

PORTFOLIO CASE STUDY

Learning Horizons | Learning Design & EdTech Product Case Study

A curriculum-first prototype informed by classroom practice, learning design and research

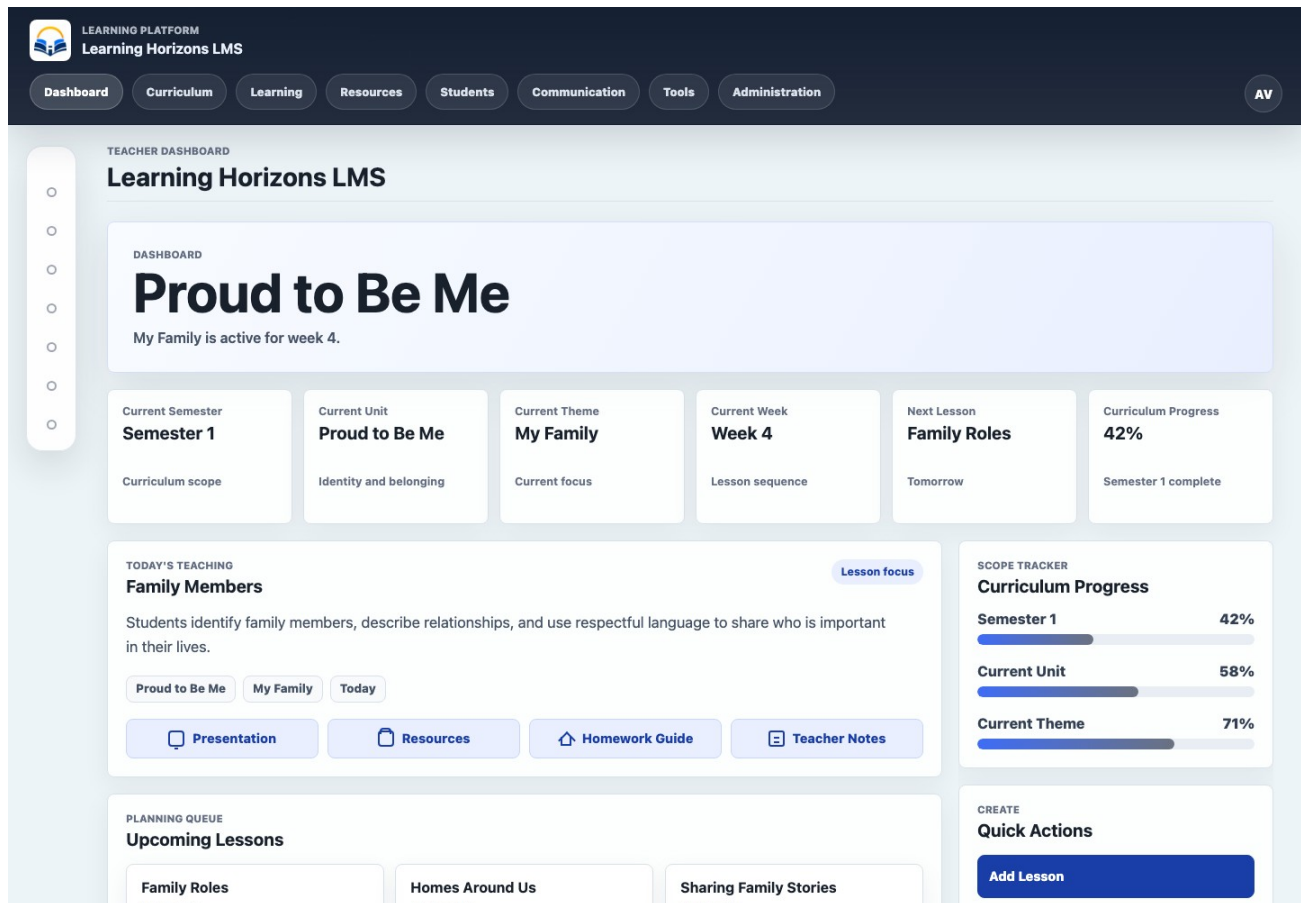


Figure 1 Teacher dashboard with curriculum scope lesson focus and planning actions

Learning Horizons is an independently directed, AI-assisted LMS prototype developed in response to a real classroom planning challenge. I defined the educational requirements, designed workflows, tested the interface and iterated on usability; Codex supported technical implementation. The platform has not yet been introduced or evaluated in school. Screenshots show fictional demonstration data.

PRODUCT OVERVIEW

The product problem and response

My co-teacher and I needed to stay aligned on Grade 2 curriculum pacing and coverage. Without a prescribed textbook programme, we also created and shared our own resources. I began Learning Horizons to make completed content, upcoming objectives and linked materials visible in one place, reducing the risk of gaps, duplication or one class moving ahead of the other.

Product response

I made the shared curriculum map the organising structure: semester, unit, theme and lesson information provides context for resources, planning and progress. As the prototype evolved, I explored linking content creation, homework, assessment and reporting to that structure. These are designed workflows, not yet evidence of improved classroom outcomes.

Users and jobs

User	Primary job	Implemented experience
Teacher	Plan and deliver coherent lessons	Dashboard, curriculum map, content tools, assessments, analytics, communication and AI support
Student	Understand what to learn and complete	Student home, lesson view, activities, homework, progress, badges and portfolio
Parent	Support learning without seeing unrelated records	Linked child view with current goals, homework, vocabulary, announcements and approved portfolio items
School leader	Review delivery and access	Curriculum oversight, class scope, reporting, permissions and audit foundations

Portfolio scope

- Responsive interface and role based navigation for teacher, student, parent, grade leader, and administrator contexts.
- Curriculum linked modules for lessons, resources, activities, reading, writing, vocabulary, homework, submissions, assessments, portfolios, rewards, analytics, and reports.
- Backend foundation for authentication, permissions, persistent records, files, audit activity, OpenAI generation, and PostgreSQL deployment through Prisma.
- Automated browser checks for core role journeys and AI to module publishing workflows.

CURRICULUM ARCHITECTURE

Design decision 1 | Start with the curriculum

The curriculum map gives the product a shared structure. Units, themes, lessons, outcomes, and progress become reusable context for planning and delivery rather than metadata added after content is created.

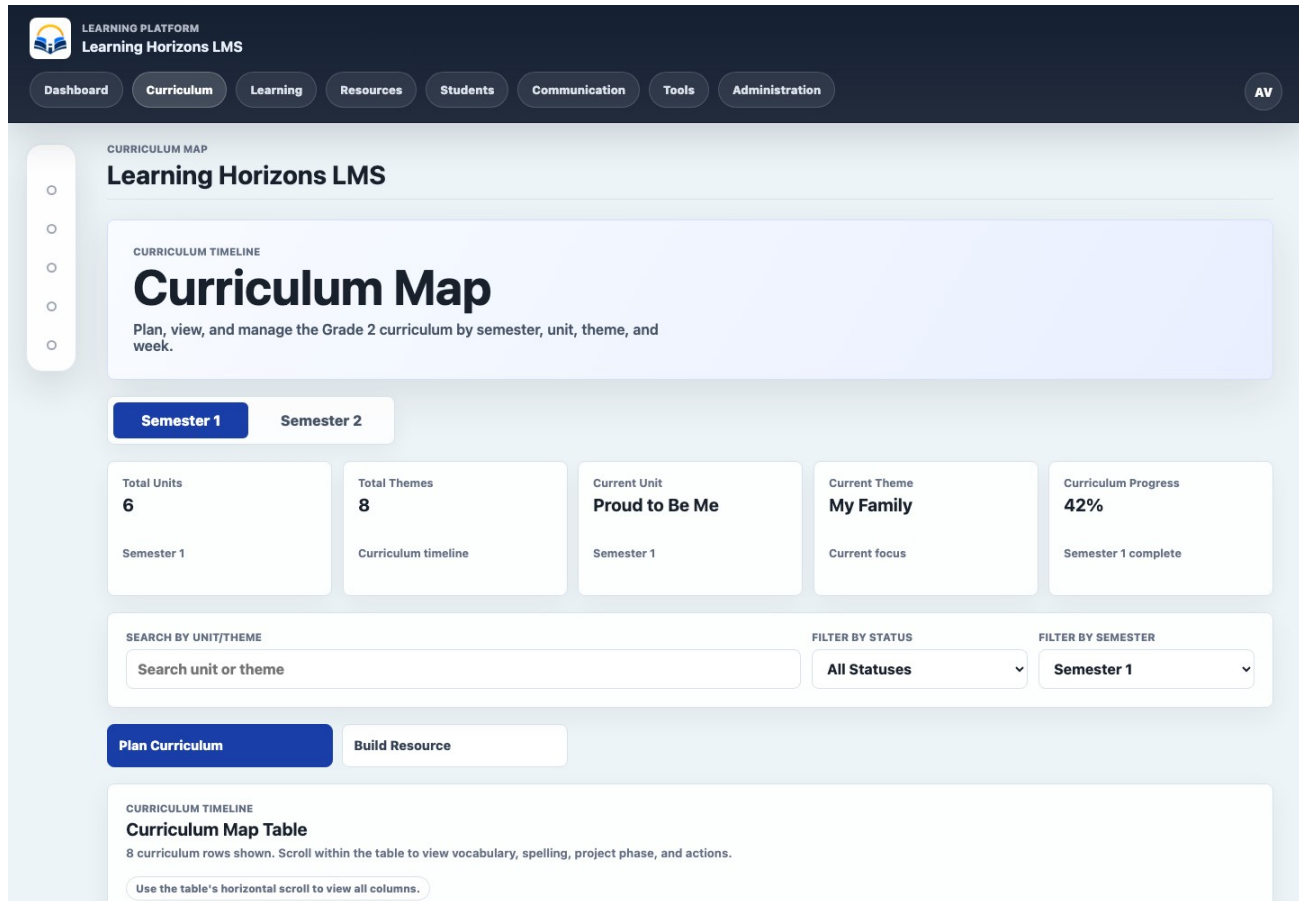


Figure 2 Curriculum map organised around semester unit theme and lesson relationships

Why this matters

A curriculum first model reduces duplicated setup. The same unit and lesson references can organise resources, student tasks, assessments, progress records, parent updates, and reports. It also creates a stable basis for future standards alignment and cross class curriculum coverage analysis.

TEACHER WORKFLOW

Design decision 2 | Create once, reuse with purpose

Teachers can create reusable items without leaving the curriculum context. The content builder supports quizzes, activities, readings, writing tasks, vocabulary sets, homework guides, flashcards, and exit tickets, then routes them to the relevant LMS area.

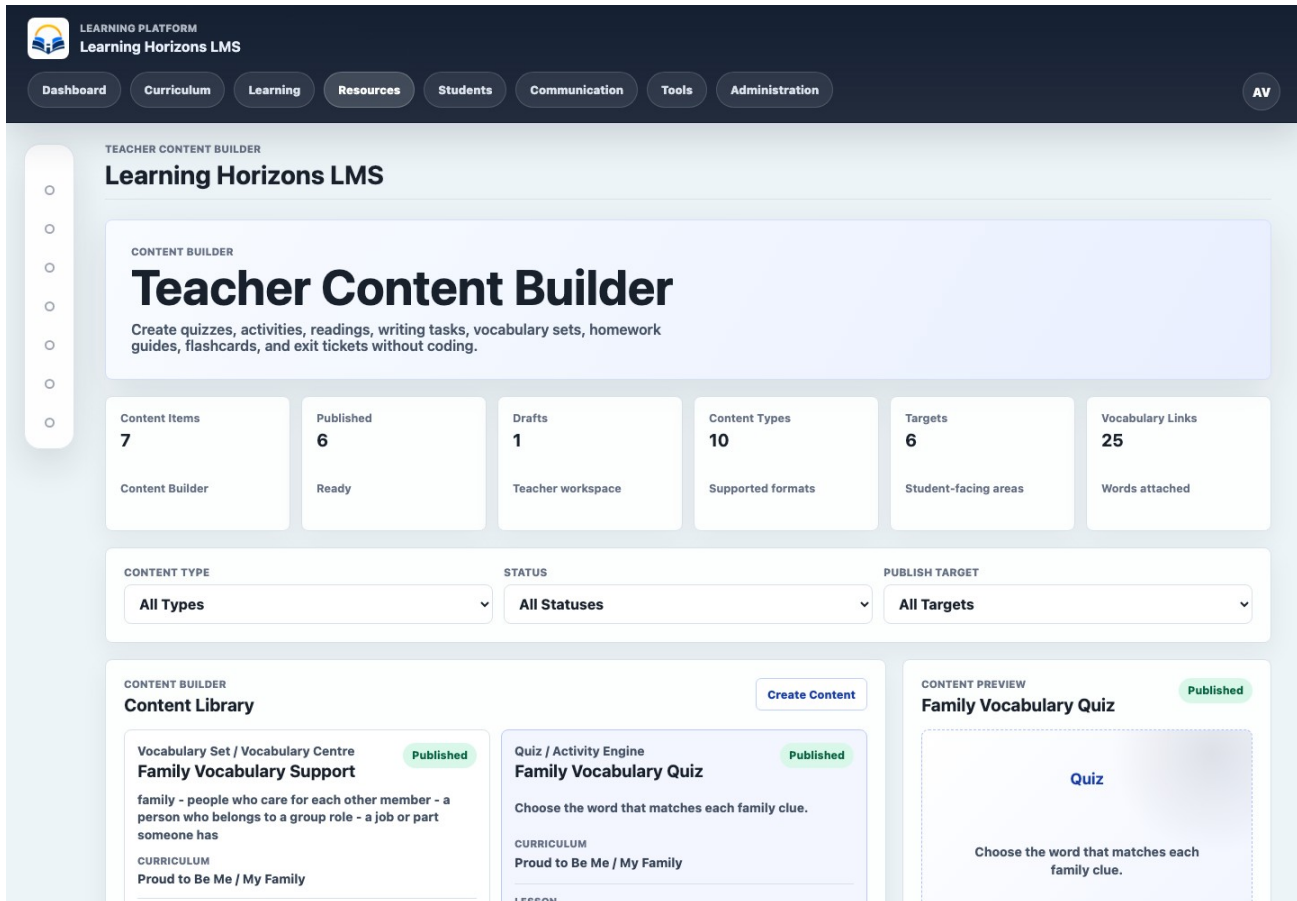


Figure 3 No code teacher content builder

Design choice

The builder separates reusable content from assignment and student progress records. This supports a workflow in which a teacher creates once, publishes to a learning area, assigns to a class, and reviews completion without copying the same material into multiple modules.

LEARNING CONTENT

Reading as a connected learning experience

The Reading Centre demonstrates how subject content can connect instructional material, vocabulary, guided discussion, homework, activities, and progress. Teacher actions for creation, duplication, assignment, and archiving appear above the library.

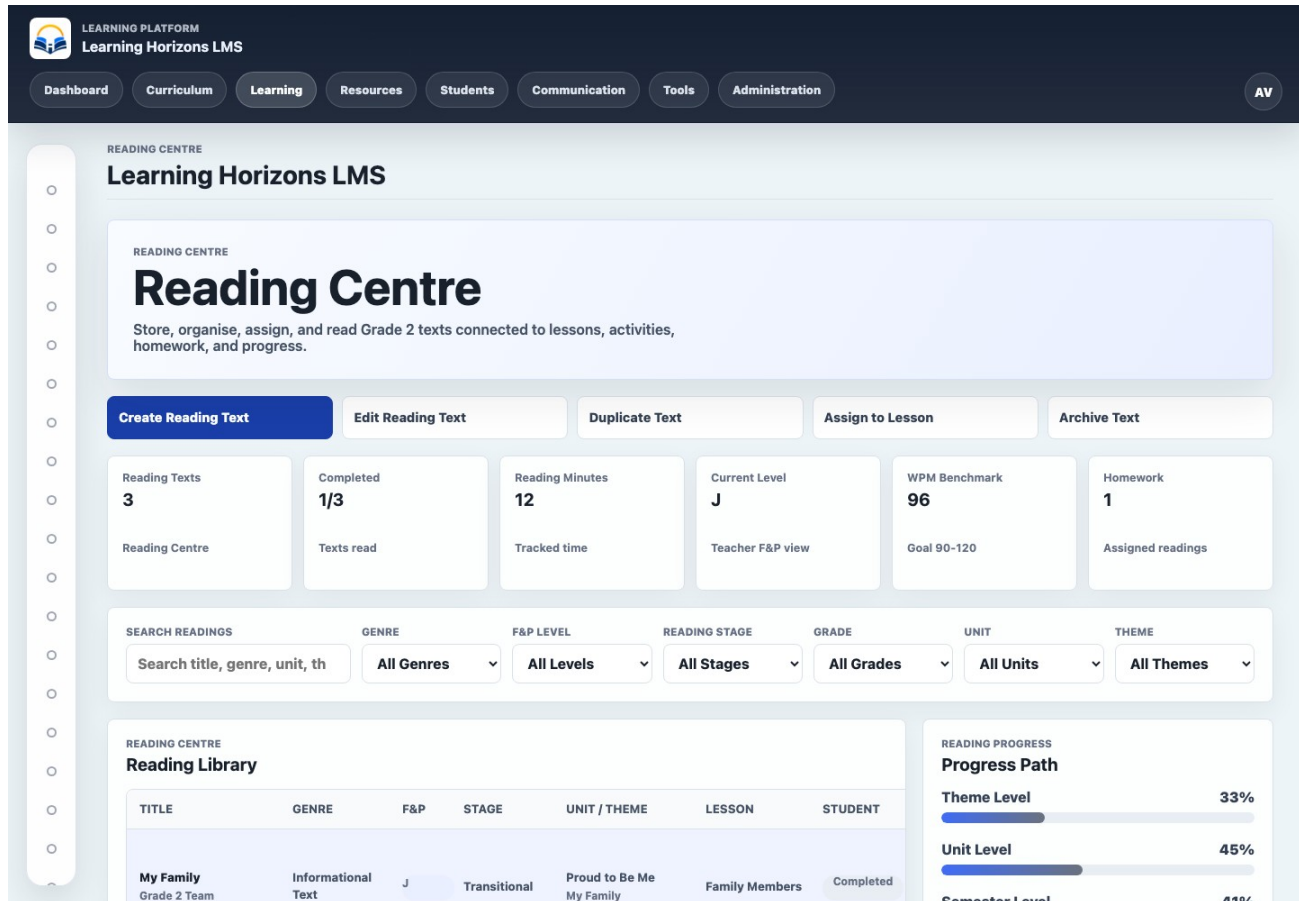


Figure 4 Reading library with authoring actions and progress context

Reusable pattern

The same information model extends to writing and vocabulary. This allows reading prompts to inform writing tasks, vocabulary sets to appear in lessons and homework, and completion signals to feed progress and reward views.

LEARNER EXPERIENCE

Design evolution | A simpler student experience

Student access was a later design extension, not part of the initial teacher-facing brief. I designed a focused learner view around current lessons, clear “I can” goals, vocabulary and homework. When reviewing navigation, I found the original top navigation less intuitive for younger users and directed a change towards a sidebar with recognisable icons. This remains a design judgement awaiting student usability testing.

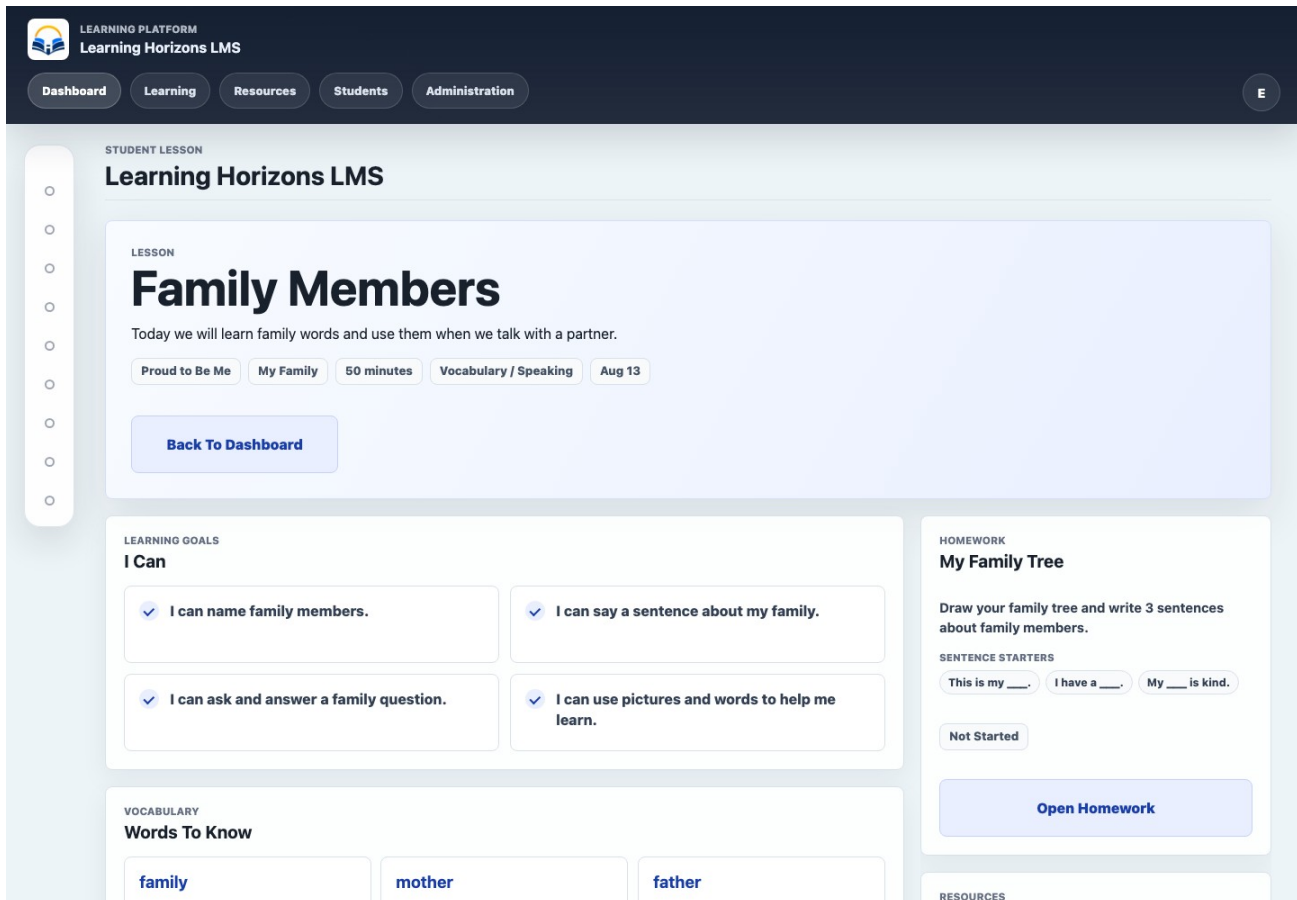


Figure 5 Student lesson view with learning goals vocabulary and homework

Role aware design

Permissions affect both data access and navigation. Students see their own learning records, while teachers receive class tools and management actions. This reduces accidental exposure of administrative functions and supports a clearer task hierarchy for each user.

FAMILY EXPERIENCE

Design evolution | Parent access and privacy

The parent view provides enough context to support learning at home while limiting access to linked children. It surfaces weekly goals, homework, vocabulary, announcements, progress, and approved portfolio evidence.

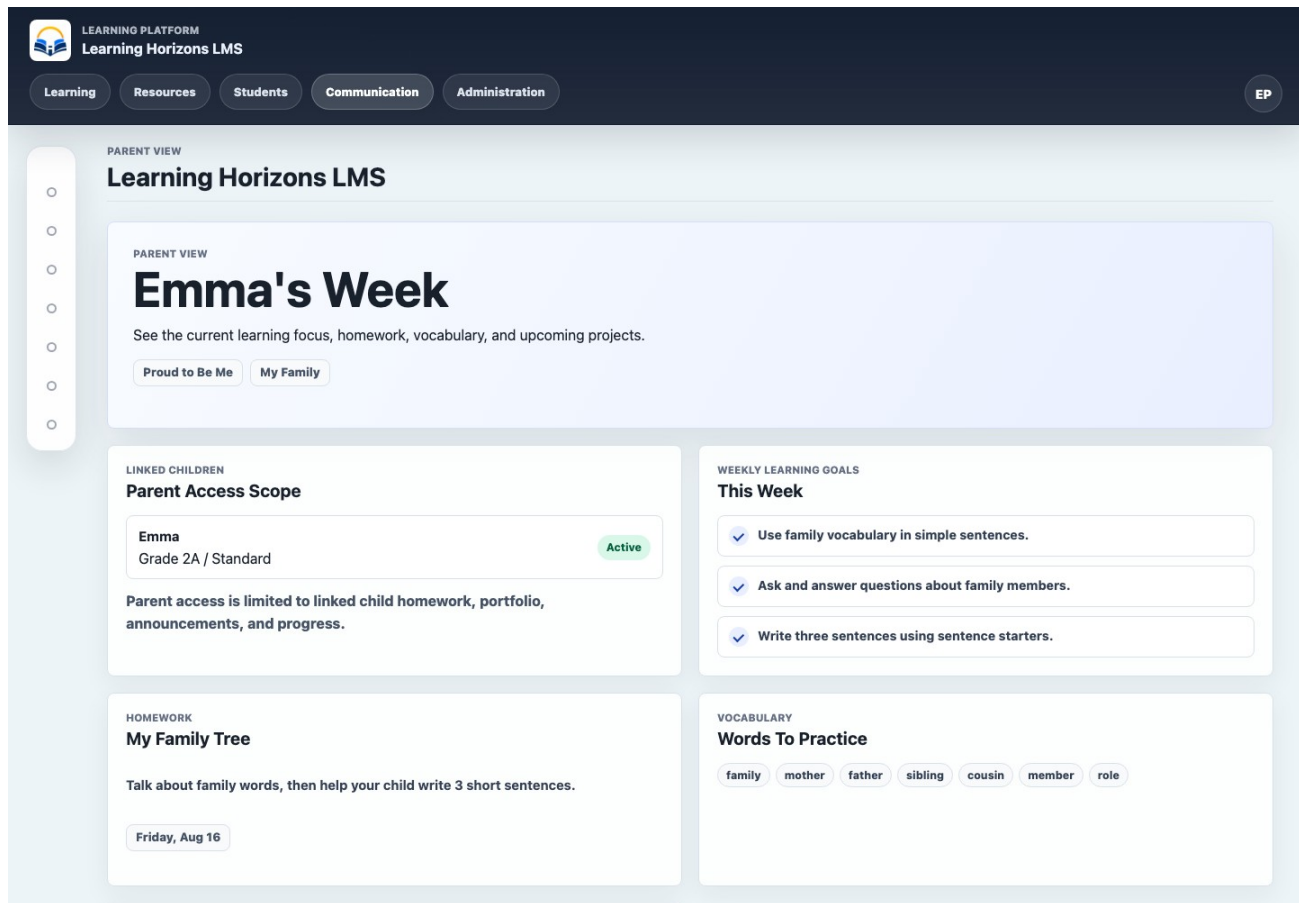


Figure 6 Parent dashboard scoped to a linked child

Privacy principle

The interface states the access boundary directly and separates parent safe information from teacher records. The backend foundation also models parent to child links and role checks, which is necessary before the experience can move beyond demonstration data.

EVIDENCE AND INTERVENTION

Prototype concept | Analytics for teacher decisions

The analytics dashboard combines engagement, completion, subject progress, rewards, and intervention indicators. Filters preserve class, student, curriculum, lesson, and date context so a teacher can move from a class signal to an individual record.

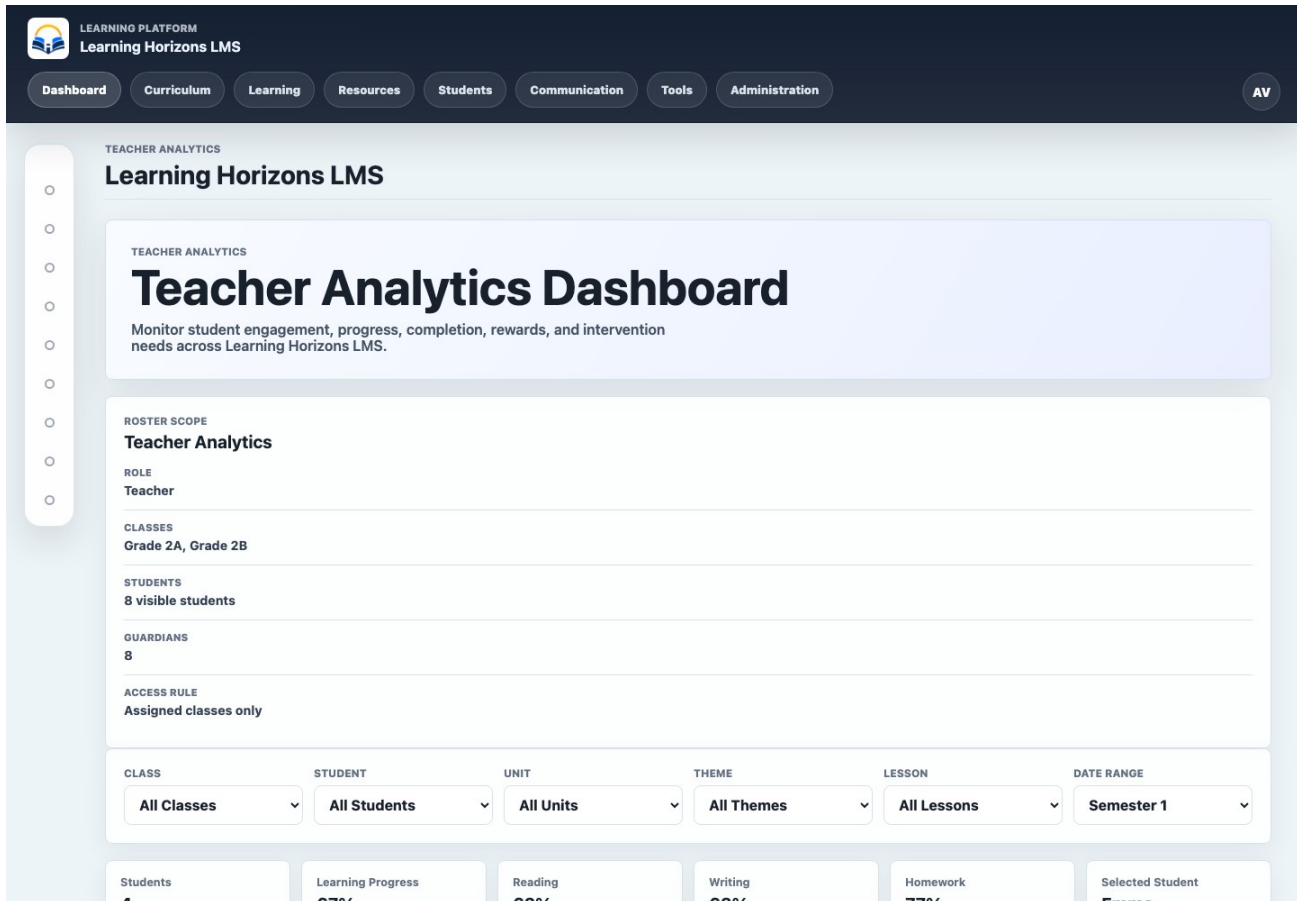


Figure 7 Teacher analytics with role scope and curriculum filters

Assessment connection

Assessment records include assignment state, rubrics, checklists, review feedback, and curriculum links. Portfolio evidence can collect selected work, badges, projects, and assessment outcomes for student and parent facing views.

RESPONSIBLE AI

Design decision 3 | Keep teachers in control of AI

The AI Teacher Assistant is designed to help teachers draft and adapt objectives, vocabulary, comprehension questions, writing tasks, homework, exit tickets, quizzes and differentiated activities within curriculum context. The teacher must check pedagogical suitability, accuracy, reading level and inclusion. A visible approval step exists in the prototype, although server-side enforcement remains a documented limitation.

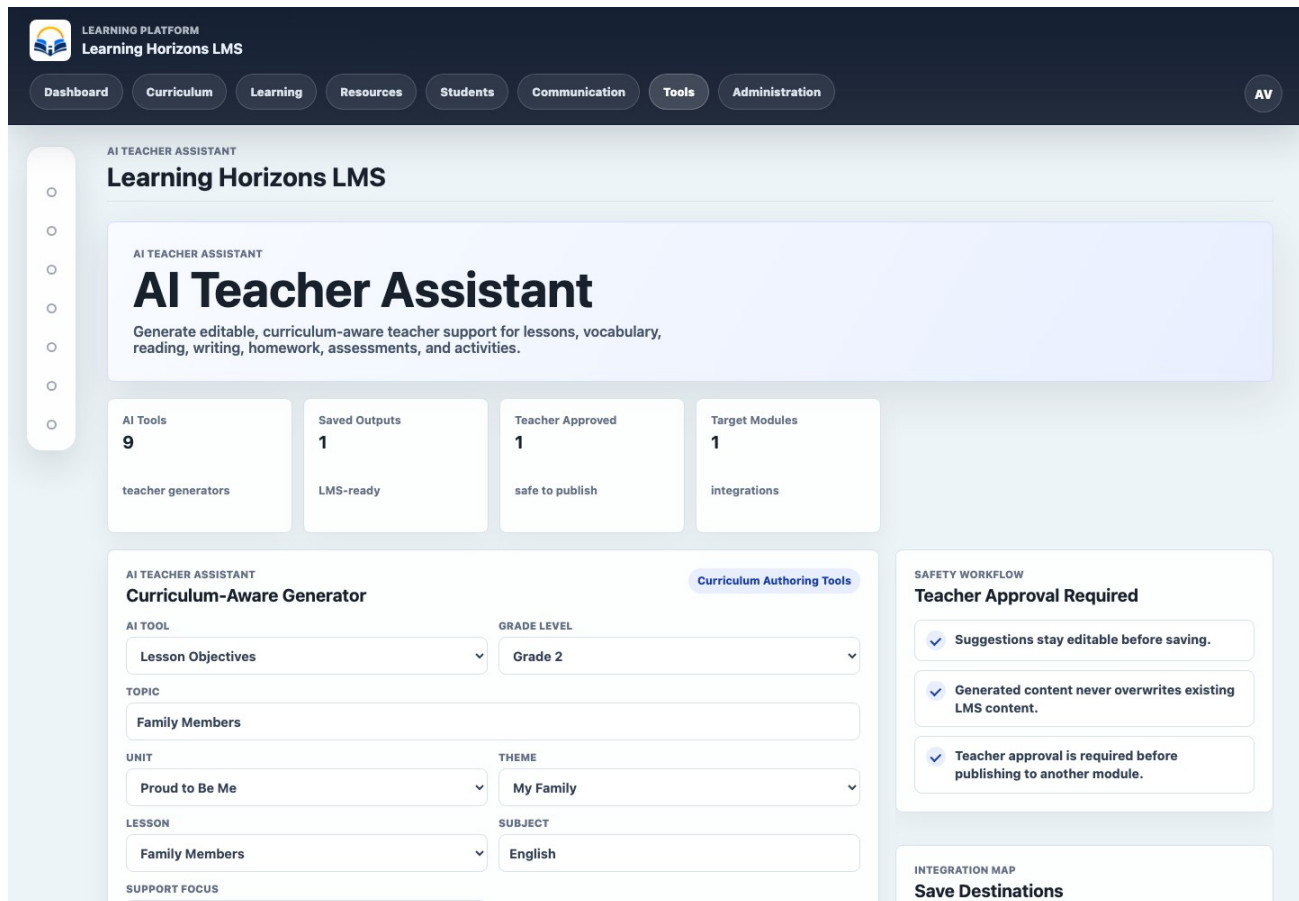


Figure 8 Curriculum aware AI teacher assistant

Implemented safeguards and constraints

- The prompt asks for age appropriate editable material and excludes private student data.
- A strict response schema limits output to a title, resources, suggestions, extensions, and support strategies.
- The browser never receives the OpenAI API key, and generation activity is recorded in the backend audit trail.
- Current output still requires human checking for accuracy, inclusion, curriculum fit, and reading level.

TECHNICAL IMPLEMENTATION

AI-assisted prototyping and technical foundations

Learning Horizons began as a data rich browser prototype and now includes a modular Node backend. The architecture allows individual modules to move from local demonstration state to persisted services without replacing the interface model.

Layer	Implementation	Portfolio evidence
Interface	HTML, CSS and modular JavaScript	Responsive layouts, reusable render functions, role navigation, forms, filters and dashboards
API	Node HTTP services and module routes	Authentication, curriculum, resources, homework, assessments, analytics, AI, files and reporting endpoints
Data	JSON development stores and Prisma	Development portability with a PostgreSQL production path and structured domain models
Security	Server sessions, role checks and permissions	Scoped navigation, protected routes, parent child relationships and audit records
Quality	Playwright end to end tests	Teacher, student and parent journeys plus AI publishing checks across responsive browser sizes
Deployment	Static frontend and separate API	Environment based configuration, backend only secrets and Linux deployment guidance

Key engineering decision

Each domain has a clear frontend state model and a corresponding backend module path. That separation keeps the prototype easy to demonstrate while establishing the contracts needed for persistent data, permissions, integrations, and automated testing.

Current product limitations

- The content and screenshots use fictional demonstration data, and several modules still rely on browser state rather than complete production persistence.
- The AI workflow presents teacher approval as a safeguard, but the publishing endpoint should enforce prior approval rather than setting approval during publication.
- The product has not yet completed formal accessibility, security, privacy, load, or classroom usability testing.
- External integrations such as Google Workspace include foundations and placeholders that require production credentials and validation.

EDTECH RELEVANCE

What I contributed and what remains to test

This project demonstrates how I translate a classroom problem into a learning technology concept: define users and learning needs, design curriculum-linked workflows, prototype, review usability and plan evidence-based evaluation. Technical architecture supports those choices; it is not the primary measure of educational success.

Product and learning design

- Translates a curriculum hierarchy into teacher, learner, and family workflows.
- Uses age appropriate task framing, visible learning goals, scaffolds, and progress signals.
- Connects instructional content to assessment, feedback, portfolios, analytics, and communication.

Platform and engineering

- Models a broad education domain with shared identifiers and integration points.
- Applies role based access, server side secrets, audit activity, and persistent storage options.
- Uses automated end to end checks to validate complete journeys rather than isolated components.

Responsible innovation

- Positions generative AI as editable teacher support instead of an autonomous instructional authority.
- Separates student and parent data scopes and avoids sending private student data to the generation prompt.
- Documents known gaps clearly, including approval enforcement, persistence coverage, and formal testing needs.

Suggested next phase

Priority	Next step	Evidence it would add
1	Complete backend persistence for every authoring destination	Reliable cross device workflows and stronger integration testing
2	Enforce AI approval states and add version history	A defensible responsible AI workflow with traceable review
3	Run accessibility and classroom usability studies	Measured improvements based on teacher, student, and parent feedback
4	Add standards mapping and validated curriculum imports	Demonstrable alignment beyond curriculum labels

My role and process: I acted as the learning designer and product owner, using Codex for AI-assisted coding rather than writing the application independently. I specified the educational problem, prioritised curriculum-linked features, tested prototypes myself and requested revisions when workflows were unclear. For example, I replaced an initial navigation-bar concept with a sidebar and recognisable icons to make navigation more approachable for younger learners. Student and parent roles emerged later; they were not part of the original teacher-alignment brief.

Evidence and next steps: The screenshots document a functional demonstration, not a school deployment.

The next stage is to validate curriculum-pacing workflows with my co-teacher, assess accessibility and privacy, test student navigation, and evaluate whether resource creation and sharing actually save time. Until then, the value demonstrated is the design process and prototype capability, not measured learning gains.

LEARNING DESIGN RATIONALE

From curriculum intentions to learning experiences

The design begins with what learners should know or be able to do, rather than with a tool or activity. The curriculum hierarchy provides a shared reference for lesson goals, resources, practice tasks and assessment. In a textbook-free teaching context, this is intended to make it easier to check whether materials genuinely support the planned objective.

Pedagogical decisions

- **Alignment:** Connect each resource and task to a stated learning goal so that teachers can review coverage and relevance.
- **Scaffolding:** Use short, visible goals, familiar vocabulary and focused task pathways suitable for young learners.
- **Feedback and evidence:** Connect tasks and assessments to progress views, while recognising that dashboard indicators must be validated before they guide interventions.
- **Teacher agency:** Treat AI suggestions as editable drafts requiring professional judgement, not as authoritative lesson plans.

Research-informed approach

My MA Education research examined technology integration in curriculum planning for active learning in international schools in Thailand. It drew on TPACK and SAMR alongside active-learning perspectives. The research highlighted potential benefits of digital tools, but also practical barriers such as teacher time, device access, connectivity, paywalls and platform fragmentation. Learning Horizons responds to the workflow-fragmentation problem by exploring a common curriculum context across tools. This is a design rationale informed by research, not proof that the prototype has solved those barriers.

DESIGN PROCESS & EVIDENCE

Discover: Identify the practical coordination problem through my own teaching experience and collaboration needs. Define: Prioritise a shared curriculum map, progress visibility and linked materials. Prototype: Use Codex to implement my requirements in an interactive system. Review: Test workflows personally and request changes, including navigation revisions. Validate next: Conduct structured teacher and student testing before claiming usability or learning impact.

Proposed evaluation plan

- Teacher task test: Can two teachers locate the current objective, mark coverage and retrieve its resources without additional spreadsheets?
- Content-alignment review: Do teachers judge AI-suggested materials appropriate for the specified objective and Grade 2 reading level?
- Student usability test: Can children independently find a lesson and its homework using the revised navigation?
- Safeguards review: Verify permissions, parent-child access, approval enforcement, privacy and accessibility before any real student data is used.

Success measures would include task completion, errors, time on task and qualitative feedback. No baseline or post-implementation outcomes have yet been collected.

PROFESSIONAL REFLECTION

The central lesson from this project is that an EdTech product should be judged by the educational work it helps people do, not by its feature count. I began with a modest need for shared planning and developed a much broader platform. That expansion created possibilities for students and families, but also introduced risks of unnecessary complexity, privacy exposure and unvalidated assumptions. My next priority is to narrow the first pilot to the original teacher workflow, test it carefully and use evidence to decide which additional features deserve development.

My contribution is best described as learning design, product direction and iterative testing with AI-assisted implementation. The project is evidence of my ability to connect pedagogy, user needs and digital prototyping; it is not presented as a deployed school system or a measured improvement in attainment.