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Introduction & Background

Culturally Relevant Pedagogy (CRP) boosts engagement, achievement, and belonging, yet teachers cite time, training, and resource gaps.

Large Language Models (LLMs) can cut routine planning work (e.g., 31% less time in a recent U.K. trial) while tailoring materials to diverse learners.

We built **CulturAIED** to explore how LLMs can scaffold CRP in K-12 AI-literacy lessons. This **preliminary study** aims to inform future design-oriented efforts to develop LLM tools that sustainably support teachers' CRP integration.

Research Questions:

- **RQ1** How do LLM-supported tools influence teachers' ability to design culturally relevant AI-literacy activities?
- **RQ2** What are the perceived strengths & opportunities of such tools?

Table 1. Participants

	P1	P2	P3	P4
Gender	Female	Male	Female	Female
Ethnicity	White	African American	Asian	White
Self-identified cultural background or community	Chronic Illness Community	African American Male		
Subject	Science	Music Ed	IT	Science
Setting	Virtual Charter School	Public School	Public School	Public School
Region	North America	North America	East Asia	North America

Methods

Participants: 4 K-12 teachers (diverse demographics, 4+ years of experience).

Procedure:

- Pre-survey: Baseline confidence in CRP (3-4/5).
- Adaptation tasks: 3 phases (independent, CRT checklist-guided, CulturAIED-supported).
- Post-survey: Confidence increased to 5/5.

Tools:

- Culturally Responsive Teaching Checklist.
- CulturAIED with rubric-based feedback, demographic integration, and a chatbot for coaching.

90-120 Minute Semi-Structured Interview

Pre-Survey → Adaptation Tasks → Post-Survey → Interview Questions

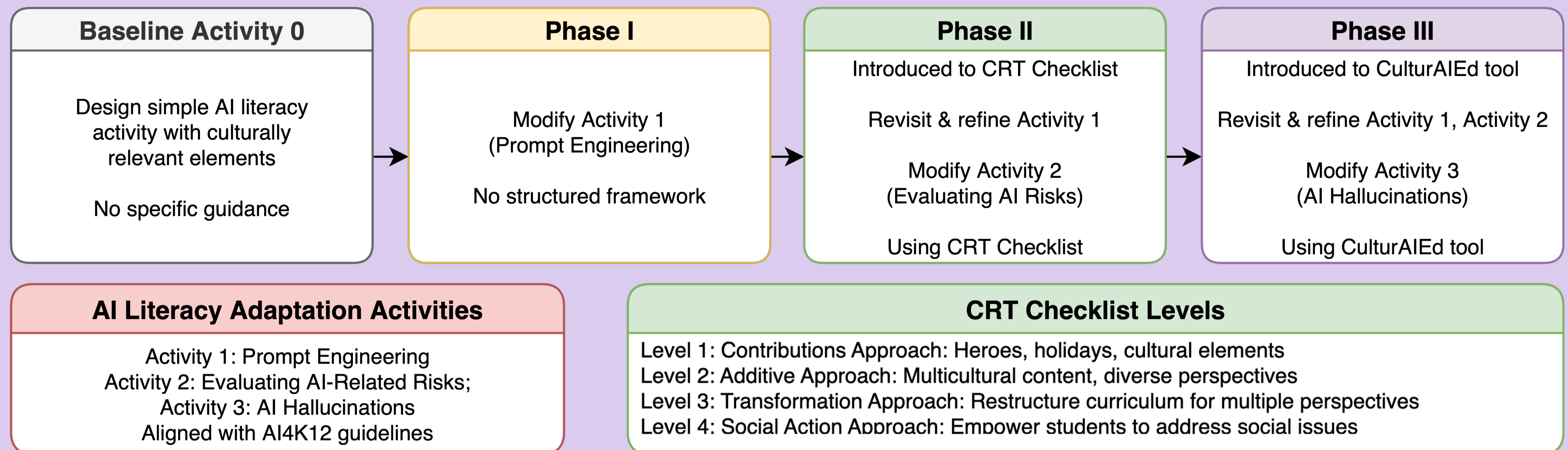


Figure 1. Study Design.

CulturAIED Design & Features

CulturAIED is an LLM-powered authoring assistant that helps teachers rapidly "level-up" AI-literacy lessons with CRP.

Its design weaves four complementary components into a single workflow:

- **Demographic-aware content generator:** produces examples, analogies, and context that reflect the specific cultural backgrounds and lived experiences that teachers input for their classes.
- **Dual-level lesson suggestions:** offers side-by-side "surface" and "deep" adaptations mapped to CRT Levels 1–4, illustrating the continuum from token contributions to transformative, social-action tasks.
- **Rubric-based quality checker:** scores each draft against CRP criteria and returns targeted, actionable feedback so educators can iteratively refine materials with confidence.
- **Just-in-time coaching chatbot:** an embedded conversational agent that answers pedagogical questions, explains rubric results, and suggests next steps, functioning like an on-call instructional coach.

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"[This experience] made it clearer that there are always opportunities ... now there really isn't an excuse." — P1

"If you want to make it more culturally inclusive, remember there are cultures within cultures." — P2

Preliminary Findings & Future Work

Findings:

- **Confidence improved:** Post-survey ratings for "identifying CRP opportunities" rose from 3-4 → 5/5 across all teachers.
- **Planning relief:** Teachers reported CulturAIED "solved [the] research & time problem" and provided concrete examples.
- **CRP depth:** Rubric plus dual-level outputs nudged teachers beyond tokenistic Level 1 edits toward transformative/socio-action levels.
- **Impact:** LLMs like CulturAIED can democratize access to CRP in AI literacy, especially for time-constrained teachers.

Challenges: Avoid "routinizing" CRP; tools should augment, not replace, teacher expertise.

Next Steps:

- Longitudinal studies with larger samples.
- Test modified lesson plans with students.
- Enhance CulturAIED's UI, multilingual support, and integration with LMS and professional development programs.

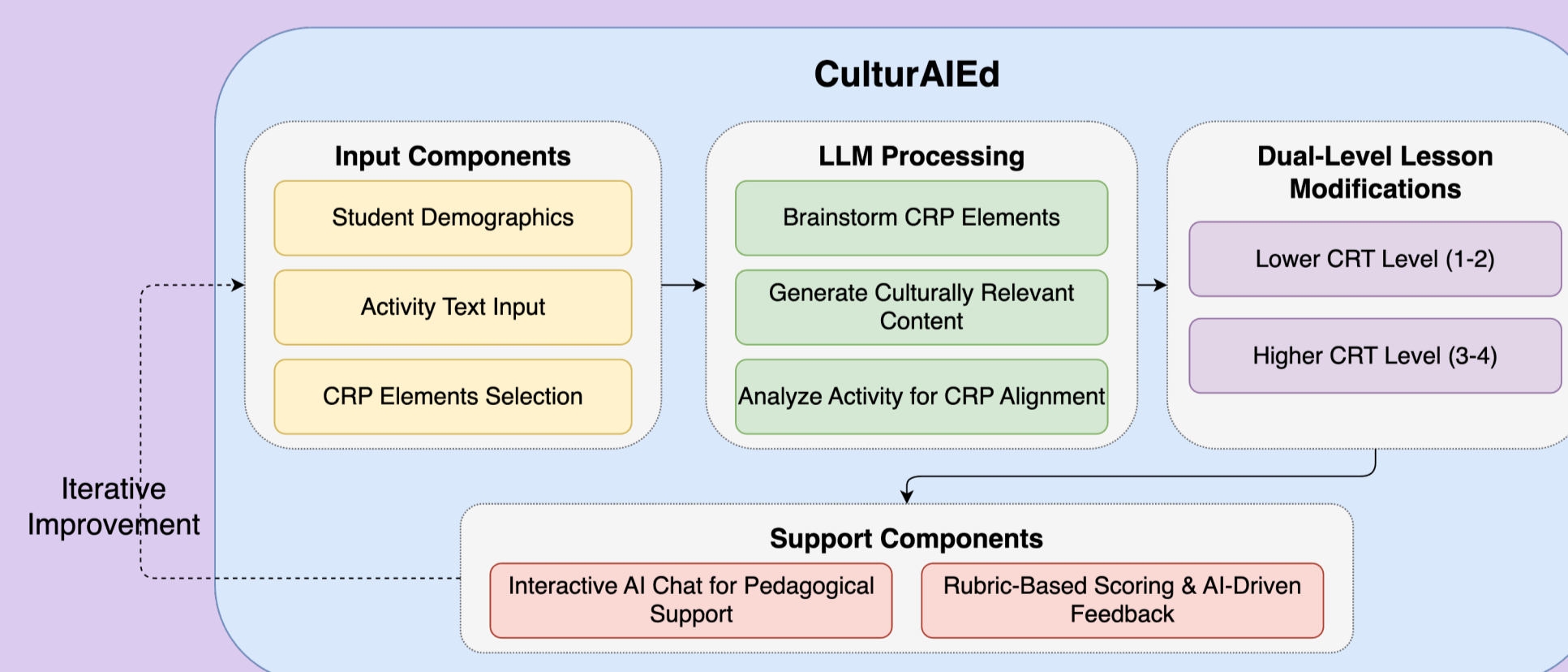


Figure 2. CulturAIED Design.

Design Implications

Address CRP Barriers: Design tools to save teachers' time and provide needed resources for CRP implementation.

Support, Don't Replace: Position the tool as an assistant to enhance teacher expertise, not automate CRP.

Promote Deep Relevance: Encourage meaningful cultural integration beyond superficial elements.

Ensure Practical Usability: Prioritize intuitive design, smooth workflows, and useful features (like export to LMS and Google Docs).

Foster Critical Use: Acknowledge AI limitations and encourage teachers to adapt suggestions to their specific classroom context.

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Interested in pursuing PhD opportunities in Learning Sciences, HCI, CSE for Fall 2026

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