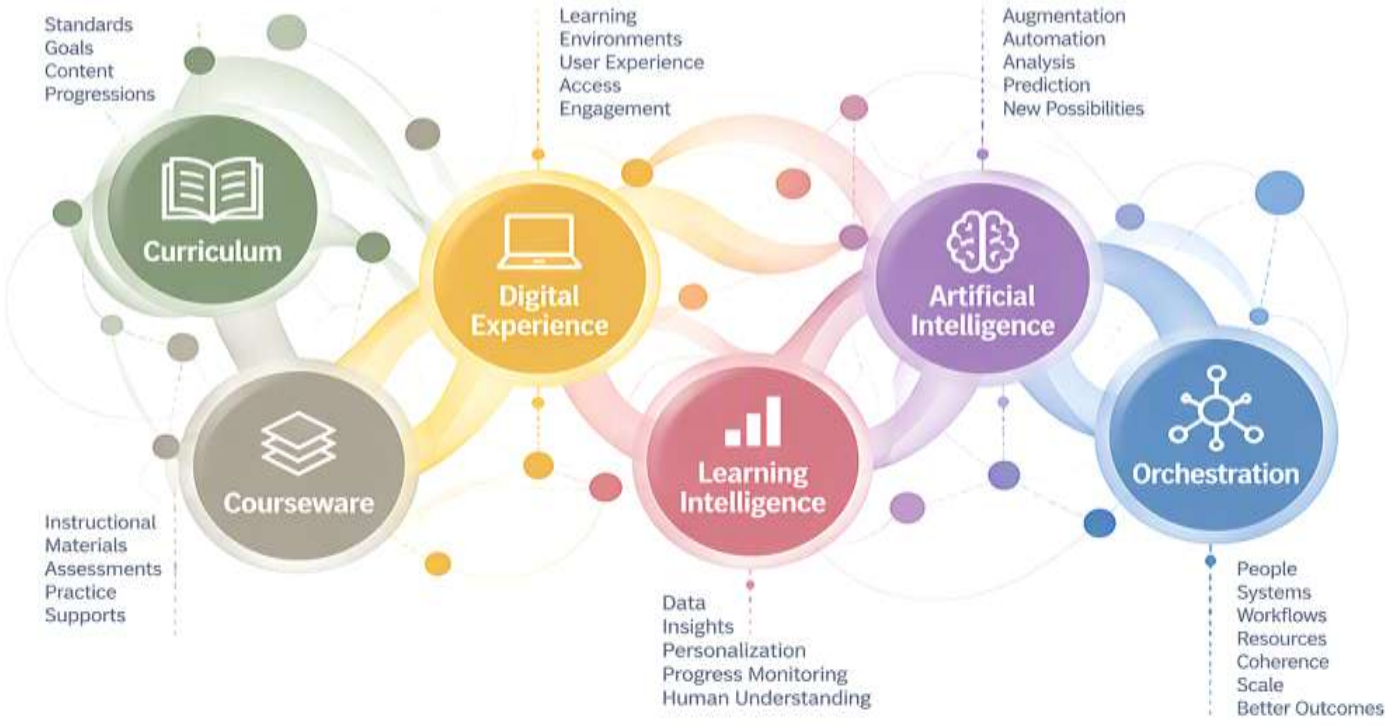
Forward > Human Agency Design

Get back to face-forward work.

PRIMER

Understanding Modern Learning Systems

Curriculum • Courseware • Digital Experience • Learning Intelligence • Artificial Intelligence • Orchestration



A visual guide to the systems, architectures, concepts, and technologies shaping modern learning.

Produced by:

the LEARNING COUNSEL
News → Context → Direction

Founding Underwriter

KIDDOM
Digital forward. Human first.

Kiddom builds technology enabling teachers and learners to unlock their full potential. It is an all-in-one education platform designed to help school districts launch, manage, and scale high-quality digital curriculum. Built for modern K-12 classrooms, the platform seamlessly integrates core curriculum with powerful tools for teacher lesson planning, student assessment, and real-time performance analytics with print versions.

By transforming static materials into dynamic, interactive learning experiences, Kiddom gives administrators centralized control over instructional equity while empowering teachers to easily differentiate lessons and address learning gaps. It provides decision-makers with a secure, cloud-based solution that maximizes curriculum investments, simplifies technology ecosystems, and drives measurable student growth.

Contributing Underwriter

KnowStory

KnowStory supports ongoing exploration of Human Agency Design, educational orchestration, Time AI, and future-ready learning systems.

A Vocabulary for Seeing the Organization

Schools have accumulated a language for instruction, administration, technology, programs, initiatives and improvement. What they often lack is a shared language for seeing how all of those things actually work together.

A goal is not a strategy. A strategy is not a tactic. A program is not a project. A department is not a workflow. Integration is not orchestration. Data is not evidence. A dashboard is not action. Automation does not necessarily reduce work. And adding a new system can improve one function while quietly creating new handoffs, monitoring, reconciliation or coordination somewhere else.

These distinctions make the operating environment visible.

The **Forward > Human Agency Design Primer** provides words for looking at a school or district as a living operating system: how purpose becomes action; how work moves; how systems connect; how decisions are made; where ownership begins and ends; how information travels; where friction accumulates; what technology performs; what people still have to perform; and what human capacity is ultimately returned.

Some terms will be familiar. Others name conditions educators have experienced for years without necessarily having a common vocabulary for them. Read together, they provide a different lens for examining curriculum, technology, operations, organizational design, procurement, artificial intelligence, time, learning and human work.

The purpose is not to make educators into technologists, project managers or systems engineers.

It is to give educators the language to see the system they are already operating inside.

Why Human Agency Design

Systems Are Never Merely Systems

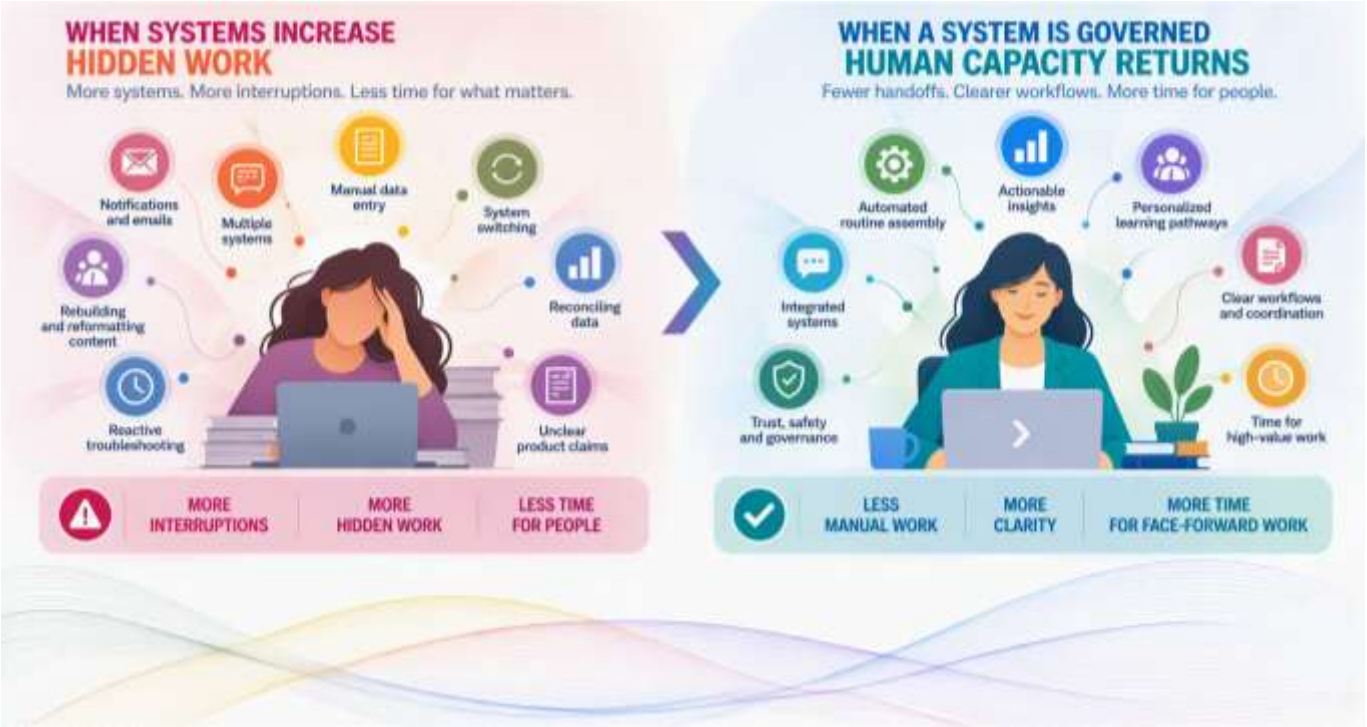
Every organizational system redistributes attention, time, judgment, communication, responsibility, resources, and work. A policy can create a workflow. A procedure can create handoffs. A schedule can constrain capacity. A program can require coordination across departments. A technology can automate one task while creating new review, placement, monitoring, reconciliation, or exception-handling somewhere else.

What appears to be a problem with people may actually be a problem with **how work has been designed around them**.

Forward > Human Agency Design examines the whole operating environment: people, organizational structures, policies, procedures, programs, technologies, resources, workflows, intelligence, decisions, and time, and how these interact to produce outcomes.

The question is not simply whether a particular process or technology works as intended. It is what work the operating system creates, moves, duplicates, fragments, automates, eliminates, or leaves behind; where judgment and responsibility reside; where unnecessary friction accumulates; and whether the design ultimately returns human capacity to the work that matters most.

For schools and districts, that means examining whether the organization gives people greater capacity for **face-forward teaching, leadership, relationships, decision-making, and learning**, rather than merely adding another layer of work around the work.



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PART I

Software Function and Experience Inspection

The observable behaviors behind the four-page Audit Workbook review

The Audit Workbook asks reviewers to observe software behavior, not merely recognize terminology. This section completes the conceptual connection between the Primer and the four-page Digital Curriculum Quality and Workflow Evaluation.

Each term names a function, condition, or control that should be demonstrated in a representative environment. Together, the terms make interface quality, learner agency, accessibility, social participation, instructional intelligence, AI trust, workflow, and capacity visible enough to evaluate.



Interface Action, Status and Recovery

Action Confirmation

A response indicating that an action has been saved, submitted, assigned, changed, or completed.
Example: *After a video upload, the learner sees the file name and successful submission status.*

Browser Zoom Resilience

Preservation of navigation, controls, order, and task completion when browser zoom is increased.
Example: *At enlarged zoom, close, save, and submit controls remain visible.*

Completed-State Visibility

Clear distinction among pending, in-progress, locked, assigned, available, submitted, reviewed, returned, and completed work.
Example: *The learner can tell which activities are finished and which need action.*

Corrective Error Message

An error message that identifies the problem and gives a usable corrective action without relying only on color or code.
Example: *The message states that a recording exceeds the limit and explains the allowed size.*

Curriculum Path Visibility

Visibility of the relationship among course, unit, lesson, activity, evidence, feedback, and next action.
Example: *Practice is visibly connected to the active lesson and the following step.*

Destructive Action Warning

A warning and confirmation before deletion, replacement, overwriting, or another difficult-to-reverse action.
Example: *Deleting portfolio evidence requires confirmation and explains whether recovery is possible.*

Disabled State

A visible condition showing that a control is temporarily unavailable and enough context to understand why.
Example: *A submit control remains unavailable until required fields are complete and the interface identifies what remains.*

Focus Visibility

A visible indication of the control or field that currently has keyboard or assistive-technology focus.
Example: *A clear outline follows the Tab key in meaningful task order.*

Orientation Resilience

Preservation of controls, context, and task completion when a device changes orientation.
Example: *Rotating a tablet does not hide the response field or reset the activity.*

Accessible Interaction and Media Control

Accessible Drag-and-Drop Alternative

A non-drag method for an activity that otherwise depends on pointer movement or touch coordination.
Example: *The learner selects an object and destination with the keyboard.*

Accessible Response Field

A response area with a meaningful label, usable focus order, visible state, and assistive-technology compatibility.
Example: *The response box announces the prompt, character limit, and error state.*

Captions

Synchronized text representing speech and relevant audio information in multimedia.
Example: *A science demonstration includes accurate narration and sound captions.*

Cognitive Distraction

Visual, auditory, or interactive activity competing with the intended lesson idea or task.
Example: *Background animation continues while a learner reads a complex explanation.*

Instructional Media Accuracy

Correctness of concepts, labels, scale, sequence, narration, and representations in media.
Example: *An animated model preserves the actual order of the scientific process.*

Learner-Controlled Media

Media that allows pause, replay, restart, speed adjustment, narration control, captions, or transcript use as appropriate.
Example: *The learner slows an animation and replays the concept stage.*

Media Necessity

The degree to which media contributes to the learning purpose rather than merely decorating the interface.
Example: *Motion reveals change over time instead of attracting attention beside unrelated text.*

Screen-Reader Compatibility

The ability of content, controls, labels, status messages, and task order to be interpreted and operated through screen-reader software.
Example: *The learner hears a meaningful button label rather than unlabeled control.*

Transcript

A readable text version of spoken audio or video content.
Example: *The learner searches and reviews the transcript after viewing.*

Voice System Requirements

The hardware, software, permission, connectivity, storage, privacy, and environmental requirements for voice functions.
Example: *The product states microphone, browser, bandwidth, storage, and headset requirements.*

Organization, Creation and Authorship

Annotation Export

The ability to preserve annotations outside the immediate view in an authorized usable format.
Example: *The learner exports cited notes into a research portfolio.*

Annotation Recovery

The ability to restore annotations after interruption, device change, error, or permitted version change.
Example: *A recovered session returns the learner to the passage with notes intact.*

Annotation Search

The ability to find prior highlights, notes, marks, or comments through search or filters.
Example: *The learner finds every annotation tagged evidence.*

Authoring Permission

A role-based rule governing who may create, edit, publish, share, duplicate, or approve content.
Example: *Learners draft while the teacher retains publishing authority.*

Authorship and Ownership Record

A record identifying who created, contributed to, changed, or owns a digital object under institutional rules.
Example: *A shared presentation shows contributions and reuse rights.*

Construction Tool

A digital tool for building, assembling, modeling, or producing an artifact through structured components.
Example: *A geometry tool preserves relationships as points move.*

Diagramming

Creation of labeled visual relationships, structures, flows, models, or spatial explanations.
Example: *The learner constructs and labels a food-web diagram.*

Math Notation

Digital input and display of mathematical symbols, equations, structures, and relationships.
Example: *The learner enters a fraction and exponent without plain-text substitutes.*

Persistent Personal Organization

Retention of self-created folders, subfolders, names, order, and saved items across sessions or authorized transitions.
Example: *The returning learner retains named portfolio folders the next year.*

Reusable Template

A structured starting form that can be copied and adapted without rebuilding the design.
Example: *A teacher duplicates a lab-report template across units.*

Revision History

A record of changes over time that allows inspection of earlier versions.
Example: *The teacher compares the adopted lesson with later edits.*

Role-Based Sharing

Controls determining what people may view, comment on, edit, redistribute, or publish according to role and audience.
Example: *A learner shares a draft with a group but not the district.*

Role-Specific Bookmarking

Separate bookmarking permissions and functions appropriate to teachers and learners.
Example: *A teacher bookmarks a report while a learner bookmarks a passage.*

Visual Composition

Arrangement of visual elements, text, space, sequence, and emphasis to communicate meaning.
Example: *The learner creates an evidence-based infographic.*

Social Participation and Identity

Archive and Retention Control

Rules and functions governing how long social content and collaboration records are kept and who may retrieve them.
Example: *A district group follows a defined archive and deletion schedule.*

Audience Control

A setting defining who can see, respond to, redistribute, or search for content or interaction.
Example: *A project is visible to the class but not the district.*

Governed Social Scope

The authorized level of interaction, such as group, class, school, district, or external community.
Example: *A districtwide interest group has age, privacy, identity, and moderation controls.*

Identity Control

A setting defining how participant identity is displayed, hidden, verified, or represented.
Example: *Peer review uses teacher-visible identity with learner-facing anonymity.*

Moderation Control

Tools and rules allowing authorized people to review, restrict, remove, report, pause, or manage participation and content.
Example: *A schoolwide interest group requires moderation before posting.*

Peer Feedback

Learner-to-learner response structured by purpose, criteria, permissions, and teacher visibility.
Example: *Peers comment against rubric criteria while the teacher can review the exchange.*

Teacher-Visible Collaboration

Collaborative activity whose contributions, revisions, participation, and communication are visible to the authorized educator.
Example: *The teacher can inspect who changed a shared model and when.*

Whole-Group Response Signal

A lightweight classwide response such as an echo, reaction, emoji, poll, post, or status indicator.
Example: *Every learner signals confidence before the teacher moves forward.*

Evidence, Adaptation and Instructional Intelligence

Accessibility-Adapted Version

A version altered to reduce disability-related barriers while preserving purpose and traceability.
Example: *The adapted lesson includes navigable structure and alternate response access.*

Advanced or Extension Version

A version increasing depth, complexity, application, or independence rather than only adding more work.
Example: *Learners apply the concept to a novel system and defend a decision.*

Attempt History

A record of attempts, revisions, timestamps, responses, and outcomes across a task or skill.
Example: *The teacher sees that a correct answer followed several strategies.*

Check for Understanding

A purposeful prompt, task, observation, or response used during learning to determine what learners understand and what should happen next.
Example: *A brief explanation determines readiness for independent practice.*

Core-Connected Adaptation

An adaptation visibly linked to the approved source lesson, standards, scope, and evidence.
Example: *The teacher can compare the adaptation with the original.*

Evidence in Context

Evidence shown with the related learner, task, lesson, standard, version, timing, and conditions needed for interpretation.
Example: *A response stays connected to the exact lesson version received.*

Explainable Grouping Evidence

Visible evidence and reasoning showing why learners were suggested for a group.
Example: *The proposal displays the shared misconception rather than only names.*

Improvement-Oriented Feedback

Feedback identifying what is working, what needs attention, and a feasible next step.
Example: *The response explains how to strengthen evidence rather than showing only a score.*

Mastery Evidence

Evidence sufficiently aligned and complete to support a conclusion that intended knowledge or performance has been demonstrated.
Example: *Completion alone is not treated as mastery.*

Readiness-Based Grouping

Grouping according to current evidence of readiness for a defined instructional purpose.
Example: *A temporary group forms for the next concept and later dissolves.*

Tier 2 Version

A version providing targeted supplemental support while remaining connected to the core lesson, objective, and evidence flow.
Example: *A small-group version adds scaffolds without replacing grade-level instruction.*

Tier 3 Version

A version providing intensive individualized support while preserving the relationship to core curriculum.
Example: *The intervention version adds modeling and monitoring under teacher control.*

AI Operating Disclosure and Escalation

AI Identity Disclosure

Clear indication that a response, recommendation, score, tutor, message, or agent is AI-generated or AI-supported.
Example: *The learner can distinguish an AI tutor from a human tutor.*

AI Operating Disclosure

A consolidated statement of AI level, boundary, approved curriculum and data, roles, actions, external connections, retention, prohibited uses, review, and accountability.
Example: *The product states whether grading uses an external model, what data is sent, and who approves results.*

Failure Handling

Defined behavior when AI or automation is uncertain, unavailable, conflicting, or outside its boundary.
Example: *Low-confidence OCR is flagged instead of silently posted.*

Human Escalation Path

A visible route from AI interaction or automated handling to an authorized person.
Example: *The learner requests teacher review when AI feedback does not fit the work.*

Model and Service Connection Disclosure

Identification of external models, APIs, services, and transfers used by an AI function.
Example: *The district can see whether AI is internally bounded or streams to a provider.*

Prohibited AI Use

A stated source, action, decision, communication, or purpose that AI may not perform.
Example: *An agent may not make final disciplinary or placement decisions.*

Workflow Continuity and Capacity

Context Switching

Repeated movement among systems, windows, formats, roles, or task states to complete work.
Example: *A teacher opens five tools to turn one result into follow-up instruction.*

Duplicate Entry

Repeated human entry of the same information into more than one place.
Example: *The same accommodation is retyped in disconnected tools.*

End-to-End Instructional Workflow

The complete sequence from planning through assignment, learner activity, evidence, feedback, grading, regrouping, follow-up, and reporting.
Example: *A review follows one lesson through every system and human handoff.*

Exception Handling

The process for identifying, assigning, resolving, documenting, and learning from cases outside the normal workflow.
Example: *An unmatched submission is flagged to a named owner with a recovery action.*

Failed Connection

An integration or system link that does not transmit, authenticate, match, or complete the intended action.
Example: *A disconnected assessment feed is visible rather than silently stale.*

IEP and Accommodation Workflow Alignment

Alignment of learner supports, permissions, implementation, evidence, and review with authorized plans and accommodations.
Example: *Approved accommodations appear in the lesson workflow without unnecessary disclosure.*

Institutional Knowledge Retention

Preservation of valuable content, versions, decisions, workflows, and rationale beyond one user.
Example: *The district retains approved lesson improvements after staff changes.*

Instructional Continuity

Preservation of course state, plans, versions, evidence, decisions, and next actions through disruption or personnel change.
Example: *A substitute or new teacher can understand what occurred and what follows.*

Locking and Unlocking

Role-based control over whether content, records, or stages can be edited, entered, or advanced.
Example: *A teacher unlocks revision while preserving the submitted version.*

Manual Transfer

Human movement of data, content, evidence, or decisions between systems or formats.
Example: *A teacher downloads results and uploads them elsewhere.*

MTSS Workflow Alignment

Alignment of evidence, tiered supports, progress monitoring, ownership, and review with the institution's support process.
Example: *A recommendation enters the existing MTSS workflow rather than a separate track.*

New Oversight Work

Monitoring, verification, correction, configuration, exception review, or governance introduced by a new system.
Example: *Automated feedback saves drafting time but creates a review queue.*

Reassignment Control

A function for moving work, content, learners, groups, or responsibility to a different authorized destination.
Example: *A teacher reassigns a lesson version to a new group.*

Recovery Path

The defined steps and authority for returning failed, interrupted, or incorrect work to a valid state.
Example: *A failed grade passback can be retried without re-entering every score.*

Residual Verification Work

Human checking that remains after automation or AI completes its portion.
Example: *A teacher still reviews low-confidence scores and sensitive comments.*

Staff-Turnover Continuity

Responsible transfer of work and context when people enter, leave, or change roles.
Example: *A new interventionist receives authorized history and the current action plan.*

Workflow Notification

A timely message indicating status, required action, exception, completion, or escalation.
Example: *The reviewer receives a notice only when human attention is required.*

Workflow Owner

The role accountable for completion, quality, and resolution of a workflow or defined portion.
Example: *A roster exception identifies whether the school, district, or provider owns correction.*

PART II

Organizational & Execution Foundations

Words that make the path from intention to daily work visible

Organizations execute well when people can trace a promise or purpose into a defined outcome, a goal, strategic choices, tactics, continuing programs, finite projects, workflows, ownership, evidence, measures, and daily action. These terms help educators distinguish organizational structure from the architecture that actually produces results.

THE EXECUTION CHAIN

PURPOSE	GOAL	STRATEGY	TACTIC	PROGRAM	PROJECT	DAILY ACTIONS	OUTCOME

The chain is traceable, but not merely linear. Programs may contain multiple projects and workflows. Evidence and measures inform decisions throughout the chain.

Form
The overall structure of an enterprise.
Example: *A district is a non-profit government entity in form.*

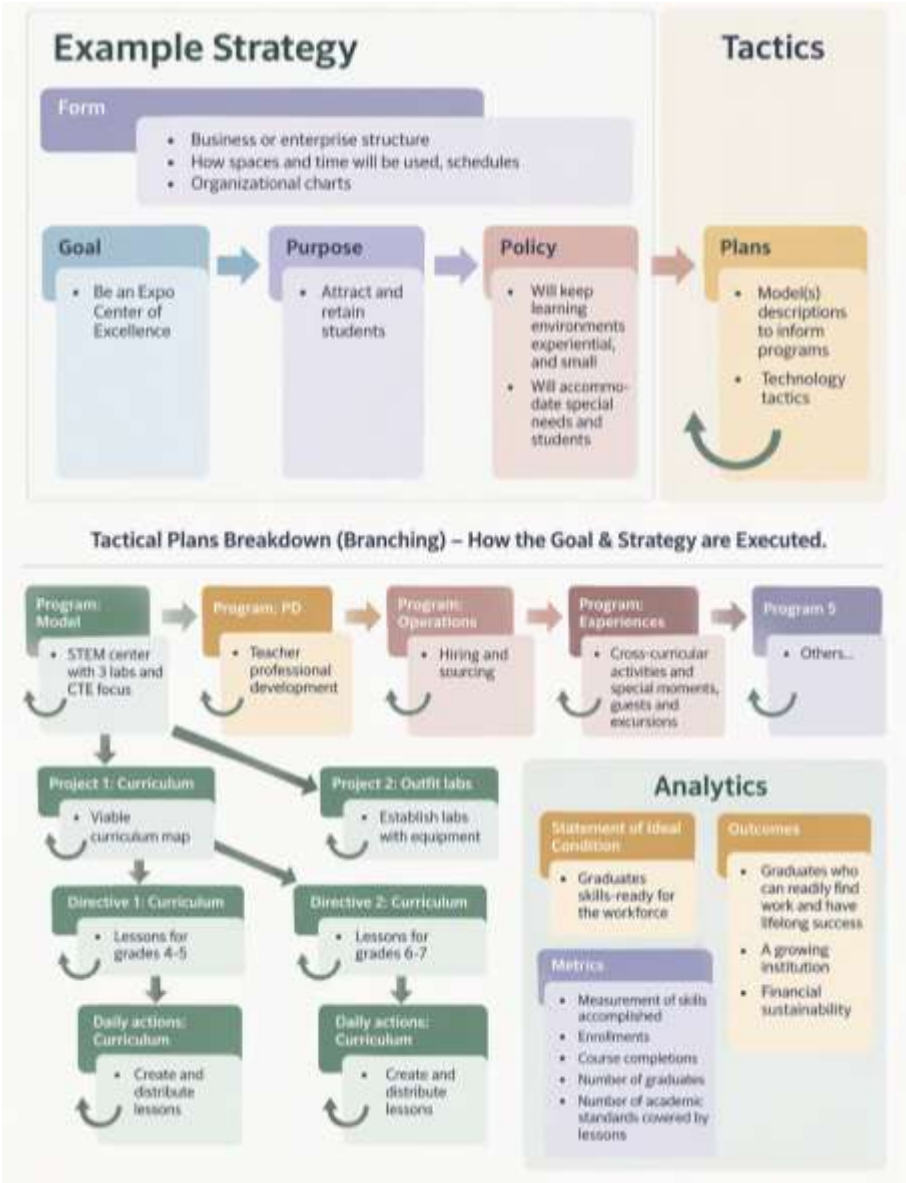
Purpose
The enduring reason an organization, function, or effort exists and the human value it is intended to serve.
Example: *A district promise gives leaders a stable reason for making choices across changing initiatives.*

Goal
A defined changed condition the organization intends to achieve within stated boundaries and measures.
Example: *Reduce delays between evidence of learner need and delivery of the appropriate support.*

Strategy
The chosen approach for reaching a goal. Strategy establishes the path and excludes other possible approaches.
Example: *Use timely learner evidence to adjust support while preserving instructional coherence.*

Tactic
A specific method used to carry a strategy. A strategy may require several tactics.
Example: *Create a common evidence-review rhythm across schools.*

Program
A coordinated, continuing series of work that carries one or more tactics and owns an ongoing outcome or operating condition.
Example: *A districtwide literacy improvement program coordinates curriculum, professional learning, evidence review, and intervention.*



Project
A finite sequence of work that creates a defined product, change, or condition under a program.
Example: *Adopt a universal screener and complete the related implementation work.*

Objective
A specific result assigned within a project, workflow, or role, with enough clarity to determine completion.
Example: *Configure roster exchange and verify that every participating school receives accurate records.*

Organizational Structure (the Org Chart)
The formal arrangement of departments, roles, authority, and reporting relationships within an institution.
Example: *The organizational chart shows where curriculum, technology, finance, and operations sit.*

Outcome
The observable condition, result, or human effect produced by completed work. An outcome describes what is different, not merely what activity occurred.
Example: *The outcome is improved continuity of intervention support, not completion of an intervention training session.*

Execution Architecture

The connected structure through which purpose and strategy become coordinated work, ownership, decisions, programs, projects, workflows, evidence, measures, and daily action.

Example: *An execution map shows how several departments jointly produce successful MTSS implementation.*

Department

A standing functional home for people, expertise, budget, compliance responsibility, and service capacity.

Example: *Technology may own identity infrastructure while participating in an instructional program led elsewhere.*

Ownership

Defined accountability for ensuring that an outcome, workflow, decision, or condition reaches completion and remains effective.

Example: *A program owner coordinates the complete outcome rather than only one departmental contribution.*

Handoff

The point at which information, work, authority, or responsibility moves between people, roles, departments, or systems.

Example: *Assessment evidence moves from the testing system to an instructional review workflow.*

Dependancy

An action, decision, resource, condition, or system connection required for other work to proceed successfully.

Example: *The intervention schedule depends on accurate learner grouping and staff availability.*

Decision Right

Defined authority to make, approve, reject, alter, or escalate a particular decision.

Example: *A school may recommend a schedule change while the district retains approval authority.*

Measure

A defined indicator used to determine whether an intended condition, outcome, or performance state is changing.

Example: *Leaders track the elapsed time between identification of need and delivery of support.*

Evidence

Information sufficient to support a conclusion, decision, or action in context.

Example: *Completion data alone is not evidence that the intended learning outcome occurred.*

Output

A product, service, deliverable, or completed activity produced by work. An output may contribute to an outcome but is not automatically the outcome.

Example: *A new dashboard is an output; more timely instructional response is the intended outcome.*

Operating Condition

A state that must exist for work or outcomes to occur reliably.

Example: *Accurate rostering is an operating condition for assignment, evidence routing, and reporting.*

Daily Action

A recurring human or system behavior through which strategy becomes actual practice.

Example: *Teachers review flagged evidence during the established planning rhythm and assign the next response.*

PART III

Digital Learning Foundations

From content to executable learning environments

ORGANIZATIONAL STRUCTURE VS. EXECUTION ARCHITECTURE

LENS	ORGANIZATIONAL STRUCTURE	EXECUTION ARCHITECTURE
Shows	Where roles and departments sit	How an outcome is produced across roles, systems, decisions, and time
Question	Who reports where?	What must connect, move, be decided, and be owned for the result to occur?

The digital learning environment is not one category of product. It is a continuum ranging from static files to systems that sequence learning, respond to evidence, and coordinate action.

The first discipline of discernment is category clarity. Before asking whether something is good, ask what it is.

Key terms

Authentic Learning

Learning connected to meaningful problems, audiences, products, performances, or consequences beyond selecting an answer.
Example: *Learners use local water data to construct and defend a recommendation.*

Chunking

Dividing content into smaller units for comprehension, display, reuse, sequencing, or targeted practice.
Example: *A long explanation becomes four short concept segments with checks for understanding.*

Collection

A grouped set of learning objects organized by subject, grade, topic, format, level, or another descriptor.
Example: *A reading collection contains hundreds of searchable eBooks but does not itself provide a complete course sequence.*

Contextualizing

Placing a discrete resource into a meaningful instructional structure such as a lesson, standard, grade, unit, or pathway.
Example: *A video becomes instructionally useful when the system shows why it appears, what precedes it, and what follows.*

Core Curriculum

The primary adopted instructional materials and sequence intended to address required learning standards for a subject or grade.
Example: *A district adopts one mathematics program as the common Tier 1 core.*

Course

An organized sequence of learning experiences designed to achieve defined outcomes.
Example: *A middle-school earth science course contains units, lessons, assessments, and support resources.*

Course Frame

The machine- and human-readable structure of a course, including sequence, prerequisites, objectives, time, assessments, supports, and completion logic.
Example: *A well-defined course frame allows lessons to be moved without losing their relationship to standards and prerequisites.*

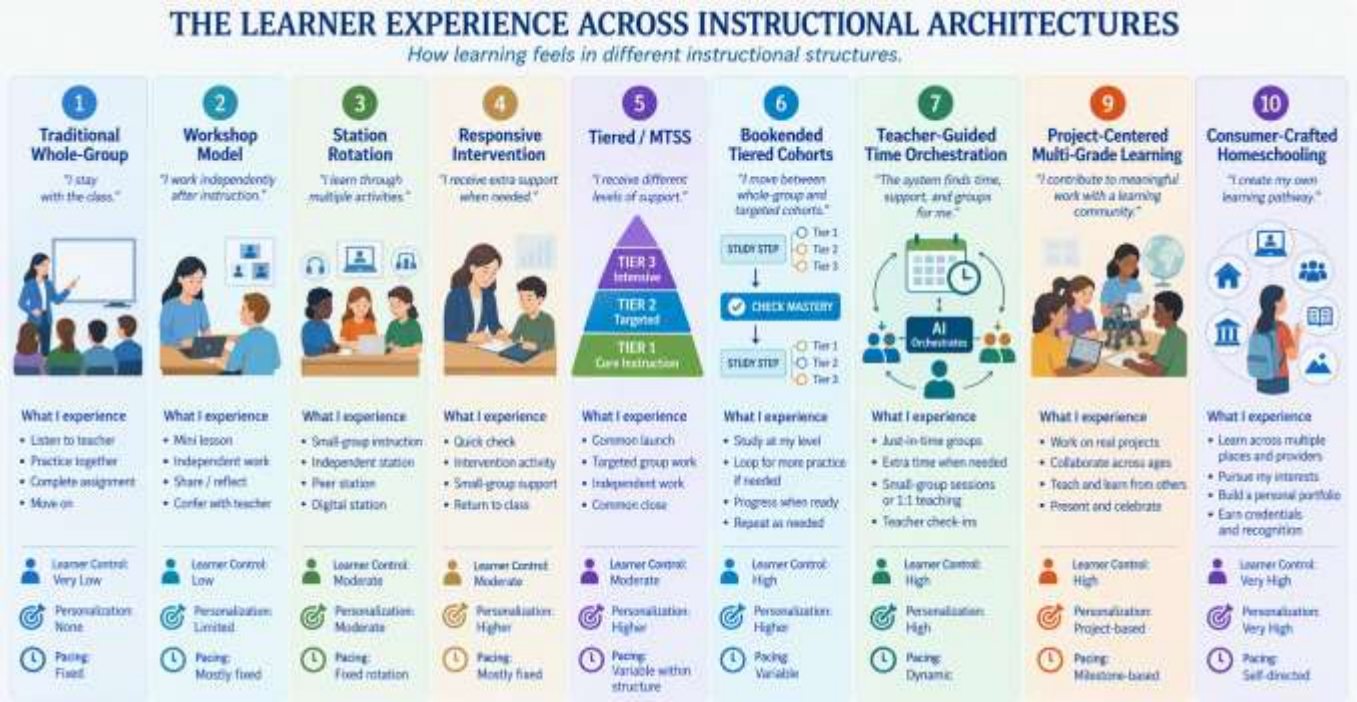
Courseware

Software that delivers an organized course or subject sequence and may include instruction, practice, assessment, feedback, remediation, progression, and analytics.
Example: *Unlike a resource library, courseware can guide what a learner encounters next.*

Architecture Inheritance

The roles, routines, constraints, coordination work, technology dependencies, and learner behaviors an institution assumes when it adopts a learning model or product.

Example: *Adopting independently paced courseware may also create new monitoring, intervention, scheduling, and learner-support obligations.*



Curriculum Architecture

The structure connecting standards, concepts, prerequisites, units, lessons, assessments, adaptations, and instructional resources.
Example: *Curriculum architecture makes clear what can change without breaking coherence.*

Digital Curriculum

Curriculum delivered through digital content, software, or both. Digital curriculum may be a static digitization of print or a highly interactive instructional environment.
Example: *The buyer must determine whether the product merely displays lessons or also sequences, assesses, adapts, and reports.*

Digital Learning Object

A knowledge object represented through software or a digital file. It may be static, interactive, adaptive, generative, or connected to a wider workflow.
Example: *A PDF worksheet is static; a simulation that changes when a learner manipulates variables is interactive.*

Digital Library

A searchable collection of digital texts, media, records, or learning objects.
Example: *Learners search a digital library for primary-source photographs.*

Digital Repository

A managed location for storing, searching, retrieving, sharing, and governing digital content or evidence.
Example: *A district repository holds approved lessons, media, assessments, and teacher-created adaptations.*

Discrete Digital Content

A separable digital item that can be reused, rearranged, or inserted into a larger learning sequence.
Example: *A teacher inserts one standards-aligned video into a larger unit built from several sources.*

Framing

Defining the parts and instructional structure of a lesson or course before filling in all content and activities.
Example: *A designer establishes the objective, sequence, evidence, and live-teaching moments before selecting resources.*

High-Quality Instructional Materials (HQIM)

Standards-aligned instructional materials that have met an established quality-review process.
Example: *HQIM quality does not by itself indicate how much assembly work the digital implementation will require.*

Highly Designed Digital Courseware

Courseware in which content, interface, sequence, feedback, practice, assessment, and progression are intentionally programmed as one learning experience.

Example: *The software does not simply hold a curriculum; the software is part of how the curriculum teaches.*

Instructional Architecture

The designed relationship among curriculum, lessons, assessment, teacher action, learner pathways, pacing, and support.

Example: *A system may contain quality content but still impose a fragmented instructional architecture.*

Interactive Content

Digital content that changes, responds, reveals, calculates, plays, or provides feedback when a user acts.

Example: *A learner moves a point on a graph and sees the equation and shape change.*

Knowledge Object

Any discrete or complete unit of knowledge that can be stored, presented, assigned, combined, or learned. A knowledge object may be a sentence, image, video, lesson, simulation, assessment, module, or complete course.

Example: *A three-minute animation and a yearlong algebra course are both knowledge objects, but they differ dramatically in behavior.*

Learner Experience Architecture

The organization of pathways, interactions, choices, supports, evidence, and transitions as they are encountered by the learner.

Example: *Two schools may use the same curriculum while creating very different learner experiences through pacing, grouping, interface, and teacher access.*

Learning Architecture

The overall design connecting curriculum, instruction, assessment, supports, technology, people, and time.

Example: *A coherent architecture makes the path from lesson to evidence to support visible.*

Learning Experience

The complete encounter through which a learner engages with content, people, tools, tasks, evidence, feedback, and reflection.

Example: *Two products may contain the same text but create very different learning experiences.*

Learning Map

A visual representation of concepts, skills, prerequisites, relationships, and intended outcomes.

Example: *A learning map shows that fraction equivalence supports later work with ratios.*

Lesson Time Used (LTU)

The expected time required for a concept, activity, lesson, project, or course.

Example: *LTU helps compare a 30-minute lesson with an adapted version designed for a shortened day.*

Linearity

A pathway in which one element follows another in a predetermined order.

Example: *A phonics sequence may require mastery of earlier skills before later patterns are introduced.*

Nonlinear Learning

A design allowing exploration, choice, branching, or multiple routes through content.

Example: *A learner investigates several sources in a different order while still producing the required evidence.*

Open Educational Resources (OER)

Teaching and learning materials released under licenses that permit specified forms of free access, reuse, revision, remixing, or redistribution.

Example: *A district adapts an openly licensed science unit for local phenomena.*

Operating Model

The combination of roles, systems, processes, decisions, ownership, time, and resources through which a learning architecture actually functions.

Example: *A station-rotation model requires defined movement, supervision, grouping, evidence, and teacher responsibilities.*

Pacing Guide

A recommended timeline for moving through standards, units, lessons, or concepts.

Example: *A pacing guide may assume common movement even when actual learner readiness varies.*

Portfolio

An organized collection of work, evidence, credentials, revisions, and reflections accumulated over time.
Example: *A portfolio shows growth across drafts rather than only a final score.*

Primary Unit of Design

The element around which a learning environment is principally organized, such as a block, classroom, course progression, project, cohort, learner, or ecosystem.
Example: *In a traditional schedule the instructional block is primary; in a project-centered architecture the project is primary.*

Proof of Learning

An artifact or performance demonstrating understanding, skill, process, or judgment.
Example: *A learner submits a narrated video demonstration with data and reflection.*

Scope and Sequence

The breadth of content to be taught and the intended order in which it is taught.
Example: *An adaptive system may vary pace while still respecting the adopted scope and sequence.*

Standards Alignment

A documented relationship between instruction, evidence, and an academic standard.
Example: *A lesson-level alignment is stronger evidence than a broad vendor claim that an entire library is standards aligned.*

Standards Attainment

Evidence that a learner has demonstrated the knowledge or performance described by a standard.
Example: *Completion is not the same as attainment.*

Static Digital Content

Digital material that primarily displays information but does not significantly respond to user actions.
Example: *A scanned textbook page is digital, but it behaves much like paper.*

PART IV

Systems, Platforms & Architecture

Understanding the layers beneath teaching and learning

Schools rarely use one system. They operate a stack of systems with different owners, data, permissions, and responsibilities. Integration may connect them technically without making the human workflow coherent.

The important question is not merely what systems the district owns. It is how the systems behave together and who performs the work between them.

SIMPLE MODEL EDTECH STACK

A simplified example based on the attached learning-organization stack. The purpose is to show categories and movement, not endorse a fixed vendor list.



Read the stack vertically and horizontally: content, learner, assessment, intervention, and administrative movement cross layers. A district may own every layer and still rely on people to coordinate much of the movement manually.

Key terms

App

A narrowly scoped application, commonly delivered through a web or mobile environment.
Example: *A vocabulary-practice app may perform one useful function without managing a complete course.*

Application

Software designed to perform one or more defined tasks. Applications may run locally, in a browser, or on a mobile device.
Example: *A diagramming application performs a narrower job than a learning management system.*

Framework System

A major operational system that structures recurring work and data across the institution.
Example: *An LMS or SIS establishes the framework within which many other tools must operate.*

Platform

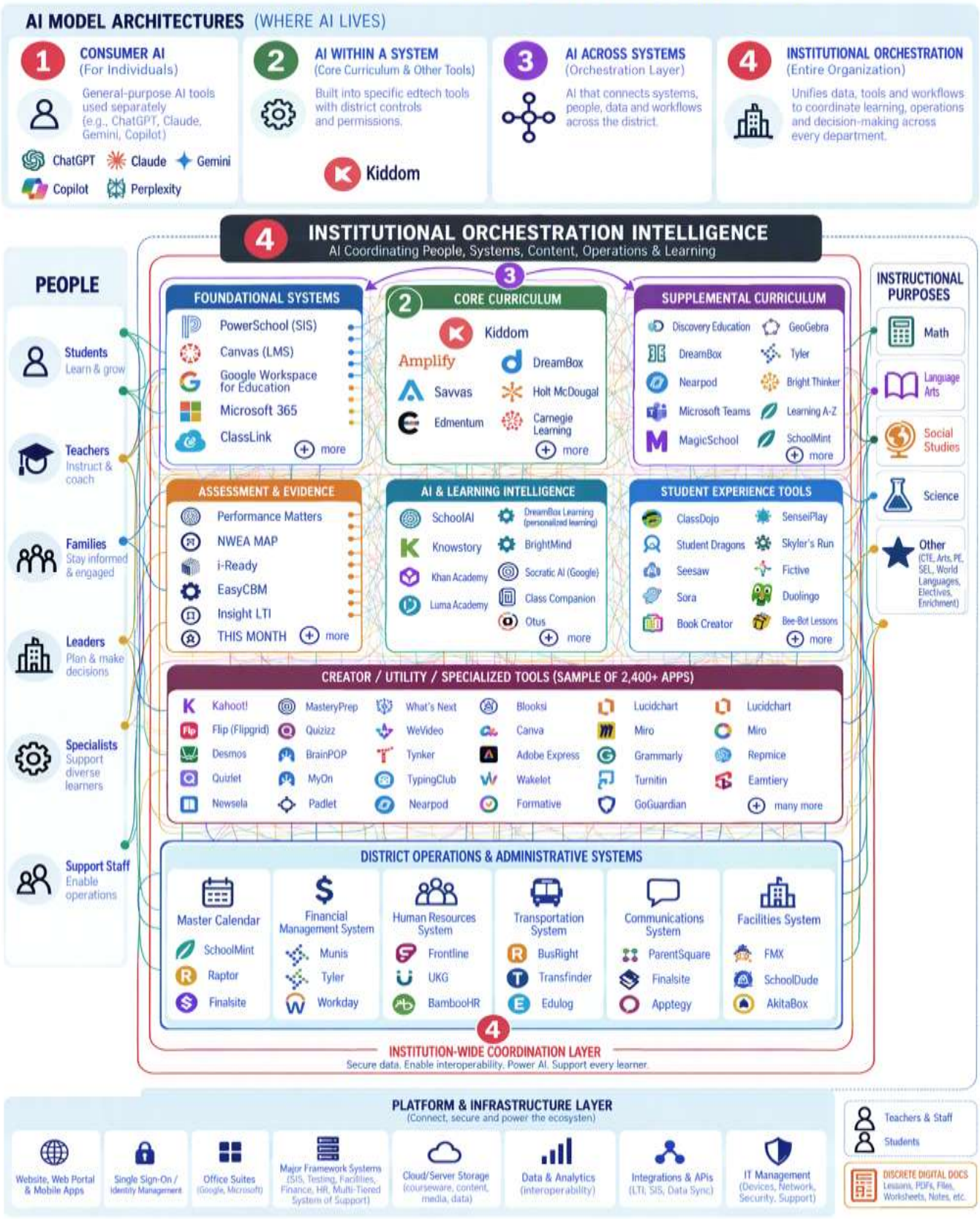
A foundational software environment on which content, services, tools, users, or other applications can operate.
Example: *A platform may host curriculum, assignments, integrations, and analytics.*

System

A coherent set of tools, data, roles, and workflows used to manage an organizational function.
Example: *A student information system manages enrollment, schedules, attendance, and records.*

WHAT AN EDTECH STACK MIGHT LOOK LIKE

PEOPLE + TOOLS + DATA = LEARNING THAT WORKS



Logos and product names are representations only and not meant to be correct placements in every respect.

Application Programming Interface (API)

A defined software interface allowing applications or systems to request data or functions from one another.
Example: *An API sends assignment results from a tool to an LMS.*

Assessment System

A platform for creating, delivering, scoring, analyzing, and reporting assessments.
Example: *An assessment system may collect strong evidence but leave follow-up planning elsewhere.*

Cloud Application

Software hosted remotely and accessed through a network or the internet.
Example: *The provider operates the application while the district manages authorized use.*

Content-Agnostic System

A system designed to accept and manage content from multiple providers rather than only proprietary content.
Example: *A content-agnostic LMS can host several publisher tools, district lessons, and OER.*

Content Management System (CMS)

Software used to create, edit, organize, publish, and retrieve content without requiring users to write source code.
Example: *A communications team updates a website through a CMS.*

Content Portability

The ability to move curriculum or learning objects while preserving structure, metadata, rights, and relationships.
Example: *A portable course retains modules and assessments rather than becoming a pile of files.*

Curriculum Management System

A system for creating, aligning, sharing, modifying, sequencing, and monitoring curriculum and instructional guides.
Example: *A district uses the system to maintain common unit maps and approved lessons.*

Data Portability

The ability to export and transfer usable data, content, configuration, and records to another environment.
Example: *A district can retrieve learner work and course structure at contract end.*

Digital Education Ecosystem

The interdependent combination of people, processes, policy, systems, content, devices, data, and services supporting teaching and learning.
Example: *Changing one major system can alter work across the ecosystem.*

EdTech Stack

The complete set of instructional and operational technologies used by an institution.
Example: *The stack includes curriculum, LMS, SIS, identity, assessment, communication, analytics, and AI.*

Enterprise Architecture

The institution-wide design of systems, data, roles, controls, integrations, and operating processes.
Example: *Enterprise architecture shows where identity, ownership, and data movement are governed.*

Identity and Access Management (IAM)

The policies and technologies used to identify users and control what each person or system may access or do.
Example: *A teacher and learner see different tools because permissions follow role.*

Instance

A distinct deployed copy or partition of software configured for a particular organization or user group.
Example: *A district has its own tenant instance of a cloud platform.*

Integration Layer

The technical and workflow mechanisms connecting systems, data, content, and actions.
Example: *An integration layer may move grades while teachers still manually interpret and act on them.*

Interoperability

The ability of systems or products to exchange data and function together through agreed specifications or services.
Example: *Interoperability can reduce custom integration, but it does not guarantee a good user workflow.*

Learning Experience Platform (LXP)

A learner-facing environment that aggregates, organizes, or recommends learning resources and experiences across sources.
Example: *An LXP may support discovery but not provide a complete governed core curriculum.*

Learning Management System (LMS)

A system for organizing courses, users, assignments, communication, content distribution, progress, and reporting.
Example: *The LMS may distribute work without providing the curriculum itself.*

Local Application

Software hosted on an institution-controlled server or device.
Example: *A specialized testing application runs only on district-managed computers.*

Orchestration

The intelligent coordination of people, time, resources, systems, processes, and decisions across a workflow.
Example: *Orchestration does more than move data; it helps move work toward a defined outcome.*

Point Solution

A product designed to solve a limited problem or perform a narrow function.
Example: *A stand-alone translation tool may be valuable but still create copying and transfer work.*

Self-Contained Learning System

A learning environment with embedded content and tools whose content, data, and workflows may remain largely within the provider environment.
Example: *Before adoption, the district verifies how created content and records can be exported.*

Silo

A system, dataset, role, or workflow that operates separately and does not coordinate effectively with the rest of the organization.
Example: *A strong assessment tool becomes a silo when its results do not enter instructional planning.*

Single Sign-On (SSO)

Identity management that allows a user to authenticate once and enter multiple authorized systems.
Example: *SSO reduces repeated logins but does not by itself integrate workflow or data.*

Software as a Service (SaaS)

Software provided as an ongoing hosted service, commonly through subscription.
Example: *The district pays annually for access, updates, and support.*

Streaming API

An API connection that continuously or near-continuously transmits selected data or events under defined controls.
Example: *A streaming connection can provide current signals but requires clear governance.*

Student Information System (SIS)

A system of record for student identity, enrollment, schedules, attendance, grades, and related institutional data.
Example: *The SIS supplies roster information to other authorized systems.*

Systems Thinking

A discipline for understanding how components, relationships, feedback, delays, and constraints interact within a whole.
Example: *A district examines how curriculum, scheduling, staffing, and data jointly shape intervention.*

Vendor Lock-In

Dependence created when data, content, integrations, or workflows are difficult or costly to move elsewhere.
Example: *The district discovers that years of teacher-created lessons cannot be exported in usable form.*

Walled Garden

An environment limiting content, integrations, or movement to approved or proprietary areas.
Example: *A walled garden can increase safety while also limiting portability and choice.*

Workflow

The sequence of tasks, decisions, handoffs, and system actions required to complete work.
Example: *A lesson workflow runs from planning through assignment, evidence, feedback, and follow-up.*

PART V

Digital Experience Design

When interface design becomes instructional design

Learners do not experience architecture as a technical diagram. They experience it as screens, choices, interruptions, clicks, symbols, paths, and recovery from mistakes.

Poor interface design consumes attention that should be used for learning. Age, coordination, reading ability, disability, device, subject, and task all matter.

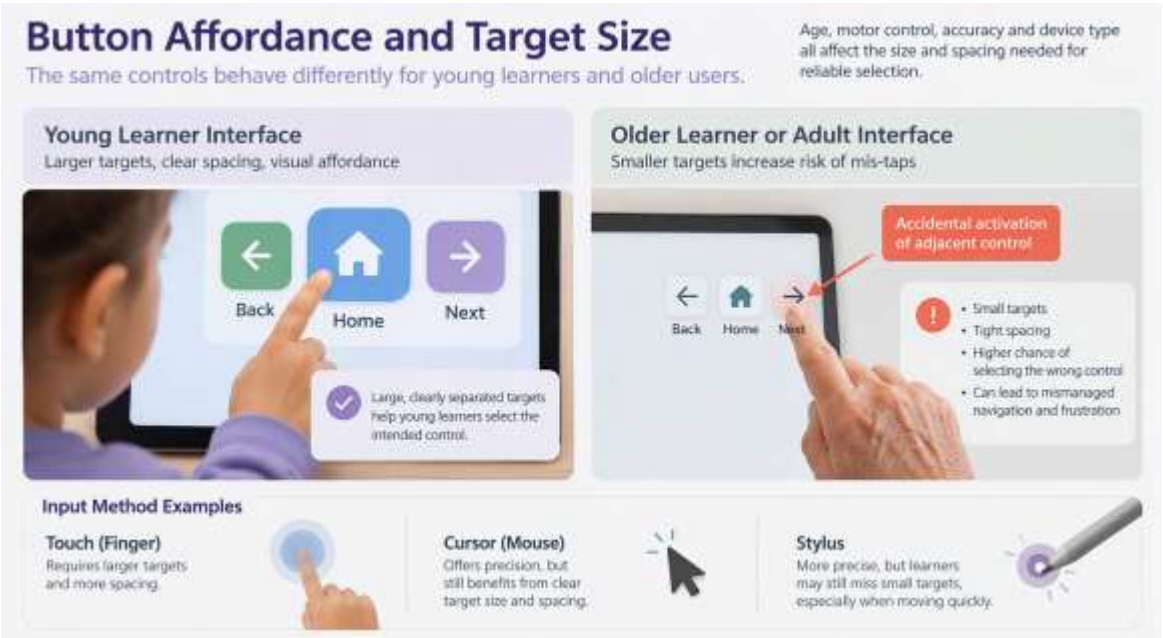
Key terms

Accessibility

The degree to which people with varied abilities can perceive, operate, understand, and use content and systems.
Example: *Accessibility includes more than a compliance statement; it must be demonstrated in the actual workflow.*

Affordance

A property suggesting what action an object allows.
Example: *A raised button suggests pressing; a slider suggests movement.*



Age-Appropriate Navigation

Navigation whose labels, symbols, reading demand, density, and target size fit the intended learner age and experience.
Example: *A first grader may need persistent, labeled buttons where an adult can use compact icons.*

Animation

Moving visual content used to demonstrate, explain, sequence, simulate, or engage.
Example: *An animation teaches plate movement rather than merely decorating the screen.*

Audio Enhancement

Purposeful use of sound, narration, cues, pronunciation, or spoken text to support access or learning.
Example: *Audio can support fluency or disability access, but unnecessary sounds can distract.*

Avatar

A graphical representation of a user or character within a system.
Example: *A school reviews whether avatars are editable, switchable, age appropriate, and inclusive of policy-acceptable clothing and symbols.*

Cognitive Load

The amount of mental effort required to process information and complete a task.
Example: *Decorative motion and hidden menus can consume attention needed for the lesson idea.*

Color Accessibility

Use of color, contrast, labels, and patterns so meaning does not depend on color alone.
Example: *An error is marked with text and an icon, not only red.*

Context Preservation

The ability to retain location, selections, notes, filters, evidence, and instructional context as a user moves through work.
Example: *A teacher opens a learner record and returns to the same lesson and group view.*

Decorative Animation

Motion added primarily for appearance or engagement rather than explanation.
Example: *Decorative motion should not compete with the lesson idea.*

Device Compatibility

The ability to access and interact with a product across intended hardware, browsers, operating systems, and input methods.
Example: *A voice feature specifies microphone, browser, permission, and bandwidth requirements.*

Error Recovery

The ability to understand, correct, reverse, or safely retry after an error.
Example: *A mistaken deletion produces an undo option rather than permanent loss.*

Focus Order

The sequence in which interface elements receive keyboard or assistive-technology focus.
Example: *Focus should follow the meaningful reading and task order.*

Hamburger Menu

A compact menu represented by three horizontal lines.
Example: *The symbol may save space but should be tested for recognition by younger learners.*

Instructional Animation

Animation whose motion is necessary to reveal a concept, process, relationship, or change over time.
Example: *Learners pause and replay the stages of cell division.*

Interface Density

The amount of information, controls, and visual material presented within a screen area.
Example: *A data-rich teacher dashboard may be inappropriate for an elementary learner view.*

Keyboard Navigation

The ability to move, select, enter, and submit without relying on a mouse or touch screen.
Example: *A learner can complete the task using Tab, arrow, Enter, and other supported keys.*

Modal

A dialog appearing above the main interface that requires interaction before returning to underlying content.
Example: *When text is enlarged, the modal close control must remain visible.*

Navigation

The structures and controls helping users move through content, functions, and locations.
Example: *Navigation should reveal where the learner is, what comes next, and how to return.*

Navigation Bar

A persistent interface area containing links or controls for major sections.
Example: *A navigation bar keeps essential destinations visible.*

Nesting

Organizing content or controls in layers of folders, menus, units, or submenus.
Example: *Nesting should follow curriculum logic rather than scatter lesson parts across unrelated areas.*

On/Offline Access

The ability to use selected content or functions with or without an active network connection.
Example: *Downloaded lessons remain available during limited connectivity.*

Pop-Up

A separate or additional window or display appearing in response to an action or event.
Example: *A pop-up definition can support vocabulary without forcing the learner to leave the page.*



Progressive Disclosure

Showing essential information first and revealing additional detail when needed.
Example: *Advanced settings remain available without crowding the learner's first view.*

Responsive Design

Interface behavior that adapts to screen size, orientation, zoom, and device without losing function.
Example: *A lesson remains usable on a laptop and tablet.*

Save-and-Return

A function allowing unfinished work to be preserved and continued later.
Example: *A learner drafts part of an explanation and completes it the next day.*

Session Recovery

The ability to resume interrupted work without losing progress or place.
Example: *After a dropped connection, the learner returns to the saved response.*

Signifier

A visual, auditory, or tactile cue indicating how an interface element can be used.
Example: *A pencil icon signifies editing when the audience recognizes the symbol.*

State Persistence

Retention of a user's work, status, settings, and position across sessions or devices.
Example: *Annotations and bookmarks remain available after logout.*

Target

The element a user clicks, taps, selects, or activates.
Example: *A target must be large enough and separated enough for the intended learner and device.*

Text Enlargement

The ability to increase text size while preserving controls, layout, context, and task completion.
Example: *At 200 percent zoom, the modal close button and submit control remain visible.*

Three-Dot Menu

A compact control represented by three dots and commonly used for additional actions.
Example: *A three-dot menu should not hide a required step from inexperienced users.*

Touch Enabled

Software designed to respond effectively to touch input.
Example: *A drag action that works on a tablet must have an alternative on a non-touch laptop.*

Universal Design for Learning (UDL)

A framework for designing flexible learning environments with multiple means of engagement, representation, and action or expression.
Example: *A lesson provides options for accessing information and demonstrating understanding.*

User Experience (UX)

The overall usefulness, clarity, efficiency, accessibility, and value experienced while using a product.
Example: *Good-looking screens can still create poor UX if learners lose work or cannot recover.*

User Interface (UI)

The screens, controls, visual elements, voice interfaces, and interaction surfaces through which users operate a product.
Example: *A clear UI helps a learner find the next action without extra explanation.*

Visualization

A visual representation intended to reveal patterns, relationships, scale, sequence, or significance.
Example: *A graph makes a trend visible that is difficult to see in a table.*

Voice Playback

The ability to record and replay spoken language or other audio.
Example: *A learner records pronunciation and compares attempts.*

PART VI

Digital Learning Functions

What software can do that paper cannot

Digital power does not come from putting a worksheet on a screen. It comes from functions that help people create, organize, manipulate, interact, communicate, preserve evidence, and return to work.

The buyer's question is whether a function is present, usable, age appropriate, instructionally purposeful, and connected to the larger learning workflow.

Key terms

Annotation
The ability to highlight, mark, comment, draw, or place notes directly on digital content.
Example: *A learner annotates a source and returns later with notes retained.*

Annotation Persistence
Retention of annotations across sessions, versions, or devices.
Example: *Highlights remain attached to the correct passage after logout.*

Audio Submission
Recording and submitting spoken evidence.
Example: *A language learner submits oral fluency practice.*

Augmented Reality (AR)
Digital information or graphics overlaid on a view of the physical environment.
Example: *A device overlays historical information at a local site.*

Authoring
Creating or assembling digital content, activities, assessments, media, or sequences.
Example: *A teacher authors a lesson using text, video, questions, and a rubric.*

Badge or Microcredential
A portable or system-based marker of completion, knowledge, skill, or demonstrated competency.
Example: *A badge links to the criteria and evidence used to award it.*

Bookmarking
Saving a location, item, report, passage, lesson, or learner state for later return.
Example: *A teacher bookmarks a misconception report; a learner bookmarks a difficult passage.*

Co-Editing
Multiple authorized users editing the same digital object.
Example: *A group revises a shared presentation with version history.*

Collaboration Workspace
A shared environment for group production, communication, files, decisions, and evidence.
Example: *A project team keeps tasks, sources, drafts, and feedback together.*

Comic Creation
Creating sequential visual narratives with panels, characters, captions, and dialogue.
Example: *A learner explains a historical conflict through a sourced comic.*

Drag-and-Drop Authoring
Creating or arranging work through movable digital objects rather than code.
Example: *A learner builds a comic sequence by arranging scenes and captions.*

Dynamic Definition
An in-context definition available without leaving the active content.
Example: *Clicking a term opens pronunciation, meaning, and an example.*

Echoing and Reactions
Lightweight signals such as repeating, endorsing, or reacting to contributions.
Example: *A whole-group poll uses reactions to surface which example needs discussion.*

Filtering
Narrowing displayed content or records according to selected rules or attributes.
Example: *A teacher filters evidence by skill and class period.*

Foldering
Creating, naming, renaming, organizing, and retaining personal folders and subfolders of system elements.
Example: *Learners keep research sources in self-named subfolders rather than one undifferentiated list.*

Game-Based Learning
Learning designed through a game or game-like environment in which the challenge itself requires knowledge, strategy, or problem solving.
Example: *Learners use economic reasoning to make decisions within a simulation.*

Gamification
Use of selected game elements such as challenge, progress, feedback, choice, or recognition in a non-game learning environment.
Example: *A mastery path uses progress indicators without making public rank the instructional goal.*

Incentive Design
The design of recognition, progress markers, rewards, and feedback intended to encourage participation or persistence.
Example: *A district avoids simulated gambling, wagering, or coin economies that distract from learning.*

Interest Group
A governed social space connecting participants around a topic or shared pursuit.
Example: *A districtwide robotics group has role, moderation, privacy, and archive controls.*

Live Chat
Synchronous text communication with a human or AI participant.
Example: *The interface must clearly identify whether the responder is a teacher, tutor, peer, or AI.*

Live Video
Synchronous communication using video and audio.
Example: *A remote specialist joins a small-group lesson.*

Metadata
Structured information describing a resource, event, person, standard, prerequisite, time, right, or other attribute.
Example: *A resource has metadata for reading level, license, and accessibility.*

Mixing
Combining different file types, systems, resources, or courseware into one instructional sequence.
Example: *A lesson combines a publisher module, local video, simulation, and response prompt.*

Multimedia Proof
Evidence of learning combining text, image, audio, video, drawing, or other media.
Example: *A science explanation includes a narrated experiment video and data table.*

Portfolio Curation
Selecting, organizing, revising, and reflecting on accumulated work.
Example: *A learner chooses evidence that demonstrates growth and explains the choices.*

Probeware
Software and devices that collect and interpret data from physical sensors or scientific instruments.
Example: *A temperature probe streams measurements into a graph.*

Sandbox Environment
A bounded space for experimentation without damaging live data or production work.
Example: *Teachers test a new course sequence before publishing it.*

Screen Sharing
Displaying all or part of one user's screen to others.

Example: *A teacher shares the lesson view without exposing private records.*

Search

A function for finding content, records, people, or actions using words, filters, or other criteria.
Example: *Search results should distinguish approved core materials from unreviewed items.*

Simulation

A dynamic model allowing users to change variables and observe results.
Example: *Learners alter ecosystem conditions and compare effects.*

Sketching

Drawing or illustrating within an application as part of thinking, practice, or response.
Example: *A learner sketches a force diagram directly beside an explanation.*

Social Interaction

Embedded synchronous or asynchronous communication among learners or educators.
Example: *A moderated class discussion supports peer explanation.*

Storyboarding

Planning a sequence through organized frames containing visual, text, audio, and transition ideas.
Example: *A learner storyboards a documentary before recording.*

Tagging

Adding structured descriptors to make content or records easier to find, classify, align, relate, or automate.
Example: *A lesson is tagged by standard, concept, grade, language, and time.*

Video Submission

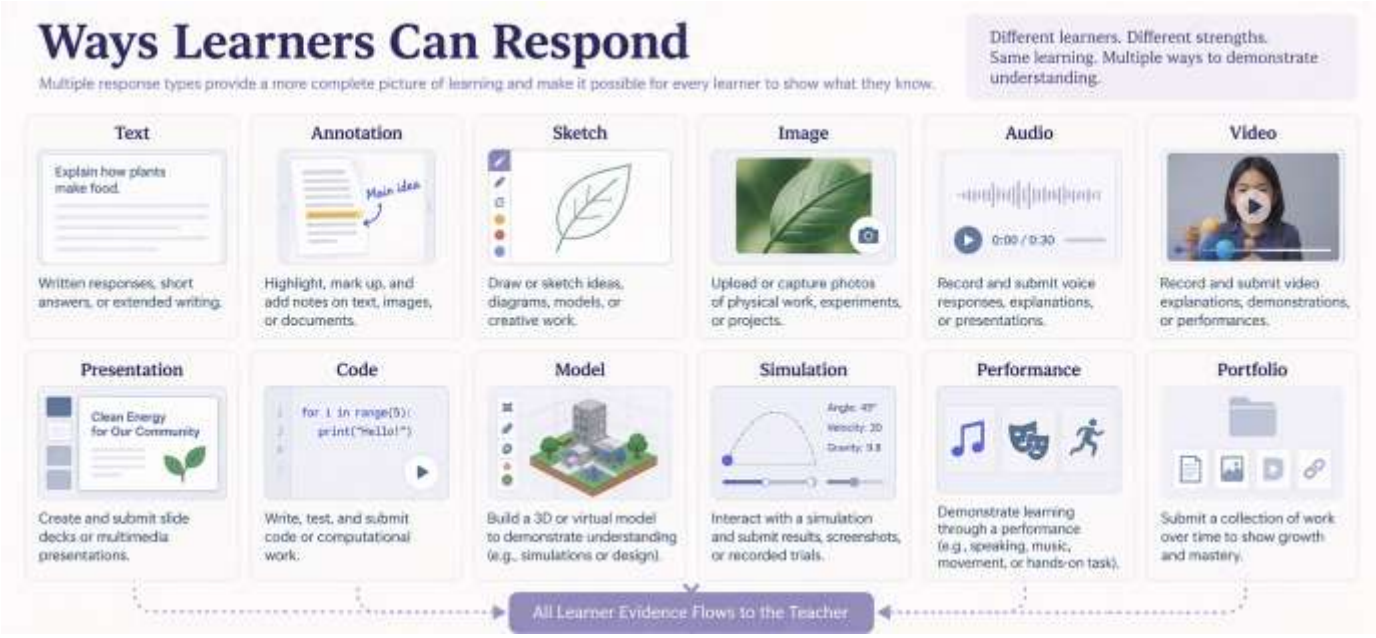
Recording and submitting visual and spoken evidence.
Example: *A learner demonstrates a physical procedure and explains safety decisions.*

Virtual Manipulative

A digital object that can be moved, grouped, rotated, measured, or otherwise manipulated to explore a concept.
Example: *Learners regroup base-ten blocks and view the corresponding equation.*

Virtual Reality (VR)

A computer-generated immersive environment experienced through a display or headset.
Example: *Learners explore a modeled environment while the lesson retains clear objectives and accessibility alternatives.*



PART VII

Curriculum, Courseware & Assessment

From content delivery to evidence-guided action

Courseware can present, sequence, assess, respond, and advance. But not every adaptive label represents the same behavior, and not every dashboard produces an instructional decision.

This section distinguishes the functions that move learning forward from features that merely display activity.

Key terms

Adaptive Learning

Adjustment of pace, sequence, content, support, or challenge based on learner data or choices.
Example: *A system changes both the next task and the support, not merely the speed.*

Adaptive Pacing

System-supported variation in the speed at which learners move through a pathway.
Example: *Two learners remain in the same sequence but complete it at different rates.*

Assignment Management

Functions for creating, distributing, collecting, tracking, reviewing, reassigning, and recording learner work.
Example: *A teacher assigns one lesson to the class and a contextual scaffold to a group.*

Auto-Feedback

System-drafted feedback based on student work, scoring logic, curriculum, or performance patterns.
Example: *The teacher edits and approves feedback before release.*

Auto-Grading

System-generated scoring based on answer keys, rules, models, or AI.
Example: *Objective items are scored automatically; open responses remain available for teacher inspection.*

Auto-Remediation

Automated routing to additional explanation, practice, or prerequisite content after evidence of difficulty.
Example: *A failed item set opens a targeted prerequisite review.*

Curriculum Grounding

Constraining generation, recommendations, or actions to approved curriculum and its instructional context.
Example: *The assistant answers from the active unit rather than from unrestricted web content.*

Differentiation

Adjusting instruction, grouping, content, process, or product for groups of learners with differing needs.
Example: *A teacher provides three entry points while maintaining a common grade-level objective.*

Embedded Assessment

Assessment placed directly within instruction, content, courseware, or workflow.
Example: *A simulation pauses for a prediction before revealing the result.*

Formative Assessment

Assessment during learning used to provide feedback and adjust instruction, pacing, content, or support.
Example: *A check for understanding changes tomorrow's grouping.*

Gating

A conditional mechanism permitting progression only after specified criteria are met.
Example: *The learner advances after demonstrating prerequisite mastery.*

Grouping

Creating learner groups according to readiness, need, interest, evidence, or another defined condition.
Example: *A teacher accepts one proposed group and adjusts another.*

Individualization

Educator or system decisions made for an individual learner, often involving pace, support, level, or resource choice.
Example: *A teacher assigns additional decoding practice to one learner.*

Instructional Recommendation

A suggested teaching action connected to evidence and curriculum context.
Example: *The recommendation proposes a brief model, warm-up, and follow-up question.*

Lesson Compression

Condensing a lesson for reduced instructional time while preserving essential objectives and sequence.
Example: *A 60-minute lesson becomes a teacher-approved 30-minute version after a weather disruption.*

Lesson Versioning

Creating modified lesson versions while preserving the original, lineage, and instructional intent.
Example: *A teacher creates a shortened version without overwriting the adopted lesson.*

Locked or Fixed Pathway

A predetermined sequence through which learners progress, often with assessments acting as gates.
Example: *Learners can move faster or slower but encounter the same ordered content.*

Loops and Branches

Alternative programmed pathways routing learners to remediation, reinforcement, extension, or return points.
Example: *An incorrect response branches to an explanation and then returns to the sequence.*

Mastery Progression

A sequence in which advancement depends on demonstrated competence rather than only time or completion.
Example: *A learner revisits a prerequisite before moving forward.*

Misconception

A coherent but inaccurate understanding that produces a pattern of errors.
Example: *Several learners apply the same incorrect fraction rule.*

Misconception Analysis

Identification of evidence patterns suggesting a specific misunderstanding rather than only an incorrect answer.
Example: *The system groups responses by misconception and presents the underlying items.*

Open-Response Feedback

Feedback on explanations, essays, drawings, models, or other constructed responses.
Example: *The system drafts a comment tied to the rubric and lesson context.*

Personalization

Learner and educator participation in shaping methods, focus, pace, sequence, resource type, or pathway.
Example: *A learner chooses the presentation format and helps set pacing goals.*

Practice Generation

Creation of additional aligned practice from the active lesson or skill context.
Example: *The system generates five new problems at matched cognitive demand.*

Pre-Assessment

An evaluation used before instruction to estimate current knowledge, skill, readiness, or placement.
Example: *A short diagnostic identifies prerequisite gaps before the unit.*

Prerequisite Detection

Identification of missing foundational knowledge needed for current learning.
Example: *Difficulty with equations is traced to an earlier misunderstanding of inverse operations.*

Recommendation Engine

A system suggesting resources, activities, pathways, groups, or actions based on rules, relationships, behavior, or models.
Example: *The system recommends a warm-up and explains the evidence behind it.*

Rubric

A scale or matrix describing criteria and performance levels for evaluating work.
Example: *A digital rubric connects criterion-level feedback with revision.*

Scaffolding

Temporary supports helping learners progress toward stronger understanding or independence.
Example: *Sentence frames are reduced as the learner gains control.*

Selective Release

Making content or functionality available only after a condition is met.
Example: *A lab opens after the safety check is completed.*

Standards-Preserving Adaptation

Changing language, support, time, modality, or level while maintaining intended standards and scope.
Example: *A multilingual scaffold remains connected to the same core objective.*

Summative Assessment

Assessment after a defined period of learning used to determine achievement, mastery, or a final result.
Example: *A performance task concludes the unit.*

Teacher Control

The educator's authority to review, edit, reject, reassign, approve, pause, or reverse system outputs and actions.
Example: *An adaptation does not become live until the teacher approves it.*

Timed Release

Making content or functionality available at a specified time.
Example: *A test becomes visible at the scheduled start.*

Timed Rollout

Advancing users to new content according to a preset interval whether or not readiness has been demonstrated.
Example: *A weekly module opens automatically every Monday.*

Trigger

A defined condition that automatically causes a system action.
Example: *A low score triggers a teacher alert and suggested practice.*

PART VIII

Instructional Approaches & Learning Design

How curriculum expects teaching and learning to occur

Curriculum does not teach by itself. Every curriculum, courseware product, intervention, lesson system, or digital resource carries assumptions about how knowledge will be introduced, modeled, explored, practiced, discussed, applied, and demonstrated.

Some learning requires clear explanation and carefully sequenced practice. Some requires questioning, investigation, collaboration, application, or reflection. Learners may need different combinations of these approaches depending on what they already know, what they are learning, and the degree of independence the task requires.

The procurement question is not which instructional philosophy wins. It is whether the adopted resource uses appropriate approaches for the intended learning, distinguishes among them clearly, and gives teachers and learners the support, time, evidence, and flexibility each approach requires.

Key terms

Activity-Based Learning
Learning organized around purposeful learner action, manipulation, construction, practice, experimentation, or participation.
Example: *Learners construct several electrical circuits and compare what changes when components are rearranged.*

Buyer lens: *An activity is not automatically a learning approach. Determine what knowledge or performance it develops, how it connects to instruction, and what evidence of learning it produces.*

Authentic Learning
Learning connected to meaningful problems, audiences, products, performances, settings, or consequences beyond the completion of a school exercise.
Example: *Learners use local transportation data to develop and defend an accessibility recommendation.*

Cross-reference: *See Authentic Learning in Digital Learning Foundations.*

Blended Learning
An instructional design combining in-person and digital learning in a coordinated experience.
Example: *Learners receive a live introduction, complete digital practice with feedback, join a teacher-led small group based on evidence, and return to independent application.*

Buyer lens: *Inspect movement among modes, continuity of context and evidence, teacher visibility, connectivity requirements, scheduling, and coordination work.*

Case-Based Learning
Learning through analysis of a bounded situation containing relevant facts, conditions, decisions, constraints, and consequences.
Example: *School leadership students examine a scheduling case, identify competing constraints, compare possible decisions, and defend a course of action.*

Collaborative Learning
Learning in which learners work together intentionally to understand, solve, create, interpret, investigate, or produce a shared outcome.
Example: *A group compares sources, develops a joint interpretation, and reconciles conflicting evidence before presenting its conclusion.*

Buyer lens: *Look for joint thinking, visible contributions, purposeful interaction, individual evidence of learning, and teacher visibility.*

Competency-Based Learning
Learning organized around demonstrated knowledge, skills, practices, or capabilities, with progression based substantially on evidence of competency rather than only seat time or activity completion.
Example: *A learner advances after demonstrating the required analytical skill through an acceptable performance, even if the time required differs from that of other learners.*

Buyer lens: *Verify the definition, granularity, evidence standards, reassessment rules, reporting implications, and relationship to adopted academic standards.*

Cooperative Learning
A structured form of group learning using defined roles, shared purpose, interdependence, individual accountability, participation expectations, or group-processing routines.
Example: *Each learner investigates one component of an ecosystem, teaches it to the group, and contributes evidence required for the group's complete model.*

Buyer lens: *Determine whether the structure prevents one learner from performing all the work and whether each learner remains accountable for the intended knowledge.*

Deliberate Practice

Focused, repeated practice directed at a defined aspect of performance, accompanied by usable feedback and adjustment.

Example: *A learner practices one difficult component of oral fluency, receives specific feedback, adjusts, and repeats before returning to the complete passage.*

Design-Based Learning

Learning through the iterative design, testing, evaluation, and revision of an artifact, system, solution, or experience.

Example: *Learners design a water-filtration system, test performance, inspect failure points, revise the design, and explain the relationship between material choices and outcomes.*

Dialogic Instruction

Instruction in which understanding is developed through disciplined dialogue, questioning, explanation, listening, response, and consideration of multiple ideas or perspectives.

Example: *Learners test several interpretations of a text by citing evidence, challenging reasoning, and revising claims during discussion.*

Direct Instruction (DI)

A specific, highly structured instructional model associated with Siegfried Engelmann in which content, examples, prompts, learner responses, corrections, and lesson sequences are deliberately designed to support accurate and efficient learning.

Example: *A reading program specifies the sequence for teaching a decoding pattern, the language used to introduce it, the examples presented, expected student responses, error-correction procedures, and practice required before progression.*

Buyer lens: *Distinguish the named Direct Instruction model from the broader use of direct instruction to mean any teacher-led explanation.*

Direct Teaching

Teacher-led presentation, explanation, demonstration, questioning, or practice intended to build specified knowledge or skill.

Example: *A teacher explains the relationship between numerator and denominator, demonstrates several representations, and asks targeted questions before students begin practice.*

Buyer lens: *Direct teaching is not automatically Direct Instruction and is not necessarily explicit, systematic, sufficiently modeled, or responsive to evidence.*

Discovery Learning

An approach in which learners identify concepts, relationships, principles, or procedures through exploration and interpretation rather than receiving the complete explanation in advance.

Example: *Learners manipulate geometric figures and compare measurements to identify a recurring relationship before the formal rule is named.*

Buyer lens: *Determine what learners are expected to discover, what prior knowledge is assumed, what boundaries make discovery productive, and how inaccurate conclusions will be detected and corrected.*

Discussion-Based Instruction

Instruction organized substantially through purposeful oral or written discussion guided by a question, text, problem, evidence set or intended understanding.

Example: *Learners discuss whether a historical decision was justified, using source evidence and responding directly to competing claims.*

Buyer lens: *Look for discussion purposes, participation structures, evidence expectations, teacher guidance, inclusion supports, and a way to determine what individual learners understood.*

Experiential Learning

Learning developed through direct experience combined with reflection, interpretation, conceptualization, or later application.

Example: *Learners operate a simulated enterprise, examine the consequences of their decisions, connect the experience to economic concepts, and revise their strategy.*

Buyer lens: *Look for structured reflection and conceptual connection. Experience alone does not ensure that the intended learning becomes understood or transferable.*

Explicit Instruction / Explicit Teaching

A systematic approach in which the intended knowledge or skill is made clear, broken into manageable elements, modeled, practiced with support, checked for understanding, and transferred toward independent performance.

Example: *Before learners independently identify the main idea of a passage, the lesson models the thinking process, works through examples with them, checks understanding, provides feedback, and then assigns independent application.*

Buyer lens: *Teacher directions alone do not make a resource explicit. Look for clear explanations, modeling, examples and non-examples, guided practice, frequent responses, corrective feedback, independent practice, and review.*

Flipped Learning

An instructional arrangement in which some initial exposure to content occurs before or outside shared instructional time so live time can be used for practice, discussion, application, feedback, or support.

Example: *Learners review a short explanation before class and use class time to solve difficult problems with teacher guidance.*

Buyer lens: *Determine whether learners can access and understand preparatory material, what happens when preparation is incomplete, and whether the live experience truly changes.*

Gradual Release of Responsibility

A planned movement of cognitive responsibility from teacher modeling and guided participation toward increasingly independent learner performance.

Example: *A teacher first models analysis of a source, analyzes another with the class, supports pairs working on a third, and then asks learners to analyze a new source independently.*

Buyer lens: *Look for a real transfer of thinking, not merely a sequence in which the teacher talks, students complete a worksheet, and support disappears.*

Guided Instruction / Guided Learning

Instruction in which learners perform an increasing share of the cognitive work while receiving purposeful prompts, questions, examples, feedback, modeling, or scaffolds from a teacher or instructional system.

Example: *Learners solve a multistep problem while the teacher uses prepared questions to surface misconceptions and move their reasoning forward without simply supplying the answer.*

Guided Practice

Supported performance of a newly introduced skill or process before learners are expected to perform it independently.

Example: *Learners identify the main idea of several passages with teacher questioning and immediate feedback before completing an unfamiliar passage alone.*

Independent Practice

Learner performance undertaken with limited immediate support after sufficient instruction and guided practice have established readiness.

Example: *After modeled and guided work with fraction equivalence, learners solve unfamiliar problems and explain their reasoning independently.*

Buyer lens: *Verify that independent work follows adequate preparation and produces evidence the teacher can use, rather than functioning as unsupported discovery or completion work.*

Inquiry-Based Learning

Learning organized around questions, investigation, evidence, explanation, and the development or testing of ideas.

Example: *Learners investigate why the same material changes temperature at different rates, collect observations, compare explanations, and defend a conclusion using evidence.*

Buyer lens: *Look for substantive questions, access to appropriate evidence, purposeful teacher guidance, clear learning intentions, and a way to distinguish productive investigation from unguided activity.*

Instructional Approach

A planned way of organizing teaching and learning to achieve an intended learning outcome.

Example: A unit may use explicit instruction to introduce an unfamiliar procedure, guided practice to stabilize it, and inquiry to apply it to a new problem.

Instructional Approach Fit

The degree to which an instructional approach is appropriate to the intended knowledge or skill, learner readiness, desired outcome, available evidence, and level of support required.

Example: *Learners receive direct modeling for an unfamiliar decoding pattern before being expected to investigate its use across unfamiliar words.*

Instructional Model Inheritance

The teaching and learning behaviors, roles, routines, time requirements, group structures, and support obligations a district assumes when it adopts a curriculum, courseware product, or instructional system.

Example: *A project-centered curriculum may require extended blocks, group management, material coordination, teacher conferencing, and common expectations for evaluating collaborative work.*

Interdisciplinary Learning

Learning that intentionally connects knowledge, methods, perspectives, or practices from more than one discipline around a common question, problem, theme, or outcome.

Example: *Learners combine mathematics, environmental science, writing, and civic analysis to develop a local water-use recommendation.*

Buyer lens: *Determine whether each discipline contributes substantive knowledge and evidence or merely supplies a decorative connection.*

Mastery Learning

An instructional approach in which learners receive additional time, instruction, feedback, or corrective support until they demonstrate defined learning expectations before advancing.

Example: *A learner who has not demonstrated understanding of fraction equivalence receives a different explanation and targeted practice before progressing.*

Buyer lens: *Identify how mastery is defined, what evidence is required, what happens when it is not demonstrated, and whether additional support preserves curriculum coherence.*

Mastery Progression

A progression mechanism in which advancement depends on demonstrated competence rather than only elapsed time, exposure, completion, or calendar movement.

Example: *A learner revisits a prerequisite concept and provides new evidence before an advanced module becomes available.*

Cross-reference: *See Mastery Progression in Curriculum, Courseware & Assessment.*

Metacognitive Instruction

Instruction that explicitly develops learners' ability to understand, select, monitor, evaluate, and adjust their own learning and thinking strategies.

Example: *A teacher models how to plan an approach to an unfamiliar problem, monitor whether the approach is working, and decide when to change strategies.*

Buyer lens: *Look for explicit strategy teaching, teacher modeling, supported application, reflection tied to actual learning, and gradual movement toward independent regulation.*

Modeling

Demonstration of a process, skill, strategy, decision, or completed performance so learners can observe what successful performance involves.

Example: *A teacher models how to compare two historical accounts by identifying the source, perspective, evidence, agreement, and contradiction in each.*

Peer Learning

Learning supported through structured explanation, feedback, demonstration, questioning, comparison, or practice among learners.

Example: *Learners exchange written explanations, identify each other's evidence and assumptions, and revise their responses using defined criteria.*

Peer Tutoring

A structured arrangement in which one learner provides another learner with guided explanation, modeling, practice, questioning, or feedback under defined instructional expectations.

Example: *A trained peer tutor conducts brief fluency practice using a specified routine and records evidence for teacher review.*

Buyer lens: *Examine tutor preparation, accuracy controls, learner matching, teacher oversight, privacy, and the process for correcting errors.*

Personalized Learning

Learning in which methods, pace, sequence, resources, goals, supports, choices, or pathways are shaped partly around the learner while remaining connected to defined expectations.

Example: *Learners work toward a common standard through different resources, pacing arrangements, and forms of supported practice.*

Buyer lens: *Determine what is personalized, who controls the change, which evidence drives it, and whether variation preserves scope, rigor, and instructional coherence.*

Problem-Based Learning

Learning organized around a complex problem that creates the need to identify, acquire, integrate, and apply relevant knowledge.

Example: *Learners determine how a community can reduce flooding by studying rainfall, land use, drainage, cost, environmental effects, and competing stakeholder priorities.*

Buyer lens: *Verify that solving the problem requires the intended disciplinary knowledge and is not merely a general activity with academic content attached.*

Project-Based Learning

Learning organized through a sustained question, challenge, or purpose that results in a developed product, performance, presentation, recommendation, or other public or consequential outcome.

Example: *Learners research local water quality over several weeks and produce an evidence-based public briefing for a community audience.*

Buyer lens: *Inspect the knowledge sequence, project-management demands, individual accountability, assessment criteria, collaboration structures, required materials, and teacher coordination load.*

Reflective Learning
Learning strengthened by intentionally examining an experience, decision, product, strategy, result, or change in understanding.
Example: *After completing a group investigation, learners identify which evidence changed their conclusion and what they would do differently in a future investigation.*

Retrieval Practice
Deliberate recall and use of previously learned information without relying entirely on rereading or immediate access to the original material.
Example: *Learners explain a previously taught concept from memory and then compare their response with source material to correct omissions or errors.*

Scaffolding
Temporary support that helps a learner engage with knowledge, thinking, or performance that is not yet fully manageable independently.
Example: *A learner initially uses a visual organizer and sentence frames to construct an evidence-based explanation; the supports are reduced as proficiency increases.*

Buyer lens: *Determine whether scaffolds preserve the intended thinking, respond to a specific barrier, and can be reduced, rather than permanently simplifying the learning.*

Self-Directed Learning
Learning in which the learner assumes substantial responsibility for identifying goals, selecting strategies or resources, organizing activity, monitoring progress, seeking support, or demonstrating completion.
Example: *A learner defines a research question, develops a plan, selects sources, monitors milestones, requests expert feedback, and presents evidence of learning.*

Buyer lens: *Determine what prior knowledge, executive functioning, reading ability, time management, navigation skill, and access to support the approach assumes.*

Self-Regulated Learning
The learner's active planning, monitoring, adaptation, and evaluation of attention, effort, strategies, progress, and performance.
Example: *A learner recognizes that rereading is not producing understanding, switches to retrieval and self-explanation, and checks whether recall improves.*

Situated Learning
Learning developed within, or closely connected to, the setting, community, tools, language, and practices in which the knowledge will be used.
Example: *Learners develop laboratory procedures while working with the instruments, documentation practices, safety expectations, and forms of reasoning used in an actual lab environment.*

Socratic Seminar
A structured discussion in which participants examine a text, question, idea, or problem through evidence-based questioning and dialogue rather than relying primarily on lecture or recitation.
Example: *Learners examine competing conceptions of justice by developing questions, citing passages, responding to peers, and revising their interpretations.*

Station Rotation
An instructional arrangement in which learners move among planned learning stations involving teacher instruction, collaborative work, independent practice, digital learning, or other modes.
Example: *One group receives targeted teacher instruction while others complete aligned practice, collaborative analysis, and digital feedback activities.*

Buyer lens: *Examine transition time, grouping logic, supervision, device access, evidence continuity, teacher workload, and whether each station contributes to the same purpose.*

Think-Aloud
Verbal modeling in which a teacher or proficient performer makes normally hidden thinking, monitoring, decision-making, or problem-solving processes visible.
Example: *The teacher explains why one piece of evidence is stronger than another while constructing an argument.*

Worked Example
A completed or partially completed demonstration showing the steps, decisions, relationships, or reasoning involved in solving a problem or producing a result.
Example: *A mathematics lesson presents a solved equation with annotations explaining why each transformation is valid.*

Workshop Model
An instructional structure commonly combining a focused opening lesson, extended learner work or practice, teacher conferencing or small-group support, and reflection or sharing.

Example: *A writing workshop begins with a brief model of revision, continues with supported drafting and conferences, and closes with learners explaining a revision decision.*

Buyer lens: *Determine what teachers must diagnose in real time, what resources support conferencing, and how individual progress becomes visible.*

Evaluating Instructional Approach Fit

When an instructional approach appears in a product description or adoption review, do not ask only whether the approach is present or whether educators prefer it. Instructional approaches are not interchangeable. Their suitability depends on what is being learned, the learner's age and developmental readiness, prior knowledge, the evidence supporting the approach for that purpose, and what the learner is being asked to do.

Questions to ask may include:

- What is being learned? Is the intended outcome foundational knowledge, a procedure, conceptual understanding, fluency, investigation, application, creation, collaboration, or transfer?
- Who are the learners? What does their age and developmental readiness reasonably allow the instructional design to assume?
- What prior knowledge is required? Does the approach teach necessary prerequisite knowledge or presume learners already possess it?
- What evidence supports this instructional approach for this type of learning and learner?
- What does the teacher need to explain, model, demonstrate, facilitate, monitor, or correct?
- What cognitive work should the learner perform, and when is the learner ready to perform it independently?
- When and how should responsibility move from teacher to learner?
- Does inquiry or discovery occur after sufficient prerequisite knowledge has been established, or does the resource make learners discover foundational knowledge they do not yet possess?
- How does the resource detect misunderstanding, missing prerequisite knowledge, or insufficient readiness?
- What happens when the instructional approach is not producing learning?
- Can the method change in response to evidence, or does the resource continue the same approach regardless of learner response?
- What grouping, time, materials, space, technology, and staffing does the approach require?
- What evidence demonstrates that learning occurred rather than merely participation, activity, or completion?
- Does the resource use different instructional approaches deliberately for different learning purposes, or impose one approach across subjects, ages, and learning conditions?
- What preparation, coordination, review, intervention, and exception-handling work will teachers inherit?
- Can teachers alter the instructional approach when learner evidence warrants it without breaking curriculum sequence, rigor, evidence, or reporting?

The purpose of asking such questions is to treat instructional approaches as unequal choices that should depend on the age group, subject, and needs, not just prevailing educator preference. One method is not universally superior. The question is fit: what is being learned, by whom, from what starting point, using what evidence-supported method, and with what result. A strong instructional design deliberately matches method to the knowledge or capability being developed and the learner's readiness, then changes support or approach when evidence shows learning is not occurring.

A district does not adopt content alone. It adopts assumptions about how teaching and learning will occur, who will perform the work, and what must be true for the design to succeed.

PART IX

Learning Architectures & Operating Models

How the structure and form of schooling organize curriculum, instruction, people, technology, & time

A **school model** is more than a philosophy, schedule, instructional method, technology platform, or physical setting. It is the structural form through which teaching and learning are delivered. That form determines how learners are grouped, how time is allocated, how curriculum moves, where teaching occurs, which adults do what work, what technology performs, how evidence changes what happens next, and ultimately what organizational roles and workflows are required to make the model function.

This distinction matters because very different schools may use the same curriculum or instructional method inside fundamentally different operating structures. A district school may organize learners primarily by age, grade, class, teacher, subject, and fixed instructional blocks. An online school may preserve many of those structures in a virtual environment or use asynchronous course progression with scheduled human support. An AI-primary model may shift substantial core instruction to an AI instructional agent while adults assume different teaching, coaching, mentoring, and experiential roles. A time-orchestrated model may form groups and schedule live teaching according to learner readiness, evidence, availability, or project need. A family or learner may assemble a pathway across schools, courses, tutors, community programs, projects, online providers, and independent experiences.

These are not simply different **instructional approaches**. Explicit instruction, guided practice, inquiry, projects, collaboration, or independent learning can occur within many different school models. The larger architecture determines **where, when, with whom, and under what operating conditions those methods occur.**

Nor is technology itself the model. Artificial intelligence may be used by an individual teacher or learner, embedded within bounded curriculum, act as a primary instructional agent, connect multiple systems, or participate in broader organizational orchestration. The consequential question is not merely whether a school "uses AI," but **where intelligence sits in the architecture, what work it performs, what authority it holds, and what work and judgment remain human.**

Schooling is becoming more structurally diverse

The familiar school form has historically bundled many things together: age and grade, teacher and class, subject and period, curriculum and pacing, building and schedule. Increasingly, those elements can be **disassembled and recombined**.

A learner can belong to a school while taking an online course elsewhere. Instruction can be synchronous without being physically co-located, or asynchronous without being independent of teachers. Learners can remain enrolled by grade while temporarily grouping by readiness. A common curriculum can support different lesson versions and pacing. Multi-grade learners can work together around a project while maintaining different academic expectations. Families can combine institutional schooling with tutoring, community experiences, online courses, projects, travel, or independently organized learning.

The result is not one inevitable "future school model." It is an expanding landscape of possible forms. Understanding that landscape requires looking below the model name and asking what actually organizes it.

A meaningful description of a school model should make visible:

- **Primary organizing unit:** Is learning principally organized around the class, instructional block, course, cohort, project, individual learner, or wider learning ecosystem?
- **Learner grouping:** Are learners grouped predominantly by age and grade, course enrollment, readiness, interest, support need, project role, or changing combinations?
- **Time architecture:** Does learning follow a fixed master schedule, flexible blocks, self-paced progression, scheduled synchronous and asynchronous periods, or dynamically orchestrated time?
- **Curriculum architecture:** Is the path common and fixed, branched, individually paced, recommendation-supported, adaptively versioned, project-centered, or assembled across multiple sources?
- **Instructional approach:** When are explicit teaching, modeling, guided practice, inquiry, collaboration, projects, independent work, intervention, or other methods used?
- **Human roles:** Who teaches, monitors, coaches, mentors, intervenes, evaluates, coordinates, designs, and makes consequential decisions?
- **Technology role:** Does technology primarily deliver content, manage workflow, collect evidence, recommend action, adapt learning, or coordinate the environment?
- **AI role and reach:** Is AI used independently, within bounded curriculum or systems, across connected systems, as a primary instructional agent, or for broader organizational orchestration?
- **Evidence and responsiveness:** What evidence is collected, who interprets it, and can it change instruction, grouping, pace, time, or pathway?
- **Learning setting:** Does learning occur primarily in a school building, online, across multiple physical sites, at home, in community settings, or across a combination?

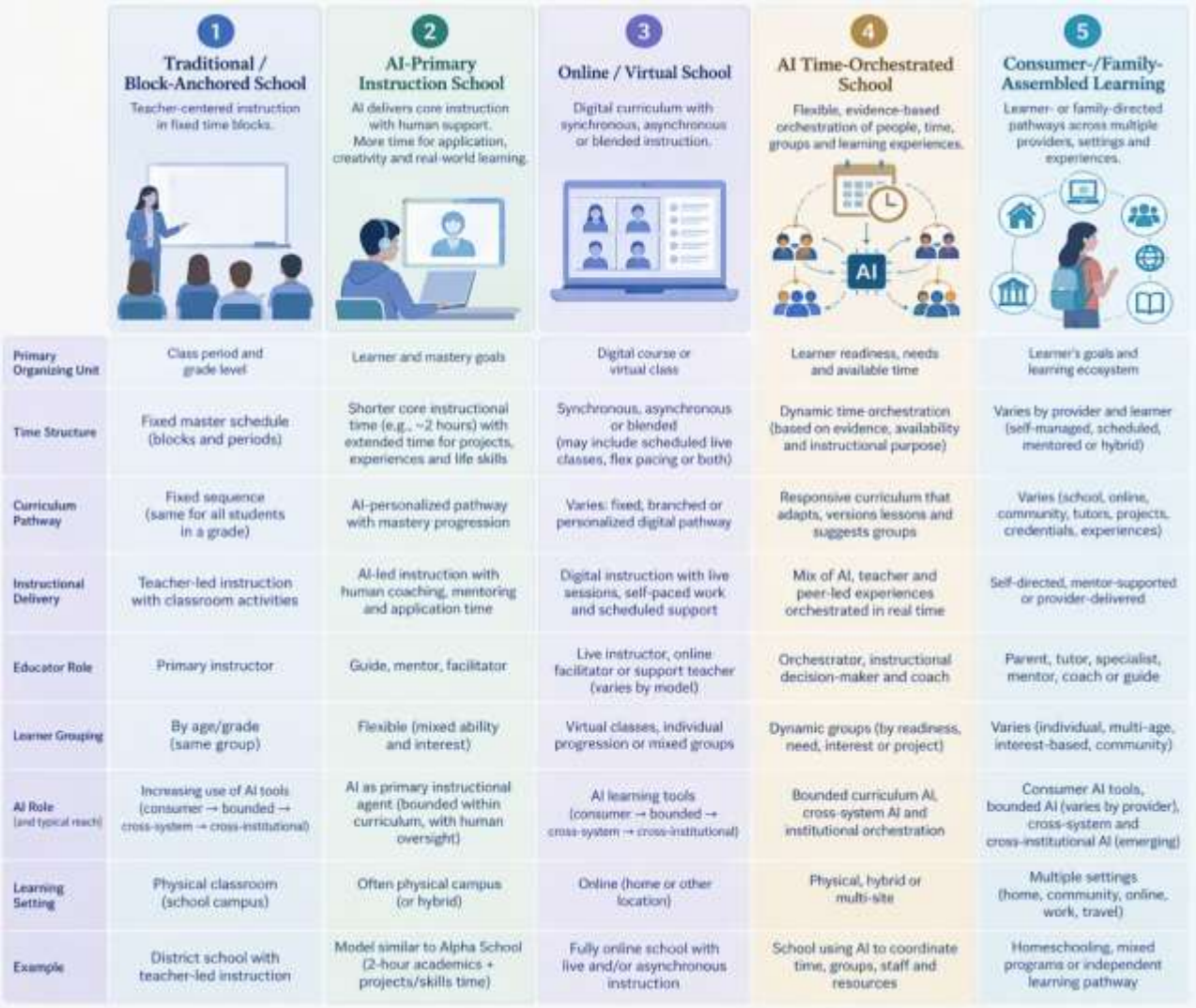
- **Organizational architecture:** What roles, staffing, reporting relationships, ownership, workflows, schedules, spaces, and decision rights does the model require?
- **Learner experience:** What does the architecture ultimately mean for what the learner does, controls, encounters, waits for, chooses, and experiences?

Change the school model and the organization beneath it may also have to change.

A model that changes learner grouping, instructional time, the teacher's role, curriculum progression, or the role of AI cannot necessarily be supported by the same staffing assumptions, master schedule, departmental boundaries, job descriptions, workflows, technology stack, space allocation, and decision rights.

That is why a school model should be examined as an **operating architecture**, not just an educational idea.

Schooling Operating Models, Structures & Forms



	1 Traditional / Block-Anchored School	2 AI-Primary Instruction School	3 Online / Virtual School	4 AI Time-Orchestrated School	5 Consumer-/Family-Assembled Learning
	Teacher-centered instruction in fixed time blocks.	AI delivers core instruction with human support. More time for application, creativity and real-world learning.	Digital curriculum with synchronous, asynchronous or blended instruction.	Flexible, evidence-based orchestration of people, time, groups and learning experiences.	Learner- or family-directed pathways across multiple providers, settings and experiences.
Primary Organizing Unit	Class period and grade level	Learner and mastery goals	Digital course or virtual class	Learner readiness, needs and available time	Learner's goals and learning ecosystem
Time Structure	Fixed master schedule (blocks and periods)	Shorter core instructional time (e.g., ~2 hours) with extended time for projects, experiences and life skills	Synchronous, asynchronous or blended (may include scheduled live classes, flex pacing or both)	Dynamic time orchestration (based on evidence, availability and instructional purpose)	Varies by provider and learner (self-managed, scheduled, mentored or hybrid)
Curriculum Pathway	Fixed sequence (same for all students in a grade)	AI-personalized pathway with mastery progression	Varies: fixed, branched or personalized digital pathway	Responsive curriculum that adapts, versions lessons and suggests groups	Varies (school, online, community, tutors, projects, credentials, experiences)
Instructional Delivery	Teacher-led instruction with classroom activities	AI-led instruction with human coaching, mentoring and application time	Digital instruction with live sessions, self-paced work and scheduled support	Mix of AI, teacher and peer-led experiences orchestrated in real time	Self-directed, mentor-supported or provider-delivered
Educator Role	Primary instructor	Guide, mentor, facilitator	Live instructor, online facilitator or support teacher (varies by model)	Orchestrator, instructional decision-maker and coach	Parent, tutor, specialist, mentor, coach or guide
Learner Grouping	By age/grade (same group)	Flexible (mixed ability and interest)	Virtual classes, individual progression or mixed groups	Dynamic groups (by readiness, need, interest or project)	Varies (individual, multi-age, interest-based, community)
AI Role (and typical reach)	Increasing use of AI tools (consumer → bounded → cross-system → cross-institutional)	AI as primary instructional agent (bounded within curriculum, with human oversight)	AI learning tools (consumer → bounded → cross-system → cross-institutional)	Bounded curriculum AI, cross-system AI and institutional orchestration	Consumer AI tools, bounded AI (varies by provider), cross-system and cross-institutional AI (emerging)
Learning Setting	Physical classroom (school campus)	Often physical campus (or hybrid)	Online (home or other location)	Physical, hybrid or multi-site	Multiple settings (home, community, online, work, travel)
Example	District school with teacher-led instruction	Model similar to Alpha School (2-hour academics + projects/skills time)	Fully online school with live and/or asynchronous instruction	School using AI to coordinate time, groups, staff and resources	Homeschooling, mixed programs or independent learning pathway

Key terms

Learning Architecture
The overall design connecting curriculum, instruction, assessment, supports, technology, people, evidence, and time.
Example: *A coherent architecture makes the path from lesson to evidence to support visible.*

Instructional Architecture
The designed relationship among curriculum, instructional approaches, lessons, assessment, teacher action, learner pathways, pacing, grouping, and support.
Example: *A resource may contain strong content while imposing a fragmented instructional architecture.*

Curriculum Architecture
The structure connecting standards, concepts, prerequisites, units, lessons, assessments, adaptations, and instructional resources.
Example: *Curriculum architecture shows what can change without breaking coherence.*

Block-Anchored Architectures

In a block-anchored architecture, the assigned instructional period remains the outer container. Methods, digital tools, differentiation, intervention, and learner choice may vary considerably, but they are primarily organized within or around the scheduled block.

Block-Anchored Architecture
A learning architecture in which a recurring instructional block, class period, room, teacher, or predetermined group remains the primary container for learning.
Example: *A school may add digital practice and flexible groups while learners still begin and end inside the same scheduled class period.*

Bookended Cohort Architecture
An architecture using a shared opening and closing around differentiated group, individual, project, intervention, or digital work.
Example: *A class begins with a common context-setting lesson, separates into varied work, and reunites for synthesis and reflection.*

Responsive Intervention Architecture
A common instructional structure supplemented by evidence-triggered regrouping, additional explanation, practice, or intervention.
Example: *A check for understanding identifies learners who receive a short targeted lesson before returning to the common sequence.*

Station-Rotation Architecture
A block-anchored arrangement in which learners move among planned stations involving teacher instruction, collaboration, independent practice, digital learning, or other modes.
Example: *One group receives targeted teacher instruction while other groups complete aligned practice and digital work.*

Tiered / MTSS Architecture
An architecture connecting common core instruction with increasingly targeted supplemental and intensive supports, evidence review, ownership, and progress monitoring.
Example: *Tier 2 support remains connected to Tier 1 objectives while adding focused instruction and more frequent evidence checks.*

Traditional Whole-Group Architecture
A block-anchored model in which a predetermined group commonly encounters shared instruction, sequence, pacing, and assessment under educator leadership.
Example: *The class begins the same lesson together and progresses through a common instructional sequence.*

Workshop Architecture
A structure commonly combining a focused opening lesson, extended learner work or practice, teacher conferencing or small-group support, and reflection or sharing.
Example: *A writing workshop begins with a revision model, continues with drafting and conferences, and closes with learners explaining a revision decision.*

Time-Organized Architectures

Time becomes architectural when readiness, sequence, duration, availability, dependencies, live teaching, independent work, and changing conditions are coordinated as connected variables rather than merely placed inside fixed calendar blocks.

Course-Centered Architecture
An architecture organizing progression, evidence, support, and live teaching around a defined course or pathway rather than only a fixed classroom block.
Example: *A learner stays connected to the course while moving among independent study, temporary cohorts, and teacher-led moments.*

Dynamic Instructional Intersection
A live learning event created when learner readiness, instructional need, educator availability, sequence, and other conditions align.
Example: *A temporary group meets for a misconception-focused lesson and dissolves after the need is resolved.*

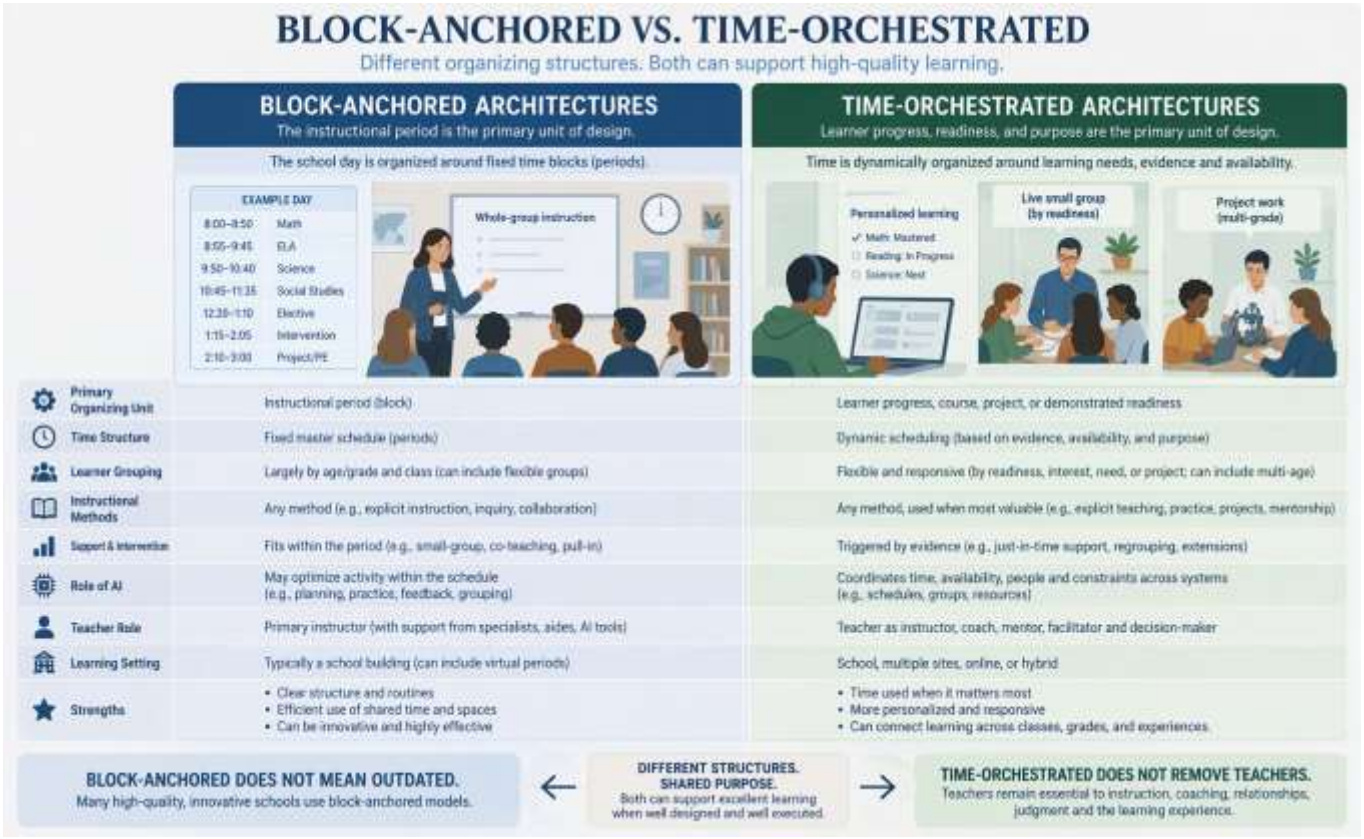
Cross-reference: *See Time, Pace & Orchestration for Time AI, dynamic cohorting, class moments, and calendar intelligence.*

Flex-Time Architecture
A planned portion of learning time in which learners move among independent practice, projects, intervention, conferencing, collaboration, or completion according to defined conditions.
Example: *A teacher uses readiness evidence to meet one group while other learners work through assigned course steps.*

Independently Paced Course Architecture

A course-centered architecture in which learners progress according to readiness, completion evidence, or approved pacing conditions while remaining connected to course standards and support.

Example: *Learners spend different amounts of time on a study step and join teacher instruction when evidence indicates need or readiness.*



Instructional Bookend

A common opening or closing experience framing varied learning activity between the two shared moments.

Example: *A whole-group launch establishes purpose and a closing session reconnects evidence, reflection, and next actions.*

Shared Anchor

A common instructional event, understanding, expectation, or milestone that connects learners moving through varied paths or paces.

Example: *All learners join a concept launch even though later practice and support differ.*

Teacher-Guided Time-Orchestrated Architecture

An architecture in which educators retain instructional leadership while learner time, groups, supports, independent work, and live intersections are dynamically coordinated.

Example: *A teacher launches a concept, the class separates into varied pathways, and learners reunite for selected instruction and synthesis.*

Time as the Organizing Architecture

A design principle in which timing, readiness, sequence, pace, availability, dependencies, and instructional intersections actively shape how learning is organized.

Example: *A live teaching moment is created when the right learners, educator, content, and readiness conditions intersect.*

Cross-reference: *See Time, Pace & Orchestration for Time AI, dynamic cohorting, class moments, and calendar intelligence.*

Time-Organized Learning Architecture

A learning architecture in which time and learner state are active design variables rather than only calendar containers.

Example: *Learners progress through a course at different rates while live instruction and support are coordinated around readiness and need.*

Variable-Bounded Whole-Group Architecture

A whole-group architecture permitting defined variation in learner pace while maintaining shared anchors, acceptable pacing bounds, and common milestones.

Example: *Learners may be several lessons apart but remain within a teacher-visible window leading toward a shared assessment period.*

AI Operating Roles in Learning

AI can serve a teacher, communicate with a learner, operate inside curriculum, or coordinate activity across multiple systems. The critical question is not whether AI is present. It is where AI operates, what authority it holds, what evidence it uses, and who remains accountable.

AI as Primary Instructional Agent

AI that performs a substantial portion of explanation, questioning, feedback, progression, or next-step determination directly with the learner while authorized people retain defined oversight and intervention responsibilities.

Example: *An AI tutor leads a learner through a sequence while the teacher reviews evidence, intervenes, and controls consequential decisions.*

Buyer lens: *Determine whether the design clearly defines curriculum boundary, instructional authority, escalation, age suitability, evidence visibility, and the work still assigned to people.*

AI Role Inheritance

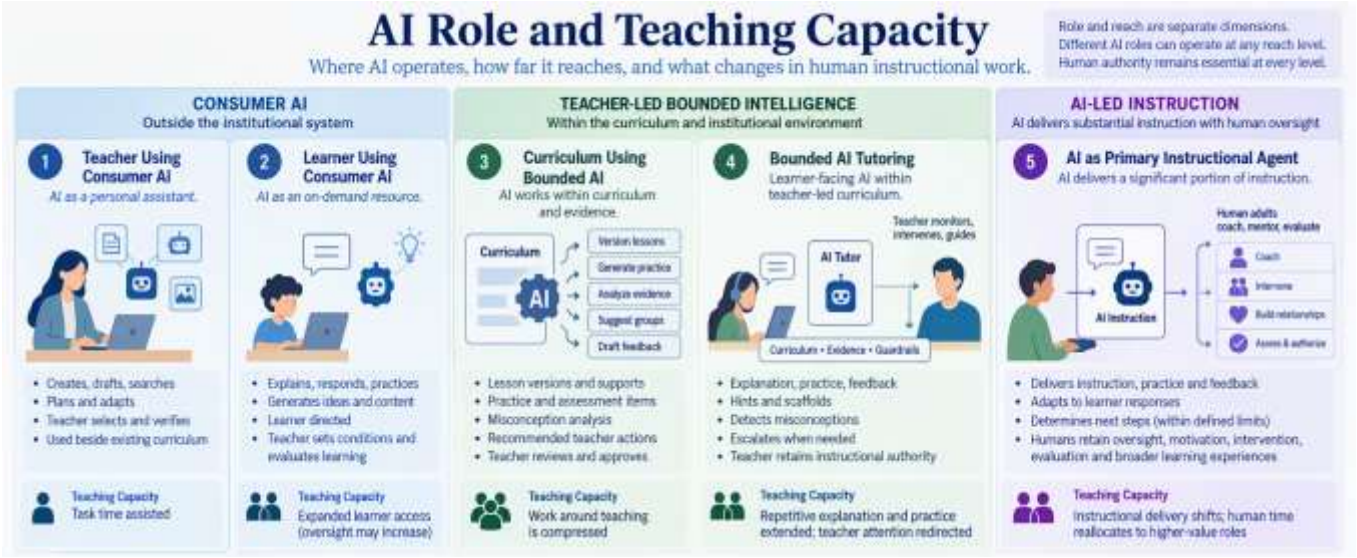
The human responsibilities, oversight work, decision rights, risks, and learner relationships created when AI occupies a particular role in a learning architecture.

Example: *A learner-facing tutor may reduce some explanation work while creating monitoring, escalation, verification, and communication duties.*

Bounded Curriculum Intelligence

AI constrained to approved curriculum, evidence, roles, functions, permissions, and human controls.

Example: *The system versions a lesson, preserves standards and lineage, and requires teacher approval before release.*



Cross-System AI

AI that analyzes, recommends, or coordinates work across more than one authorized institutional system.

Example: *Assessment evidence informs grouping and scheduling across connected systems.*

Curriculum-Embedded AI

AI operating within curriculum or courseware context to perform defined generation, adaptation, analysis, recommendation, assessment, or workflow functions.

Example: *The active lesson supplies the context for generated practice and feedback.*

Instructional Authority Boundary

The defined limit separating what AI may generate, recommend, adapt, schedule, communicate, or execute from what requires authorized human judgment or approval.

Example: *AI may suggest a lesson version and temporary group, but the teacher decides whether to release either.*

Learner-Facing AI

AI that interacts directly with a learner through explanation, questioning, feedback, practice, recommendations, tutoring, or other support.

Example: *A learner receives guided practice from an AI function and can request teacher review.*

Organizational Orchestration Intelligence
An intelligence layer coordinating systems, roles, workflows, time, resources, evidence, and authorized actions across an institution or learning ecosystem.
Example: *The system connects curriculum evidence, intervention ownership, staff availability, and schedule constraints while preserving decision rights.*

Teacher-Facing AI
AI designed primarily to support educator planning, creation, adaptation, analysis, grading, feedback, grouping, scheduling, or decision preparation.
Example: *The system drafts a curriculum-connected lesson version for teacher review.*

Multi-Grade and Cross-Age Architectures

Multi-grade learning is not one instructional method. It can describe a shared class, temporary grouping, course design, mentoring structure, or project architecture. The architecture should make differences in objectives, roles, evidence, safety, and educator responsibility visible.

Cross-Age Mentoring
A structured arrangement in which learners of different ages support one another through explanation, demonstration, collaboration, guidance, or feedback.
Example: *An older learner supports a younger learner in documenting field observations while each completes separate evidence requirements.*

Cross-Curricular Multi-Grade Project Architecture
A project-centered environment in which multiple grades contribute differentiated disciplinary work, roles, artifacts, and evidence toward a shared mission.
Example: *Younger learners collect observations, middle-grade learners analyze patterns, and older learners develop and defend recommendations.*

Cross-Grade Grouping
Temporary or continuing grouping across grade levels for a defined instructional, project, readiness, interest, or support purpose.
Example: *Learners from two grades form a temporary group for the same prerequisite concept.*

Grade Cluster
A defined grouping of grade levels sharing parts of a course, project, instructional purpose, or experience while retaining differentiated expectations.
Example: *Grades 2–4 investigate foundational questions while older clusters perform more complex analysis.*

Multi-Age Learning
Learning organized across learners of different ages, often through shared experiences, flexible grouping, mentoring, or developmental rather than strictly grade-based organization.
Example: *A mixed-age studio includes common collaboration and age-appropriate individual expectations.*

Multi-Grade Course Architecture
A course structure allowing learners from more than one grade to participate through differentiated objectives, tasks, supports, evidence, or progression.
Example: *A common environmental course provides varied reading demands and performance criteria by grade cluster.*

Multi-Grade Learning
Learning intentionally organized across more than one conventional grade level.
Example: *Learners from several grades participate in a common experience with differentiated objectives and evidence expectations.*

Consumer-Crafted and Ecosystem Architectures

An emerging architecture places the learner's accumulated experiences, evidence, goals, and connections at the center rather than expecting one institution to supply the entire path. This can expand opportunity, but it also introduces questions of coherence, legitimacy, portability, access, privacy, safeguarding, and accountability.

Affiliation Intelligence
A proposed intelligence function connecting learners with institutions, programs, providers, or learning communities according to defined needs, goals, conditions, and governance.
Example: *The system identifies an accredited program fitting the learner's pathway and location constraints.*

Consumer-Crafted Learning Architecture
A learner- or family-directed architecture in which learning experiences are assembled across institutional, community, professional, digital, experiential, and independent sources rather than supplied entirely through one school or program.
Example: *A learner combines district courses, tutoring, a community project, an online course, field learning, and service experience in one connected path.*

Credential Portability
The ability to carry and have a credential interpreted or recognized across institutions, platforms, employers, or other authorized settings.
Example: *A microcredential includes issuer, criteria, evidence, and verification information.*

Ecosystem Orchestration
Coordination of goals, time, evidence, people, resources, credentials, permissions, and next opportunities across multiple learning providers and settings.
Example: *Course deadlines, tutoring, field experiences, and project work are coordinated around the learner's goals and availability.*

Experience Portability
The ability to carry usable learning records, artifacts, context, and verified experience across authorized providers or settings.
Example: *A project artifact retains its source, date, criteria, and permissions when included in another learning record.*

Learner-Owned Learning Record
A persistent record of experiences, evidence, reflections, competencies, credentials, and connections organized around the learner across authorized providers and settings.
Example: *The learner retains verified evidence from school, service, projects, and external courses.*

Learning Ecosystem
The full network of institutions, people, programs, tools, communities, experiences, and resources contributing to learning.
Example: *A learner's ecosystem may include a school, library, tutor, online course, club, museum, employer, and community project.*

Matching Intelligence
A proposed intelligence function connecting learners with appropriate tutors, mentors, specialists, peers, experts, or teams according to needs, goals, strengths, availability, and permissions.
Example: *A verified mentor opportunity is suggested because it fits the learner's project and schedule.*

Evaluating Architecture Fit

A learning architecture should not be judged by novelty or by the amount of technology it contains. The review question is whether the architecture fits the learners, subject, instructional purpose, evidence requirements, human relationships, operating conditions, and institutional capacity.

- What is the primary unit of design: block, classroom, course progression, cohort, project, learner, or ecosystem?
- Which instructional approaches occur inside the architecture, and are those approaches appropriate to learner age, readiness, subject, and intended outcome?
- What remains common, and what is allowed to vary: content, method, pace, sequence, grouping, support, evidence, time, or provider?
- Where do teachers provide explanation, modeling, feedback, relationship, judgment, intervention, and synthesis?
- Where does AI operate: for the teacher, with the learner, inside curriculum, across systems, or across the organization?
- What is AI permitted to generate, recommend, adapt, schedule, communicate, or execute, and where is human approval required?
- How does time function: as a fixed container, a flexible resource within blocks, or an active organizing variable?
- How are misunderstanding, missing prerequisites, stalled progression, and exceptions detected and resolved?
- How are individual pathways kept connected to curriculum coherence, shared learning, and meaningful human teaching?
- What staffing, grouping, space, technology, transportation, family support, and schedule conditions must exist?
- What new monitoring, coordination, review, and exception-handling work does the architecture create?
- What evidence demonstrates learning and allows the architecture to change when learning is not occurring?
- Can learners, evidence, content, credentials, and records move appropriately across systems or providers?
- Who remains accountable for coherence, safety, access, decisions, and outcomes?

A learning environment is never only a schedule, curriculum, classroom, platform, or AI feature. It is an operating architecture that determines how learning moves, where people intersect, what technology performs, who retains authority, and what the learner ultimately experiences.

PART X

Data, Analytics & Interoperability

From collection to usable instructional evidence

Data is not intelligence, and a dashboard is not an action. Schools need language for the difference between collecting activity, measuring learning, finding patterns, and producing a defensible instructional response.

Data systems also need to exchange information without turning educators and technical staff into permanent translators between incompatible formats.



Key terms

Actionable Insight

An interpretation connected to a feasible, authorized next action.
Example: *"Six learners share the same prerequisite gap" is more actionable than "Class average: 68."*

AI Literacy

The ability to understand what AI is doing, what data and models contribute, what limitations and risks exist, and how to inspect outputs and use systems responsibly.
Example: *A student verifies a generated explanation against trusted evidence.*

Analytics

The collection, comparison, analysis, and reporting of data to understand activity, performance, patterns, or outcomes.
Example: *Analytics reveals that a misconception appears across several classes.*

Audit Log

A time-stamped record of access, changes, approvals, overrides, recommendations, and actions.
Example: *The district can see who approved an AI-generated lesson version.*

Auditability

The ability to reconstruct what a system accessed, recommended, changed, decided, or executed and under whose authority.
Example: *A consequential action without an audit trail is difficult to govern.*

Caliper Analytics

A specification for capturing and exchanging standardized learning activity events.
Example: *Tools express comparable activity events for authorized analytics.*

Common Cartridge

A standard format for packaging and transferring digital course materials across compatible learning systems.
Example: *A course package moves without rebuilding every module by hand.*

Course Planning and Scheduling (CPS)

A standards-based model supporting communication between planning or scheduling systems and student information systems.
Example: *A planning system sends structured schedule information to the SIS.*

Dashboard

A visual display of metrics, status, patterns, alerts, or results.
Example: *A useful dashboard lets a teacher move from a pattern to the underlying evidence.*

Data

Recorded facts, observations, measurements, responses, events, or representations used for analysis or action.
Example: *A click is data, but it is not automatically evidence of learning.*

Data Collection Infrastructure

Systems and processes used to capture, transmit, store, and make interaction data available.
Example: *The infrastructure records responses, timestamps, and assignment context.*

Data Lifecycle

The full life of information from collection through use, sharing, storage, retention, portability, archival, and verified deletion.
Example: *A district reviews data obligations when adopting, renewing, replacing, or retiring a system.*

Data Literacy

The ability to understand data sources, definitions, quality, scale, context, uncertainty, patterns, and limitations and to use data responsibly.
Example: *A leader distinguishes a real trend from a change caused by missing records.*

Data Map

A specification matching fields, formats, meanings, and allowable transformations between datasets or systems.
Example: *Student ID in one system maps to the corresponding identifier in another.*

Data Passback

The return of data such as scores, status, or completion from one system to another.
Example: *An assessment tool returns a score to the LMS gradebook.*

Encryption

Transforming information so it is readable only by authorized parties with the required key or credential.
Example: *Student records are encrypted in transit and at rest.*

Evidence Aggregation

Combining evidence across assignments, lessons, modalities, or time into a usable view.
Example: *A standards view includes digital responses and uploaded paper work.*

Growth Tracking

Monitoring change in knowledge, performance, or capability over time.
Example: *The teacher can compare baseline and later evidence using the same construct.*

Learning Analytics

Measurement and analysis of data about learners and learning contexts for understanding and improving learning and its environment.
Example: *Learning analytics connects evidence to course and instructional context.*

Learning Information Services (LIS)

A standards-based model for exchanging people, course, enrollment, and related enterprise learning data.
Example: *A SIS shares course and enrollment records with a learning platform.*

Learning Signal

A data point or pattern generated through learner interaction that may inform understanding or action.
Example: *Repeated retries can be a signal, but context is needed to interpret it.*

Learning Tools Interoperability (LTI)

A standard for securely connecting learning tools and content with platforms such as an LMS and supporting related services.
Example: *A virtual lab launches from the LMS with the learner's authorized context.*

Metric

A defined calculation describing or comparing an aspect of activity, performance, or condition.
Example: *Completion rate is a metric, not a complete learning judgment.*

OneRoster

A standard for exchanging roster, course, enrollment, and grade information between school systems and providers.
Example: *A district uses a standard roster feed instead of a custom file for each vendor.*

Predictive Analytics

Analysis used to estimate the likelihood of a future outcome based on historical or current data.
Example: *A risk signal should prompt review, not become a final judgment about a learner.*

Rostering

Creating and maintaining users, courses, classes, enrollments, and role relationships across systems.
Example: *Automated rostering reduces manual account setup.*

Time on Task

An estimate of time associated with an activity or screen state.
Example: *Time can indicate persistence or difficulty, but it does not by itself prove attention or learning.*

PART XI

Artificial Intelligence Foundations

A plain-language map of the AI landscape

Artificial intelligence is not one technology. The term covers rule-based systems, statistical learning, language models, image models, classifiers, recommendation systems, agents, and combinations of these.

Understanding the differences allows educators to ask better questions about purpose, boundary, evidence, risk, and human authority.

Key terms

Agent

Software configured to pursue a defined goal by observing information, selecting steps, using tools, and producing or executing actions.
Example: *An agent retrieves approved records and prepares a draft report.*

Agentic AI

AI capable of planning and performing multi-step work across tools or systems and adapting subsequent actions.
Example: *An agent can be useful only when permissions, boundaries, and approvals are explicit.*

AI Copilot

AI designed to assist a person during work while the person remains the primary decision-maker.
Example: *A copilot proposes a lesson adaptation for teacher review.*

AI-First

A product or workflow designed around AI as a primary operating capability rather than an added feature.
Example: *Buyers should still ask which functions are actually governed and dependable.*

AI-Infused

A product containing one or more AI-supported features while remaining primarily a conventional application or system.
Example: *An LMS adds an AI summary function.*

Algorithm

A defined procedure or set of computational steps for solving a problem or producing an output.
Example: *A scheduling algorithm applies constraints to place events.*

Artificial General Intelligence (AGI)

A hypothetical form of machine intelligence capable of broad, flexible performance across intellectual tasks rather than a bounded set of functions.
Example: *Current product claims should not be treated as evidence of AGI.*

Artificial Intelligence (AI)

Machine-based systems that use rules, statistical methods, trained models, or combinations of these to generate outputs, classify, predict, recommend, or perform tasks.
Example: *A system can be AI without resembling human thought.*

Attention Mechanism

A model function weighting which parts of an input are most relevant to other parts during processing.
Example: *Attention helps relate a pronoun to its earlier noun.*

Autoregressive Model

A model predicting a next value or element from prior values or previously generated elements.
Example: *A language model generates one token after another.*

Classification

Assigning an input to one or more defined categories.
Example: *A model classifies a response by misconception type.*

Clustering

An unsupervised method that groups data points according to similarity or distance.
Example: *Clustering can reveal response patterns, but a human must interpret the educational meaning.*

Computer Vision

AI methods that interpret and analyze images or video, including classification, detection, segmentation, and visual search.
Example: *Computer vision can recognize markings on photographed paper work.*

Deep Learning

Machine learning using neural networks with multiple processing layers to learn complex representations.
Example: *Deep learning powers many modern vision and language applications.*

Diffusion Model

A generative model that creates data by learning to reverse a gradual noise process.
Example: *Diffusion models are commonly used for image generation.*

Discriminative AI

AI designed primarily to distinguish, classify, score, or predict among categories or outcomes.
Example: *A discriminative model identifies whether an image contains a specified object.*

Edge AI

AI processing performed locally on a device or near the data source rather than entirely in a remote cloud.
Example: *On-device speech processing can reduce latency and data transfer.*

Embedding

A numerical representation placing words, items, users, or other objects into a mathematical space based on learned relationships.
Example: *Similar concepts may appear near one another in embedding space.*

Flow-Based Model

A generative model learning a data distribution through a sequence of reversible transformations.
Example: *The reversible structure supports exact probability calculations in some designs.*

Generative Adversarial Network (GAN)

A generative approach in which a generator and discriminator are trained against each other.
Example: *The generator improves as the discriminator becomes better at detecting synthetic outputs.*

Generative AI

AI that produces new content such as text, images, audio, video, code, or structured data based on learned patterns and inputs.
Example: *A teacher requests an alternate explanation tied to the current lesson.*

Inference

Use of a trained model or defined logic to produce an output from new input.
Example: *A model performs inference when it classifies a new response.*

Large Language Model (LLM)

A model trained on large collections of tokens to predict and generate language and perform language-centered tasks.
Example: *An LLM can draft an explanation but may still produce unsupported claims.*

Machine Learning

Methods that fit or adjust models using data so a system can classify, predict, recommend, or generate without every output being explicitly programmed.
Example: *A model learns patterns associated with correct classifications.*

Model

A mathematical or computational representation learned or constructed to produce outputs from inputs.
Example: *A language model predicts likely token sequences.*

Multimodal AI

AI capable of working across more than one form of input or output, such as text, image, audio, video, or data.
Example: *A model interprets a diagram and written explanation together.*

Natural Language Processing (NLP)

Methods enabling computers to process, interpret, classify, or generate human language.
Example: *NLP supports translation, summarization, search, and feedback.*

Neural Network

A layered set of connected mathematical functions whose weights are adjusted during training to recognize patterns or produce outputs.
Example: *Neural networks support many modern language, vision, and speech systems.*

Neural Network Layer

A stage of processing units within a neural network.
Example: *Different layers may represent increasingly complex patterns.*

Neural Radiance Field (NeRF)

A neural approach for reconstructing a 3D scene from 2D images and generating new views.
Example: *A virtual environment can be reconstructed from multiple photographs.*

Omni-AI

A proposed connective intelligence architecture combining multiple AI types across systems, platforms, and data flows to coordinate intelligence across an ecosystem.
Example: *The concept describes a cross-system cognitive layer rather than a single chatbot.*

Predictive Model

A model estimating an outcome or future value from available data.
Example: *A prediction should be treated as an estimate, not destiny.*

Recommendation AI

AI ranking or suggesting items, resources, pathways, or actions based on data, relationships, rules, or predicted relevance.
Example: *The system recommends practice connected to a demonstrated gap.*

Reinforcement Learning

Machine learning in which an agent learns a strategy through actions, feedback, rewards, and penalties.
Example: *An agent improves a policy in a simulated environment.*

Rules-Based System

Software applying explicit conditions, commonly if-then logic, to produce repeatable actions or decisions.
Example: *If mastery is below a threshold, release a review activity.*

Spatial-Temporal AI

AI analyzing relationships involving both location and time.
Example: *A model identifies how activity patterns change across places and periods.*

Supervised Learning

Machine learning trained with examples that include known labels or correct outputs.
Example: *A model learns to classify writing samples from labeled examples.*

Synthetic Data

Artificially generated data designed to resemble selected properties of real data.
Example: *Synthetic records may support testing, but they still require validation for realism and bias.*

Tensor

A multidimensional numerical structure used to represent and process data in many machine-learning systems.
Example: *An image can be represented as a tensor of pixel values.*

Theory of Mind AI

Research and design approaches attempting to model beliefs, intentions, perspectives, or social states.
Example: *Schools should distinguish experimental social inference from verified understanding of a person.*

Token

A unit of input processed by a model, such as a word, subword, symbol, or image patch.
Example: *A prompt is divided into tokens before model processing.*

Training Data

Data used to fit or adjust a machine-learning model.
Example: *Training data quality and representation affect model behavior.*

Transfer Learning

Reusing a model or learned representation from one task as a starting point for another.
Example: *A vision model is adapted to recognize a specialized set of laboratory images.*

Transformer Model

A model architecture using attention mechanisms and positional information to represent relationships among tokens.
Example: *Transformers support many modern generative systems.*

Unsupervised Learning

Machine learning that searches unlabeled data for patterns, groupings, or structure.
Example: *Clustering reveals groups of similar response patterns.*

Variational Autoencoder (VAE)

A generative model that encodes data into a probability-based latent representation and decodes it to reconstruct or create varied samples.
Example: *A VAE can generate variations from a learned representation.*

Virtual Assistant

Software providing conversational or task-oriented support to users.
Example: *A virtual assistant answers how to locate a lesson.*

Voice AI

AI that recognizes, interprets, generates, or translates spoken language.
Example: *A speaking-practice tool transcribes and plays back learner speech.*

PART XII

AI Literacy, Governance & Safety

Using AI without surrendering judgment or accountability

AI literacy must include more than prompt writing. Educators and learners need to understand evidence, boundaries, uncertainty, attribution, privacy, human oversight, and the difference between an output and a justified decision.

Governance becomes real when the institution can specify what AI may access, what it may do, who remains accountable, how actions are logged, and how errors are corrected.

Key terms

Agent Boundary

The enforced definition of what an agent may access, decide, propose, execute, retain, and communicate.
Example: *An agent may draft a family message but may not send it.*

AI Fluency

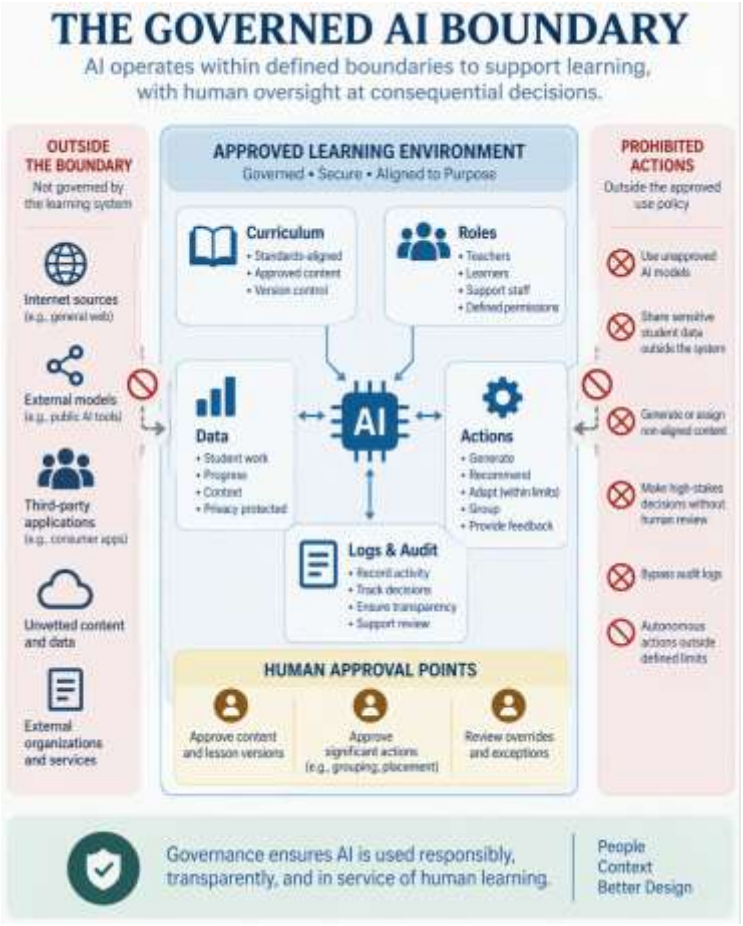
The ability to use and direct AI effectively across tasks while selecting appropriate tools, evaluating outputs, and preserving human judgment.
Example: *A leader coordinates several AI-supported steps without treating any output as automatically authoritative.*

AI Guardrail

A technical, policy, interface, or workflow constraint intended to prevent disallowed inputs, outputs, access, or actions.
Example: *The system blocks external communication by an instructional agent.*

AI Literacy

The ability to understand AI purposes, inputs, models, outputs, limitations, risks, and governance and to inspect and use AI responsibly.
Example: *A learner asks what evidence supports the generated claim.*



Bias

A systematic tendency that can produce uneven error, representation, access, treatment, or outcome.
Example: *Bias may arise from data, labels, objectives, design, or deployment context.*

Bias Audit

A structured review for systematically different treatment, error, access, recommendation, or outcome among groups or contexts.
Example: *The district compares error patterns across intended populations.*

Bounded AI

AI constrained to approved content, data, function, role, workflow, or system boundaries with defined permissions and human controls.
Example: *A curriculum assistant can recommend practice but cannot alter final grades.*

Bounded Curriculum Intelligence

AI operating inside approved curriculum and evidence contexts to analyze, adapt, recommend, draft, or perform defined instructional functions.
Example: *A lesson is compressed while preserving standards and requiring teacher approval.*

Content Safety

Controls and practices intended to prevent harmful, inappropriate, or unauthorized content.
Example: *Safety controls are tested in the actual age and subject context.*

Data Dignity

A governance principle treating personal data as connected to human identity, agency, consent, labor, and creative contribution.
Example: *Student work is not treated as an unlimited raw material for unrelated model training.*

Data Minimization

Collecting, using, and retaining only the data necessary for a defined purpose.
Example: *A reading tool does not collect location data it does not need.*

Data Sovereignty

Institutional authority over where data resides, who can access it, what uses are permitted, and how it moves or is deleted.
Example: *The contract identifies storage location, subprocessors, and deletion obligations.*

Explainability

Information helping authorized users understand evidence, rules, model factors, or reasoning behind an output or action.
Example: *A grouping recommendation shows the shared errors and lesson context.*

Four Levels of AI Use

A buyer-facing model distinguishing individual generation, one-system bounded or streaming intelligence, operational multi-system intelligence, and institution-wide intelligence.
Example: *The model classifies where intelligence operates and how widely it coordinates.*

Grounding

Connecting an AI output to specified evidence, content, data, or rules.
Example: *A grounded answer links to the lesson passages used.*

Hallucination

An AI-generated statement or detail that is unsupported, incorrect, or fabricated while presented as plausible.
Example: *A generated citation must be verified before use.*

Human-in-the-Loop

1. A design in which a person reviews, approves, corrects, or makes specified decisions within an automated process.
   Example: *Teacher approval is required before feedback is released.*
2. A design in which automation operates while a person monitors and can intervene or override.
   Example: *The system routes routine records while an administrator monitors exceptions.*

Institutional Readiness

The policies, skills, architecture, data quality, support, procurement practice, and governance needed to use AI responsibly and effectively.
Example: *A district pauses a high-autonomy deployment until ownership and audit processes exist.*

Least Privilege

Giving a user or system only the minimum access necessary to perform an authorized function.
Example: *A tutoring agent cannot view unrelated student records.*

Model Drift

Change in model performance or behavior as data, users, conditions, or patterns change.
Example: *A model that performed acceptably last year requires monitoring and revalidation.*

Override Right

A defined ability for an authorized person to reject, change, pause, reverse, or escalate an AI-supported action.
Example: *A teacher can replace an auto-score and document the reason.*

Privacy by Design

Embedding privacy principles into architecture, settings, workflows, and defaults rather than adding them after deployment.
Example: *The default learner profile reveals the minimum necessary information.*

Prompt

An instruction, question, context, or input provided to a generative model or agent.
Example: *A strong prompt can improve relevance but cannot guarantee truth.*

Prompt Engineering

The deliberate design and testing of prompts, context, examples, constraints, and output formats to improve model performance.

Example: *A teacher specifies grade, objective, approved source, and required rubric.*

Retrieval-Augmented Generation (RAG)

A design in which a generative model retrieves selected external or internal information and uses it as context for producing an output.
Example: *A curriculum assistant retrieves the active unit before answering.*

Reversibility

The extent to which an action, adaptation, score, recommendation, or workflow change can be undone or corrected.
Example: *A lesson version can be restored after an unsuitable adaptation.*

Streaming AI

AI receiving selected data or model services through a secured external connection rather than operating entirely within one closed environment.
Example: *The district verifies what information crosses the boundary and how long it is retained.*

Transparency

Visibility into AI use, data sources, limitations, recommendations, actions, and governance.
Example: *Users are told when feedback was AI-drafted.*

1 INDEPENDENT GENERATIVE AI	2 AUTONOMOUS SYSTEM: BOUNDED OR STREAMING	3 OPERATIONAL MULTI-SYSTEM INTELLIGENCE	4 INSTITUTION-WIDE OR INDUSTRY ALL-SYSTEM INTELLIGENCE
Individuals use public or stand-alone generative AI. Data may leave the institution. Best for low-sensitivity productivity and inquiry under policy safeguards.	AI operates inside one application or autonomous system. Bounded AI remains inside the approved environment; streaming AI uses a governed external connection.	AI coordinates or analyzes work across multiple institutional systems. Strong identity, roles, guardrails, governance, and auditability are required.	AI orchestration spans the institution or a broader ecosystem to coordinate systems, people, content, time, workflow, and shared learning.

Level 1: **Independent Generative AI**

Stand-alone generative AI used by individuals to create text, images, audio, code, or other outputs without inherent connection to approved curriculum or institutional workflow.
Example: *A teacher drafts questions in a public prompt interface.*

Level 2: **Autonomous-System Bounded or Streaming AI**

AI embedded within one application, curriculum platform, courseware product, or framework system, operating inside an approved boundary or through a governed external connection.
Example: *A curriculum system adapts the active lesson and requires teacher approval.*

Level 3: **Operational Multi-System Intelligence**

AI coordinating or analyzing work across multiple institutional systems through bounded internal intelligence and/or governed APIs.
Example: *Evidence from assessment informs grouping and scheduling across connected systems.*

Level 4: **Institution-Wide or Industry All-System Intelligence**

An intelligence and orchestration layer operating across an institution or broader ecosystem, unifying systems, roles, time, data, and workflows.
Example: *This level requires enterprise governance, identity, auditability, and explicit human authority.*

PART XIII

Learning Intelligence Technology

When intelligence operates inside the learning workflow

Generative AI can create an artifact. Learning intelligence goes further when it uses curriculum and evidence to support or perform governed instructional work inside the active workflow.

The distinction is not how much AI a product claims. It is what changes, how much integration work remains for the educator, and whether the system returns usable human capacity.

Key terms

Assessment Intelligence

System capability to process, interpret, route, score, or provide feedback on evidence under defined rules and review controls.
Example: *Paperwork enters the digital evidence flow through OCR and teacher review.*

Capacity Return

The time, attention, or expertise made available when routine construction, coordination, retrieval, or administration is reduced.
Example: *Returned capacity is used for diagnosis, coaching, relationships, and leadership.*

Class Start Time Scripting

Translating a lesson into a suggested allocation of minutes and activity phases for live instruction.
Example: *The system proposes time for intervention, whole-group teaching, and independent work.*
Cross-reference: *See Time, Pace & Orchestration.*

Content Intelligence

System capability to analyze, generate, classify, relate, or transform content using context and rules.
Example: *An assistant identifies which parts of a lesson address a specific concept.*

Contextual Differentiation

Adapting entry points, scaffolds, language, examples, or practice while keeping learners connected to the active grade-level lesson.
Example: *Support does not move the learner into an unrelated lower-grade path.*

Course Mapping

Plotting course components across sequence, standards, time, assessments, supports, and dependencies.
Example: *The course map reveals where an interruption will affect later lessons.*

Curriculum Intelligence

System capability to understand and act within curriculum structure, content, standards, sequence, versions, and instructional intent.
Example: *The system alters a lesson without breaking its relationship to the core.*

Decision Compression

Reduction in repetitive decision assembly by connecting evidence, options, rules, and authorized next actions.
Example: *The system does not replace judgment; it prepares a defensible choice in context.*

Duplication

Copying an original lesson or course element to create an editable version while retaining the source.
Example: *A district can compare the adopted lesson with a local adaptation.*

Evidence Routing

Directing evidence to the correct learner, class, assignment, record, or reviewer.
Example: *Uploaded work is matched to the intended class and flagged when uncertain.*

Individual Intervention Suggestion

A targeted support recommendation for one learner based on evidence and context.
Example: *The suggestion is visible as advice, not an irreversible placement decision.*

Instructional Intelligence

System capability to turn curriculum and evidence into usable guidance for instructional execution.
Example: *The system proposes a class rhythm and lesson-specific scaffolds.*

Intervention Intelligence

System capability to identify needs from evidence and connect them to targeted supports, groupings, and actions.
Example: *A misconception pattern produces a suggested warm-up and intervention group.*

Learning Intelligence

The organized use of curriculum, learner evidence, context, and patterns to support better instructional decisions and actions.
Example: *Learning intelligence connects a misconception to the active lesson and an appropriate response.*

Learning Intelligence Technology (LIT)

A category of technology that combines high-quality instructional materials with embedded, AI-powered support for planning, delivery, grading, evidence, and instructional action while preserving teacher control.
Example: *LIT operates within the lesson, course, assessment, evidence, time, and workflow rather than as a separate chatbot.*



Lesson and Content Creation

Generation or assembly of instructional material connected to the active curriculum context that retains fidelity to the overarching lesson and module intent.
Example: *New practice appears within the lesson rather than as a detached file.*

Lesson Clipper

A function that condenses a fully built lesson into a shorter version while preserving the original and essential instructional intent.
Example: *A teacher prepares a 30-minute version for a shortened day.*

Lesson Versioning

Creating an editable version of an existing lesson while preserving the original, source relationship, curriculum context, and instructional intent.
Example: A teacher creates a shortened or differentiated version while the adopted original remains intact.

Misconception-Based Grouping

Using evidence of shared misunderstanding to suggest groups for a specific instructional response.
Example: *Learners are grouped because their errors reveal the same concept gap.*
Cross-reference: *See Learning Intelligence Technology.*

OCR Paper Scoring

Using optical character recognition and related analysis to bring photographed or scanned paperwork into a digital evidence workflow.
Example: *The teacher reviews exceptions before scores are posted.*

Practice Generator

A system function that creates additional practice directly from the active lesson, skill, standard, or instructional context.
Example: The system generates additional problems matched to the lesson's concept and cognitive demand without requiring the teacher to build a separate resource.

Recommended Teacher Action

A proposed instructional response tied to evidence, curriculum, and role authority.
Example: *The teacher sees why the action is recommended and may accept, revise, or reject it.*

Scaffold Generation

Creating lesson-connected supports that reduce barriers while preserving the intended thinking.
Example: *The system drafts vocabulary and step supports for teacher review.*

Schedule Restructuring

Moving or reorganizing learning events while preserving instructional relationships and constraints.
Example: *Lessons shift after a closure without rebuilding the entire plan.*
Cross-reference: *See Time, Pace & Orchestration.*

Teacher Approval Workflow

A designed sequence in which educator review, editing, rejection, reassignment, or approval occurs before an action becomes live.
Example: *AI-drafted feedback remains pending until the teacher releases it.*

Translation Generation

Translating curriculum or related material while keeping it connected to the active instructional context.
Example: *A family-facing explanation remains tied to the assigned lesson.*

Warm-Up Generation

Creating brief lesson-connected practice or review intended to prepare learners for current instruction.
Example: *A warm-up targets the exact prerequisite needed for the day's lesson.*

Workflow Compression

Reduction in the number of handoffs, transfers, repeated entries, and separate tasks required to complete work.
Example: *The teacher moves from evidence to assigned follow-up without exporting and rebuilding.*

PART XIV

Human Intelligence & Learning Design

The human vocabulary beneath agency, learning variability, judgment, and system design

Human Agency Design requires language for both sides of the environment: what technology can perform and what human beings uniquely perceive, integrate, judge, originate, and contribute. These terms connect learner variability to curriculum, software inspection, instructional architecture, and time-based orchestration.

Human Intelligence Foundations

Critical Thinking

Holding more than one possibility in consideration, comparing evidence or representations, deciding among alternatives, and revising when information or consequences require it.

Example: *A learner withholds a conclusion until conflicting evidence has been inspected.*

Domain Language

The representational system through which the mind encodes, processes, exchanges, and acts upon information within an intelligence domain.

Example: *Language uses words; formational intelligence can use structure; motional intelligence can use rhythm and movement.*

Human Intelligence

The mind's capacity to represent reality, evaluate it, and act effectively within it across time.

Example: *A learner may demonstrate intelligence through language, quantity, spatial design, relationships, physical systems, judgment, or combinations of them.*

Human Intelligence Domain

An arena of reality that the human mind continuously represents, evaluates, and acts within.

Example: *Self, other people, meaning, quantity, living systems, matter, energy, space, and time each require forms of representation and judgment.*



Non-Conceptual Awareness

Perception or awareness occurring before an experience has been formed into an explicit concept, word, or symbol.

Example: *A learner notices a spatial relationship before being able to name or explain it.*

Non-Verbal Cognition

Cognition operating primarily through representations other than words, such as shape, structure, rhythm, relationship, movement, or sensory pattern.

Example: *A learner organizes objects or sketches a system before explaining the reasoning verbally.*

Thinking

The comparison or interaction of representations across two or more domains of intelligence.

Example: *A learner tests a structural idea against material behavior and revises the design.*

Nine Domains of Human Intelligence

Ethical Intelligence

Governing action across time through judgment, sequencing, restraint, consequence, and decision.

Example: *A learner pauses to consider second- and third-order effects before choosing a course of action.*

Formational Intelligence

Understanding how matter, structures, systems, and workflows are built, organized, constrained, and transformed.

Example: *A learner sees why a structure will fail before constructing it.*

Incorporeal Intelligence

Working with space, dimension, visualization, absence, possibility, and relationships not yet materialized.

Example: *A learner mentally rotates a form and imagines several arrangements before drawing it.*

Interpersonal Intelligence

Understanding and navigating relationships, shared attention, trust, cooperation, conflict, and repair.

Example: *A learner adjusts communication after noticing that a group has interpreted an idea differently.*

Intrapersonal Intelligence

Awareness and regulation of internal state, identity, attention, effort, and self-direction.

Example: *A learner notices loss of concentration and deliberately changes strategy.*

Linguistic Intelligence

Using words, symbols, narrative, and language to create, communicate, and interpret meaning.

Example: *A learner restates a difficult idea in several ways to make the meaning precise.*

Logical-Mathematical Intelligence

Working with quantity, pattern, order, comparison, relationship, and formal consistency.

Example: *A learner detects that a result conflicts with the pattern established by the data.*

Motional Intelligence

Operating through energy, movement, rhythm, force, timing, coordination, and synchronization.

Example: *A learner uses rhythm or movement to stabilize attention and execute a task.*

Naturalistic Intelligence

Recognizing and relating to living systems, organisms, environments, cycles, and interdependence.

Example: *A learner notices how a change in one part of an ecosystem affects several other parts.*

Characteristics of Human Intelligence

Cognition

Knowing and integrating understanding so that it becomes internally organized, usable, and transferable rather than merely repeated.

Example: *A learner can apply an idea in a new setting without copying the original form.*

Conscientiousness

Focused restraint that allows a person to pause, sustain attention, hold alternatives, and evaluate before acting.

Example: *A learner checks assumptions and consequences rather than submitting the first plausible answer.*

Creativity

Human origination or deliberate departure from an existing mental model, including the capacity to begin from possibility rather than merely vary a known pattern.

Example: *A learner releases the expected form and originates a new way to represent the problem.*

Curiosity

The human drive to identify, investigate, or resolve what is unknown.

Example: *A learner notices an unexplained result and continues investigating rather than ignoring it.*

Emotional Resonance

Human real-time synchronization and shared meaning through presence, interaction, rhythm, and reciprocal response.

Example: *A group adjusts its pace and attention as members work together.*

Human Intelligence Characteristics

The living mechanics through which human intelligence originates, evaluates, integrates, explores, and connects.

Example: *Creativity, conscientiousness, cognition, curiosity, and emotional resonance animate every intelligence domain.*

Human Variability and Learning Obstacles

Bypassed Definition

A word, symbol, term, or concept used before the learner has secured sufficient meaning for it.

Example: *A learner repeats technical language fluently but cannot explain or apply the central term.*

Cognitive Variability

Natural differences among learners in readiness, pace, representational starting point, and the conditions through which understanding stabilizes and becomes visible.

Example: *Two learners can encounter the same lesson while requiring different entry points, supports, time, or forms of expression.*

False Fluency

The appearance of understanding created by fluent language or polished output without sufficient underlying comprehension.

Example: *An AI-assisted response sounds authoritative, but the learner cannot restate the idea or use it in context.*

Learning Obstacle

A condition preventing knowledge from becoming sufficiently represented, connected, or usable even when the learner has capacity to learn it.

Example: *Confusion may indicate missing instructional structure rather than lack of ability.*

Missing Mass

Lack of a sufficiently concrete, sensory, physical, visual, or otherwise perceptible referent for what is being learned.

Example: *A learner cannot stabilize the meaning of threshing without seeing grain, a stalk, or a visual model of the action.*

Steep Gradient

A learning progression in which the next required understanding or action exceeds the learner's present foundation because intermediate steps are missing or compressed.

Example: *A polished explanation moves from novice vocabulary to advanced abstraction without the necessary footholds.*

Data Logic and Judgment

Automation Bias

Over-reliance on an automated recommendation or output because it appears authoritative, efficient, or complete.

Example: *A reviewer accepts an AI-generated score without inspecting the source evidence.*

Data Logic

The human discipline of inspecting, sorting, weighing, and clearing information before action is taken or withheld.

Example: *A reviewer identifies what is present, what is missing, what supports confidence, and what weakens it before deciding.*

Data Logic Ledger

A structured comparison of positives that support a conclusion with errors, omissions, contradictions, or weaknesses that reduce confidence.

Example: *A leadership team records both verified evidence and unresolved gaps before approving a recommendation.*

Premature Certainty

Acceptance of a conclusion before sufficient evidence, alternatives, missing information, or errors have been inspected.

Example: *A team commits to an intervention before checking whether the pattern is caused by incomplete data.*

FROM HUMAN VARIABILITY TO ORCHESTRATION

Cognitive variability makes common pacing and whole-group structures insufficient for many learners. Human-centered systems therefore connect independent progression, live teaching, dynamic cohorts, class moments, and governed Time AI without removing teacher judgment or shared learning.

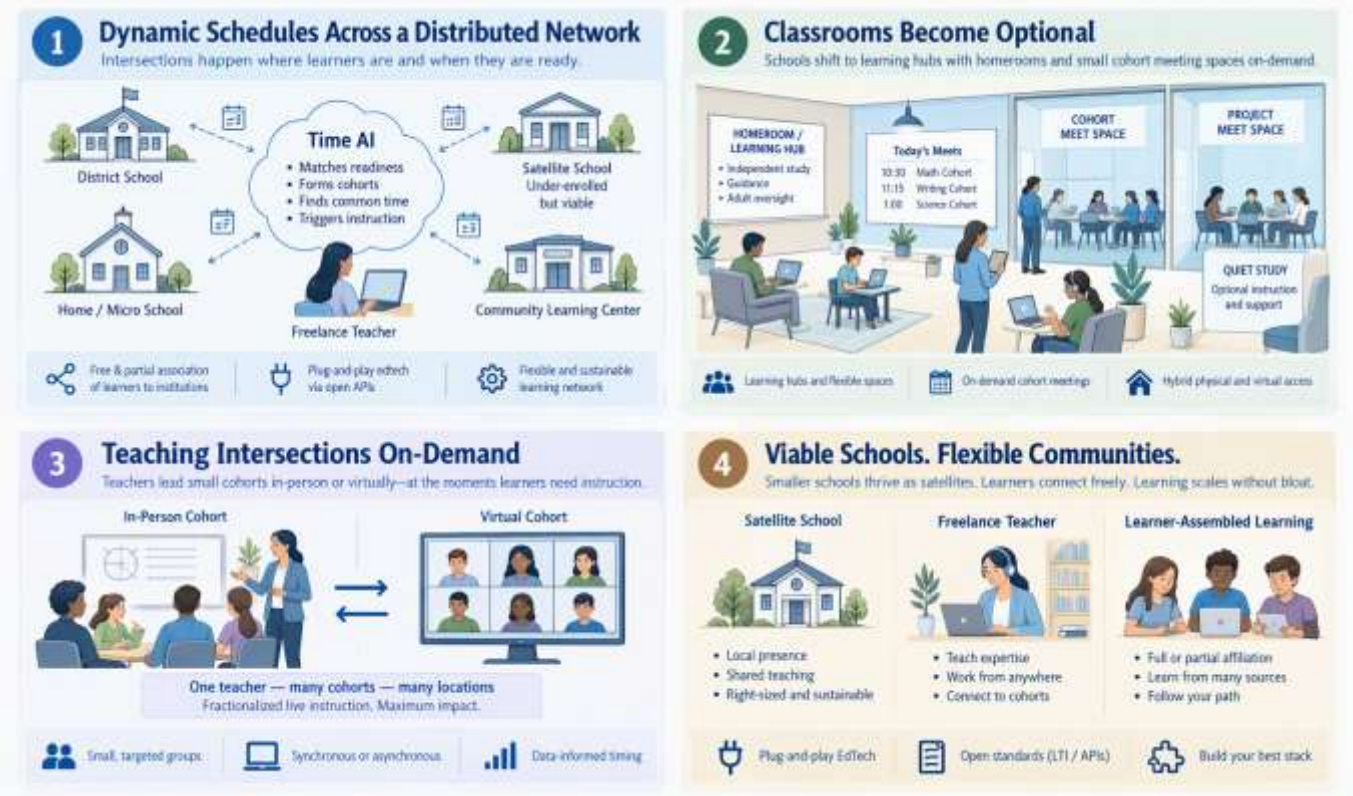
PART XV

Time, Pace & Orchestration

Making time visible as a learning variable

Traditional calendars record appointments. Learning orchestration must also account for readiness, pace, sequence, staffing, interruption, space, and the moment when human teaching is most valuable.

Time intelligence is not simply faster scheduling. It is the ability to reason about when learning should occur, who should intersect, and how the course remains coherent as conditions change.



Key terms

Auto-Adaptive Cohorting

Formation or adjustment of members and numbers in cohorts and placement in curriculum sequences within defined variance limits, size rules, time windows, or instructional constraints.
Example: *The system can widen or narrow the allowed readiness range.*

Auto-Calendaring

Automatic placement of a meeting, lesson, lab, or live event based on defined conditions, readiness, availability, or course progress.
Example: *A tutorial is scheduled when an eligible cohort and teacher are available.*

Auto-Cohorting

Automatic formation of a learner group based on progress, readiness, need, interest, availability, or another defined condition.
Example: *Learners reaching the same misconception are grouped for a short intervention.*

Calendar Intelligence

Use of constraints, dependencies, availability, and event relationships to support scheduling decisions.
Example: *A lesson requiring a specialist is placed when the specialist and ready learners overlap.*

Disaggregated Pace AI Cohorting

Free-form AI formation of cohorts from learners progressing independently, based on readiness overlap and available live instruction.
Example: *Learners from several sections form a temporary course-centered group.*

Pacing Intelligence

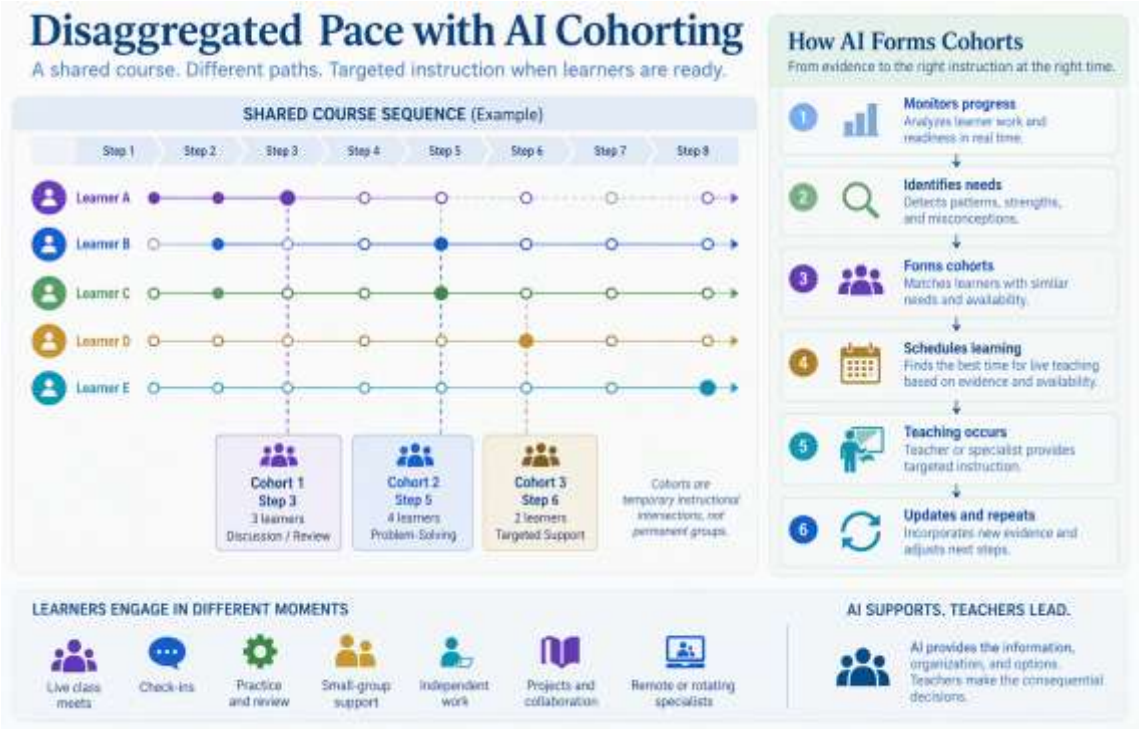
Use of evidence, course structure, and timing data to understand or recommend changes in learning pace and personal or organizational schedules.

Example: *A system identifies that a unit is drifting beyond available instructional days.*

Time AI

AI that models timing, readiness, sequence, constraints, pace, availability, and changing conditions to coordinate or forecast events. It learns from vector states.

Example: *Time AI learns from how time is used over time by individuals, groups and organizations to make recommendations and adjustments intelligently.*



AI Hold

An open bracket of time with a start, end, label, and unavailable segments within which eligible dynamic events may be placed.

Example: *A teacher reserves an intervention window that Time AI can fill under approved rules.*

Bounded-Variance Cohorting

Cohorting that permits variation only within defined instructional, pacing, age, readiness, size, or time limits such that the members are spread across the curriculum sequence in a “shaggy” way but within acceptable norms towards whole group testing dates.

Example: *Authorized educators can see and adjust the bounds.*

Class Moment

A live instructional intersection created when defined learners and an educator meet readiness, cohort, and availability conditions.

Example: *The class moment exists because teaching is needed now, not only because the calendar repeats.*

Classroom-Centric Learning

An operating model organizing instruction primarily around a fixed group, room, teacher, and scheduled block.

Example: *The class moves together even when readiness varies.*

Course-Centric Learning

An operating model organizing progress, evidence, teaching intersections, and support around a course or pathway rather than only a fixed classroom block.

Example: *A learner remains connected to the course while participating in temporary cohorts.*

Dynamic Cohort

A group formed for a specific need or point in a pathway and changed, dissolved, or re-formed as conditions change.

Example: *The group ends after the targeted misconception is resolved.*

Dynamic Space Use

Assignment or reassignment of physical or virtual spaces according to current learning, cohort, staffing, or activity needs.
Example: *A lab is allocated when the ready cohort and equipment are available.*

Fractional Teaching

Separating conventional class time into live instruction, independent study, project work, intervention, and on-demand support.
Example: *An educator teaches several targeted groups rather than repeating one full-period lecture.*

Infinite Schedules Within a Master Schedule

A structure in which institutional, group, and individual schedules coexist within larger constraints while allowing individualized timing.
Example: *Personal learning events remain bounded by transportation, staffing, and required shared experiences.*

Instructional Logistics

The coordination of people, place, time, resources, sequence, access, and support required to make instruction occur.
Example: *A strong lesson still fails when materials, learners, and specialist support do not intersect.*

Instructional Time Compression

The deliberate restructuring of instruction to fit reduced available time while preserving the highest-priority learning objectives, prerequisite relationships, and necessary teaching or evidence moments.

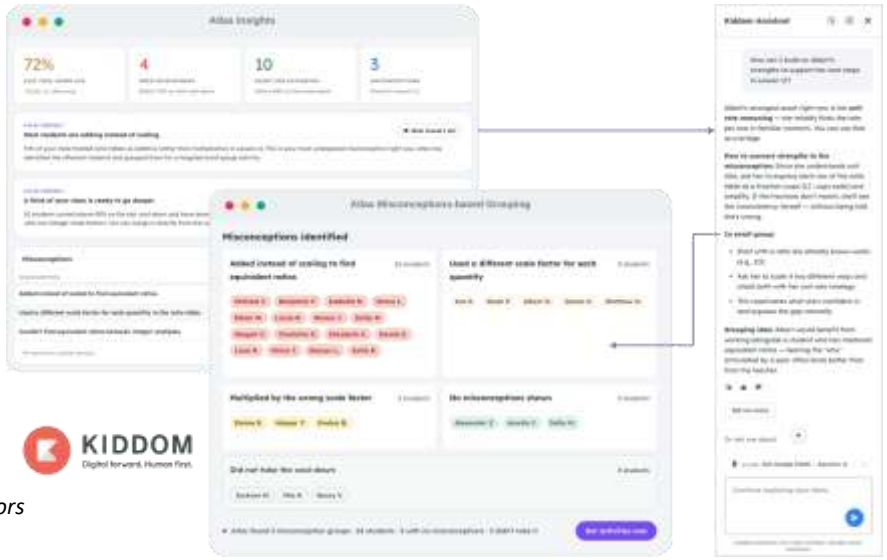
Example: *A weather closure removes one instructional day, so the remaining sequence is recomposed rather than simply skipping one lesson or accelerating every remaining activity*

Schedule Restructuring

Reorganizing instructional events, lessons, pacing, or learning sequences in response to available time or changing conditions while preserving necessary instructional relationships and dependencies.
Example: *A shortened week causes the remaining lessons to shift while prerequisite order and required live instruction remain intact.*

Class Start Time Scripting

Translation of a lesson into a time-aware instructional sequence showing suggested durations and transitions among teaching, guided practice, independent work, intervention, collaboration, or other learning phases.
Example: *A 50-minute class is mapped into a brief warm-up, explicit teaching, guided practice, learner work, and closing evidence check.*



Misconception-Based Grouping (See also under Section XI)

When grouping is dynamically coordinated with learner readiness, educator availability, and instructional timing, it becomes a cohorting and orchestration function.
Example: *Learners are grouped because their errors reveal the same concept gap.*

Schedule Recovery

Reorganizing events and learning sequences after disruption while preserving priorities and dependencies.
Example: *A snow day moves lessons and live intersections forward without losing sequence.*

Temporal State

The current timing-related condition of a person, resource, task, or event.
Example: *A learner may be pending, ready, blocked, cohorted, scheduled, complete, or deferred.*

PART XVI

Procurement & Product Claims

Reading what the product actually does

Modern product language is easy to overread. “AI-powered,” “adaptive,” “personalized,” “integrated,” and “actionable” can describe very different architectures and levels of human work. The practical discipline is to require representative demonstrations, inspect the inherited operating model, and measure residual work rather than scoring labels.

Key terms

Actionable Data

Data presented with sufficient context, evidence, timeliness, and connection to an authorized decision or action.
Example: *A label of “at risk” is not actionable unless the underlying evidence and options are visible.*

Adaptive

A broad claim that may refer to pace, branching, content, support, difficulty, or model-driven recommendations.
Example: *The product demonstrates whether it changes speed only or also changes the learning experience.*

Administrative Burden

Recurring setup, monitoring, reporting, compliance, configuration, and maintenance work created by a product or process.
Example: *A tool automates scoring but adds weekly roster repair.*

AI-Powered

A broad claim indicating some product function uses AI.
Example: *The buyer must ask which function, model, data, boundary, and action are involved.*

Buyer Discernment

The ability to distinguish marketing labels from actual architecture, content boundary, workflow, data use, controls, and capacity impact.
Example: *A buyer asks the vendor to perform the complete workflow rather than show a feature slide.*

Capacity Impact

The net effect of a purchase on the time, attention, expertise, and availability of staff and learners.
Example: *A good review identifies which role gains time and which role inherits work.*

Classroom Suitability

Fitness for K-12 use considering privacy, safety, accessibility, age, content, social features, advertising, and applicable requirements.
Example: *A consumer app may be useful yet unsuitable for assigned student use.*

Common Demonstration Scenario

A standardized end-to-end task completed by every finalist under comparable conditions.
Example: *Each vendor adapts the same lesson and shows all remaining steps.*

Coordination Load

The work of aligning people, systems, data, time, resources, approvals, and next actions.
Example: *More individualized pathways can increase classroom coordination.*

Implementation Load

The human work required to configure, integrate, train, migrate, support, and govern a purchase.
Example: *Implementation time belongs in the cost and capacity analysis.*

Instructional Load

The ongoing effort required to plan, adapt, sequence, deliver, assess, interpret, communicate, and respond.
Example: *A resource can be academically strong and still create a high assembly load.*

Integrated

A broad claim indicating some connection among systems or functions.
Example: *A shared login is not the same as a coherent evidence-to-action workflow.*

Learning Intelligence Claim

A claim that a system uses curriculum and evidence to support instructional understanding or action.
Example: *The vendor shows the learning context, reasoning, teacher control, and next action.*

License Agreement

Contractual terms governing authorized use, restrictions, ownership, data, support, liability, and termination.
Example: *The license clarifies whether locally created curriculum can be exported.*

Operating Model

The combination of roles, systems, processes, decisions, ownership, time, and resources through which a product is actually used.
Example: *A district is buying not only software but a continuing way of working.*

Orchestration Claim

A claim that a system coordinates work across people, systems, resources, data, or time.
Example: *The demonstration must show more than data exchange; it must show coordinated work.*

Personalized

A broad claim that may refer to learner choice, teacher assignment, paced pathways, recommendations, or generated variations.
Example: *The reviewer identifies who makes the choice and what actually changes.*

Pilot

A bounded trial designed to answer defined questions under representative conditions.
Example: *A pilot measures workflow and capacity, not only participant enthusiasm.*

Procurement Enforcement

Use of requirements, contracts, acceptance criteria, monitoring, and remedies to ensure purchased technology meets institutional standards.
Example: *A claim becomes enforceable when it is tied to evidence and a contractual obligation.*

Product Maturity

The stability, completeness, reliability, supportability, and demonstrated use of a product.
Example: *A promising roadmap is not the same as a functioning capability.*

Proof of Concept

A limited demonstration intended to establish technical or functional feasibility.
Example: *A proof of concept is not evidence of sustainable districtwide operation.*

Representative Review Environment

A populated evaluation environment containing realistic users, courses, assignments, submissions, history, exceptions, and reports.
Example: *A blank demonstration account cannot prove a progress-monitoring workflow.*

Residual Human Work

The tasks, decisions, transfers, checks, and coordination that remain after the product performs its part.
Example: *Generation may save drafting time while adding review and placement work.*

Roadmap Claim

A statement about a capability planned for future development rather than currently available.
Example: *Reviewers label roadmap items separately from demonstrated functions.*

Subprocessor

A third party used by a provider to process data or perform part of the service.
Example: *The district requires disclosure and flow-down obligations.*

Total Cost of Ownership (TCO)

The full cost of acquisition, implementation, integration, training, support, administration, renewal, migration, transition, and staff time.
Example: *The lower license price may hide higher continuing labor.*

Workflow and Decision Compression

Reduction of handoffs, repeated judgments, data transfers, and separate actions required to move from curriculum to evidence to response.
Example: *The system connects misconception evidence directly to a teacher-approved next action.*

Workflow Friction

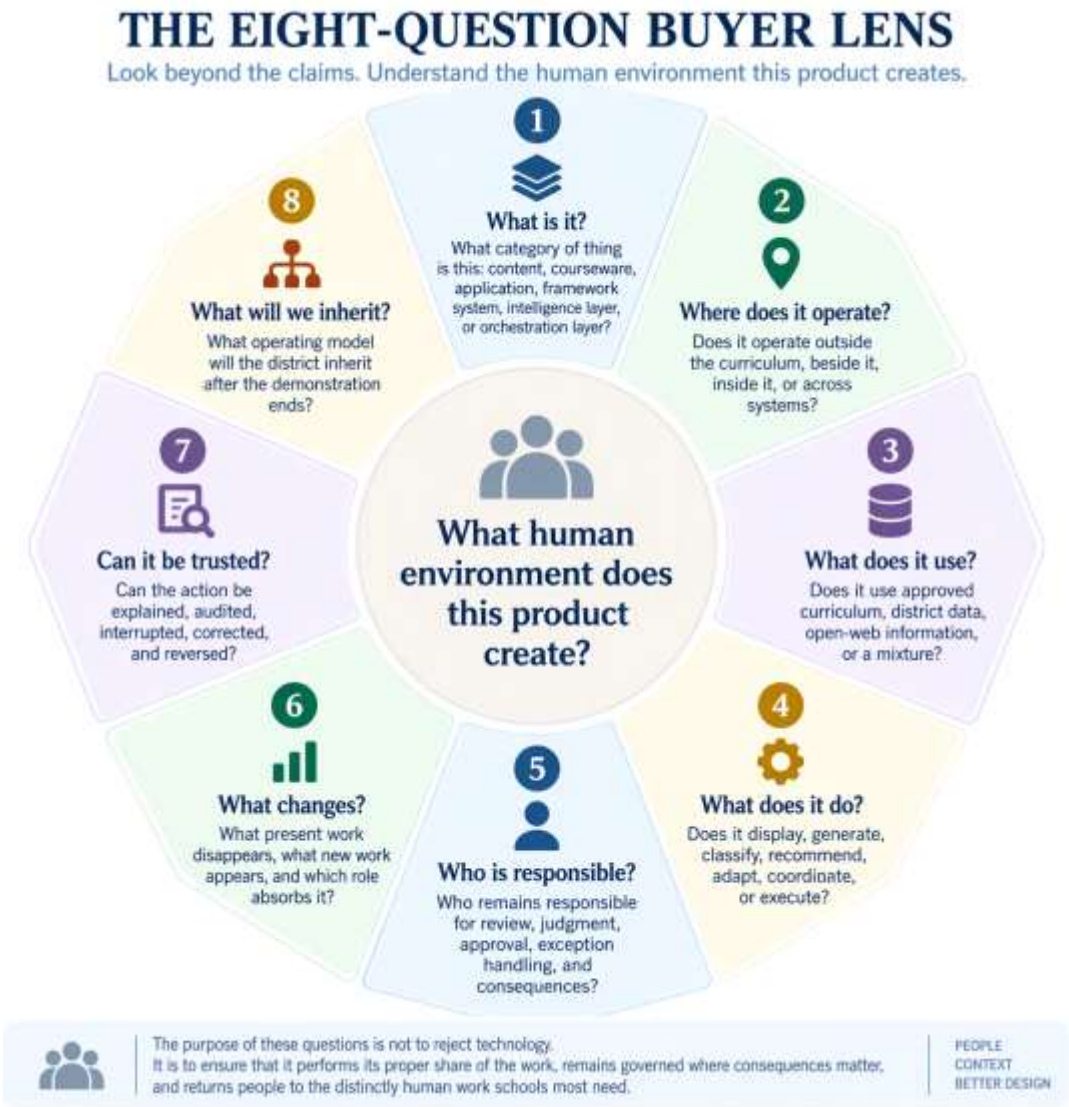
Unnecessary steps, delays, interruptions, duplicate actions, dead ends, transfers, and context switching within work.
Example: *A report requires three exports and manual regrouping before it changes instruction.*

A Final Reading Practice

When a product claim appears, do not ask only whether the feature exists. Ask the complete set of questions below.

- What category of thing is this: content, courseware, application, framework system, intelligence layer, or orchestration layer?
- Where does the function operate: outside the curriculum, beside it, inside it, or across systems?
- What does the function use: approved curriculum, district data, open-web information, or a mixture?
- What does the function do: display, generate, classify, recommend, adapt, coordinate, or execute?
- Who remains responsible for review, judgment, approval, exception handling, and consequences?
- What present work disappears, what new work appears, and which role absorbs it?
- Can the action be explained, audited, interrupted, corrected, and reversed?
- What will we inherit? What operating model, workflow, coordination, staffing, oversight, and continuing obligations will the institution inherit after the demonstration ends?

The purpose of discernment is not to reject technology. It is to demand that technology perform its proper share of the work, remain governed where consequences matter, and return people to the distinctly human work schools most need.



PART XVII

Alphabetical Index

Term	Part
Accessibility	Digital Experience Design
Accessibility-Adapted Version	Software Function and Experience Inspection
Accessible Drag-and-Drop Alternative	Software Function and Experience Inspection
Accessible Interaction and Media Control	Software Function and Experience Inspection
Accessible Response Field	Software Function and Experience Inspection
Action Confirmation	Software Function and Experience Inspection
Actionable Data	Procurement & Product Claims
Actionable Insight	Data, Analytics & Interoperability
Activity-Based Learning	Instructional Approaches & Learning Design
Adaptive	Procurement & Product Claims
Adaptive Learning	Curriculum, Courseware & Assessment
Adaptive Pacing	Curriculum, Courseware & Assessment
Administrative Burden	Procurement & Product Claims
Advanced or Extension Version	Software Function and Experience Inspection
Affiliation Intelligence	Learning Architectures & Operating Models
Affordance	Digital Experience Design
Age-Appropriate Navigation	Digital Experience Design
Agent	Artificial Intelligence Foundations
Agent Boundary	AI Literacy, Governance & Safety
Agentic AI	Artificial Intelligence Foundations
AI as Primary Instructional Agent	Learning Architectures & Operating Models
AI Copilot	Artificial Intelligence Foundations
AI Fluency	AI Literacy, Governance & Safety
AI Guardrail	AI Literacy, Governance & Safety
AI Hold	Time, Pace & Orchestration
AI Identity Disclosure	Software Function and Experience Inspection
AI Literacy	AI Literacy, Governance & Safety
AI Literacy	Data, Analytics & Interoperability
AI Operating Disclosure	Software Function and Experience Inspection
AI Operating Disclosure and Escalation	Software Function and Experience Inspection
AI Role Inheritance	Learning Architectures & Operating Models
AI-First	Artificial Intelligence Foundations
AI-Infused	Artificial Intelligence Foundations
AI-Powered	Procurement & Product Claims
Algorithm	Artificial Intelligence Foundations
Analytics	Data, Analytics & Interoperability
Animation	Digital Experience Design
Annotation	Digital Learning Functions
Annotation Export	Software Function and Experience Inspection
Annotation Persistence	Digital Learning Functions
Annotation Recovery	Software Function and Experience Inspection
Annotation Search	Software Function and Experience Inspection
App	Systems, Platforms & Architecture
Application	Systems, Platforms & Architecture
Application Programming Interface (API)	Systems, Platforms & Architecture
Architecture Inheritance	Digital Learning Foundations
Archive and Retention Control	Software Function and Experience Inspection
Artificial General Intelligence (AGI)	Artificial Intelligence Foundations
Artificial Intelligence (AI)	Artificial Intelligence Foundations
Assessment Intelligence	Learning Intelligence Technology
Assessment System	Systems, Platforms & Architecture
Assignment Management	Curriculum, Courseware & Assessment
Attempt History	Software Function and Experience Inspection
Attention Mechanism	Artificial Intelligence Foundations
Audience Control	Software Function and Experience Inspection
Audio Enhancement	Digital Experience Design

Audio Submission	Digital Learning Functions
Audit Log	Data, Analytics & Interoperability
Auditability	Data, Analytics & Interoperability
Augmented Reality (AR)	Digital Learning Functions
Authentic Learning	Digital Learning Foundations
Authentic Learning	Instructional Approaches & Learning Design
Authoring	Digital Learning Functions
Authoring Permission	Software Function and Experience Inspection
Authorship and Ownership Record	Software Function and Experience Inspection
Auto-Adaptive Cohorting	Time, Pace & Orchestration
Auto-Calendaring	Time, Pace & Orchestration
Auto-Cohorting	Time, Pace & Orchestration
Auto-Feedback	Curriculum, Courseware & Assessment
Auto-Grading	Curriculum, Courseware & Assessment
Auto-Remediation	Curriculum, Courseware & Assessment
Automation Bias	Human Intelligence & Learning Design
Autoregressive Model	Artificial Intelligence Foundations
Avatar	Digital Experience Design
Badge or Microcredential	Digital Learning Functions
Bias	AI Literacy, Governance & Safety
Bias Audit	AI Literacy, Governance & Safety
Blended Learning	Instructional Approaches & Learning Design
Block-Anchored Architecture	Learning Architectures & Operating Models
Bookended Cohort Architecture	Learning Architectures & Operating Models
Bookmarking	Digital Learning Functions
Bounded AI	AI Literacy, Governance & Safety
Bounded Curriculum Intelligence	AI Literacy, Governance & Safety
Bounded Curriculum Intelligence	Learning Architectures & Operating Models
Bounded-Variance Cohorting	Time, Pace & Orchestration
Browser Zoom Resilience	Software Function and Experience Inspection
Buyer Discernment	Procurement & Product Claims
Bypassed Definition	Human Intelligence & Learning Design
Calendar Intelligence	Time, Pace & Orchestration
Caliper Analytics	Data, Analytics & Interoperability
Capacity Impact	Procurement & Product Claims
Capacity Return	Learning Intelligence Technology
Captions	Software Function and Experience Inspection
Case-Based Learning	Instructional Approaches & Learning Design
Check for Understanding	Software Function and Experience Inspection
Chunking	Digital Learning Foundations
Class Moment	Time, Pace & Orchestration
Class Start Time Scripting	Learning Intelligence Technology
Classification	Artificial Intelligence Foundations
Classroom Suitability	Procurement & Product Claims
Classroom-Centric Learning	Time, Pace & Orchestration
Cloud Application	Systems, Platforms & Architecture
Clustering	Artificial Intelligence Foundations
Co-Editing	Digital Learning Functions
Cognition	Human Intelligence & Learning Design
Cognitive Distraction	Software Function and Experience Inspection
Cognitive Load	Digital Experience Design
Cognitive Variability	Human Intelligence & Learning Design
Collaboration Workspace	Digital Learning Functions
Collaborative Learning	Instructional Approaches & Learning Design
Collection	Digital Learning Foundations
Color Accessibility	Digital Experience Design
Comic Creation	Digital Learning Functions
Common Cartridge	Data, Analytics & Interoperability
Common Demonstration Scenario	Procurement & Product Claims
Competency-Based Learning	Instructional Approaches & Learning Design

Completed-State Visibility	Software Function and Experience Inspection
Computer Vision	Artificial Intelligence Foundations
Conscientiousness	Human Intelligence & Learning Design
Construction Tool	Software Function and Experience Inspection
Consumer-Crafted Learning Architecture	Learning Architectures & Operating Models
Content Intelligence	Learning Intelligence Technology
Content Management System (CMS)	Systems, Platforms & Architecture
Content Portability	Systems, Platforms & Architecture
Content Safety	AI Literacy, Governance & Safety
Content-Agnostic System	Systems, Platforms & Architecture
Context Preservation	Digital Experience Design
Context Switching	Software Function and Experience Inspection
Contextual Differentiation	Learning Intelligence Technology
Contextualizing	Digital Learning Foundations
Cooperative Learning	Instructional Approaches & Learning Design
Coordination Load	Procurement & Product Claims
Core Curriculum	Digital Learning Foundations
Core-Connected Adaptation	Software Function and Experience Inspection
Corrective Error Message	Software Function and Experience Inspection
Course	Digital Learning Foundations
Course Frame	Digital Learning Foundations
Course Mapping	Learning Intelligence Technology
Course Planning and Scheduling (CPS)	Data, Analytics & Interoperability
Course-Centered Architecture	Learning Architectures & Operating Models
Course-Centric Learning	Time, Pace & Orchestration
Courseware	Digital Learning Foundations
Creativity	Human Intelligence & Learning Design
Credential Portability	Learning Architectures & Operating Models
Critical Thinking	Human Intelligence & Learning Design
Cross-Age Mentoring	Learning Architectures & Operating Models
Cross-Curricular Multi-Grade Project Architecture	Learning Architectures & Operating Models
Cross-Grade Grouping	Learning Architectures & Operating Models
Cross-System AI	Learning Architectures & Operating Models
Curiosity	Human Intelligence & Learning Design
Curriculum Architecture	Digital Learning Foundations
Curriculum Architecture	Learning Architectures & Operating Models
Curriculum Grounding	Curriculum, Courseware & Assessment
Curriculum Intelligence	Learning Intelligence Technology
Curriculum Management System	Systems, Platforms & Architecture
Curriculum Path Visibility	Software Function and Experience Inspection
Curriculum-Embedded AI	Learning Architectures & Operating Models
Daily Action	Organizational & Execution Foundations
Dashboard	Data, Analytics & Interoperability
Data	Data, Analytics & Interoperability
Data Collection Infrastructure	Data, Analytics & Interoperability
Data Dignity	AI Literacy, Governance & Safety
Data Lifecycle	Data, Analytics & Interoperability
Data Literacy	Data, Analytics & Interoperability
Data Logic	Human Intelligence & Learning Design
Data Logic Ledger	Human Intelligence & Learning Design
Data Map	Data, Analytics & Interoperability
Data Minimization	AI Literacy, Governance & Safety
Data Passback	Data, Analytics & Interoperability
Data Portability	Systems, Platforms & Architecture
Data Sovereignty	AI Literacy, Governance & Safety
Decision Compression	Learning Intelligence Technology
DECISION RIGHT	Organizational & Execution Foundations
Decorative Animation	Digital Experience Design
Deep Learning	Artificial Intelligence Foundations
Deliberate Practice	Instructional Approaches & Learning Design

Department	Organizational & Execution Foundations
Dependency	Organizational & Execution Foundations
Design-Based Learning	Instructional Approaches & Learning Design
Destructive Action Warning	Software Function and Experience Inspection
Device Compatibility	Digital Experience Design
Diagramming	Software Function and Experience Inspection
Dialogic Instruction	Instructional Approaches & Learning Design
Differentiation	Curriculum, Courseware & Assessment
Diffusion Model	Artificial Intelligence Foundations
Digital Curriculum	Digital Learning Foundations
Digital Education Ecosystem	Systems, Platforms & Architecture
Digital Learning Object	Digital Learning Foundations
Digital Library	Digital Learning Foundations
Digital Repository	Digital Learning Foundations
Direct Instruction (DI)	Instructional Approaches & Learning Design
Direct Teaching	Instructional Approaches & Learning Design
Disabled State	Software Function and Experience Inspection
Disaggregated Pace AI Cohorting	Time, Pace & Orchestration
Discovery Learning	Instructional Approaches & Learning Design
Discrete Digital Content	Digital Learning Foundations
Discriminative AI	Artificial Intelligence Foundations
Discussion-Based Instruction	Instructional Approaches & Learning Design
Domain Language	Human Intelligence & Learning Design
Drag-and-Drop Authoring	Digital Learning Functions
Duplicate Entry	Software Function and Experience Inspection
Duplication	Learning Intelligence Technology
Dynamic Cohort	Time, Pace & Orchestration
Dynamic Definition	Digital Learning Functions
Dynamic Instructional Intersection	Learning Architectures & Operating Models
Dynamic Space Use	Time, Pace & Orchestration
Echoing and Reactions	Digital Learning Functions
Ecosystem Orchestration	Learning Architectures & Operating Models
Edge AI	Artificial Intelligence Foundations
EdTech Stack	Systems, Platforms & Architecture
Embedded Assessment	Curriculum, Courseware & Assessment
Embedding	Artificial Intelligence Foundations
Emotional Resonance	Human Intelligence & Learning Design
Encryption	Data, Analytics & Interoperability
End-to-End Instructional Workflow	Software Function and Experience Inspection
Enterprise Architecture	Systems, Platforms & Architecture
Error Recovery	Digital Experience Design
Ethical Intelligence	Human Intelligence & Learning Design
Evidence	Organizational & Execution Foundations
Evidence Aggregation	Data, Analytics & Interoperability
Evidence in Context	Software Function and Experience Inspection
Evidence Routing	Learning Intelligence Technology
Evidence, Adaptation and Instructional Intelligence	Software Function and Experience Inspection
Exception Handling	Software Function and Experience Inspection
EXECUTION ARCHITECTURE	Organizational & Execution Foundations
Experience Portability	Learning Architectures & Operating Models
Experiential Learning	Instructional Approaches & Learning Design
Explainability	AI Literacy, Governance & Safety
Explainable Grouping Evidence	Software Function and Experience Inspection
Explicit Instruction / Explicit Teaching	Instructional Approaches & Learning Design
Failed Connection	Software Function and Experience Inspection
Failure Handling	Software Function and Experience Inspection
False Fluency	Human Intelligence & Learning Design
Filtering	Digital Learning Functions
Flex-Time Architecture	Learning Architectures & Operating Models
Flipped Learning	Instructional Approaches & Learning Design

Flow-Based Model	Artificial Intelligence Foundations
Focus Order	Digital Experience Design
Focus Visibility	Software Function and Experience Inspection
Foldering	Digital Learning Functions
Form	Organizational & Execution Foundations
Formational Intelligence	Human Intelligence & Learning Design
Formative Assessment	Curriculum, Courseware & Assessment
Four Levels of AI Use	AI Literacy, Governance & Safety
Fractional Teaching	Time, Pace & Orchestration
Framework System	Systems, Platforms & Architecture
Framing	Digital Learning Foundations
Game-Based Learning	Digital Learning Functions
Gamification	Digital Learning Functions
Gating	Curriculum, Courseware & Assessment
Generative Adversarial Network (GAN)	Artificial Intelligence Foundations
Generative AI	Artificial Intelligence Foundations
Goal	Organizational & Execution Foundations
Governed Social Scope	Software Function and Experience Inspection
Grade Cluster	Learning Architectures & Operating Models
Gradual Release of Responsibility	Instructional Approaches & Learning Design
Grounding	AI Literacy, Governance & Safety
Grouping	Curriculum, Courseware & Assessment
Growth Tracking	Data, Analytics & Interoperability
Guided Instruction / Guided Learning	Instructional Approaches & Learning Design
Guided Practice	Instructional Approaches & Learning Design
Hallucination	AI Literacy, Governance & Safety
Hamburger Menu	Digital Experience Design
Handoff	Organizational & Execution Foundations
High-Quality Instructional Materials (HQIM)	Digital Learning Foundations
Highly Designed Digital Courseware	Digital Learning Foundations
Human Escalation Path	Software Function and Experience Inspection
Human Intelligence	Human Intelligence & Learning Design
Human Intelligence Characteristics	Human Intelligence & Learning Design
Human Intelligence Domain	Human Intelligence & Learning Design
Human-in-the-Loop	AI Literacy, Governance & Safety
Identity and Access Management (IAM)	Systems, Platforms & Architecture
Identity Control	Software Function and Experience Inspection
IEP and Accommodation Workflow Alignment	Software Function and Experience Inspection
Implementation Load	Procurement & Product Claims
Improvement-Oriented Feedback	Software Function and Experience Inspection
Incentive Design	Digital Learning Functions
Incorporeal Intelligence	Human Intelligence & Learning Design
Independent Practice	Instructional Approaches & Learning Design
Independently Paced Course Architecture	Learning Architectures & Operating Models
Individual Intervention Suggestion	Learning Intelligence Technology
Individualization	Curriculum, Courseware & Assessment
Inference	Artificial Intelligence Foundations
Infinite Schedules Within a Master Schedule	Time, Pace & Orchestration
Inquiry-Based Learning	Instructional Approaches & Learning Design
Instance	Systems, Platforms & Architecture
Institutional Knowledge Retention	Software Function and Experience Inspection
Institutional Readiness	AI Literacy, Governance & Safety
Instructional Animation	Digital Experience Design
Instructional Approach	Instructional Approaches & Learning Design
Instructional Approach Fit	Instructional Approaches & Learning Design
Instructional Architecture	Digital Learning Foundations
Instructional Architecture	Learning Architectures & Operating Models
Instructional Authority Boundary	Learning Architectures & Operating Models
Instructional Bookend	Learning Architectures & Operating Models
Instructional Continuity	Software Function and Experience Inspection

Instructional Intelligence	Learning Intelligence Technology
Instructional Load	Procurement & Product Claims
Instructional Logistics	Time, Pace & Orchestration
Instructional Media Accuracy	Software Function and Experience Inspection
Instructional Model Inheritance	Instructional Approaches & Learning Design
Instructional Recommendation	Curriculum, Courseware & Assessment
Instructional Time Compression	Time, Pace & Orchestration
Integrated	Procurement & Product Claims
Integration Layer	Systems, Platforms & Architecture
Interactive Content	Digital Learning Foundations
Interdisciplinary Learning	Instructional Approaches & Learning Design
Interest Group	Digital Learning Functions
Interface Action, Status and Recovery	Software Function and Experience Inspection
Interface Density	Digital Experience Design
Interoperability	Systems, Platforms & Architecture
Interpersonal Intelligence	Human Intelligence & Learning Design
Intervention Intelligence	Learning Intelligence Technology
Intrapersonal Intelligence	Human Intelligence & Learning Design
Keyboard Navigation	Digital Experience Design
Knowledge Object	Digital Learning Foundations
Large Language Model (LLM)	Artificial Intelligence Foundations
Learner Experience Architecture	Digital Learning Foundations
Learner-Controlled Media	Software Function and Experience Inspection
Learner-Facing AI	Learning Architectures & Operating Models
Learner-Owned Learning Record	Learning Architectures & Operating Models
Learning Analytics	Data, Analytics & Interoperability
Learning Architecture	Digital Learning Foundations
Learning Architecture	Learning Architectures & Operating Models
Learning Ecosystem	Learning Architectures & Operating Models
Learning Experience	Digital Learning Foundations
Learning Experience Platform (LXP)	Systems, Platforms & Architecture
Learning Information Services (LIS)	Data, Analytics & Interoperability
Learning Intelligence	Learning Intelligence Technology
Learning Intelligence Claim	Procurement & Product Claims
Learning Intelligence Technology (LIT)	Learning Intelligence Technology
Learning Management System (LMS)	Systems, Platforms & Architecture
Learning Map	Digital Learning Foundations
Learning Obstacle	Human Intelligence & Learning Design
Learning Signal	Data, Analytics & Interoperability
Learning Tools Interoperability (LTI)	Data, Analytics & Interoperability
Least Privilege	AI Literacy, Governance & Safety
Lesson and Content Creation	Learning Intelligence Technology
Lesson Clipper	Learning Intelligence Technology
Lesson Compression	Curriculum, Courseware & Assessment
Lesson Time Used (LTU)	Digital Learning Foundations
Lesson Versioning	Curriculum, Courseware & Assessment
Lesson Versioning	Learning Intelligence Technology
Level 1: Independent Generative AI	AI Literacy, Governance & Safety
Level 2: Autonomous-System Bounded or Streaming AI	AI Literacy, Governance & Safety
Level 3: Operational Multi-System Intelligence	AI Literacy, Governance & Safety
Level 4: Institution-Wide or Industry All-System Intelligence	AI Literacy, Governance & Safety
License Agreement	Procurement & Product Claims
Linearity	Digital Learning Foundations
Linguistic Intelligence	Human Intelligence & Learning Design
Live Chat	Digital Learning Functions
Live Video	Digital Learning Functions
Local Application	Systems, Platforms & Architecture
Locked or Fixed Pathway	Curriculum, Courseware & Assessment
Locking and Unlocking	Software Function and Experience Inspection
Logical-Mathematical Intelligence	Human Intelligence & Learning Design

Loops and Branches	Curriculum, Courseware & Assessment
Machine Learning	Artificial Intelligence Foundations
Manual Transfer	Software Function and Experience Inspection
Mastery Evidence	Software Function and Experience Inspection
Mastery Learning	Instructional Approaches & Learning Design
Mastery Progression	Curriculum, Courseware & Assessment
Mastery Progression	Instructional Approaches & Learning Design
Matching Intelligence	Learning Architectures & Operating Models
Math Notation	Software Function and Experience Inspection
MEASURE	Organizational & Execution Foundations
Media Necessity	Software Function and Experience Inspection
Metacognitive Instruction	Instructional Approaches & Learning Design
Metadata	Digital Learning Functions
Metric	Data, Analytics & Interoperability
Misconception	Curriculum, Courseware & Assessment
Misconception Analysis	Curriculum, Courseware & Assessment
Misconception-Based Grouping	Learning Intelligence Technology
Missing Mass	Human Intelligence & Learning Design
Mixing	Digital Learning Functions
Modal	Digital Experience Design
Model	Artificial Intelligence Foundations
Model and Service Connection Disclosure	Software Function and Experience Inspection
Model Drift	AI Literacy, Governance & Safety
Modeling	Instructional Approaches & Learning Design
Moderation Control	Software Function and Experience Inspection
Motional Intelligence	Human Intelligence & Learning Design
MTSS Workflow Alignment	Software Function and Experience Inspection
Multi-Age Learning	Learning Architectures & Operating Models
Multi-Grade Course Architecture	Learning Architectures & Operating Models
Multi-Grade Learning	Learning Architectures & Operating Models
Multimedia Proof	Digital Learning Functions
Multimodal AI	Artificial Intelligence Foundations
Natural Language Processing (NLP)	Artificial Intelligence Foundations
Naturalistic Intelligence	Human Intelligence & Learning Design
Navigation	Digital Experience Design
Navigation Bar	Digital Experience Design
Nesting	Digital Experience Design
Neural Network	Artificial Intelligence Foundations
Neural Network Layer	Artificial Intelligence Foundations
Neural Radiance Field (NeRF)	Artificial Intelligence Foundations
New Oversight Work	Software Function and Experience Inspection
Non-Conceptual Awareness	Human Intelligence & Learning Design
Non-Verbal Cognition	Human Intelligence & Learning Design
Nonlinear Learning	Digital Learning Foundations
OBJECTIVE	Organizational & Execution Foundations
OCR Paper Scoring	Learning Intelligence Technology
Omni-AI	Artificial Intelligence Foundations
On/Offline Access	Digital Experience Design
OneRoster	Data, Analytics & Interoperability
Open Educational Resources (OER)	Digital Learning Foundations
Open-Response Feedback	Curriculum, Courseware & Assessment
OPERATING CONDITION	Organizational & Execution Foundations
Operating Model	Digital Learning Foundations
Operating Model	Procurement & Product Claims
Orchestration	Systems, Platforms & Architecture
Orchestration Claim	Procurement & Product Claims
Organization, Creation and Authorship	Software Function and Experience Inspection
Organizational Orchestration Intelligence	Learning Architectures & Operating Models
Organizational Structure (the Org Chart)	Organizational & Execution Foundations
Orientation Resilience	Software Function and Experience Inspection

Outcome	Organizational & Execution Foundations
Output	Organizational & Execution Foundations
Override Right	AI Literacy, Governance & Safety
Ownership	Organizational & Execution Foundations
Pacing Guide	Digital Learning Foundations
Pacing Intelligence	Time, Pace & Orchestration
Peer Feedback	Software Function and Experience Inspection
Peer Learning	Instructional Approaches & Learning Design
Peer Tutoring	Instructional Approaches & Learning Design
Persistent Personal Organization	Software Function and Experience Inspection
Personalization	Curriculum, Courseware & Assessment
Personalized	Procurement & Product Claims
Personalized Learning	Instructional Approaches & Learning Design
Pilot	Procurement & Product Claims
Platform	Systems, Platforms & Architecture
Point Solution	Systems, Platforms & Architecture
Pop-Up	Digital Experience Design
Portfolio	Digital Learning Foundations
Portfolio Curation	Digital Learning Functions
Practice Generation	Curriculum, Courseware & Assessment
Practice Generator	Learning Intelligence Technology
Pre-Assessment	Curriculum, Courseware & Assessment
Predictive Analytics	Data, Analytics & Interoperability
Predictive Model	Artificial Intelligence Foundations
Premature Certainty	Human Intelligence & Learning Design
Prerequisite Detection	Curriculum, Courseware & Assessment
Primary Unit of Design	Digital Learning Foundations
Privacy by Design	AI Literacy, Governance & Safety
Probeware	Digital Learning Functions
Problem-Based Learning	Instructional Approaches & Learning Design
Procurement Enforcement	Procurement & Product Claims
Product Maturity	Procurement & Product Claims
Program	Organizational & Execution Foundations
Progressive Disclosure	Digital Experience Design
Prohibited AI Use	Software Function and Experience Inspection
Project	Organizational & Execution Foundations
Project-Based Learning	Instructional Approaches & Learning Design
Prompt	AI Literacy, Governance & Safety
Prompt Engineering	AI Literacy, Governance & Safety
Proof of Concept	Procurement & Product Claims
Proof of Learning	Digital Learning Foundations
Purpose	Organizational & Execution Foundations
Readiness-Based Grouping	Software Function and Experience Inspection
Reassignment Control	Software Function and Experience Inspection
Recommendation AI	Artificial Intelligence Foundations
Recommendation Engine	Curriculum, Courseware & Assessment
Recommended Teacher Action	Learning Intelligence Technology
Recovery Path	Software Function and Experience Inspection
Reflective Learning	Instructional Approaches & Learning Design
Reinforcement Learning	Artificial Intelligence Foundations
Representative Review Environment	Procurement & Product Claims
Residual Human Work	Procurement & Product Claims
Residual Verification Work	Software Function and Experience Inspection
Responsive Design	Digital Experience Design
Responsive Intervention Architecture	Learning Architectures & Operating Models
Retrieval Practice	Instructional Approaches & Learning Design
Retrieval-Augmented Generation (RAG)	AI Literacy, Governance & Safety
Reusable Template	Software Function and Experience Inspection
Reversibility	AI Literacy, Governance & Safety
Revision History	Software Function and Experience Inspection

Roadmap Claim	Procurement & Product Claims
Role-Based Sharing	Software Function and Experience Inspection
Role-Specific Bookmarking	Software Function and Experience Inspection
Rostering	Data, Analytics & Interoperability
Rubric	Curriculum, Courseware & Assessment
Rules-Based System	Artificial Intelligence Foundations
Sandbox Environment	Digital Learning Functions
Save-and-Return	Digital Experience Design
Scaffold Generation	Learning Intelligence Technology
Scaffolding	Curriculum, Courseware & Assessment
Scaffolding	Instructional Approaches & Learning Design
Schedule Recovery	Time, Pace & Orchestration
Schedule Restructuring	Learning Intelligence Technology
Scope and Sequence	Digital Learning Foundations
Screen Sharing	Digital Learning Functions
Screen-Reader Compatibility	Software Function and Experience Inspection
Search	Digital Learning Functions
Selective Release	Curriculum, Courseware & Assessment
Self-Contained Learning System	Systems, Platforms & Architecture
Self-Directed Learning	Instructional Approaches & Learning Design
Self-Regulated Learning	Instructional Approaches & Learning Design
Session Recovery	Digital Experience Design
Shared Anchor	Learning Architectures & Operating Models
Signifier	Digital Experience Design
Silo	Systems, Platforms & Architecture
Simulation	Digital Learning Functions
Single Sign-On (SSO)	Systems, Platforms & Architecture
Situated Learning	Instructional Approaches & Learning Design
Sketching	Digital Learning Functions
Social Interaction	Digital Learning Functions
Social Participation and Identity	Software Function and Experience Inspection
Socratic Seminar	Instructional Approaches & Learning Design
Software as a Service (SaaS)	Systems, Platforms & Architecture
Spatial-Temporal AI	Artificial Intelligence Foundations
Staff-Turnover Continuity	Software Function and Experience Inspection
Standards Alignment	Digital Learning Foundations
Standards Attainment	Digital Learning Foundations
Standards-Preserving Adaptation	Curriculum, Courseware & Assessment
State Persistence	Digital Experience Design
Static Digital Content	Digital Learning Foundations
Station Rotation	Instructional Approaches & Learning Design
Station-Rotation Architecture	Learning Architectures & Operating Models
Steep Gradient	Human Intelligence & Learning Design
Storyboarding	Digital Learning Functions
Strategy	Organizational & Execution Foundations
Streaming AI	AI Literacy, Governance & Safety
Streaming API	Systems, Platforms & Architecture
Student Information System (SIS)	Systems, Platforms & Architecture
Subprocessor	Procurement & Product Claims
Summative Assessment	Curriculum, Courseware & Assessment
Supervised Learning	Artificial Intelligence Foundations
Synthetic Data	Artificial Intelligence Foundations
System	Systems, Platforms & Architecture
Systems Thinking	Systems, Platforms & Architecture
Tactic	Organizational & Execution Foundations
Tagging	Digital Learning Functions
Target	Digital Experience Design
Teacher Approval Workflow	Learning Intelligence Technology
Teacher Control	Curriculum, Courseware & Assessment
Teacher-Facing AI	Learning Architectures & Operating Models

Teacher-Guided Time-Orchestrated Architecture	Learning Architectures & Operating Models
Teacher-Visible Collaboration	Software Function and Experience Inspection
Temporal State	Time, Pace & Orchestration
Tensor	Artificial Intelligence Foundations
Text Enlargement	Digital Experience Design
Theory of Mind AI	Artificial Intelligence Foundations
Think-Aloud	Instructional Approaches & Learning Design
Thinking	Human Intelligence & Learning Design
Three-Dot Menu	Digital Experience Design
Tier 2 Version	Software Function and Experience Inspection
Tier 3 Version	Software Function and Experience Inspection
Tiered / MTSS Architecture	Learning Architectures & Operating Models
Time AI	Time, Pace & Orchestration
Time as the Organizing Architecture	Learning Architectures & Operating Models
Time on Task	Data, Analytics & Interoperability
Time-Organized Learning Architecture	Learning Architectures & Operating Models
Timed Release	Curriculum, Courseware & Assessment
Timed Rollout	Curriculum, Courseware & Assessment
Token	Artificial Intelligence Foundations
Total Cost of Ownership (TCO)	Procurement & Product Claims
Touch Enabled	Digital Experience Design
Traditional Whole-Group Architecture	Learning Architectures & Operating Models
Training Data	Artificial Intelligence Foundations
Transcript	Software Function and Experience Inspection
Transfer Learning	Artificial Intelligence Foundations
Transformer Model	Artificial Intelligence Foundations
Translation Generation	Learning Intelligence Technology
Transparency	AI Literacy, Governance & Safety
Trigger	Curriculum, Courseware & Assessment
Universal Design for Learning (UDL)	Digital Experience Design
Unsupervised Learning	Artificial Intelligence Foundations
User Experience (UX)	Digital Experience Design
User Interface (UI)	Digital Experience Design
Variable-Bounded Whole-Group Architecture	Learning Architectures & Operating Models
Variational Autoencoder (VAE)	Artificial Intelligence Foundations
Vendor Lock-In	Systems, Platforms & Architecture
Video Submission	Digital Learning Functions
Virtual Assistant	Artificial Intelligence Foundations
Virtual Manipulative	Digital Learning Functions
Virtual Reality (VR)	Digital Learning Functions
Visual Composition	Software Function and Experience Inspection
Visualization	Digital Experience Design
Voice AI	Artificial Intelligence Foundations
Voice Playback	Digital Experience Design
Voice System Requirements	Software Function and Experience Inspection
Walled Garden	Systems, Platforms & Architecture
Warm-Up Generation	Learning Intelligence Technology
Whole-Group Response Signal	Software Function and Experience Inspection
Worked Example	Instructional Approaches & Learning Design
Workflow	Systems, Platforms & Architecture
Workflow and Decision Compression	Procurement & Product Claims
Workflow Compression	Learning Intelligence Technology
Workflow Continuity and Capacity	Software Function and Experience Inspection
Workflow Friction	Procurement & Product Claims
Workflow Notification	Software Function and Experience Inspection
Workflow Owner	Software Function and Experience Inspection
Workshop Architecture	Learning Architectures & Operating Models
Workshop Model	Instructional Approaches & Learning Design

PUBLICATION NOTES

This manuscript is intentionally written as a reading primer. Definitions are alphabetized within each section or conceptual subsection for faster scanning, while section placement preserves the larger conceptual structure. The alphabetical index supports whole-book reference use.

Graphic directions are displayed in large, clearly marked boxes. They are editorial placeholders for the future illustration phase and are not intended as final artwork.

The finished visual edition should use a consistent light, human-designed Forward > family palette; prioritize clear educational diagrams over decorative imagery; and avoid embedding essential explanations only inside images.

Manuscript indexed term count: 594