TRANSFORM LEARNING FOR EVERY STUDENT:

HOW TO USE AI TO MAKE OPEN EDUCATION RESOURCES MORE ACCESSIBLE AND PERSONALIZED

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- Working in higher education | business since 1972.

- Teaches anticipatory studies at the University of Alberta and Athabasca University at the graduate level.

- Written extensively on leadership, change, transformation and development. Over 52 books.

- Led a large consulting company focused on organizational change and transformation – working with 40 of the Fortune 100.

- Worked in around the world on a range of projects – including India, China, New Zealand, Paraguay, Chile, UK, US and across Canada.

- Research Associate Contact North | Contact Nord

NOT HERE TO PROMOTE MY NEW (2026) BOOK!

Strategic Choices and Leadership Change in Higher Education Institutions

Stephen John Murgatroyd

We will explore how to

- Transform static resources into dynamic learning experiences through AI-driven interactivity, simulations and multimedia content

- Personalize learning at scale with AI-powered lessons, quizzes and adaptive scaffolding for diverse learner needs

- Break down barriers to access using AI translation, accessibility features for students with disabilities and low-bandwidth deployment strategies

- Ensure quality and build trust with AI-supported fact-checking, outcome alignment and peer-review systems

- Future-proof educational content through VR/AR integration, adaptive pathways and continuous content updates

- Navigate ethical AI use in education by addressing privacy, fairness and equitable access challenges

BUT FIRST - CONTEXT

What is Active Learning?

- Learning = decision-making – building knowledge in action

- Designers optimize tasks, not content – the aim is engagement | agency | mastery

- AI should be used to help us expand decision-rich opportunities

- DOMS™ ensures coherence and flow
  - Discovery: Understand learners' needs, backgrounds, and prior knowledge.
  - Objectives: Define clear, measurable learning outcomes.
  - Mapping: Design learning experiences that align with objectives and promote mastery.
  - Storyboarding: Develop engaging content and activities that facilitate learning.

Five Failure Modes in Learning Design (Hardman 2025)
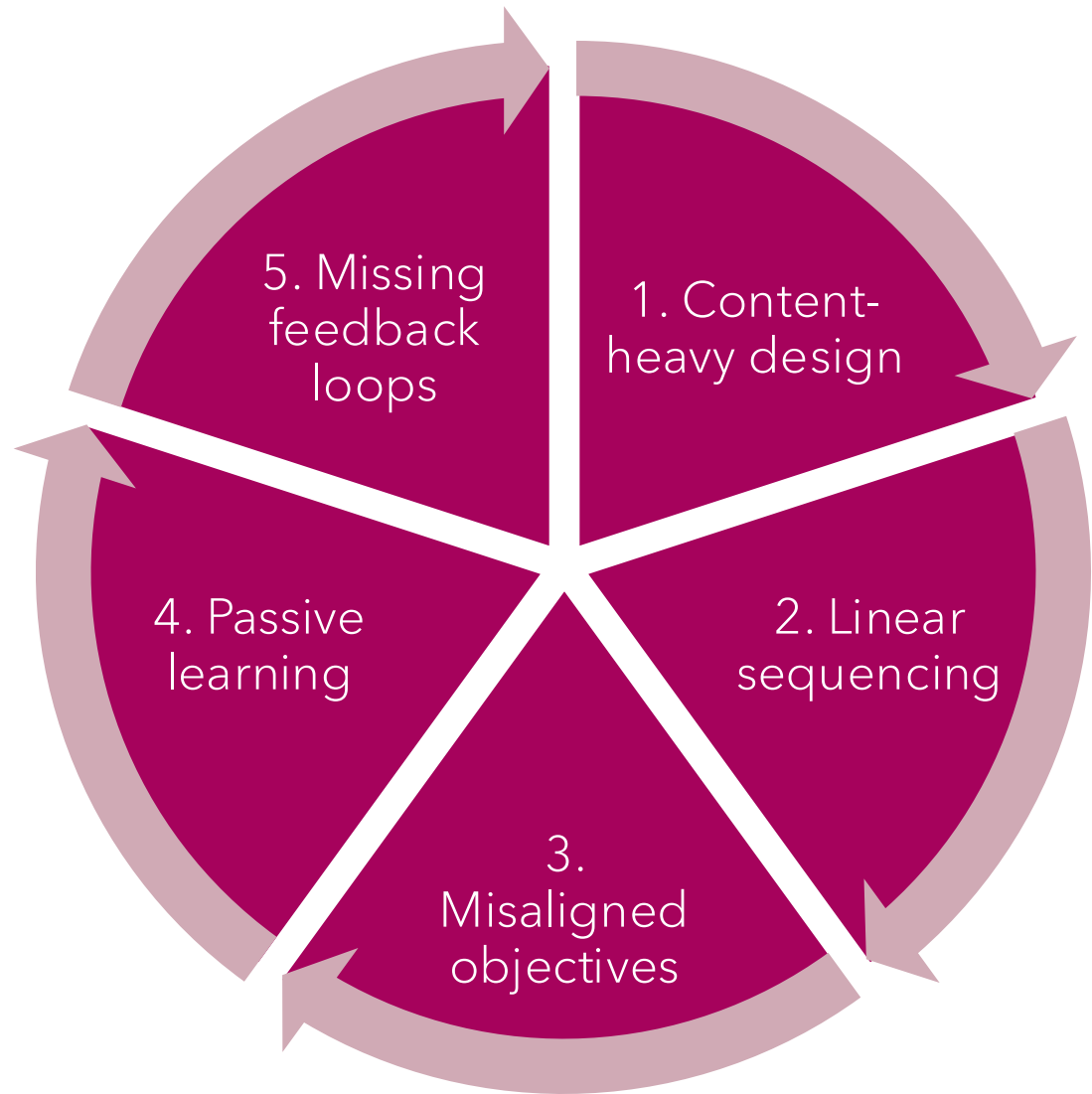
Why AI Matters in 2025 - 2030

- Transforming learning demands scalable, adaptive, multilingual resources

- AI enables personalization at a level impossible with static PDFs

- Growing linguistic and cultural diversity requires dynamic materials

- Bandwidth and accessibility constraints require multimodal, low-load content

- OER ecosystems now require continuous updating and quality assurance

- AI allows educators to design for agency, equity, and decision-rich learning

How AI Can Help

- AI expands task variability

- Supports rapid prototyping

- Enhances transparency and iteration

- Build low-fidelity prototypes - Test with 1–2 learners - Iterate before full launch

- Identify cognitive-load issues

- AI rewrites instructions & differentiates complexity – enables differentiated instruction and learning

What AI Tools Am I Talking About?

- Core Tools:
  - Google Gemini 3
  - Notebook LM with Gemini 3 and Nano Banana
  - Diffit
  - Magic School
  - ChatGPT5 and its Web Browser *Atlas*
  - DeepSeek and Qwen (both from China)
  - Flora (for Storyboarding)
- Other Tools will be mentioned – Notion, Claude, Curipod, Otter, Socratic, Elicit, Nano Banana, Canva, Genially, ThingLink and some others..
- Note: According to There's An AI for That – there are 42,733 AI Applications related to 11,770 tasks.

ACTIVE OER

ACTIVE OER – WHAT IT LOOKS LIKE

- Decision-rich tasks integrated into content
- Embedded formative checks and adaptive hints
- Multimodal explanations supporting different pathways
- Auto-generated examples, analogies, and step sequences
- Optional extension tasks for fast learners

The Before & After Look

OLD VERSIONS OF OER

- Text heavy PDFs with some audio and video

- Quizzes, tests and self-assessments

- No scaffolding

- Insufficient media variety

- No (or very little) interaction

AI ENGAGED OER

- Learning resources adapt to the learner - pace, ability, performance

- Multilingual & culturally appropriate

- Automated updating

- Embedded, continuous formative assessment with rapid feedback

- Highly interactive – simulations, activities and connection

- Potential for low bandwidth modes

Let's Elaborate and Explore
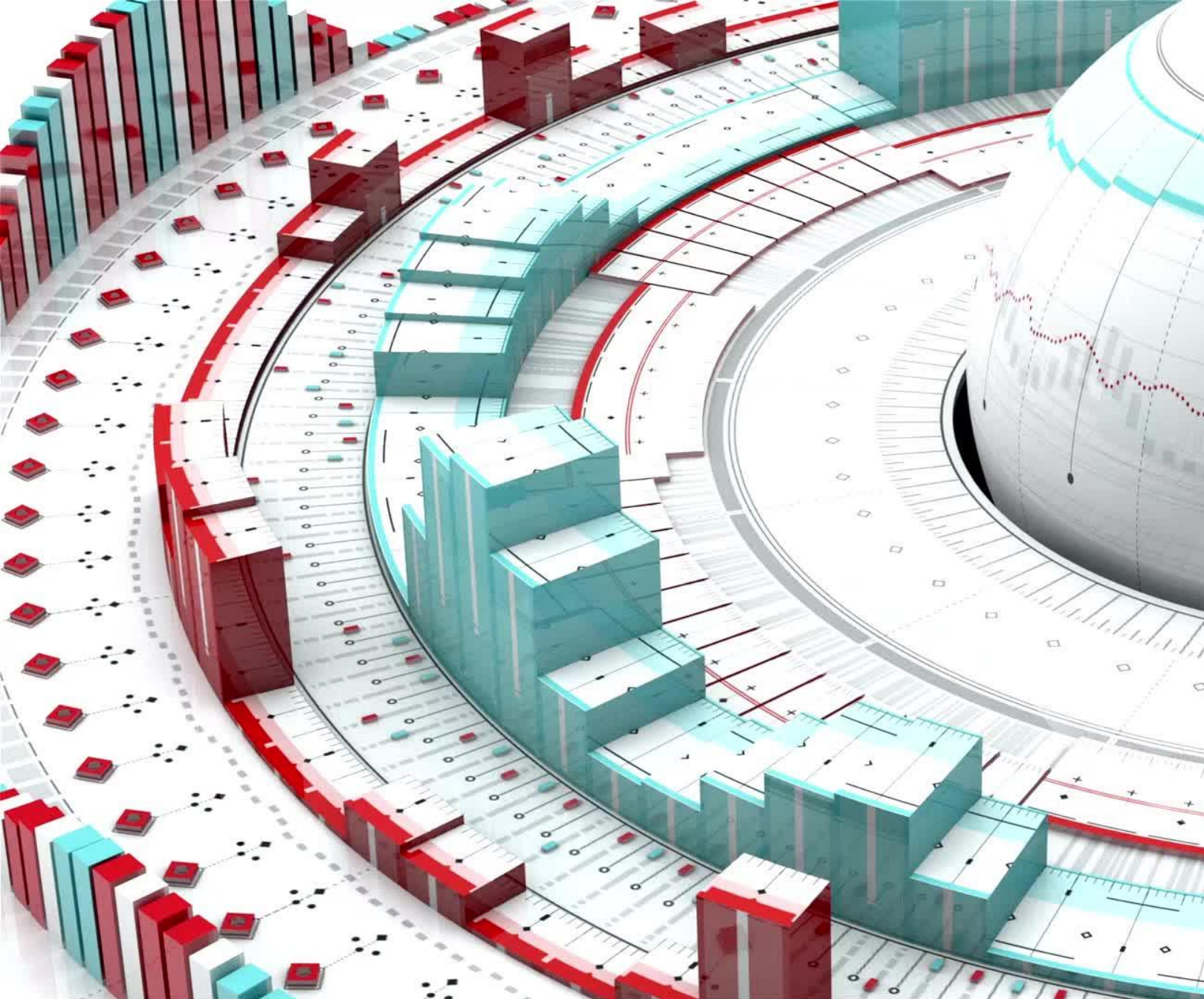
From Static to Dynamic OER

Legacy PDFs, slides, readings → AI-converted interactive modules.

Auto-generated multimedia: animations, explanations, worked examples.

Simulations for STEM, business, and trades using generative models.

Materials which update automatically

Adaptive Learning Architecture

AI Powered Quizzes and Activities Based on Decision Making not Memorization

Skills Diagnostics – AI Video Review and Analysis + Audio and Text

Adaptive Cognitive Scaffolding

DESIGNING FOR DIVERSITY AND INCLUSION
No More One Size Fits All

AI-powered formative quizzes – adaptive learning in action.

Skill-level diagnostics and personalized pathways.

Adaptive scaffolding: hints, analogies, step-by-step coaching.

Multi-reading-level content generation – adapting level for reading ability and language fluency.

Support for learners with foundational skill gaps.

Culturally responsive examples and localization.

DESIGNING FOR ACCESSIBILITY – THE 4 DIMENSIONS

1. Linguistic

2. Cognitive

3. Socio-cultural

4. Technological (bandwidth, device, modality)

Students with Exceptionalities

Visual Impairments AI can provide:

- **Automated text-to-speech** for any digital content (PDFs, whiteboards, images, diagrams).
- **AI-generated alt text** that is more accurate, descriptive, and context-aware (e.g., describing a chemistry diagram rather than generic labels).
- **Navigation assistance** within LMSs or digital workspaces through voice interfaces.
- **Image-to-tactile conversion support** (AI helps produce simplified line drawings suitable for tactile printers).
- **Dynamic simplification** of visual information—reducing clutter or enhancing contrast

Hearing Impairments - AI enables:

- **Real-time captioning** for teachers' spoken words, class discussions, and videos.
- **AI-enhanced noise reduction** improving clarity in group discussions.
- **Speech-to-text note-taking** with summarization.
- **Sign language recognition and synthesis** (emerging): converting spoken language to ASL/LSQ animations.

Physical Disabilities / Motor Impairments - AI provides:

- **Voice-driven interfaces** where students can control computers, navigate LMSs, or complete assignments hands-free.
- **AI handwriting recognition** that translates partial or nonstandard handwriting into typed text.
- **Gesture or eye-tracking interpretation** for students with limited mobility.
- **Predictive text and phrase generation** reducing keystrokes.
- **Robot-assisted telepresence** enabling remote participation (AI-assisted navigation).

Mental Health, Anxiety, Chronic Illness - Students who cannot attend consistently benefit from:

- **AI-generated personalised catch-up modules** after missed classes.
- **Adaptive pacing** (faster/slower progression).
- **Homework summaries and auto-generated study guides**.
- **Chat-based tutoring** available anytime to lower stress and cognitive load.
- **Energy-level-based scheduling** using patterns in student engagement

Breaking Down Access Barriers: A Unified View

- Real-time translation and language-level adaptation

- Responsive multimodality for varied cognitive load profiles

- Built-in accessibility: captions, alt-text, audio descriptions

- Low-bandwidth delivery: compressible assets, SMS-based content

- Differentiated scaffolding for foundational skill gaps

- AI as an equalizer across bandwidth, linguistic and ability differences

CULTURAL AND LINGUISTIC COMPLEXITY

AI Multilingual Access

- Real-time translation of readings, lectures, and assignments.

- Support for multilingual classrooms and newcomer communities.

Accessibility & Low-Bandwidth Strategies

- Auto-captioning, alternative text, audio descriptions.

- Compressible file formats, offline modes, SMS-based content delivery.

- Cognitive accessibility: simplified language versions on demand.

Key Messages:

- Inclusive design becomes practical at scale.

- AI as an equaliser in bandwidth- and resource-constrained environments.

Immersive Content

Now we can rapidly create 3D environments and simulations using integrated AI Agents

Creating simulations with text + video is now a rapid process

Using Notebook LM to create automated video or podcasts based on specific resources

Using text to create challenges which require voice responses

AI-Enabled Immersive Learning Experiences as OER

- How AI creates immersive, reusable open learning experiences:
  - AI generates interactive simulations (e.g., virtual lab, policy scenario, or historical walk-through).
  - Learners engage in decision-making pathways that adapt to their choices.
  - Resulting activities export as HTML5 or SCORM-compliant OER assets.
  - Educators can remix, localize, and re-deploy these immersive modules.
- Example: A third-year Engineering **"Materials Failure Analysis"** challenge where AI generates an interactive virtual lab. Students inspect a simulated aircraft component using AI-rendered microscopy, run stress-testing scenarios, and choose diagnostic pathways (fatigue, corrosion, impact, thermal degradation). Each decision reveals adaptive data sets, visualizations, and AI-generated failure models. Learners must justify their conclusions using an auto-generated, standards-aligned rubric. The entire virtual lab exports as an HTML5/SCORM OER package that any instructor can reuse or localize (e.g., for civil, mechanical, or aerospace applications), including low-bandwidth versions with static images and simplified text.

Cognitive Load – Why It Breaks Learning & How to Fix it

Intrinsic Load (conceptual difficulty)
AI creates multiple representations (text, visual, step-by-step, multilingual) so learners engage with the same idea at the right difficulty level.

Extraneous Load (avoidable confusion)
AI rewrites unclear instructions, removes redundancy, simplifies layout, and generates clean worked examples to strip away "noise."

Germane Load (productive effort)
Adaptive hints, targeted practice, analogies, and micro-simulations help students direct their mental effort toward schema formation, not task interpretation.

Implication for OER:
AI-enabled multimodality is not "nice to have"—it is a cognitive load management system that ensures every learner can process, retain, and transfer knowledge.
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WHAT WE NEED TO BE MINDFUL OF...

Ethical AI Use in OER

- **Privacy first:** no unnecessary student data in prompting workflows

- **Fairness**: prompts designed to avoid cultural erasure or stereotypes

- **Transparency**: always disclose AI involvement in content creation

- **Accessibility**: WCAG-aligned multimodal design patterns

- **Accountability**: educators remain final arbiters of accuracy and fit – always a human in the loop

- **Equity lens**: designing inclusively for the full range of learners

The "Usual" AI Suspects

Privacy & Security

Bias - especially cultural "ignorance" – think about what AI doesn't know about Canada's Indigenous Peoples, for example

Transparency – how is AI arriving at the "conclusions" it arrives at ?

Hallucination – less frequent, but still real

What We Need to Ensure

We embrace active, engaged, decision, skills-based learning

We need to ensure that there are humans in the loop – instructors, students, employers

Ethical governance and policy compliance

Future ready and futures focused

CONTEXT ENGINEERING & DOMS™

Phillippa Hardman's "DOMS™" Framework

- Dr. Hardman's <u>DOMS™ framework</u> offers a structured approach to learning design:
  - **Discovery**: Understand learners' needs, backgrounds, and prior knowledge.
  - **Objectives**: Define clear, measurable learning outcomes.
  - **Mapping**: Design learning experiences that align with objectives and promote mastery.
  - **Storyboarding**: Develop engaging content and activities that facilitate learning.

How DOMS Embeds Design Justice

Discovery → centers marginalized perspectives

Objectives → prioritize impact over intention

Mapping → decision-rich, inclusive tasks

Storyboarding → shifts power to learners

Evaluate/Iterate → accountability to real outcomes

AI as a Design Partner

AI expands task variability – we push AI to engage learners in active ways

Supports rapid prototyping – every version of every course is a prototype – learning designs are never "done"

Reduces workload – by getting AI systems, agents and companions to do the work

Enhances transparency and iteration

Prototyping with AI

Build	Build low-fidelity prototypes
Test	Test with 1–2 learners
Identify	Identify cognitive-load issues
Iterate	Iterate before full launch

Cognitive Load & Flow

Reduce extraneous load

Increase germane load

Balance intrinsic load

AI rewrites instructions & differentiates complexity

Quality Assurance for AI Enabled OER

- Automated fact-checking using AI research tools and citation verification

- Cross-model triangulation to confirm accuracy and reduce hallucinations

- Alignment checks: AI maps content to curricular outcomes and competencies

- Bias scanning for cultural, linguistic and representational equity

- Human-in-the-loop peer review cycles supported by structured prompts

- Version control and provenance logs for all AI-generated assets

Step 1: Discovery

- Discovery: AI-Powered Learner Analysis

- **Tool**: Use AI platforms like ChatGPT to simulate **learner personas**, helping educators anticipate diverse student needs. Create 4-5 personas that reflect who is in your class. Ask GPT to design learning paths for each persona.

- **Application**: Generate insights into potential misconceptions or interests related to social studies topics – e.g.. truth and reconciliation

Context Engineering

Phillipa Is Basically Demanding that we give ChatGPT | Gemini etc. CONTEXT Before we ask it to complete a Task. This is known as context engineering.

Sample Personas (Profile all Categories of Students)

Amina (26) – The Inquisitive Story-Seeker

- **Background**: Born in Calgary to recent immigrants from Somalia

- **Strengths**: Strong verbal skills, curious about cultural histories, empathetic, thrives in group discussions

- **Learning Style**: Prefers narratives, project-based learning, and multimodal presentations (videos, interviews, maps)

- **Technology Comfort**: Comfortable using classroom tools like Google Classroom, Canva, and educational YouTube

- **Challenges**: Sometimes overwhelmed by dense text or abstract political concepts; needs scaffolded vocabulary support

- **Engagement Tip**: Connect assignments to lived experiences or stories from different communities, use AI tools to co-create timelines or compare perspectives (e.g., using ChatGPT to simulate historical debates)

Ethan (21) – The Analytical Skeptic

- **Background**: From a rural Alberta farming family, fifth-generation Canadian

- **Strengths**: Critical thinker, excels in logic and cause-effect reasoning, likes structured tasks and clear criteria

- **Learning Style**: Prefers charts, timelines, data-driven comparisons, and historical simulations

- **Technology Comfort**: Proficient with spreadsheets, research databases, and apps like Notion or MindMeister

- **Challenges**: Reluctant to engage in group projects or interpret subjective perspectives unless framed logically

- **Engagement Tip**: Use AI tools to generate "what-if" historical scenarios, fact-check data, or debate policy impacts (e.g., using **Claude or Perplexity** for source triangulation)

Or Do This..

- I have a class of 19 students:
  - 5 are recent immigrants from the Ukraine with limited English, but a great deal of determination and strong community support.
  - One is severely handicapped physically and has hearing difficulties (I have no EA).
  - 9 are students I have taught before and are able, but often unwilling, to learn – they need active learning and to be engaged in a task or challenge rather than be passive.
  - 2 are very capable and "fast" learners
  - The remainder of the students vary in ability and interest in social studies (and school in general).

Discovery: AI Tools

AI Tool	How It Supports Discovery
	Generate realistic learner personas and simulate student perspectives for planning inclusive lessons. Ask for possible misconceptions or culturally sensitive framing.
ChatGPT / Claude / Gemini	
Diffit.ai	Analyze curriculum content for complexity and adjust reading levels based on student personas.
Curipod	Use class polling or interactive surveys to gather student interests and real-time feedback on prior knowledge.
Otter.ai + AI summarizers	Transcribe and summarize student interviews or focus groups to discover learning needs.

Step 2: Objectives - Crafting Effective Learning Outcomes

- **Tool**: Employ AI to draft and refine SMART (Specific, Measurable, Achievable, Relevant, Time-bound) objectives and learning outcomes.

- **Application**: Ensure objectives align with provincial curriculum standards (get GPT to do that) and address critical thinking skills and relevant social and emotional learning developments.

Objectives Crafting: AI Tools

AI Tool	How It Supports Objective Setting
ChatGPT / Bing Copilot	Co-create SMART learning objectives and align them to Alberta's curriculum (ask AI to cross-check).
MagicSchool.ai	Generate assessment-aligned learning objectives tailored to different cognitive levels (e.g., Bloom's taxonomy).
Eduaide.ai	Create rubrics and success criteria for learning goals to ensure clarity and coherence.

Step 3: Mapping: Designing Aligned Learning Experiences

Tool: Utilize AI to suggest activities and resources that match learning objectives and intended outcomes. Use Magic School to create great activities and relevant formative assessments.

Application: Create differentiated learning paths to cater to varying student abilities and interests

Mapping Experiences: AI Tools

AI Tool	How It Supports Learning Mapping
MagicSchool.ai	Suggest differentiated activities, formative assessments, and collaborative projects.
Socratic by Google	Allow students to engage in guided inquiry on historical or economic topics.
Perplexity.ai / Elicit.org	Help students (and teachers) explore evidence-based or historical information, supporting student-led research.
MindMeister with AI	Help structure timelines or concept maps of fur trade events, cause-effect diagrams, or socio-economic impact flows.

Step 4: Storyboarding: Developing Engaging Content and Activities

Tool: Leverage AI to generate interactive scenarios, quizzes, games, simulations and multimedia content.

Application: Design immersive experiences that encourage students to explore historical events and social concepts in meaningful, fun and creative ways.

Storyboarding: AI Tools

AI Tool	How It Supports Storyboarding
Canva Magic Design / Genially	Co-create visually rich storyboards, timelines, or posters for student-led projects.
Heygen or Synthesia	Generate short AI videos with avatars explaining historical contexts or simulating role-plays.
Quillionz	Automatically generate quizzes or comprehension questions based on learning materials.
ThingLink	Build interactive maps or infographics detailing fur trade routes, economic shifts, and cultural contact zones.
StoryJumper or Book Creator	Let students co-create AI-enhanced digital books or storytelling projects from Indigenous or settler perspectives.

Trust Building for AI OER

Transparent prompts, context packages and design decisions

Readable provenance: what AI generated, what educators reviewed

Consistency audits: tone, level, reading complexity, accessibility

Curriculum-aligned mappings visible to educators and students

Embedded reflection points encouraging critical engagement

Clear disclosure of AI assistance throughout the resource

Future Proofing AI OER

Durable formats: HTML5, EPUB3, LTI-ready content

Structured metadata for searchability and long-term reuse

Content that updates automatically as knowledge shifts

Interoperability with LMS/LOR systems for seamless integration

Modular design enabling rapid revision and adaptation

Sustainability: minimizing rebuilds when models evolve

THE 3 KEYS

1. **Analysis**: Rethinking how we analyze learning needs, shifting focus from institution and educator-first analysis, to learner-first analysis.

2. **Design & Development**: Redesigning content and activities to prioritize active decision-making over passive consumption and recall.

3. **Evaluation & Iteration**: Transforming evaluation methods to measure real-world application rather than knowledge mastery and completion rates.

The Five Take Aways

AI makes OER adaptive, inclusive and continuously updating

Design justice and DOMS ensure coherence and learner-first design

Quality and trust require clear workflows and transparent context

Multimodality reduces barriers and supports exceptional learners

Future-proofing demands durable formats, metadata and interoperability
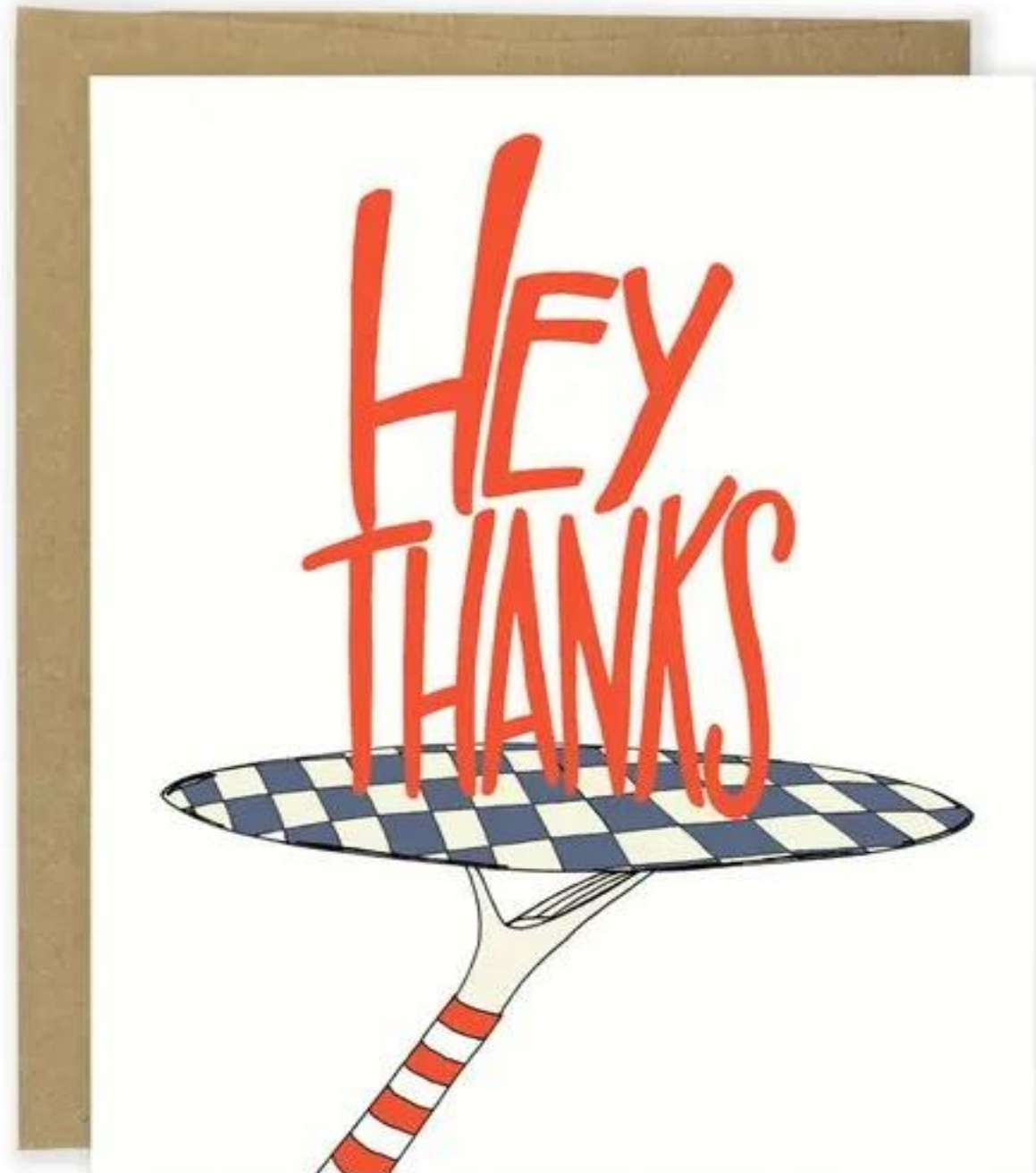
What You Can Do Before Monday!

- Convert one static resource into a dynamic, AI-enhanced module

- Generate three learner personas and map differentiated pathways

- Run your materials through an AI-supported quality assurance workflow

- Add accessibility layers: captions, alt-text, simplified versions

- Create a context package to improve model performance

- Prototype one interactive activity using Magic School or Gemini

- Engage with 1-2 students in a learning design activity

- Explore some of the tools mentioned here that you know nothing about – it's playtime!!

Between Now and the New Year

Build	Build your prompt context package
Test	Test one QA workflow using an agent
Prototype	Prototype an interactive activity
Explore	Explore five new AI tools – go on a scavenger hunt!

MANY
THANKS

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