Artificial Intelligence Techniques and Best Practices to Improve Motivation and Learning

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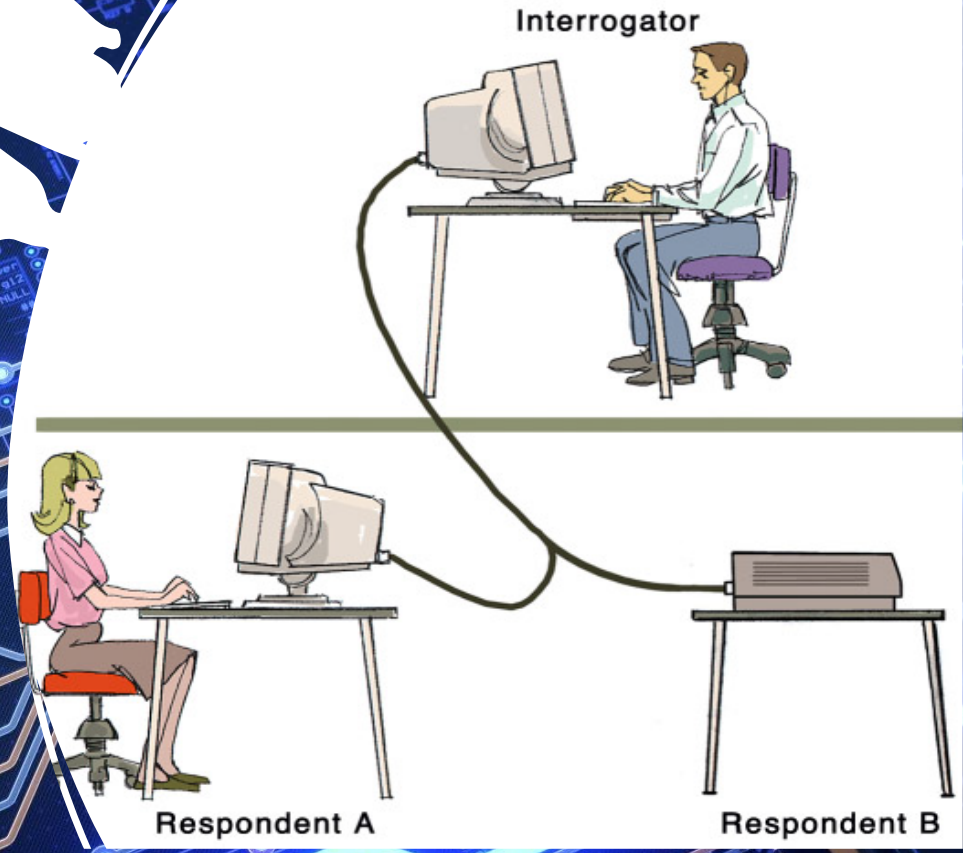
Purpose & Context

Potential of AI to assist educators and motivate students in social skill development

- Artificial intelligence (AI) progress
- AI applications can now reject inappropriate requests, challenge incorrect assumptions, and admit mistakes
- College students interacting with chatbots reported greater curiosity and perseverance compared to peer interactions
- Concerns exist over AI use in education, including unnatural, misleading, or inaccurate responses

Happy 82nd Birthday

- 1943 McCulloch & Pitts: Boolean circuit model of brain
- 1950 Alan Turing's Test, Markov Models [HMMs], Gaussian Mixture Models [GMMs]
- 1956 Dartmouth: "Artificial Intelligence" adopted
- 1969 Early knowledge-based systems [1st chatbots Eliza (1966), Parry (1972)]
- 1970 AIEd was introduced with the creation of the Turtle robot & computational LOGO (Papert et al., 1971)
- 1980 AI becomes an industry



More Abridged History of AI

- 1981 Chatbot Jabberwacky (Cleverbot in 1990)
- 1987 AI becomes a science
- 1995 The emergence of intelligent agents more chatbots Alice (1995), Deepblue (1997)
- More sophisticated:

IBM's 2010 Watson;

Apple's 2011 Siri;

Amazon's 2014 Alexa & 2017 Lex;

Microsoft's 2014 Cortana & 2018 Xiaoice;

Google's 2020 Meena & 2023 Bard;

Meta's 2022 Blenderbot; & OpenAI's ChatGPT

(Ciesla, 2024)

Understanding Social Narratives

- Evidence-based practice for teaching social skills
- Used to teach skills such as:
  - Expressive communication
  - Emotion processing
  - Perspective-taking
  - Play skills
- Traditionally presented by an adult
- Now various technologies

Privacy Check: 93% Rating Common Sense Media's Independent Privacy Evaluations

Behavior Intervention Suggestions

Presentation Generator

Custom Chatbot

Personalize Feedback

Song Generator

Academic Content

Project Based Learning

MAGIC SCHOOL

@IITSEC NTSAToday

NTSA

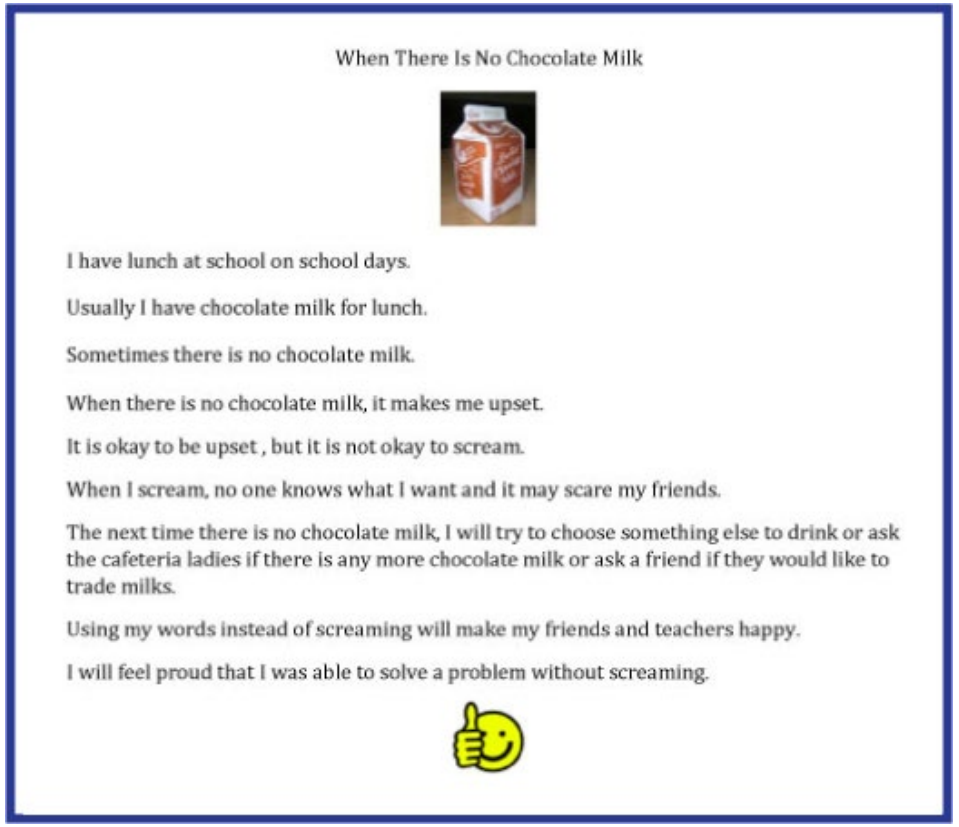
The MagicSchool AI Platform

- Collaborative effort between educators and AI experts
- Provides personalized assistance and resources
- Adapts to specific needs
- Supports learning, teaching, and creativity

What benefits do you see in using AI to personalize education?

Social Narratives as an Evidence-Based Practice

- Effective for teaching various social skills
- Particularly beneficial for individuals with autism
- Can improve communication, emotion processing, and play skills
- Technology has increased delivery options for narratives
- How might social narratives help students in real-life situations?



When There Is No Chocolate Milk

I have lunch at school on school days.

Usually I have chocolate milk for lunch.

Sometimes there is no chocolate milk.

When there is no chocolate milk, it makes me upset.

It is okay to be upset , but it is not okay to scream.

When I scream, no one knows what I want and it may scare my friends.

The next time there is no chocolate milk, I will try to choose something else to drink or ask the cafeteria ladies if there is any more chocolate milk or ask a friend if they would like to trade milks.

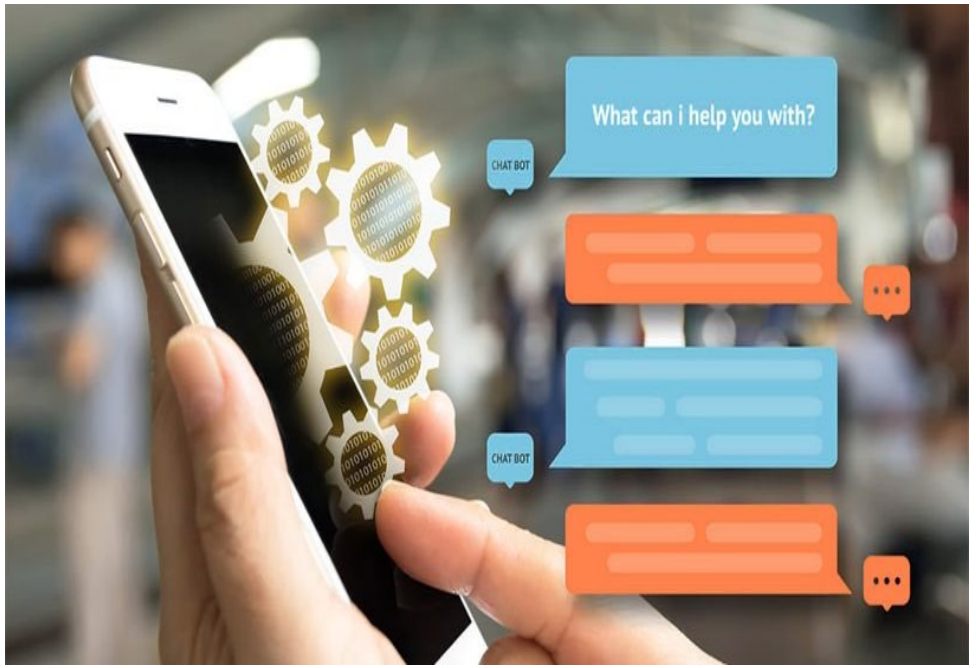
Using my words instead of screaming will make my friends and teachers happy.

I will feel proud that I was able to solve a problem without screaming.

AI-Assisted Social Narrative Creation

- MagicSchool's chatbot Merlin helps generate social narratives
- Assists with script ideas, dialogue, and storytelling
- Adapts content to individual student needs
- Promotes active learning and student interaction

What challenges might arise when using AI for narrative creation?



Key Elements of Effective Social Skill Interventions

- Choice
- Instructional antecedent manipulation
- Opportunities to respond
- Praise and reinforcement
- Precorrection and routines
- Self-management

Which of these elements do you think is most important? Why?

2024 Poll on Generative AI Use

Ithaka S+R & Impact Research (4,007 Participants)

K-12 teachers: 71% are confident in ability to use effectively, & 49% use 1x awk

***Students*:** 76% of undergraduates and 69% of K-12 students are confident in their ability to use & listed at least weekly use.

K-12 teachers: 48% say generative AI has had a positive impact on students.

***Students*:** 66% of undergraduates & 63% of K-12 students say already had a positive impact on their education.

Study Design

- Randomized Control Trial (RCT) with two groups:
  - Educator-supported social narrative creation
  - AI chatbot-supported social narrative creation
- Participants: 100 middle school students (ages 10-13)
- Setting: Various school types (public, private, charter)
- Duration: September 2022 to April 2023
- Intervention: 150 minutes within a two-month span

Participant Demographics

- Gender: Relatively balanced between groups
- Diagnoses included:
  - Autism Spectrum Disorder (ASD)
  - Attention Deficit Hyperactivity Disorder (ADHD)
  - Learning Disabilities (LD)
- Various education plans: IEPs, 504 Plans, Social Skill Groups

Intervention Process

- Students trained in creating social narratives (60 minutes total)
- Intervention delivered during regular social skill instruction time
- iPads or Chromebooks (familiar to students)
- MagicSchool AI chatbot utilized for the AI group
- Educators present during all stages
- Fidelity measures

Evaluation Method

- Computer Simulation Evaluation Scale for Students (CSES-S) used
- 12-item survey assessing attitudes toward computer-based simulations
- Focus on learning, quality, and engagement constructs
- 5-point Likert scale (1-Strongly Disagree to 5-Strongly Agree)
- Surveys administered electronically via Qualtrics

Key Findings

- Significant difference in total scores between groups:
  - AI group: Mean score of 4.11 out of 5
  - Educator group: Mean score of 3.19 out of 5
  - Large effect size (eta-squared = .20)
- Students strongly preferred AI support over teacher support
- 11 out of 12 individual items showed significant differences favoring AI

Detailed Results

- AI group scored higher in:
  - Effective learning (4.16 vs 2.86)
  - Helpful feedback (4.08 vs 2.76)
  - Understanding new concepts (4.30 vs 3.16)
  - Motivation (4.10 vs 3.00)

Only non-significant difference:

- Ease of use (both groups rated high)

Why do you think students might prefer AI support?

Challenges in Implementing Social Narratives

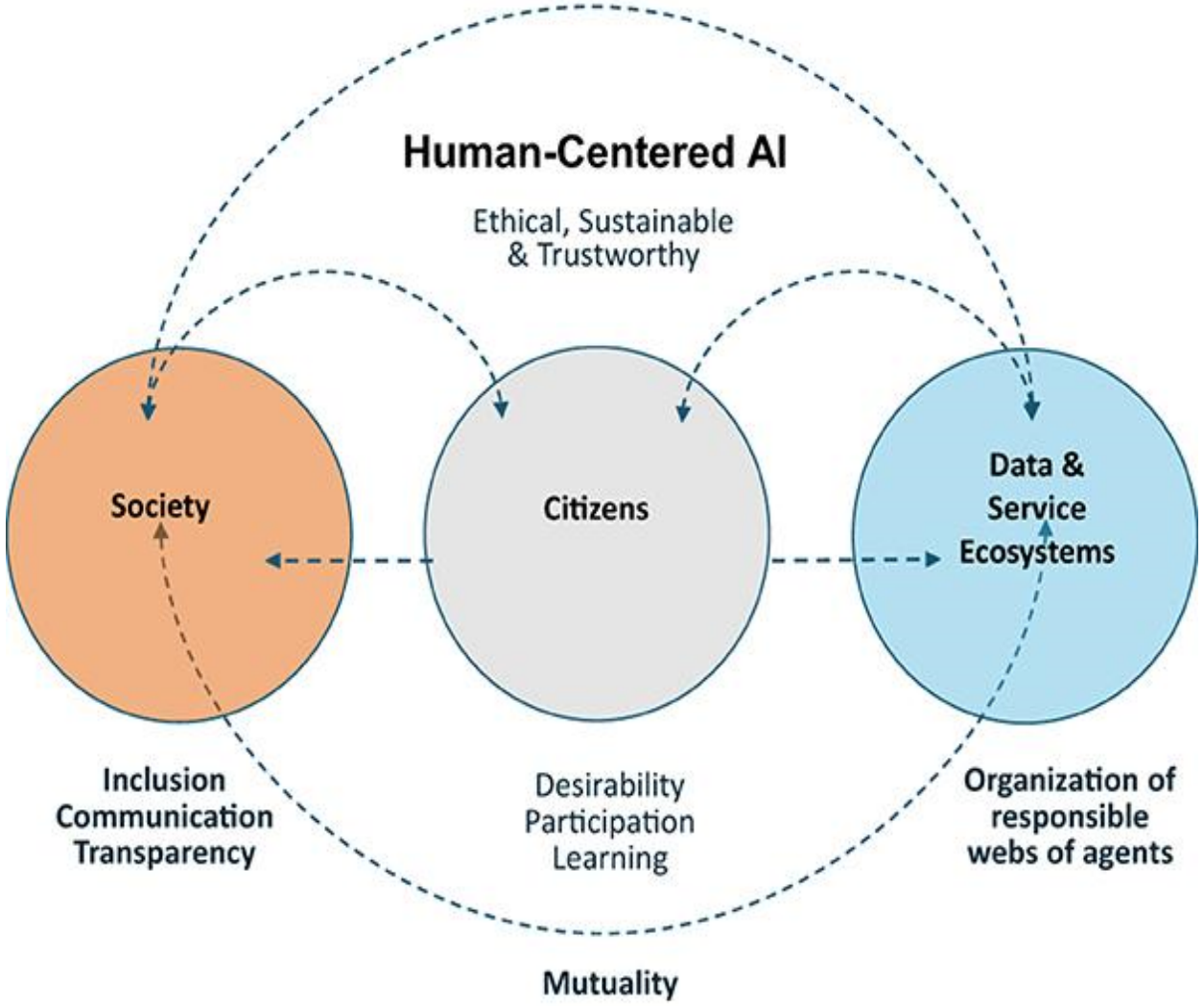
- Difficulty maintaining intervention fidelity
- Need to adapt to individual student needs
- Time constraints for educators
- Complexity of social skill instruction

What solutions can you suggest for these challenges?

AI as a Complementary Tool

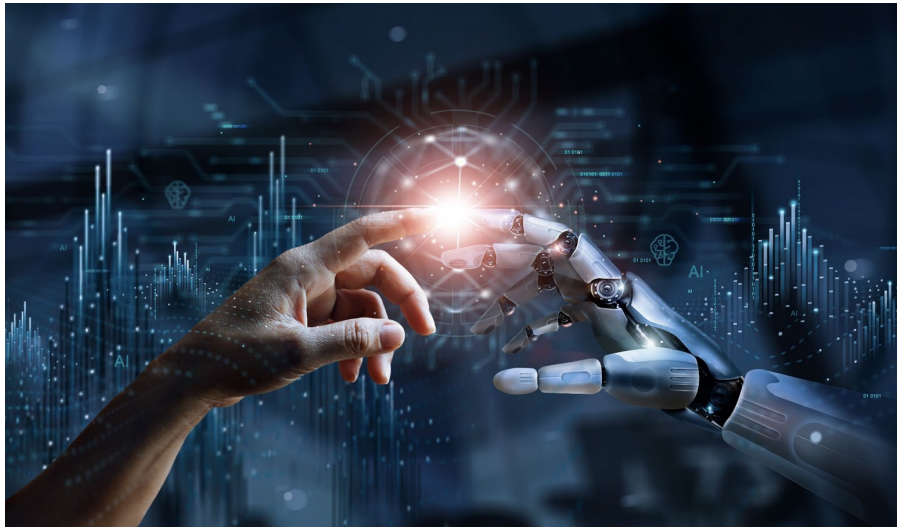
- AI enhances, not replaces, traditional teaching methods
- Combines proven strategies with technological support
- Frees up teacher time for relationship-building
- Provides consistent, on-demand assistance

How can educators best integrate AI tools into their teaching?



Conclusion: Embracing AI Responsibly

- AI offers promising tools for enhancing social skill development
- Careful integration with existing evidence-based practices is key
- Ongoing research and evaluation are necessary
- The goal is to augment, not replace, human educators



What role do you see yourself playing in the future of AI in education?

Future Research Directions

- Exploring long-term impacts of AI-assisted social skill instruction
- Investigating optimal combinations of AI and traditional methods
- Assessing AI's role in supporting diverse learner needs
- Examining potential biases in AI-generated content

What other research questions would you propose in this field?

Challenges and Ethical Considerations

Data privacy: Student data.

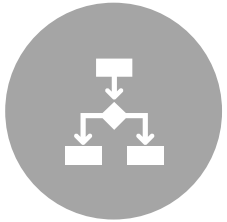
Algorithmic bias: Biases perpetuate inequalities.

Digital divide: Equal access.

Human touch: Balancing AI integration with irreplaceable humans.

Transparency: Disclose AI tool usage in methodology.

Creator Rights: Credit the correct source.

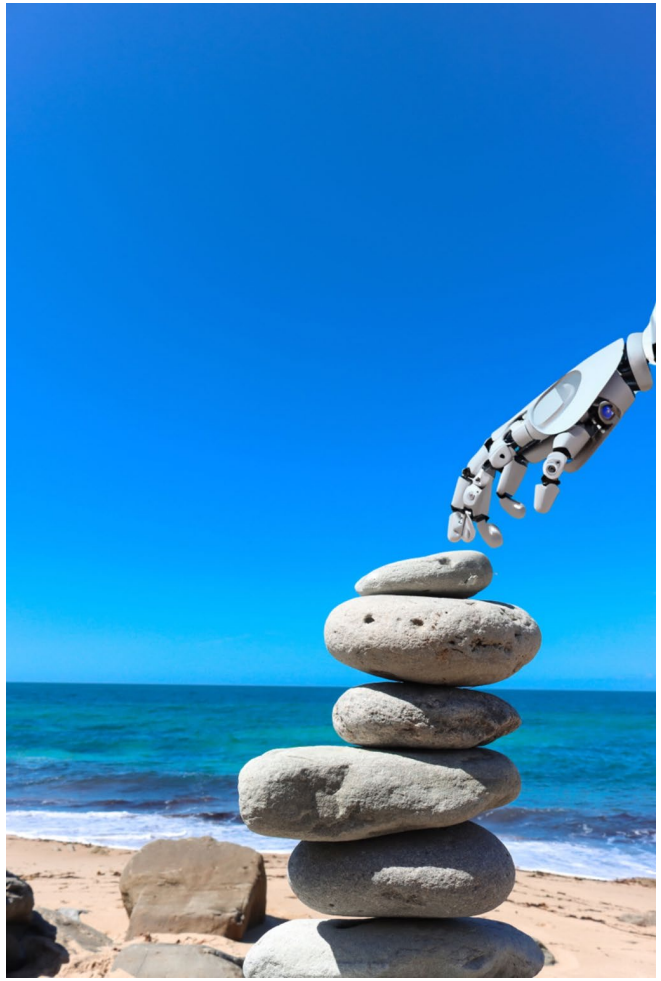


Verification: Double-check for accuracy.

Original thought: supplement, not a replacement for critical thinking.

Laws, frameworks, & guidelines: institutional policies on usage.

Preparing Educators for AI Integration



- Professional development on AI tools and applications
- Training on effective prompt engineering
- Developing critical evaluation skills for AI-generated content
- Balancing AI use with traditional teaching methods
- What skills do you think educators need to effectively use AI?

The Future of AI in Special Education

- Potential for highly personalized interventions
- Real-time adaptation to student needs and progress
- Enhanced accessibility through AI-powered assistive technologies
- Improved data analysis for individualized education plans
- How might AI transform special education in the next decade?

AI-Enhanced Social Narratives

AI chatbots assist in crafting social narratives on topics like:

- Friendship
- Empathy
- Conflict resolution

Benefits of AI in social narrative creation:

- Character development
- Plot structuring
- Dialogue practice
- Immediate feedback
- Personalized learning experience

Limitations and Future Research

- Potential inflation of type I error due to multiple comparisons
- Need for long-term studies on AI's impact on social skill development
- Investigation of AI's effectiveness across diverse student populations
- Exploration of optimal balance between AI and human instruction
- Examination of AI's role in generalizing social skills to real-world settings

Reasons for AI Failure

Sensitive Information

Lack of Knowledge of AI Tools

Lack of Knowledge of Machine Learning vs Generative AI

Not Reviewing & Editing Responses

Not Writing Quality Prompts: Context, Details, Desired Output

Plagiarism Tools Often Inaccurate with International Students

Entire Web Rather than Accurate Sources

Right questions… "Improve this prompt to maximize…"

Not Taking Advantage of Continuous Teacher Training

Not Using Upheaval "Crisis" to Push for Systemic Change

Implications for Educators

- AI can supplement traditional social skill instruction
- Potential to address teacher workload and consistency issues
- Opportunity for more personalized and adaptive learning
- Importance of combining AI with evidence-based practices
- Need for educator training in AI integration
- Consideration of ethical use and data privacy

QUESTIONS ANYONE?

THANKS FOR TAKING THE TIME TO ATTEND

Presentation Slides

References & Articles to Learn More QR Code:

Chart of Low to No Cost By Category QR Code:

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