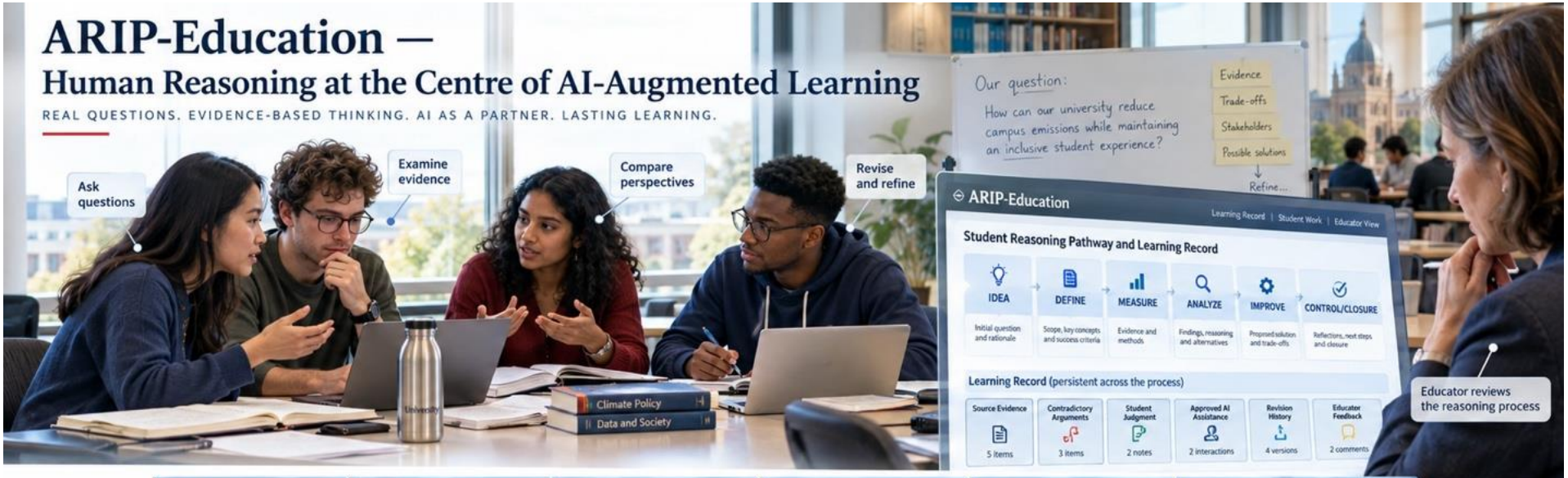

ARIP-E | Developing the Next Generation of Critical Thinkers
INQUIRY • EVIDENCE • ANALYSIS • ALTERNATIVES • JUDGMENT • REAL-WORLD IMPACT
PEOPLE
IDEAS
EVIDENCE
BETTER
SOCIETIES
REAL-WORLD PROBLEMS. REAL PEOPLE. BRIGHTER SOLUTIONS.
IDEAS TODAY. BRIGHTER TOMORROWS.
CURIOSITY
PRIOR KNOWLEDGE
STAKEHOLDERS
SCOPE
KEY QUESTIONS
CONSTRAINTS
DATA
EVIDENCE
CREDIBILITY
PATTERNS
CONTRADICTIONS
ALTERNATIVE VIEWS
ITERATE
TEST ARGUMENTS
STRENGTHEN SOLUTIONS
DECISION
EVIDENCE-BASED
REAL-WORLD IMPACT
1 IDEA
A question, observation or real-world challenge.
2 DEFINE
Frame the problem and set clear questions.
3 MEASURE
Gather and assess evidence from diverse sources.
4 ANALYZE
Examine, compare and evaluate explanations.
5 IMPROVE
Test solutions, weigh trade-offs and iterate.
6 CONTROL / CLOSURE
Make an informed decision and accountable conclusion.
REAL QUESTIONS. REAL IMPACT.
CLIMATE SOLUTIONS
PUBLIC HEALTH
SUSTAINABLE CITIES
GLOBAL EQUITY
AI-ASSISTED ANALYTICAL INTERFACE (SUPPORTING, NOT REPLACING)
ARIP-AI ASSISTANT
Ideas and evidence
Explore options
Tailored to your context
SUGGESTS QUESTIONS
What do we know?
What else should we consider?
What evidence would be most useful?
FINDS EVIDENCE
Trusted sources
Data and cases
Credibility indicators
OFFERS PERSPECTIVES
Alternative viewpoints
Potential trade-offs
Related case studies
HUMAN REASONING AT THE CENTRE
DEEPER LEARNING
STRONGER COMMUNITIES
REAL-WORLD SOLUTIONS
A MORE EQUITABLE FUTURE
From Idea to Informed Decision — Human-Led. AI-Augmented. Evidence-Governed.

ARIP-Education —

Human Reasoning at the Centre of AI-Augmented Learning

REAL QUESTIONS. EVIDENCE-BASED THINKING. AI AS A PARTNER. LASTING LEARNING.



A GOVERNED REASONING PATHWAY

IDEA — Identify a question or opportunity

DEFINE — Clarify scope, concepts and criteria

MEASURE — Gather and assess evidence

ANALYZE — Interpret findings, weigh alternatives

IMPROVE — Develop and justify proposals

CONTROL/CLOSURE — Evaluate outcomes, reflect and close

A PERSISTENT LEARNING RECORD (ACROSS ALL STAGES)

Learning Record — evidence, reasoning, contributions and feedback persist across the entire process

Source Evidence



IPCC (2023)
Summary for Policymakers

Credible source

Contradictory Arguments

"May be too costly in the short term."

"Could create unintended equity impacts."

Counterarguments

Student Judgment

Our view:
The benefits outweigh the costs if implementation is phased and inclusive.

Reasoned judgment

Approved AI Assistance

Used to summarize 5 articles and compare policy options. Verified key points and added our own analysis.

Approved use

Revision History

v4	Refined analysis	Apr 22
v3	Added counterarguments	Apr 20
v2	Revised measure plan	Apr 18
v1	Initial proposal	Apr 15

Track changes

Educator Feedback

Thoughtful analysis and good use of evidence. Consider the long-term equity implications further.

Educator comment

Human judgment, not automated grading

Students do the reasoning with AI as a trusted tool.

A governed process builds better thinking.

A persistent learning record supports transparency and growth.

Educators provide guidance, context and human judgment.

STUDY SNAPSHOT
Key details of the study

Institution
University of Toronto Mississauga

Year
2025

Course context
First-year undergraduate management course

Study design
Experimental comparison: traditional group case study activities vs. AI-supported case analysis

COMPARISON
Two learning workflows examined in the study

Compared learning workflows

Traditional group case-study activity
- Students discuss and interpret the case together
- Collaborative knowledge construction
- No generative AI support

AI-supported case analysis
- Students use generative AI during case analysis
- Faster information retrieval
- Different collaboration pattern

REPORTED EFFECTS
Key outcomes reported in the study

Information retrieval
Faster
AI-assisted students retrieved information more quickly.

Peer discussion
Reduced
Less peer discussion than in the traditional group condition.

Average performance
Lower
Average performance was lower than the control group.

CLASSROOM OBSERVATIONS
Observed changes in student behaviour

Observed behavioural shift
Post-experiment surveys and classroom observations suggested that AI use shifted student behaviour toward information consumption rather than collaborative knowledge construction.

Collaborative knowledge construction → **Information consumption**

IMPLICATION FOR EDUCATION
What this means for teaching and learning

Why this matters
The reported issue is not simply whether students use AI, but how AI is incorporated into learning. Unstructured use may reduce discussion and weaken deeper engagement, even when it speeds information retrieval.

Implication for ARIP Education
Human reasoning, evidence judgment and intellectual participation should remain visible and assessable.

Summary of reported findings from the study abstract and related presentation materials.

Source: Cherki El Idrissi, S. (2025). AMCIS 2025 Proceedings.

Concept use case • Draft for discusssion • SWICH

ARIP-E Institutional Deployment and Reasoning Governance Architecture

Institutional Actors

People who use, oversee and support ARIP-E

Student

Investigates questions, engages with evidence, uses approved AI, develops and defends reasoned conclusions.



Educator / Assessor

Guides inquiry, reviews reasoning record, provides feedback and makes assessment decisions.



Institution / Administrator

Configures courses, manages access, ensures responsible use and oversees institutional deployment.



ARIP-E Learning Environment

Education-specific application layer built on ARIP Core

Assignment Configuration — Learning objectives | Evaluation criteria | Approved AI tools | Evidence requirements | Submission settings

IDEA → Explore the question, context and initial ideas

DEFINE → Clarify scope, hypotheses and evaluation criteria

MEASURE → Gather and assess evidence from multiple sources

ANALYZE → Examine evidence, test contradictions and evaluate alternatives

IMPROVE → Refine analysis, incorporate feedback and strengthen reasoning

CONTROL / CLOSURE → Finalize conclusion, document decisions and submit

- **Evidence Registry** — Source material and reference management
- **Contradictions & Counterarguments** — Document and test alternative explanations
- **AI Contribution Provenance** — Track and label AI assistance
- **Revision History** — Track changes and rationale over time
- **Educator Review** — Feedback, questions and assessment decisions

Outputs

- Student reasoning record
- Educator feedback and assessment
- Exportable record for institutional use

ARIP Core Platform

Shared foundation across all ARIP domains (SIM, P3, E, HP²)

- **Governed Object Model** — Structured data for ideas, evidence, analyses, decisions and outcomes
- **Authenticated Actor Actions** — Secure, role-based access and complete audit trail
- **Append-Only Event Ledger** — Immutable record of all key actions and changes
- **Source Traceability** — Links to original sources and versioned content
- **Role-Based Permissions** — Student, educator, administrator and system roles
- **Approved AI Integration Interfaces** — Institution-approved AI providers and usage controls

Persistent Learning Layer (ULA-Oriented)

Institutional learning records across assignments and courses (separately enabled where required)

- **Aggregated Learning Records** — Completed assignments and reasoning records over time
- **Analysis and Reporting** — Support program review, curriculum development and learning research
- **Institutional Insights** — De-identified analysis to inform teaching and learning (subject to policy and approvals)

External Interfaces

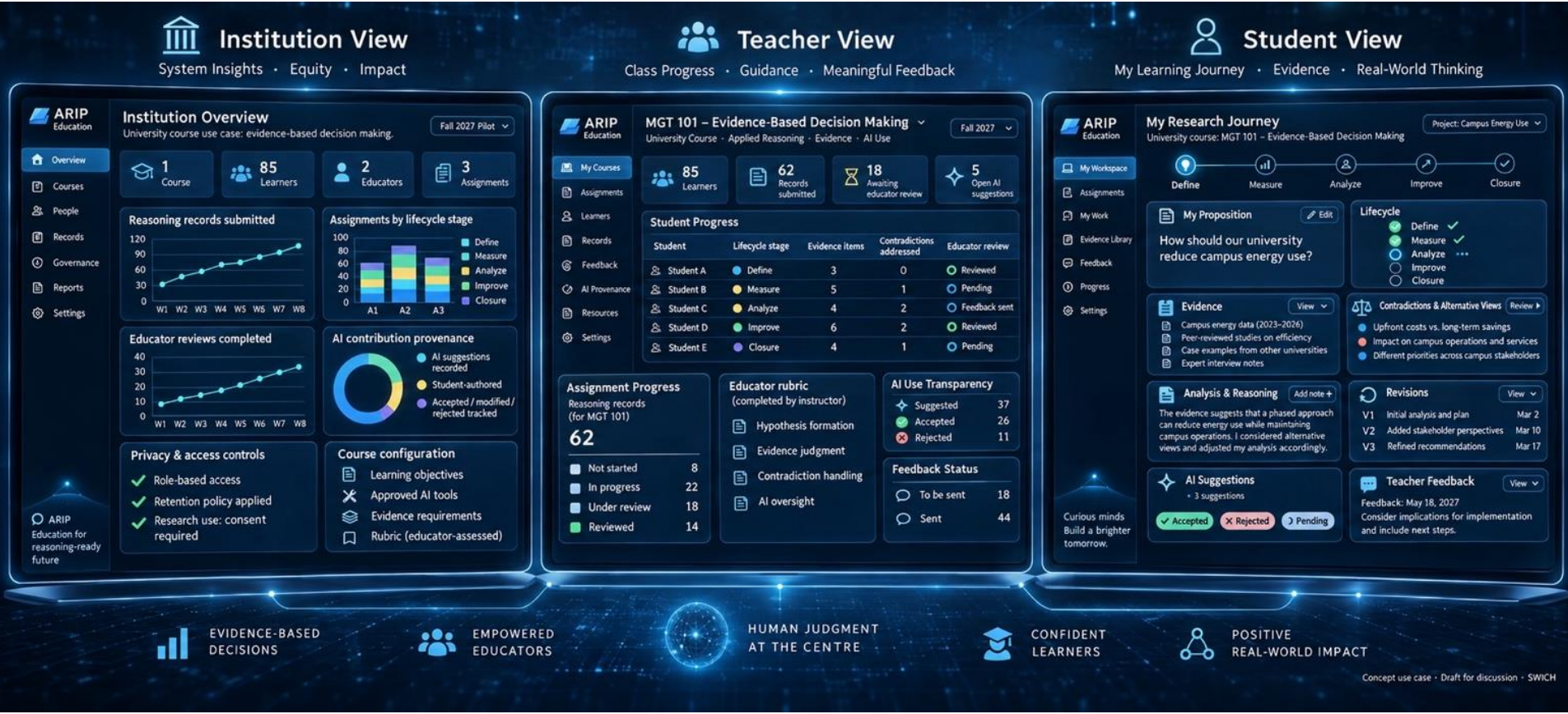
Institutional systems and approved services

- **Institution-Approved AI Providers** — e.g., Microsoft Azure OpenAI, other approved tools
- **Institutional Identity Systems** — e.g., Microsoft Entra ID (single sign-on)
- **Learning Management Systems** — e.g., Canvas, Brightspace, Moodle (LTI integration)
- **Permitted Evidence Sources** — e.g., academic databases, government publications, internal resources

ARIP-E education-specific functions

Inherited ARIP Core functions

Separately enabled capability


Institution View
System Insights · Equity · Impact
Teacher View
Class Progress · Guidance · Meaningful Feedback
Student View
My Learning Journey · Evidence · Real-World Thinking
ARIP Education
Institution Overview
University course use case: evidence-based decision making.
Fall 2027 Pilot
Overview
Courses
People
Records
Governance
Reports
Settings
1 Course
85 Learners
2 Educators
3 Assignments
Reasoning records submitted
Assignments by lifecycle stage
Define
Measure
Analyze
Improve
Closure
Educator reviews completed
AI contribution provenance
AI suggestions recorded
Student-authored
Accepted / modified / rejected tracked
Privacy & access controls
Role-based access
Retention policy applied
Research use: consent required
Course configuration
Learning objectives
Approved AI tools
Evidence requirements
Rubric (educator-assessed)
ARIP Education for reasoning-ready future
MGT 101 – Evidence-Based Decision Making
University Course · Applied Reasoning · Evidence · AI Use
Fall 2027
My Courses
Assignments
Learners
Records
Feedback
AI Provenance
Resources
Settings
85 Learners
62 Records submitted
18 Awaiting educator review
5 Open AI suggestions
Student Progress
Student
Lifecycle stage
Evidence items
Contradictions addressed
Educator review
Student A
Define
3
0
Reviewed
Student B
Measure
5
1
Pending
Student C
Analyze
4
2
Feedback sent
Student D
Improve
6
2
Reviewed
Student E
Closure
4
1
Pending
Assignment Progress
Reasoning records (for MGT 101)
62
Not started 8
In progress 22
Under review 18
Reviewed 14
Educator rubric
(completed by instructor)
Hypothesis formation
Evidence judgment
Contradiction handling
AI oversight
AI Use Transparency
Suggested 37
Accepted 26
Rejected 11
Feedback Status
To be sent 18
Sent 44
ARIP Education
My Research Journey
University course: MGT 101 – Evidence-Based Decision Making
Project: Campus Energy Use
My Workspace
Assignments
My Work
Evidence Library
Feedback
Progress
Settings
Define
Measure
Analyze
Improve
Closure
My Proposition
Edit
How should our university reduce campus energy use?
Lifecycle
Define
Measure
Analyze
Improve
Closure
Evidence
View
Campus energy data (2023–2026)
Peer-reviewed studies on efficiency
Case examples from other universities
Expert interview notes
Contradictions & Alternative Views
Review
Upfront costs vs. long-term savings
Impact on campus operations and services
Different priorities across campus stakeholders
Analysis & Reasoning
Add note +
The evidence suggests that a phased approach can reduce energy use while maintaining campus operations. I considered alternative views and adjusted my analysis accordingly.
Revisions
View
V1 Initial analysis and plan Mar 2
V2 Added stakeholder perspectives Mar 10
V3 Refined recommendations Mar 17
AI Suggestions
• 3 suggestions
Accepted
Rejected
Pending
Teacher Feedback
View
Feedback: May 18, 2027
Consider implications for implementation and include next steps.
Curious minds Build a brighter tomorrow.
EVIDENCE-BASED DECISIONS
EMPOWERED EDUCATORS
HUMAN JUDGMENT AT THE CENTRE
CONFIDENT LEARNERS
POSITIVE REAL-WORLD IMPACT
Concept use case · Draft for discussion · SWICH

The ARIP-E Reasoning and Learning Lifecycle

A structured, evidence-governed process to help students develop, document and improve their reasoning.

Human judgment at the centre. AI as a governed assistant.



Student

Investigates the question, analyses evidence, tests ideas and develops a reasoned conclusion.



Educator / Assessor

Provides guidance, reviews the reasoning process, asks questions and gives feedback.



Collaborative Learning

Students can work individually or in teams, with a transparent record of contributions and feedback.

Reasoning Lifecycle

From assignment to supported and documented conclusion.

1 IDEA / ASSIGNMENT

Frame the question

- Understand the problem
- Define context and scope
- Identify initial ideas and hypotheses

2 DEFINE

Clarify the analysis

- Refine the question
- Define key terms and criteria
- Plan evidence and methods
- Identify assumptions

3 MEASURE

Examine evidence

- Gather and assess evidence
- Evaluate source quality
- Organize and document findings

4 ANALYZE

Assess and challenge

- Analyze evidence
- Test assumptions
- Consider contradictions and alternative explanations
- Evaluate uncertainty

5 IMPROVE

Revise or retain

- Refine analysis
- Incorporate feedback
- Address new evidence
- Strengthen reasoning

6 CONTROL / CLOSURE

Conclude and explain

- Summarize findings
- State conclusion and rationale
- Document limitations
- Submit for review

AI Assistance (and provenance)

Approved AI tools support, but do not replace, student reasoning.

- **Idea generation and exploration** — Brainstorming, alternative perspectives
- **Information retrieval and summarization** — Find relevant information, summarize sources
- **Data analysis support** — Organize and analyze data, identify patterns
- **Contradiction analysis** — Highlight alternative explanations and counter-arguments
- **Revision support** — Suggest improvements, check consistency, identify gaps
- **Output documentation** — Help structure and format submissions (with source attribution)

All AI contributions are tracked and labeled with provenance in the analytical record.

Educator Supervision

Guidance, feedback and assessment based on the documented process.

- **Initial guidance** — Discuss scope, criteria and expectations
- **Check-in and questions** — Prompt deeper analysis and alternative perspectives
- **Formative feedback** — Comments on evidence, reasoning and assumptions
- **Review revisions** — Guide further improvement where needed
- **Final review** — Assess the reasoning process, conclusion and communication

Persistent Learning and Reflection

Completed assignments inform future learning (across courses if enabled).

- **Completed analytical records** — All inputs, AI contributions, revisions and feedback are retained.
- **Analysis and reflection** — Identify patterns in strengths, challenges and learning progress (over time).
- **Support future assignments and learning goals** — Prior work can be referenced to inform new analysis and skill development.

- Unified Learning Architecture (ULA) and related capabilities may be enabled separately where appropriate. ULA is not a required final stage of the analytical lifecycle.

ARIP Education

Pilot Measurement Framework

Planned measures for a bounded ARIP-Education pilot: reasoning visibility, educator value and governance readiness

PILOT DESIGN

Define a focused, ethical and measurable pilot with clear outcomes and safeguards

Scope
- One course
- 25–100 students
- 2–4 governed assignments

Comparison
- Where feasible, compare conventional workflow vs. ARIP-supported workflow

Primary outcomes
- Instructor usefulness
- Student engagement
- Reasoning visibility
- Completion burden
- Usability

Secondary outcomes
- Evidence handling
- Contradiction response
- Revision behaviour
- Academic-integrity observations

Validation
- Compare ARIP indicators with independent educator ratings
- Do not treat indicators as validated until agreement and outcome evidence are established

Governance
- Privacy review
- Ethics review
- Academic-integrity review before launch

PILOT EXECUTION

Implement the pilot through a governed, structured workflow

Course setup — Rubrics, permissions, policies → **Governed assignments** — 2–4 tasks inside ARIP → **Student reasoning activity** — Ideas, evidence, contradiction review, revision → **Teacher review & assessment** — Provenance-aware educator assessment → **Pilot evaluation** — Compare outcomes, identify lessons

STUDENT ACTIVITY

How students engage inside the governed workflow

Planned measures

Assignment completion rate	To be measured
Evidence submissions	To be measured
AI accept / reject / edit trail	To be measured
Contradictions reviewed	To be measured
Revision count	To be measured
Time-on-task / usability feedback	To be measured

TEACHER ASSESSMENT

How educators inspect and judge reasoning quality

Educator rubric dimensions (scored by instructors)

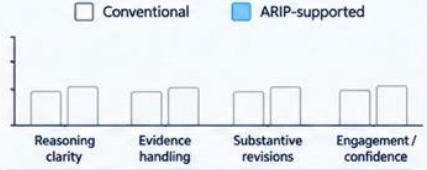
Reasoning visibility
Quality of evidence judgment
Contradiction handling
Revision quality
Closure quality
Instructor usefulness rating

Inter-rater agreement and review time per assignment will be recorded.

LEARNING OUTCOMES

What changes in student work and learning quality

Planned comparison (where feasible)



Blinded or independent review of initial and final reasoning exercises, where feasible.

GOVERNANCE REVIEW

Institutional readiness, compliance and responsible deployment

Illustrative checklist

☐ Privacy and retention compliance	Before launch
☐ Auditability / provenance completeness	Before launch
☐ Ethics considerations	Before launch
☐ Academic-integrity observations	Before launch
☐ Role / permission controls	Before launch

Controls to be confirmed with the institution before launch.

SYNTHESIS & GO / NO-GO REVIEW

Integrate findings across domains and determine next steps

Usability findings — What worked and what needs improvement → **Educator value** — Instructor benefits and remaining challenges → **Student behaviour insights** — Patterns, gains and unintended effects → **Governance readiness** — Compliance, risks and mitigations → **Pilot Review Outcome**

- ○ Refine and expand
- ○ Validate further
- ○ Do not scale until issues resolved

ARIP-generated indicators should be treated as exploratory until validated against independent educator judgment and observed outcomes.

Evidence-based review | Accountability