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Disclosure

I do not have any financial relationships with ineligible companies to disclose.

I will be discussing and demonstrating off-label use of a commercial product.

2

APPLIED ARTIFICAL INTELLIGENCE

TRANSFORMING TEACHING-LEARNING-RESEARCH-WORKFORCE

DR. ROBBIE MELTON
PROVOST &
VP SMART AI TECHNOLOGIES

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Tennessee State University- SMART Center
'AI for ALL' Applied Research Center
for Education Innovations

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AI in Education & Research

Inclusive Approaches and Collaborative Innovations Across Disciplines

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Artificial Intelligence (AI) is revolutionizing education and research across multiple dimensions, empowering educators with advanced tools and capabilities that were previously unimaginable.

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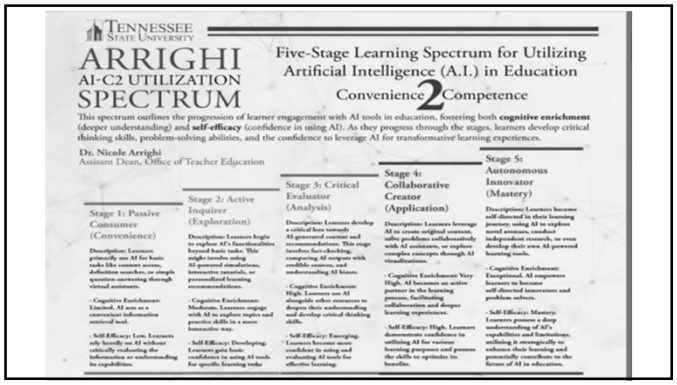
TENNESSEE STATE UNIVERSITY
ARRIGHI AI-C2 UTILIZATION SPECTRUM
Five-Stage Learning Spectrum for Utilizing Artificial Intelligence (A.I.) in Education
Convenience 2 Competence
This spectrum outlines the progression of learner engagement with AI tools in education, fostering both cognitive enrichment (deeper understanding) and self-efficacy (confidence in using AI). As they progress through the stages, learners develop critical thinking skills, problem-solving abilities, and the confidence to leverage AI for transformative learning experiences.
Dr. Nicole Arrighi
Assisant Dean, Office of Teacher Education
Stage 1: Passive Consumer (Convenience)
Description: Learners primarily use AI for basic tasks like content access, definition searches, or simple question-answering through virtual assistants.
· Cognitive Enrichment: Limited, AI acts as a convenient information retrieval tool.
· Self-Efficacy: Low. Learners rely heavily on AI without critically evaluating the information or understanding its capabilities.
Stage 2: Active Inquirer (Exploration)
Description: Learners begin to explore AI's functionalities beyond basic tasks. This might involve using AI-powered simulations, interactive tutorials, or personalized learning recommendations.
· Cognitive Enrichment: Moderate. Learners engage with AI to explore topics and practice skills in a more interactive way.
· Self-Efficacy: Developing. Learners gain basic confidence in using AI tools for specific learning tasks
Stage 3: Critical Evaluator (Analysis)
Description: Learners develop a critical lens towards AI-generated content and recommendations. This stage involves fact-checking, comparing AI outputs with credible sources, and understanding AI biases.
· Cognitive Enrichment: High. Learners use AI alongside other resources to deepen their understanding and develop critical thinking skills.
· Self-Efficacy: Emerging. Learners become more confident in using and evaluating AI tools for effective learning.
Stage 4: Collaborative Creator (Application)
Description: Learners leverage AI to create original content, solve problems collaboratively with AI assistants, or explore complex concepts through AI visualizations.
· Cognitive Enrichment: Very High. AI becomes an active partner in the learning process, facilitating collaboration and deeper learning experiences.
· Self-Efficacy: High. Learners demonstrate confidence in utilizing AI for various learning purposes and possess the skills to optimize its benefits.
Stage 5: Autonomous Innovator (Mastery)
Description: Learners become self-directed in their learning journey, using AI to explore novel avenues, conduct independent research, or even develop their own AI-powered learning tools.
· Cognitive Enrichment: Exceptional. AI empowers learners to become self-directed innovators and problem solvers.
· Self-Efficacy: Mastery. Learners possess a deep understanding of AI's capabilities and limitations, utilizing it strategically to enhance their learning and potentially contribute to the future of AI in education.

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ARTIFICIAL INTELLIGENCE
PROMPT
ASSESS
C. ITE
IT UP
A.I. FOR ALL
Artificial intelligence (AI) is transforming education by providing personalized learning experiences, enhancing cognitive engagement, and supporting critical thinking. Artificial intelligence holds great potential to enhance learning when utilized properly. This guide aims to help students and faculty safely and ethically "P.A.C. it Up!" when using AI tools for academic purposes. The term "P.A.C. it Up" stands for Prompt, Assess, and Cite, which are essential steps for effectively using AI in research and education.
Mr. Marcus Horton
Academic Technology Coach
Smart Innovation Technology Center, 2024
TENNESSEE STATE UNIVERSITY
Educational Aid for Artificial Intelligence
ai-tnstatesmartcenter.org

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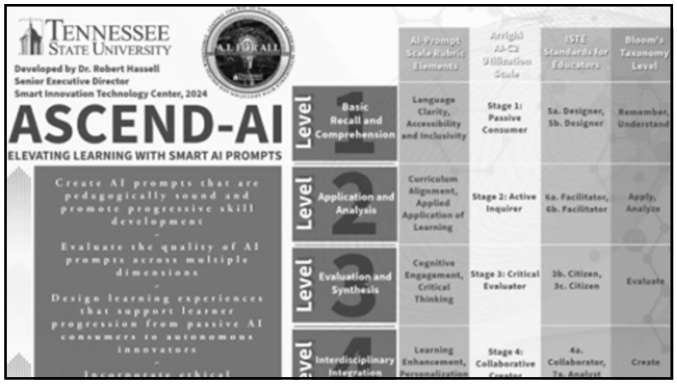
TENNESSEE STATE UNIVERSITY
A.I. FOR ALL
Developed by Dr. Robert Hassell
Senior Executive Director
Smart Innovation Technology Center, 2024
ASCEND-AI
ELEVATING LEARNING WITH SMART AI PROMPTS
Create AI prompts that are pedagogically sound and promote progressive skill development
Evaluate the quality of AI prompts across multiple dimensions
Design learning experiences that support learner progression from passive AI consumers to autonomous innovators
AI Prompt Scale Rubric Elements
Arrighi AI-C2 Utilization Scale
ISTE Standards for Educators
Bloom's Taxonomy Level
Level 1 Basic Recall and Comprehension
Language Clarity, Accessibility and Inclusivity
Stage 1: Passive Consumer
5a. Designer, 5b. Designer
Remember, Understand
Level 2 Application and Analysis
Curriculum Alignment, Applied Application of Learning
Stage 2: Active Inquirer
6a. Facilitator, 6b. Facilitator
Apply, Analyze
Level 3 Evaluation and Synthesis
Cognitive Engagement, Critical Thinking
Stage 3: Critical Evaluator
3b. Citizen, 3c. Citizen
Evaluate
Level 4 Interdisciplinary Integration
Learning Enhancement, Personalization
Stage 4: Collaborative Creator
4a. Collaborator, 7a. Analyst
Create

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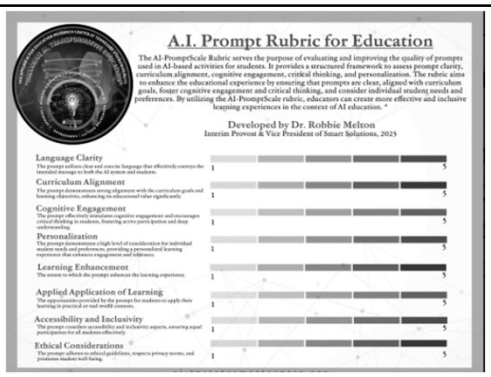

A.I. Prompt Rubric for Education

The AI-PromptScale Rubric serves the purpose of evaluating and improving the quality of prompts used in AI-based activities for students. It provides a structured framework to assess prompt clarity, curriculum alignment, cognitive engagement, critical thinking, and personalization. The rubric aims to enhance the educational experience by ensuring that prompts are clear, aligned with curriculum goals, foster cognitive engagement and critical thinking, and consider individual student needs and preferences. By utilizing the AI-PromptScale rubric, educators can create more effective and inclusive learning experiences in the context of AI education. *

Developed by Dr. Robbie Melton
Interim Provost & Vice President of Smart Solutions, 2025

Language Clarity
The prompt utilizes clear and concise language that effectively conveys the intended message to both the AI system and students.
1 5

Curriculum Alignment
The prompt demonstrates strong alignment with the curriculum goals and learning objectives, enhancing its educational value significantly.
1 5

Cognitive Engagement
The prompt effectively stimulates cognitive engagement and encourages critical thinking in students, fostering active participation and deep understanding.
1 5

Personalization
The prompt demonstrates a high level of consideration for individual student needs and preferences, providing a personalized learning experience that enhances engagement and relevance.
1 5

Learning Enhancement
The extent to which the prompt enhances the learning experience.
1 5

Applied Application of Learning
The opportunities provided by the prompt for students to apply their learning in practical or real-world contexts.
1 5

Accessibility and Inclusivity
The prompt considers accessibility and inclusivity aspects, ensuring equal participation for all students effectively.
1 5

Ethical Considerations
The prompt adheres to ethical guidelines, respects privacy norms, and promotes student well-being.
1 5

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1. Accelerating Data Analysis and Insights

Big Data Processing: AI algorithms analyze vast datasets efficiently, identifying patterns and correlations in minutes compared to manual methods.
Predictive Analytics: AI enables predictive modeling in fields like climate science, disease outbreaks, and economic forecasting.
Real-Time Analysis: AI-powered systems can process and analyze data in real-time, improving responsiveness in research applications such as disaster management and clinical trials.
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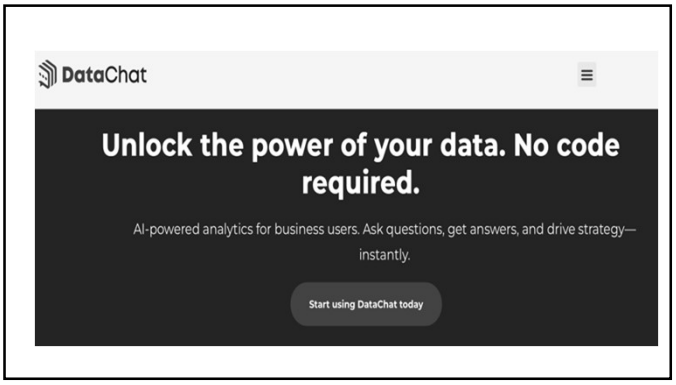

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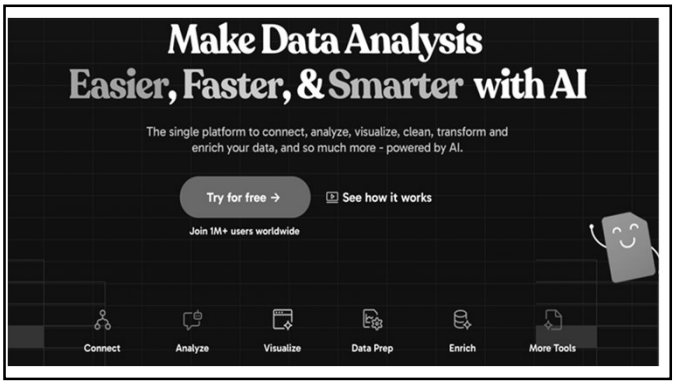

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2. Advancing Simulations and Modeling

Complex Simulations: AI enhances the accuracy and speed of simulations, such as protein folding in biology or crash testing in engineering.
Generative Models: AI-driven generative models create new designs, such as drug molecules in pharmaceuticals or materials in manufacturing.
High-Performance Computing (HPC): AI optimizes HPC workflows, allowing researchers to run more complex computations on supercomputers.

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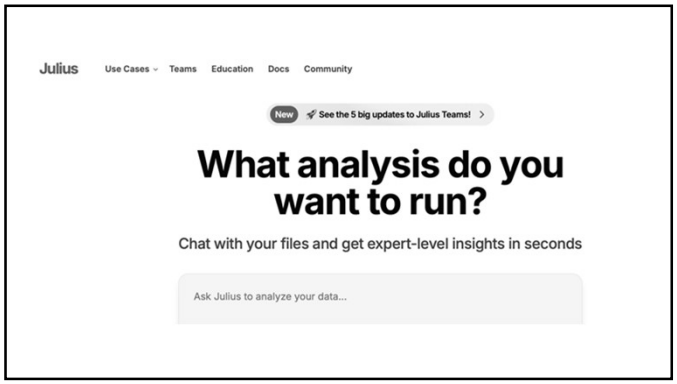

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3. Transforming Collaboration and Accessibility

- **Automated Research Assistance**: AI-powered virtual assistants streamline literature reviews, summarize research papers, and propose experimental designs.
- **Democratizing Research**: Open-source AI tools and platforms lower barriers for underfunded institutions, enabling broader participation in cutting-edge research.
- **Global Collaboration**: AI tools facilitate multilingual communication, data sharing, and real-time collaboration among researchers worldwide.

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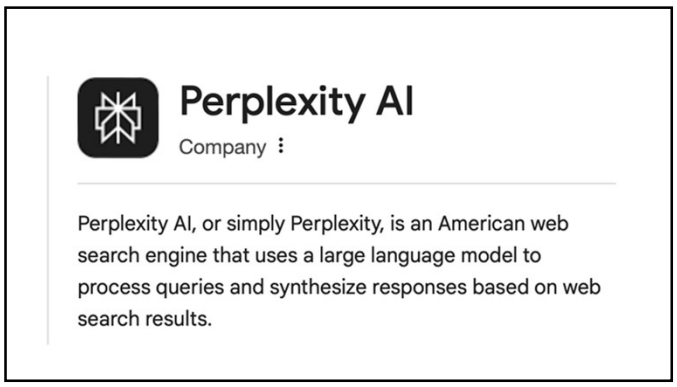

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4. Driving Innovation Across Disciplines

- **Healthcare**: AI accelerates drug discovery, diagnostics, and personalized medicine.
- **Environmental Science**: AI models predict and mitigate climate change impacts, optimize renewable energy systems, and improve conservation efforts.
- **Social Sciences**: AI analyzes societal trends, human behavior, and policy impacts, contributing to more informed decision-making.

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5. Promoting Ethical and Responsible Research

- **Bias Detection and Mitigation**: AI helps identify and reduce bias in datasets and algorithms, fostering more equitable outcomes.
- **Privacy and Security**: AI safeguards sensitive research data through enhanced encryption and secure access controls.
- **Ethical AI Development**: Researchers are creating frameworks to ensure AI applications are fair, transparent, and aligned with societal values.

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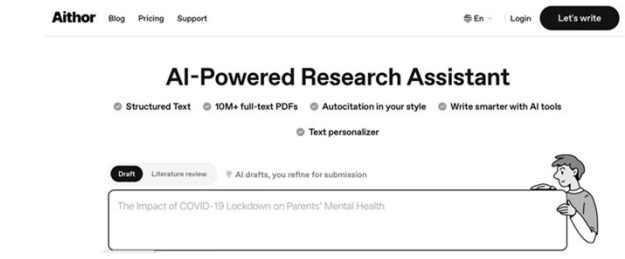

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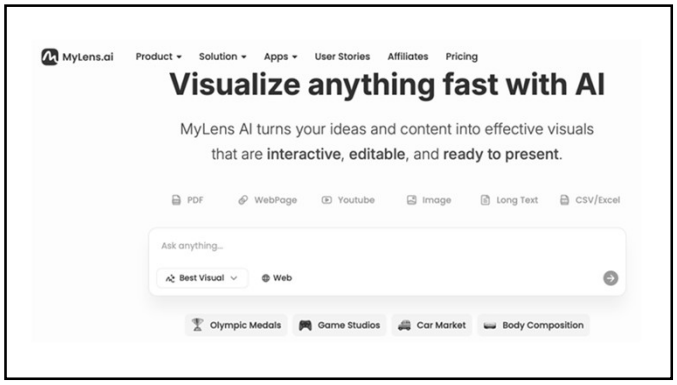

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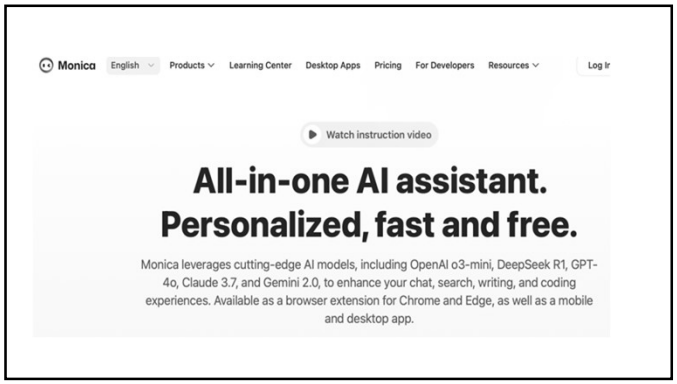

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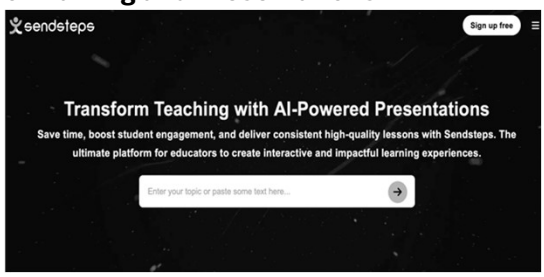
6. Training and Presentations



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7. Shaping the Future of Research Computing

- **Edge Computing**: AI enables decentralized data processing, reducing latency and improving efficiency in research workflows.
- **Quantum Computing**: AI is being integrated with quantum systems to address problems beyond the reach of classical computing.
- **AI-Driven Automation**: Automating repetitive tasks in research workflows allows scientists to focus on creative and strategic exploration.

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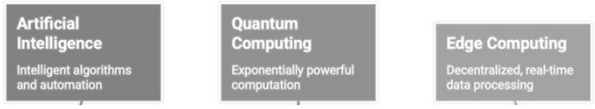
Synergy of AI and Advanced Computing Paradigms



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WHAT - WHEN – WHERE and HOW to USE TECHNOLOGY

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Questions?

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