

PROGRESS: 85%

SESSION ID: EDU-904



LEARNING COURSE



ANALYTICS TOOLS



RESOURCES



COLLABORATE



AI ASSIST

The Art and Science of Learning Analytics

Navigating the future of education with data as our compass and AI as our co-pilot.

DATA FEED



The Car Dashboard

Prevents you from running out of gas or speeding blindly. It measures real-time performance to keep the journey safe.



The Educator's Dashboard

Prevents students from falling behind unnoticed. It measures engagement, comprehension, and progress to keep the learning journey on track.

Just as telemetry ensures a safe drive, Learning Analytics ensures a supported learner.

Defining the Engine of Learning Analytics

Engine Schematic

Measurement & Collection:

Gathering multi-modal data from learner environments.



Analysis & Interpretation:

Using data science, theory, and design to find patterns.

Learning analytics is the collection, analysis, interpretation and communication of data about learners and their learning that provides theoretically relevant and actionable insights to enhance learning and teaching. (SoLAR, 2025)

Actionable Insights:

Closing the loop to enhance learning, teaching, and wellbeing.



Communication:

Visualizing insights through dashboards and data storytelling.



The Fuel: Refining Clicks into Constructs

Phase 1
Raw Telemetry

Phase 2
The Refinery

Phase 3
High-Level Constructs



The Four Gears of Analytics



Descriptive Analytics (1st Gear)

Analyzing past actions, course feedback, and historical trends.

Diagnostic Analytics (2nd Gear)

Identifying major factors affecting performance (e.g., preparation time).

Predictive Analytics (3rd Gear)

Using historical patterns to forecast future performance and behavior.

Prescriptive Analytics (4th Gear)

Combining descriptive and predictive data to propose recommended interventions.

The Educational Weather Forecast

We cannot control the storm, but we can predict who needs an umbrella.

The Radar (Predictive)

Identifying patterns.

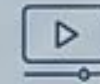
Data indicates a 70% probability that students missing the week 3 quiz will struggle with the midterm.



The Alert (Prescriptive)

Targeted interventions.

Automatically routing supplementary visual media to students identified as struggling with text-heavy modules.



The Outcome

Shifting from reactive grading to proactive support.



The Open Road: Supercharging the Educational Journey

Predicting & Supporting Behavior



Understanding study habits to offer timely, gentle positive reinforcement or constructive criticism before a student fails.

Personalizing Learning Paths



Identifying visual vs. auditory preferences and automatically assigning the right difficulty level to keep students in the optimal zone of proximal development.

Reducing the Cost of Trial & Error



A/B testing teaching methods (e.g., video lessons vs. textbook excerpts) on sample groups to optimize institutional investments in new EdTech.



Warning Lights: System Maintenance Required



Data Security & Privacy

Risk: Mishandling sensitive, personally identifiable information.

Fix: Mandating encrypted servers, secure software, and explicit guardian consent.



The Analytical Skill Gap

Risk: Dashboards only present charts; interpreting them requires time and data literacy that educators may lack.

Fix: Leveraging AI adaptive platforms or dedicated institutional analysts.



Expensive Infrastructure

Risk: Large-scale longitudinal tracking requires massive, costly, and easily accessible cloud or local storage solutions.

Diagnostic Matrix: Power vs. Friction

POWER

Real-time prediction of at-risk students and targeted interventions.

Reduces institutional cost of trial-and-error for new teaching methods.


Maps exact student needs (e.g., visual vs. text) for tailored feedback.



Performance



Infrastructure



Personalization

FRICTION

High burden on educator time and analytical skill to interpret raw trends.

Requires expensive, secure, large-scale data storage systems.

Raises complex data privacy, ownership, and consent hurdles.

The Driver's Seat: Empowering Student Agency

Shifting students from quantified data objects to qualified and qualifying selves.



Customizable

Allowing learners to choose how data is displayed (e.g., toggling peer comparison on/off based on personal anxiety/motivation).



Foreground Sense-Making

Revealing the provenance of the data so students understand why a metric looks the way it does.

Data Visibility

- Full Access
- Essential
- Minimal

Peer Comparison

- Enabled
- Limited
- Disabled

Progress Tracking

- Active
- Paused
- Hidden

Pacing

Self-Paced | Guided | Intensive

Agency Level

85%

Focus Areas

Broad | Balanced | Specific



Actionable Insights

Providing clear pathways to improve, rather than just delivering a static grade or "at-risk" label.



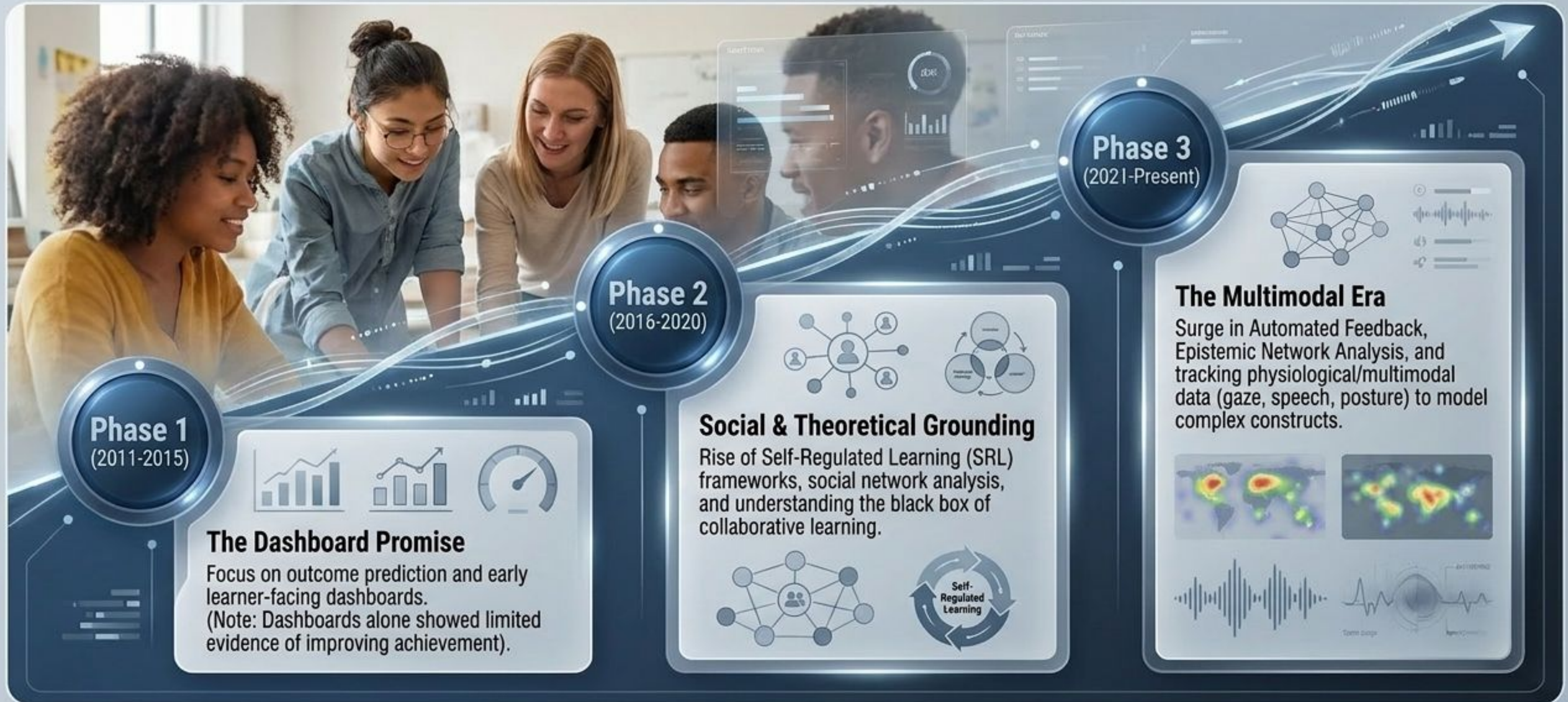
Contextual

Framing data within the specific design and requirements of their unique academic program.

The Pre-Flight Checklist: Establishing Trust

- ✓ **Determination:** Define the exact purpose of the analytics.
- ✓ **Explain:** Clearly define the scope of data collection to users.
- ✓ **Legitimate:** Operate strictly within established legal frameworks.
- ✓ **Involve:** Talk to stakeholders and guarantee transparent data use.
- ✓ **Consent:** Seek explicit consent through clear questioning.
- ✓ **Anonymise:** De-identify individuals whenever possible.
- ✓ **Technical:** Monitor data access and maintain high security.
- ✓ **External:** Ensure third-party partners meet the highest security standards.

15 Years of Navigation: The Evolution of Analytics



Enter the Co-Pilot: Forging Hybrid Intelligence

Human Intelligence

Cognitive flexibility, empathy, long-term reflective planning, real-world contextual understanding, navigating uncertainty.

Artificial Information Processing

Scale, speed, pattern recognition, floating-point arithmetic, probabilistic text generation (LLMs).

Hybrid Intelligence

Tightly coupled systems where AI processes massive datasets to extend and augment human cognition, ensuring teachers remain in the loop to apply ethical, contextual judgment.



The Three Modes of the AI Co-Pilot

Forging Hybrid Intelligence through Distinct Modes of AI Integration



Automation (Externalization)

Concept: AI replaces human tasks.

Example: Generative AI predicting language issues to save grading time.



Risk Indicator:
Cognitive atrophy if overused.



Internalization (Reflection)

Concept: AI models influence human mental models.

Example: Using computational models of collaboration to help students reflect on and refine their own teamwork skills.



Extension (Coupling)

Concept: Human cognition extended via tightly coupled AI.

Example: Real-time Multimodal Dashboards that help teachers prioritize live scaffolding over basic monitoring, elevating their pedagogical reach.

Closing the Loop: The Ultimate Destination



Analytics does not replace the educator; it illuminates the path, ensuring no learner navigates the future alone.

