have developed a conceptual AI literacy framework (2020). Their working definition for AI literacy is "a set of competencies that enables

individuals to critically evaluate AI literacy; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace."

Long-Magerko AI Literacy Model
What is AI?

Competency 1: Recognizing AI
Distinguish between technological artifacts that use and not use AI.

Competency 2: Understanding Intelligence
Critically analyze and discuss features that make an entity "intelligent," including discussing differences between human, animal, and machine intelligence.

Competency 3: Interdisciplinarity

Recognize that there are many ways to think about and develop "intelligent" machines. Identify a variety of technologies that use AI, including technology spanning cognitive systems, robotics, and machine learning.

Competency 4: General vs. Narrow
Distinguish between general and narrow AI.

Long-Magerko AI Literacy Model
What Can AI Do?

Competency 5: AI's Strengths and Weaknesses

Identify problem types that AI excels at and problems that are more challenging for AI. Use this information to determine

when it is appropriate to use AI and when to leverage human skills.	Imagine possible future applications of AI and consider the effects of such applications on the world.
Competency 6: Imagine Future AI	

Long-Magerko AI Literacy Model
How Does AI Work?

Competency 7: Representations
Understand what a knowledge representation is and describe some examples of knowledge representations.

Competency 8: Decision Making
Recognize and describe examples of how computers reason and make decisions.

Competency 9: Machine Learning Steps
Understand the steps involved in machine learning and the practices and challenges that each step entails.

Competency 10: Human Role in AI
Recognize that humans play an important role in programming, choosing models, and fine-tuning AI systems.

Competency 11: Data Literacy
Understand basic literacy concepts such as understanding data; finding and/or obtaining data; reading, interpreting, and evaluating data; managing data; and using data.

Competency 12: Learning from Data
Recognize that computers often learn from data, including one's own data.

Competency 13: Critically Interpreting Data
Understand that data cannot be taken at face-value and requires interpretation. Describe how the training examples provided in an initial dataset can affect the results of an algorithm.

Competency 14: Action & Reaction
Understand that some AI systems have the ability to physically act on the world. This action can be directed by higher-level reasoning (e.g., walking along a planned path) or it can be reactive (e.g., jumping backwards to avoid a sensed obstacle).

Competency 15: Sensors
Understand what sensors are, recognize that computers perceive the world using sensor, and identify sensors on a variety of devices. Recognize that different sensors support different types of representation and reasoning about the world.

Design Consideration 1: Explainability
Consider including graphical visualizations, simulations, explanations of agent decision-making processes, or interactive demonstrations in order to aid in learners' understanding of AI.

Design Consideration 2: Embodied Interactions
Consider designing interventions in which individuals can just put themselves "in the agent's shoes" as a way of making sense of the agent's reasoning process. This may involve embodied simulations of algorithms and/or hands-on physical experimentation with AI technology.

Design Consideration 3: Contextualizing Data
Encourage learners to investigate who created the dataset, how the data was collected, and what the limitations of the dataset are. This may involve choosing datasets that are relevant to learners' lives, are low-dimensional, and are "messy" (i.e., not cleaned or neatly categorizable).

Long-Magerko AI Literacy Model
What Should AI Do?

Competency 16: Ethics
Identify and describe different perspectives on the key ethical issues surrounding AI (i.e., privacy,

employment, misinformation, the singularity, ethical decision making, diversity, bias, transparency, accountability).

Long-Magerko AI Literacy Model
How Do People Perceive AI?

Competency 17: Programmability
Understand that agents are programmable.

Design Consideration 4: Promote Transparency
Promote transparency in all aspects of AI design (i.e., eliminating black-boxed functionality, sharing creator intentions and funding/data sources, etc.). This may involve improving documentation, incorporating explainable AI (Design Consideration 1), contextualizing data (Design Consideration 3), and incorporating design features such as interpretative affordances or the Sim-City Effect.

Design Consideration 5: Unveil Gradually
To prevent cognitive overload, consider giving users the option to inspect and learn about different system components; explaining only a few components at once; or introducing scaffolding that fades as the user learns more about the system's operations.

Design Consideration 6: Opportunities to Program
Consider providing ways for individuals to program and/or teach AI agents. Keep coding skill prerequisites to a minimum by focusing on visual/auditory elements and/or incorporating strategies like

Parsons problems and fill-in-the-blank code.

Design Consideration 7: Milestones
Consider how developmental milestones (e.g., theory of mind development), age, and prior experience with technology affect perceptions of AI—particularly when designing for children.

Design Consideration 8: Critical Thinking
Encourage learners—and especially young learners—to be critical consumers of AI technologies by questioning their intelligence and trustworthiness.

Design Consideration 9: Identity, Values, & Backgrounds
Consider how learners' identities, values, and backgrounds affect their interest in and preconceptions of AI. Learning interventions that incorporate personal identity or cultural values may encourage learner interest and motivation.

Design Consideration 10: Support for Parents
[Note: This reflects that the majority of AI research has been for K-12 students.] When designing for families, consider providing support to aid parents in scaffolding their children's AI learning experiences.

Design Consideration 11: Social Interaction

Consider designing AI learning experiences that foster social interaction and collaboration.

Design Consideration 12: Leverage Learners' Interests
Consider leveraging learners' interests (e.g., current issues, everyday experiences, or common pastimes like games or music) when designing AI literacy interventions.

Design Consideration 13: Acknowledging Preconceptions
Acknowledge that learners may have politicized/sensationalized preconceptions of AI from popular media and consider how to address, use, and expand on these ideas in learning interventions.

Design Consideration 14: New Perspectives
Consider introducing perspectives in learning interventions that are not as well-represented in popular media (e.g., less-publicized AI subfields, balanced discussion of the dangers/benefits of AI).

Design Consideration 15: Low Barrier to Entry
Consider how to communicate AI concepts to learners without extensive backgrounds in math or Computer Science (e.g., reducing required prerequisite knowledge/skills, relating AI to prior knowledge, addressing learner insecurities about math/CS ability).

Olari-Romeike AI Literacy Model

Viktoriya Olari and Ralf Romeike (2021) advocate for a framework that blends artificial intelligence literacy and data literacy.

Data Lifecycle: Acquisition
- Students should extract information from subject-specific data for further processing.
- Students should collect a dataset and maintain training data diversity for efficient classification tasks.
- Students should identify datasets needed to train an AI system to achieve a set goal.

Data Lifecycle: Evaluation
- Students should be able to train a model.
- Students should understand how biases in training data affect the accuracy and robustness of a machine learning model.
- Explaining why results contain errors due to processing them with AI techniques and questioning such results.

Data Lifecycle: Modeling
- Students should understand that computers construct representations using data.

Data Lifecycle: Analysis
- Students should train a model using clean, labeled data.
- Generating new information from data using AI analysis methods.

Data Lifecycle: Archiving
- Students should be aware that personal data is stored to facilitate the functioning of many AI systems.
- Using AI-driven procedures to optimize archiving, deletion, or exchange of data.

Data Lifecycle: Cleansing
o Students should conduct efficient data sanitization and mitigating unfairness in datasets using AI methods.

Data Lifecycle: Implementation
o Implementing concrete AI learning procedures and data management systems.

Data Lifecycle: Optimization
o Enriching data using AI techniques.

Data Lifecycle: Visualization
o Visualizing data using AI algorithms such as clustering.

Schmarzo AI Literacy Model
Bill Schmarzo (2022) echoes Olari and Romeike, although his approach emphasizes user protections.
Data & Privacy Awareness Understand how your personal data is captured and used to influence your thoughts and actions. Benchmark: Reads web site and mobile app privacy Terms and Conditions, and validates app & site credibility before engaging.
Making Informed Decisions Understand how we use data and analytics to make "models" to guide decision-making. Benchmark: Creates model that considers false positives and false negatives before making decisions; practices critical thinking.
AI & Analytical Techniques Understand how AI works and some key advanced analytic techniques. Benchmark: Understands how to collaborate to identify KPIs and metrics across a wide variety of value dimensions that comprise AI Utility Function.
Prediction & Strategies Understand how to use basic statistics to make predictions about what is likely to have next. Benchmark: Actively seeks out information from credible sources to improve the odds of making an informed decision.
Value Creation Understand how organizations leverage data and analytics to create "value." Benchmark: Understand the value dimensions and has identified the KPIs and metrics against which value creation effectives is measured.
Ethics Understand moral principles of right and wrong that governs a person's behavior or actions. Benchmark: Actively works to embrace different perspectives and rational when making decisions.

Ng et al. AI Literacy Model
Davy Tsz Kit Ng et al. (2021) performed a literature review from which they derived a framework.

Know and Understand AI o   Know the basic of AI and how to use AI applications in everyday life ethically. o   Educating learners about acquiring fundamental concepts, skills, knowledge, and attitudes that require no prior knowledge.
Apply AI o   Applying AI knowledge, concepts, and applications in different scenarios.
Evaluate and Create AI o   AI augments human intelligence with digital automation to engage learners in higher-order thinking skills (e.g., evaluate, appraise, predict, design).
AI Ethics o   Human-centered considerations (e.g., Fairness, Accountability, Transparency, Ethics).

Frameworks for AI literacy are still being developed; the Barton Library's approach will certainly change.

Additional Resources

Teaching Critical AI Literacy | Elicit.org