



THE AI-ALOE SPOTLIGHT



Ashok Goel
Executive Director

The Fall/Winter 2024 Edition of the AI-ALOE Spotlight showcases our progress in advancing AI tools for adult and online learning. Notable updates include *Apprentice Tutors* expanding into nursing topics, *Jill Watson* and *SMART* scaling within Technical College System of Georgia, *iTELL* deployment in vocational settings, and an upgraded *SAMI* or broader use. We've also introduced an intelligent coach in our interactive video system, *IVY*, and the *VERA* team is enhancing transparency in AI-driven educational tools. Each project aims to make learning more personalized, scalable, and effective.

Our collaboration efforts featured key contributions to the Summit for AI Institute Leadership (SAIL), a successful instructional design outreach workshop, webinars for the AI community, the launch of our first teaching fellows cohort, and a podcast series with AI institutes in education—bridging research, teaching, and broader community engagement. This issue also highlights *Dr. Aileen Reid's* work in culturally responsive STEM evaluation, and features Ph.D. students *Sibley Lyndgaard* and *Glen Smith*, whose contributions are helping shape the future of AI-augmented education.

As 2024 ends, we look forward to continued growth and innovation. We hope you enjoy our latest updates and join us in pushing the boundaries of AI in education.

Warm regards,
Ashok Goel

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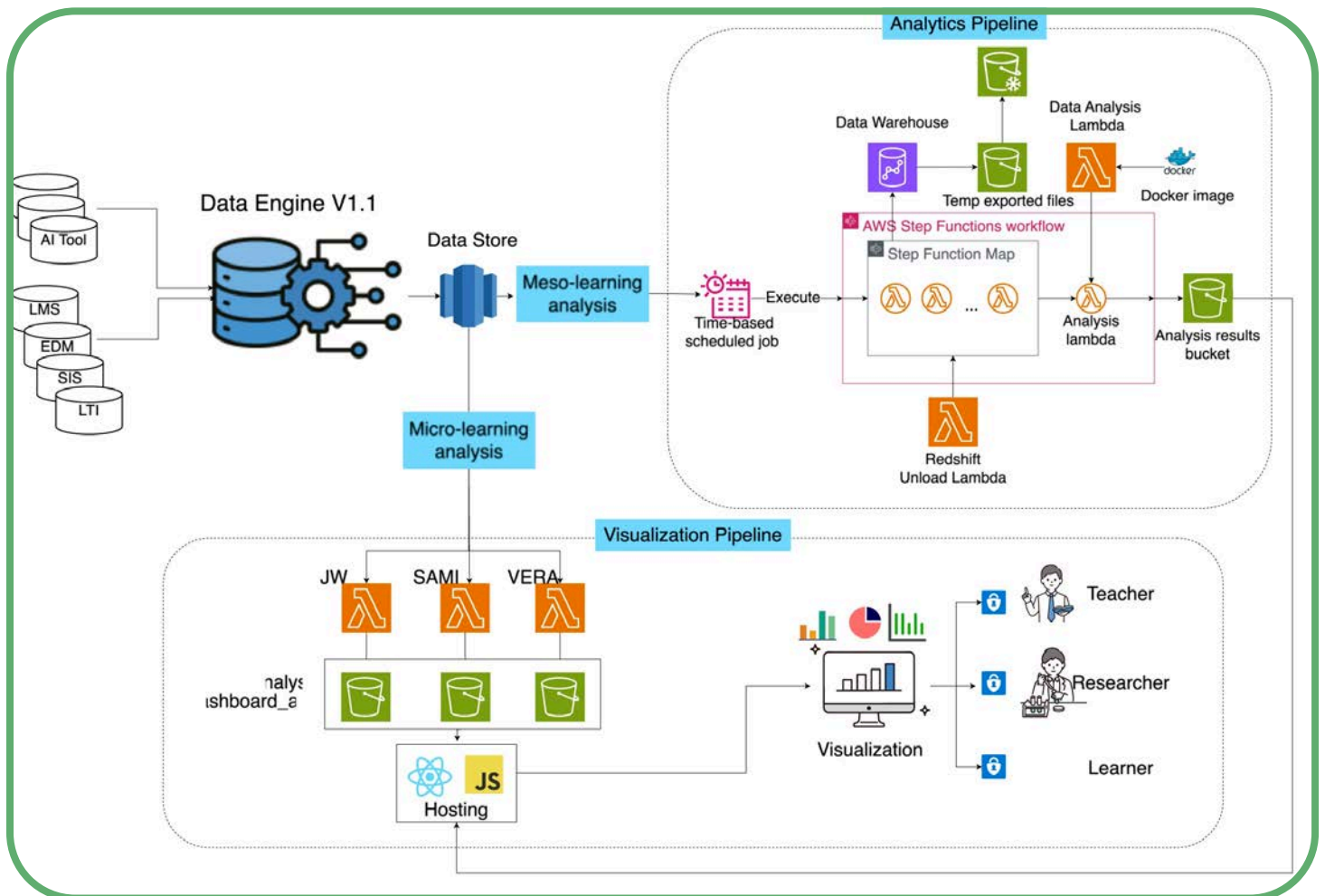


A4L Technology Infrastructure

The Architecture for Learning (A4L) project is designed to address adult learners' educational goals by supporting adaptive learning experiences through data-driven personalization. This architecture meets adult learning needs by focusing on:

- **Personalization of Learning:** Implementing statistical and personalized analyses ensures that learning paths can be tailored to individual adult learners, managing different levels of motivation and learning paces.
- **Feedback Loops:** Integrating teacher-learner feedback allows for near real-time adjustments, reinforcing engagement and enhancing learning efficiency.
- **Scalable Data Processing:** The infrastructure's design, using cloud services like AWS, ensures that data is processed efficiently, allowing for flexible scaling as the learning data grows.

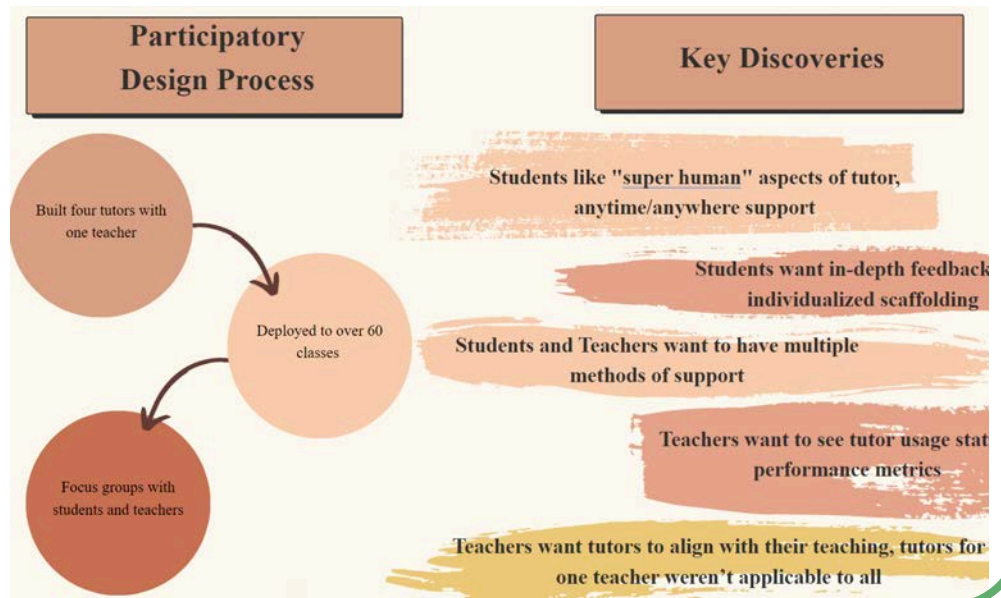
The figure below provides an overview of the A4L workflow:



Data flows from different sources (e.g., JW, SAMI, VERA, LMS, EDM etc) into the data engine, which supports analysis on micro and meso learning levels. Results feed into a visualization dashboard accessible to teachers, researchers, and learners. An educational feedback loop informs and adjusts learning strategies at various stages. This framework leverages AWS cloud-based solutions for advanced data processing supporting a robust learning ecosystem.

Apprentice Tutors

The Apprentice Tutors project aims to support adult learners by creating domain-specific tutors tailored to their educational needs. This year, we focused on improving and expanding our College Algebra tutors based on teacher and student feedback and developing tutors for Nursing, a new area that is occupationally focused.



Math Tutor Updates

- This year, we paused deployments to implement several improvements and changes, we are now testing these over Fall 2024 with deployments ramping back up starting in the Spring.
- For our testing in Fall 2024, we narrowed our deployment to those of 1-2 teaching fellows so that we can work more closely with them to evaluate the test deployment.
- Created a video introduction to enhance student onboarding.
- Backend redesigns:
 - Re-designed backend to use hierarchical task networks for model tracing (see [more details](#)).
 - Re-designed frontend user interfaces to support progressive disclosure of problem-solving steps
 - We rolled out a three condition RCT in Summer 24 to test different design choices and are currently analyzing summer and fall data.
 - We are currently redesigning front/back end again toward subproblem decomposition and more flexible scaffolding (adding radicals, scaffolds for simplifying each radical separately), target experiment for spring 25 or summer 25.
- Preliminary results from experiments with generative AI hints have been submitted to IJAIED.

Nursing Tutor Updates

- We met monthly with RN instructors to identify the tutoring needs of their students. They described both skills included in course content and skills not taught but useful for future nurses.
- We built 6 new tutoring topics based on the needs described by RN instructors.
- We presented these tutors at the RN faculty meeting and received requests for additional tutoring topics.
- Teachers are now able to embed these tutors in their classes and we expect full course integration in Spring 2025.
- We will be presenting these tutors at the RN Educational Technology conference in December.

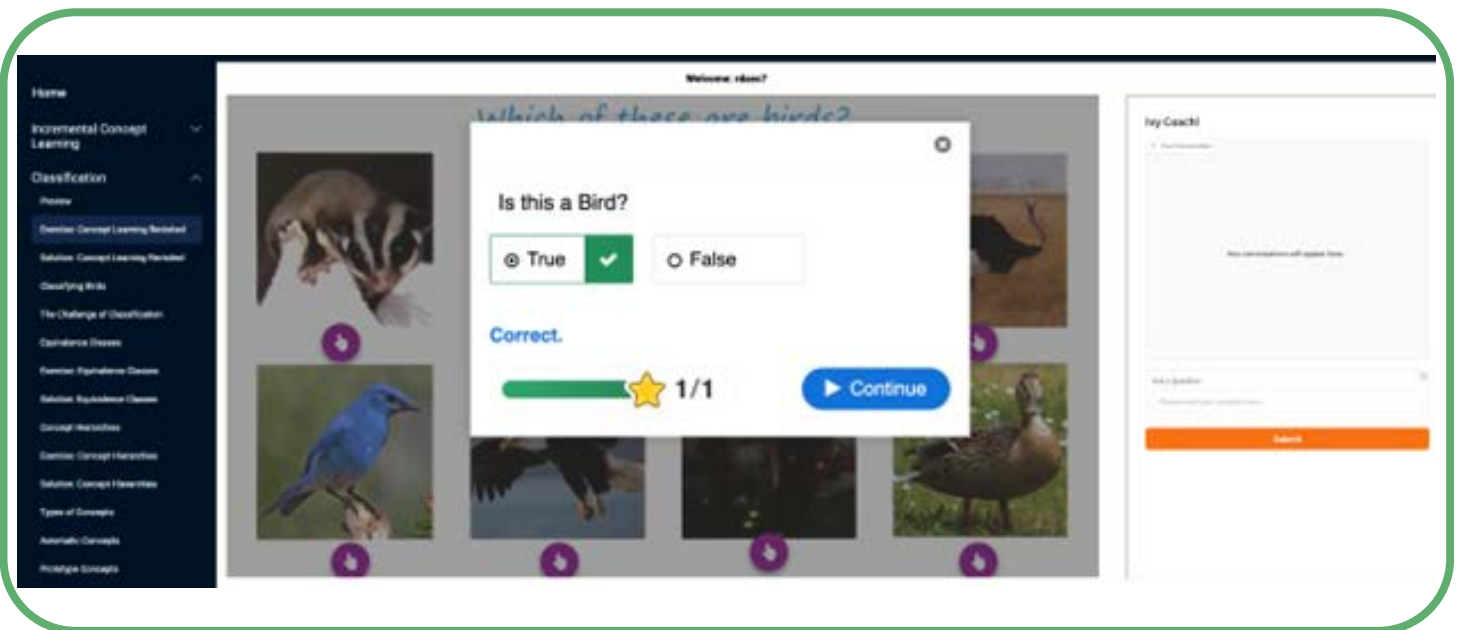
Interactive Videos (IVY)

In online learning, providing accurate and actionable feedback is essential for skill-based learning where learners must grasp both the underlying concepts and mechanisms of a skill to apply it effectively in problem-solving. Traditional tools, like instructional videos, do not assess learners' understanding of taught skills. While Generative AI models excel at information retrieving from knowledge bases, their ability to explain complex skill mechanisms remains unclear in online settings.

To address this gap, we explore the representation of procedural knowledge of skills taught in online settings using a framework called Task-Method-Knowledge (TMK). This is accomplished by organizing a skill's components and procedures into Task, Method and Knowledge modules. By leveraging generative AI methods like iterative refinement via the LangChain framework, we create and embed an intelligent coach in the interactive video or "Ivy" system in an online setting to generate dynamic, context-relevant explanations to learners' questions about taught skills.

Over this past year, we have worked on developing an Ivy production system using a cloud-based system hosted within an AWS environment. We developed a React (Next.js) application that is embedded in a Canvas sandbox. This React app embeds Youtube or Kaltura videos of the KBAI course within it and can display a chat UI alongside the video for users to ask questions to the Ivy coach (see the figure below). To make the course's quizzes interactive, we converted them into H5P videos allowing users to interact with quizzes directly in videos and obtain static feedback. The figure below shows static feedback provided to a user when submitting a response to an interactive H5P video in an online course on Canvas.

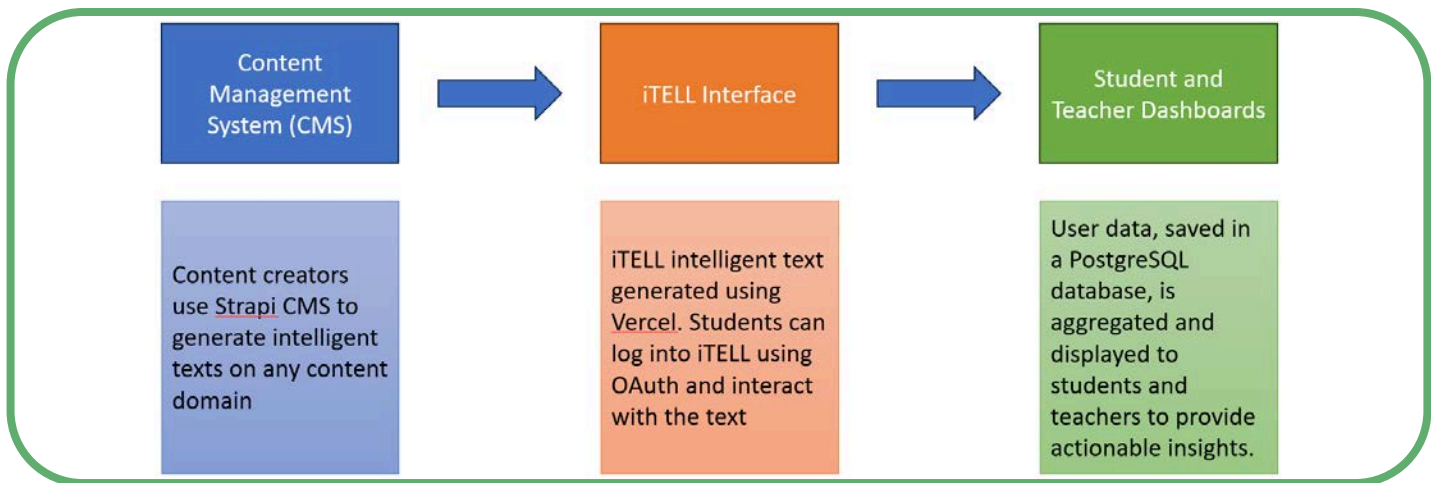
To better understand a "user's journey" as they interact with the Ivy system, we track key data such as video start/stop playback, number of quiz attempts, submitted quiz responses, and questions asked to the Ivy coach.



Intelligent Texts for Enhanced Lifelong Learning (iTELL) is a computational framework that converts any type of machine-readable text into interactive, intelligent text within a web-app. The framework includes the following AI features:

- Short constructed responses and feedback
- Summarization scoring and feedback
- Guided self-explanations
- Guided think aloud protocols
- AI guide on the side

The figure below demonstrates the iTELL user experience pipeline:



The interventions in iTELL are personalized so that learning is dynamic and situated for adult learners. For instance, the summary module is personalized such that after writing a passing summary, users can skip summaries as long as they maintain a streak of writing passing summaries. If a user writes a successful summary, the next summary is skipped. If they write two successful summaries, they skip two summaries. Additionally, if they write a summary that scores in the top 20% while they are on a streak, the users receive a congratulations message and can skip writing the next two summaries. If a user receives a “content” score for a summary submission that is below the passing threshold, STAIRS 1.0 (Strategic Thinking And Interactive Reading Support) will trigger. STAIRS 1.0 is a targeted re-reading exercise involving a self-explanation question, which provides learners with an opportunity to revisit a chunk of the page and engage more deeply with that reading via a self-explanation process. Chunk selection is personalized and is based on telemetry data that is unique to each user, including their focus time on reading chunks (chunks with lower focus time are more likely to be selected), semantic overlap between the summary and the selected chunk for re-reading (lower semantic summary indicates a higher likelihood of chunk selection for rereading), and whether they answered a CRI correctly for a chunk (that chunk will not be selected).

In 2024, iTELL was deployed to adult learners in vocational settings with a focus on community college students and students in more traditional university settings that focused on computer science, data science, or STEM related classes. The majority of the students that used iTELL were in online classes including a python programming class at Georgia Tech, a web application development class at Augusta Technical College, a management class at Wiregrass Georgia Technical College, and a research methods course at Middle Georgia University. Data was also collected from a hybrid learning analytics course at Cornell University and from a randomized control trial using crowd-sourced adult workers in the United States. The population of learners sampled were diverse in terms of geographic location, race/ethnicity, gender, and socio-economic status.

Jill Watson

Jill Watson is a conversational AI teaching assistant that answers student questions related to instructor-approved courseware, engaging students in conversations on a concept of interest. A student can ask Jill to generate a quiz on a particular topic and then provide feedback on her answers. They can also engage in a conversation regarding how to approach a project or problem at hand.

Deployment

In 2024, Jill Watson has been deployed in six classes at the Technical College System of Georgia. We are working closely with instructors in above classes to increase Jill's impact. These collaborations focus on content selection for Jill to answer student questions; instructional design and strategies to integrate Jill into the curriculum; and adding tweaks to Jill's responses to better align with instructor's wishes.

Our A/B experiments show that Jill Watson enhances the design and organization component of teaching presence measured using a Community of Inquiry instrument.

Dimension	Student's t-test		Mann-Whitney U Test		Effect Size	
	Test statistic	p-value	Test statistic	p-value	Cohen's d	CLES
Teaching presence: Design and Organization	2.05	0.0203	21975	0.0378	0.1776	0.552

In addition, students who used Jill more than 3 times in the class had higher mean scores (91.4% vs. 86.6%, $p = 0.007$), which aligns directionally with Bloom's 2-sigma hypothesis.

We also log and analyze student interactions with Jill. We observe extended conversations, and requests for feedback on their stated conceptual understanding. This interactive engagement, in line with Micki Chi's ICAP theory (Interactive, Constructive, Active, Passive) indicates that Jill encourages students to engage at a deeper cognitive level

Finally, we observe statistically higher student retention rate in the treatment section versus the control section (81% vs. 73%, $z = 2.2231$, $p = 0.0264$).

Development

- While Jill Watson is generally deployed as an LTI tool in the class LMS, it now also features a dedicated website for deployments in institutions that don't provide access to an LMS.
- To achieve full scalability, we are on track to have instructor-deployable Jill Watson ready for test deployment in Spring 2025.
- Jill now features voice capabilities – students can ask questions verbally and get Jill to respond in kind.

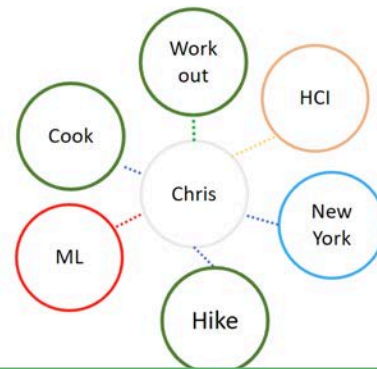
SAMI

SAMI is a virtual agent that uses artificial intelligence (AI) to enhance social connectedness in online classes: analyzing students' self-introductions posted in a class discussion forum, it encourages students to connect by suggesting matches with peers based on entities such as shared locations, interests, and academic goals.

SAMI works with Students' self-introduction posts on the class discussion forum

I live in **New York**. I am pursuing the **ML specialization** and **taking ML4T**. In my free time, I like to **work out**, **cook** and **hiking**. #connectme

Chris



SAMI infrastructure has been updated with a persistent backend database architecture. This allows SAMI to have longitudinal data on student profiles spanning multiple classes. Additionally, this architecture enables SAMI to operate more flexibly throughout the semester.

Self-explanation in SAMI is now able to answer questions that are episodic in nature, for example, "Why was I matched with [Student A]?" This is in addition to previous work on Self-explanation in SAMI that uses the Task-Model-Knowledge (TMK) framework. Additionally, SAMI Self-Explanation has been updated to work with the ChatGPT-based SAMI core.

SAMI is now able to detect personality traits from introduction posts using ChatGPT. In particular, SAMI is measuring Openness, Agreeableness, and Extraversion from the Big 5 personality traits. These personality traits are added to a student's profile and used to find better matches among students.

SAMI's matching algorithm framework is now much more flexible. The framework allows for an arbitrary number of matching criteria, as well as assigning weights to different criteria. This enables the implementation of much more sophisticated matching algorithms and personalization of matching criteria importance.

This year, SAMI has deployed in four classes in Georgia Tech's Online Master of Computer Science (OMSCS) program. We will deploy SAMI at the Technical College System of Georgia (TCSG) with 6 teaching fellows in the Spring 2025 semester and co-design an expansion of SAMI's functionality with the teaching fellows.

Meanwhile, the SAMI team is working with the Jill Watson team to mutually share data from their respective projects. To that end, the SAMI project is the test project in a collaboration between A4L and 1EdTech to build an automated data pipeline.

SMART

The SMART team has collaborated with 8 instructors: 6 from various TCSG colleges and 2 nursing instructors from Georgia State University. A total of 294 learners, enrolled in 8 different courses, benefited from SMART-integrated online learning experiences in Fall 2024. Of these instructors, 6 are first-time users of AI tools in their classrooms. The SMART team has supported these instructors in familiarizing themselves with SMART features and exploring potential integration strategies. We conducted intensive meetings at the beginning of the semester and have continued to meet regularly throughout.

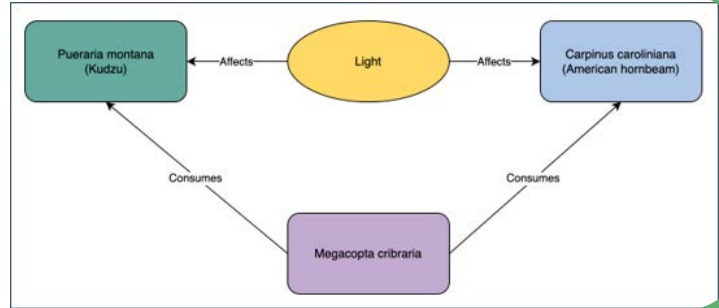
For these introductory classes, we implemented a minimum number of SMART interventions to pilot its integration, assess its implementation, and observe its effects. These findings will inform further improvements and prepare us for a full-scale deployment in Spring 2025. Additionally, we conducted quasi-experimental studies in two courses. In each course, one section received SMART-integrated concept learning, while the other completed similar assignments without AI technology.

We have developed a theory-driven research plan aligned with a whole-person perspective on adult learning, encompassing cognition, personality and temperament, and contextual factors. Guided by adult learning theory, we have defined research variables and associated measures for data collection. The table below presents the measures and variables within the three components of adult learning, along with the associated data collection tools.

Component	Measures/Variables	Data Collection Tools
C1. Cognition and Knowledge	<ul style="list-style-type: none">• SMART 11 similarity measures• Number of revision attempts• Time-on-Task• Scores for subsequent learning activities.	<ul style="list-style-type: none">• SMART• Learning Management System
C2. Personality and Temperament	<ul style="list-style-type: none">• Teaching presence (human and AI)• Self-efficacy• Motivation• Value of the AI features and curricular activities	<ul style="list-style-type: none">• Survey
C3. Contextual Affordances and Hinderances	<ul style="list-style-type: none">• Gender• Ethnicity• Age• First-time learner• Marital Status• Household size• Area of profession• Employment status• Hours per week for online learning• Reason to take the current course• Average income via ZIP code	<ul style="list-style-type: none">• Survey

VERA

VERA is an ecology based conceptual modeling platform that is able to model and simulate relationships between components. Users form what-if inquiries based on changes to the models and then simulate it to evaluate results.



Personalized Learning Studies

Last year, we conducted two A/B experiments at Georgia Tech to investigate the effects of a personalized learning (“Exploration”) coach embedded in VERA. This coach was designed to analyze learners’ modeling behaviors and provide procedural scaffolding, guiding learners through a full cycle of construction, parameterization, and simulation in inquiry-based modeling. We implemented this coach in two courses: a timed undergraduate ecology course and an untimed graduate cognitive science course.

The results indicated that in the cognitive science course, students with access to the coach developed more complex models than those without the coach. Conversely, in the ecology course, the no-coach group produced more complex models. These findings suggest that the effectiveness of AI coaches in open domains is highly context dependent. AI coaches need to be aware of the learner’s goals to be effective beyond initial scaffolding, and different stages of the learner’s journey may require different types of feedback. Based on these insights, we are developing several new AI coaches to tackle different challenges that arise in inquiry-based modeling. A central objective is to provide learners with essential support in scenarios where traditional one-on-one instruction is unfeasible, such as in self-directed learning environments. These developments will be detailed in an article for submission to the iRAISE workshop at AAAI 2025.

Self-Explanation in VERA

We explored the convergence of knowledge-based AI and generative AI to develop a self-explanation agent within VERA. The agent is designed to explain VERA’s reasoning and behaviors as learners build conceptual models of complex ecological systems and experiment with agent-based simulations of models. From the perspective of knowledge-based AI, we endowed VERA with a functional model of its own design, knowledge and reasoning using a structured framework called Task-Method-Knowledge (TMK). To generate dynamic and contextually appropriate explanations, we leveraged generative AI methods such as ChatGPT, LangChain, and Chain-of-Thought. By leveraging Generative AI methods like ChatGPT, LangChain and Chain-of-Thought, this allowed the self-explanation agent to respond effectively to users’ inquiries about VERA’s operations and methodologies. Our preliminary analysis, based on a series of explanation AI questions, confirmed that the agent can provide relevant and accurate explanations to users’ questions.

We presented our findings and highlighted the potential of combining multiple AI technologies to enhance transparency and user understanding in complex AI-driven educational tools at the Human-Centric eXplainable AI in Education (HEXED) workshop held at the 2024 Educational Data Mining Conference.

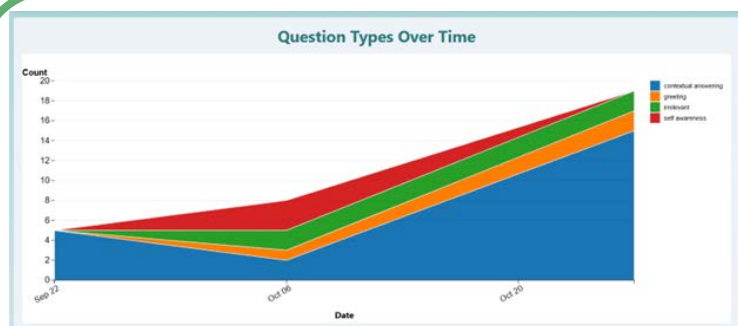
Visualization

This visualization project focuses on creating visualizations within dashboards for Jill Watson, SAMI, and VERA. The goal is to provide teachers, researchers, and adult learners with essential insights into student interactions to enhance classroom outcomes. Teachers are expected to use these insights to identify areas for curriculum or teaching adjustments. Researchers can leverage the data to make evidence-based recommendations for educational improvements, or to improve the AI tool. Furthermore, adult learners benefit from a more personalized learning experience.

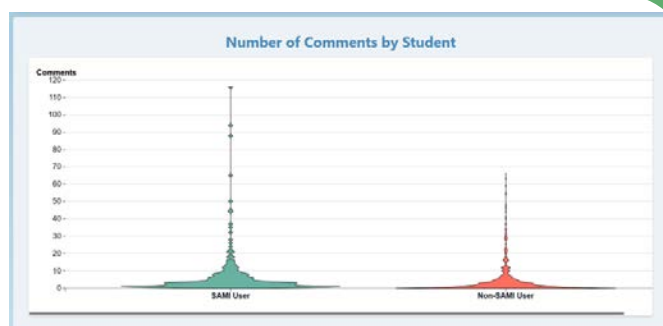
Dashboard Structure

Each dashboard (Jill Watson, SAMI, and VERA) is divided into three sections tailored for teachers, researchers, and learners. Last semester (Summer 2024), we focused on the researcher sections. This semester (Fall 2024), our primary focus is on building and refining the teacher sections. This effort is guided by feedback from pilot studies with instructors and insights from colleagues. Currently, both the teacher and researcher sections are in early iterations for Jill Watson and SAMI, while VERA has the researcher section available. These sections are dedicated to addressing specific research questions, some of which will be detailed below with accompanying visualizations.

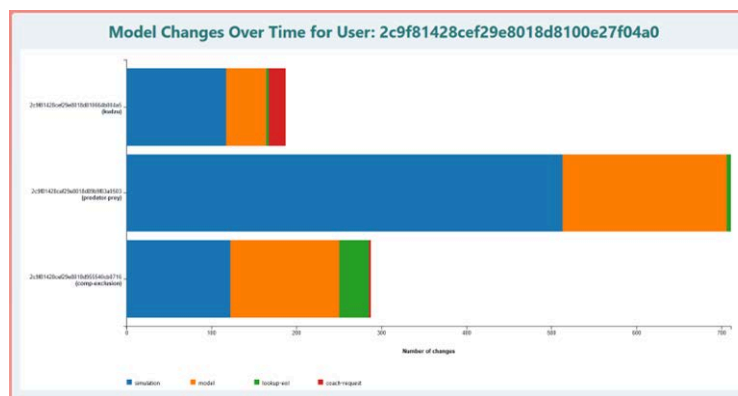
Visualization Insights



In the teacher section of the Jill Watson dashboard, we addressed the question:
How frequently do students engage with Jill Watson, and what is the skill classification of the questions?



For the SAMI teacher dashboard, we explored the question:
How does the SAMI tool correlate with student connectivity and engagement?



In the researcher section of the VERA dashboard, we examined the question:
As VERA becomes less hands-on, do students make more adjustments to their models/parameters?

User-Engaged Design

Within AI-ALOE, the team “User-Engaged Design for Human Well-Being” (UE-D) analyzes the impact of deployed AI technologies on users’ and stakeholders’ well-being through the steps defined in the IEEE Standard 7010-2020. The summary of these steps provided in the first figure below explains the major activities that the UE-D team has performed. The second figure shows the procedure and progress achieved for each AI-ALOE technology.

1 Internal Ethical Analysis	Aims at the identification of well-being indicators that are required to determine the impacts of AI technologies on well-being.
2 Stakeholder Identification & Recruitment	The process of identifying and recruiting users and stakeholders who can affect or are affected by the AI technologies.
3 Focus group meeting	We divide all focus groups into sub-groups of about five participants. The discussions are managed by a trained facilitator.
4 Data Analysis of Focus Group Meeting	We transcribe and analyze the video-recordings of all sub-group discussions.
5 Report: Well-being Impact Analysis	Includes the results of the internal ethical analysis, the stakeholder engagement, and recommendations for possible design steps to address identified negative impacts on human well-being.
6 Talk to the Technology Team	Discussing the Well-being Impact Analysis report with the technology development team. Goal: determining whether and to what degree the Well-being Impact Analysis report shaped the design of the AI technology.
7 Report Measuring User-Engaged Design Impact on Technology	Writing the final report based on an analysis of the discussion in the Well-being Impact Analysis meeting. Corresponding evidence is presented in a final report titled: “To what degree has the design of [AI technology] been shaped by the User-Engaged Design team’s Well-being Impact Analysis?”

The Procedure & Progress for Each AI Technology

		Internal Ethical Analysis	Stakeholder Identification & Recruitment	Focus group meeting	Data Analysis of Focus Group Meeting	Report Technology WIA	Talk to the Technology Team	Report Measuring PD Impact on Technology
AI-ALOE Technologies	SMART	✓	✓	✓	✓	✓	✓	✓
	ITS	✓	✓	✓	✓	✓	✓	✓
	Jill-Watson	✓	✓	✓	✓	✓	🔄	✗
	VERA	✓	✓	✓	🔄	✗	✗	✗
	SAMI	✓	✓	✓	🔄	✗	✗	✗
	A4L	✗	✗	✗	✗	✗	✗	✗
	ITELL	✗	✗	✗	✗	✗	✗	✗
	IVY	✗	✗	✗	✗	✗	✗	✗

✓ Completed

🔄 In Progress

✗ not-yet started

AI-ALOE at SAIL 2024



Day 1: Dr. Chris Dede, associate director of research, gave a talk about AI-ALOE's research, education outreach, outcomes, and future plans during the Five Education Institutes meeting. Dr. Michael Hoffmann, assistant director for program evaluation, co-led a special interest group workshop on the ethics and trustworthiness of AI.

Day 2: Dr. Min Kyu Kim, an AI-ALOE researcher and associate professor in the Department of Learning Sciences at Georgia State University's College of Education & Human Development, served on a panel discussing foundational AI research. Dr. Kim addressed the challenges of building foundational models for AI tools in personalizing adult learning and online education, and the strategic ways these challenges are addressed.

Day 3: In the morning, Dr. Aileen Reid participated in a panel discussing broadening participation in computing and AI. Dr. Michael Hoffmann was on a separate panel that engaged the audience in a discussion about ethics and trustworthy AI. In the afternoon, Dr. Chris Dede joined a panel exploring strategies for institute sustainability, wrapping up a day full of thoughtful discussions and shared learning.

Day 4 - Expo Day: The AI-ALOE team, including Suzanne Carbonaro, Blaine Helmick, Sandeep Kakar, Min Kyu Kim, Breon Martin, and Chaohua Ou, participated in the AI Institutes Expo Day. They shared how responsible AI is developed and implemented to transform education and explored opportunities for collaboration with visitors.

AI-ALOE Webinars and Conferences



AI-ALOE Webinars

AI-ALOE's webinars featured distinguished researchers, scientists, and experts in AI and education during the past quarter. These two webinars attracted more than 120 attendees.

- Oct. 23, 2024: Dr. Neil Heffernan, William Smith Dean's Professor of Computer Science and director of the Learning Sciences & Technology program at Worcester Polytechnic Institute, explored various ways the ASSISTments group is leveraging large language models (LLMs) to enhance student learning.
- Oct. 30, 2024: Peter Shea, a learning professional with extensive experience as a designer, instructor, editor, writer, and professional development manager at Middlesex Community College (Massachusetts), showcased a series of learning artifacts developed with the assistance of artificial intelligence. He also discussed how these products were created and the future of AI in collegiate-level work.

AI-ALOE at 2024 Learning @ Scale Conference



- AI-ALOE's associate director for research, Dr. Chris Dede, delivered the keynote address at the ACM Learning @ Scale 2024 conference. His talk was titled Designing a Model for Massive Digital Lifelong Learning.
- AI-ALOE researchers Chaohua Ou, Ploy Thajchayapong, and David Joyner presented a poster titled Open, Collaborative, and AI-Augmented Peer Assessment.
- Several AI-ALOE graduate students also showcased their projects during the poster session. Presentations included Karan Taneja on Jill Watson and teaching presence, Tommaso Calo on generative AI for intelligent tutors, and Sibley Lyndgaard and Utkarsh Nattamai Subramanian on intelligent tutors for adult learning at scale.

AI-ALOE in the Press

Jill Watson Showcased at UNESCO's Digital Learning Week 2024

On Sept. 4, AI-ALOE research scientist Pratyusha Maiti showcased Jill Watson during UNESCO's Digital Learning Week. The breakout session, moderated by Saurabh Roy, senior project officer for teacher development at UNESCO, focused on system-level and teacher-facing generative AI tools.

Jill Watson, a virtual teaching assistant powered by OpenAI's ChatGPT, is designed for higher education, technical/vocational training, and adult learners in online education. The presentation highlighted its ability to support self-directed learning and provide a strong teaching presence in online environments.

[Learn More](#)



Ashok Goel Featured in the Chronicle's Research Brief on AI in Education



Chronicle Intelligence, a division of *The Chronicle of Higher Education*, recently published a research brief, *Communicating with Students in the Age of AI*, featuring Professor Ashok Goel, AI-ALOE's principal investigator and executive director. Goel emphasizes AI as an opportunity to reimagine educational experiences and highlights the importance of including students' voices in shaping institutional guidelines for AI usage.

He also shares AI-ALOE's research on Jill Watson, which supports both logistical and academic student needs. The results show measurable impacts, including higher teaching presence, increased social presence, and slight improvements in student grades and retention. [Download the Report](#)

Hoffmann Named H. Bruce McEver Professor in Engineering and the Liberal Arts



Professor Michael Hoffmann, AI-ALOE's assistant director for responsible AI, has been named the H. Bruce McEver Professor in Engineering and the Liberal Arts, effective Aug. 1. As McEver Professor, Hoffmann will encourage, cultivate, and support interdisciplinary exchanges among liberal arts and engineering scholars at Georgia Tech and beyond.

Congratulations, Michael! We are proud to have you lead the User-Engaged Design for Human Well-being team at AI-ALOE.

[Learn More](#)

Collaboration & Outreach



AI and Instructional Design Outreach Workshop

On Nov. 15, AI-ALOE held its AI and Instructional Design Outreach Workshop, exploring how instructional design can transform AI in education. The event attracted 88 attendees, including instructional designers from the U.S. and abroad.

During the three-hour Zoom workshop, the institute's project teams introduced AI-ALOE's suite of technologies and detailed their applications in teaching and learning. The workshop also featured two breakout sessions, where attendees discussed and explored the educational applications of each AI technology. [Learn More](#)



AI-ALOE Welcomed 11 Teaching Fellows

We were excited to welcome 11 instructors from the Technical College System of Georgia as the institute's inaugural cohort of teaching fellows. The program began in July with an engaging meeting where the fellows were introduced to AI-ALOE technologies.

Our project teams have worked closely with the teaching fellows to identify the AI technologies that best fit the unique needs of their classes. The implementation phase then began, integrating these AI tools into their teaching environments.

This collaboration marks a significant milestone in our effort to integrate AI into education. [Meet the Teaching Fellows](#)

AI Institutes in Education: Insights from the Silver Lining for Learning Podcast



Dr. Chris Dede, Associate Director for Research at AI-ALOE, serves as one of the hosts of the [Silver Lining for Learning \(SLL\)](#) podcast, a platform dedicated to discussing the future of learning with educators, innovators, and thought leaders worldwide. Over the past two months, Dr. Dede and his SLL cohorts have spotlighted five AI institutes focused on education. Each episode, available on major podcast platforms, offers unique insights into the opportunities and challenges these institutes face, highlighting diverse perspectives from researchers and stakeholders. For those interested, archived video recordings of the episodes are also available on the [SLL website](#), providing a comprehensive look at how AI is shaping the future of education.

Researcher Spotlight



Aileen Reid

Dr. Aileen Reid is an Assistant Professor of Educational Research Methodology in the Information, Library and Research Sciences department and Senior Fellow in the Office of Assessment, Evaluation, and Research Services (OAERS) in the UNC Greensboro School of Education. Aileen has expertise in culturally responsive, STEM and mixed methods research and evaluation, educational measurement and assessment, and organizational change. Dr. Reid co-directs the STEM Program Evaluation Lab (SPEL) which provides training in research and evaluation for graduate and undergraduate students on STEM education projects. Dr. Reid is the principal/co-principal/co-investigator of four grants funded by NSF and the National Institutes of Health and the external evaluator for six National Science Foundation (NSF) funded projects including AI-ALOE.

Aileen serves on the AI-ALOE leadership team as the Assistant Director of Program Evaluation, where she works with the leadership to integrate formative and summative evaluation into the general operation of the project to guide with planning, decision-making, and provide recommendations for project improvement. Evaluation questions are focused on project theory, implementation, effectiveness, outcomes, impact, and sustainability of the ALOE institute.

Dr. Reid utilizes a mixed-methods approach (qualitative and quantitative methodology), as well as informal reporting, including regular communication and critical feedback to ALOE project stakeholders, and reviews of AI-ALOE activities and service delivery. Evaluation reports, including “just in time” feedback aid in monitoring project implementation and reporting on progress, challenges, and slippage.

Aileen’s work with the AI-ALOE team has led to several invited presentations, including the 2024 Summit for AI Institutes Leadership where she presented a culturally responsive framework for broadening participation in computing and the 2024 American Evaluation Association plenary on the use of generative-AI in evaluation practices.

Aileen’s research investigates inequities in outcomes among underrepresented and minoritized groups, specifically how the intersection of identities and practice impact engagement and responsiveness to varying contexts and cultures. She also investigates values-engaged teaching, learning, and mentorship in research and evaluation. This work is centered on social justice, access, diversity, equity, and inclusion and challenges researchers and practitioners to look at our own cultural location as well as key dimensions of practice to incite change (e.g., context, relationships, validity, methodology, and design). Aileen believes that evaluators should exercise our social and political responsibility through courageous leadership and advocacy to attend to the values of stakeholders and to advance an equitable AI world.



Student Highlight



Sibley Lyngaard

Sibley Lyngaard is an Industrial-Organizational Psychology Ph.D. student at Georgia Tech and works closely with Dr. Ruth Kanfer as a member of the [PARK Lab](#). Her work takes a person-centered approach to study lifelong learning processes, especially those related to work and career development. Previously held research positions in industry have spanned projects related to assessment, training, organizational culture, and the future of work.

What are your main research interests and how did you become interested in your field?

My primary research interests include equitable 21st century workforce development, impacts of technology on adult learning, and the dynamics of learning throughout the lifespan, including the impact of individual differences in ability and non-ability traits on learning processes and outcomes. Work is such a central part of our lives, and increasingly, having sustainable employment requires continuous learning - but getting access to these learning opportunities can be difficult. My research interests developed out of an appreciation for all the intersecting variables- psychological, interpersonal, environmental, contextual-that impact people's ability to pursue meaningful and sustainable careers.

What exciting projects are you working on at AI-ALOE?

Currently, I am working on a project aimed at centralizing ALOE's survey data collection. Our goal is to achieve a more systematic understanding of ALOE's population of adult learners, including differences in their learning needs and challenges and how their learning experiences are shaped by interactions with ALOE technology. To date these questions have been explored separately across teams - centralizing measurement will help track the collective impact of ALOE research, and more easily synthesize findings across teams.

What skills or experiences from your time at AI-ALOE do you think will be most valuable for your future career?

After graduate school, I am interested in working in applied research related to workforce development. This is a highly interdisciplinary field, and so my experiences in ALOE working with experts in fields as wide ranging as computer science, ethics, policy, and technical/vocational education will be hugely valuable in helping me translate and apply psychological research to cross-cutting project areas.

What's a hobby or activity you enjoy when you're not immersed in research?

I am a big reader and love thrift stores, so I always enjoy finding secondhand book stores whenever I'm in a new city (or going back to my favorites in Atlanta!).

What's something surprising or fun about you that most people wouldn't know?

I attended the (at the time) only public high school in the U.S. that had a cirque performance troupe in its theatre department. I was a part of this group for three years, and specialized in aerial performance including silks and static trapeze!

Student Highlight



Glen Smith

Glen Smith is an Interactive Computing Ph.D. student at Georgia Tech and works with Dr. Christopher MacLellan as a member of the Teachable Artificial Intelligence Lab (TAIL). His research sits at the intersection of human-computer interaction, machine learning, and cognitive science, where his focus is on designing teachable planning agents that learn tasks from humans in a multi-modal and incremental way. This includes work that looks at how best to facilitate effective/efficient human-AI knowledge transfer using demonstrations, correctness feedback, verbal/text instruction, etc. His work has wide-reaching applications and has been explored in the space of intelligent tutoring systems and human-machine teaming in video games. He has worked in multi-disciplinary teams in partnership with Carnegie Mellon University, Stanford University, UC San Diego, Army Research Laboratory, and more.

What are your main research interests and how did you become interested in your field?

My research focuses on developing teachable AI systems that can learn incrementally from humans through demonstrations, feedback, and natural interactions. I had various interests in computing before this point, including game design, database administration, data science, and natural language processing. When applying for Ph.D. programs, I spoke with my current advisor about work in bias mitigation in language-based tools for populations with dialectic variances. Although my current work deviates from that, I am able to introduce anti-bias measures in all of my research since much of it focuses on human participation.

What exciting projects are you working on at AI-ALOE?

I am working on an exciting platform called Apprentice Tutor Builder that empowers teachers to create their own custom intelligent tutors for their classrooms. The platform addresses key scalability, curriculum alignment, and other personalization challenges in educational technology by putting tutor creation directly in teachers' hands. What makes this particularly powerful is our use of teachable AI agents based on Hierarchical Task Networks (HTNs). Instructors can teach these AI agents how to solve problems through various interactions like demonstrations and feedback, which then allows the agents to provide personalized help to students.

What skills or experiences from your time at AI-ALOE do you think will be most valuable for your future career?

AI-ALOE has been great at fostering a truly interdisciplinary environment with strong participation from diverse teams and stakeholders such as NSF review board members, prominent

faculty and labs, and industry leaders. I think that through program reviews and technology presentations, I have gained expertise in effectively communicating complex AI concepts to different audiences - from technical peers to educational stakeholders. Additionally, working on systems that combine AI with adult online learning has strengthened my ability to translate research into practical educational solutions which are skills that will be invaluable whether I pursue academia or industry roles in the future.

What's a hobby or activity you enjoy when you're not immersed in research?

Yes! I love to drive and the outdoors, so I often go hiking with a group here in Atlanta. I often like to hang out and catch up with friends, but I am not afraid to go out on an adventure alone either. This includes a solo trip to a restaurant, movie theater, arcade, shopping center, bowling alley, you name it! On quieter days, I might spend time at home watching television or thinking about new art to purchase for my living room wall.

What's something surprising or fun about you that most people wouldn't know?

I actually only just started driving recently in life. In fact, I only just got a license last year! I had previously lived in metropolitan areas that did not require a car due to there being adequate public transportation. I would ride bikes and public scooters until I decided to purchase a scooter of my own (one you would definitely need a helmet for – it went over 40mph!). Now I am an avid driver and will find any excuse to take a small road trip for even the most basic things. I have already taken a few 12-hour drives from Atlanta to D.C. and Philadelphia just to visit friends!

Select Recent Publications (1)

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