WEEK 3 Deliverable

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Final Recommendations Document: Al-Driven Learning Enhancement

1. Introduction

This document offers a comprehensive set of recommendations for integrating Al-driven tools—ChatGPT, Cohere, and DeepSeek, along with other specialized Al tools (Chore, HuggingFace)—into Excelerate's educational and operational ecosystem. The aim is to boost learner engagement, improve content accessibility, increase operational efficiency, and deliver personalized learning experiences. This report outlines tool functionalities, potential opportunities, feasibility analyses, strategic integration approaches, and a phased implementation plan, ultimately creating an engagement enhancement blueprint for future-ready education.

2. Tool Descriptions and Mapped Opportunities

This section outlines the functionalities of each proposed tool and their potential applications within Excelerate's courses, events, competitions, and internships.

Tool	Key Features	Example Use Cases	Mapped Opportunities
ChatGPT	Conversational AI, Essay feedback, Quiz generation	Al tutor, writing assistant, adaptive assessments	24/7 student support, accelerated creativity in competitions, improved communication skills in internships
Cohere	Semantic search, Summarization, Topic modeling, Emotion tagging	Personalized content, progress reports, and emotion-aware learning	Increased content discoverability, reduced logistical confusion in events, faster performance evaluations for interns

Tool	Key Features	Example Use Cases	Mapped Opportunities
DeepSeek	Code generation, Multilingual support, Auto-grading	Coding tutor, global learning content, quiz assessments	Improved comprehension of complex topics, competitive advantage in coding competitions, amplified value of events through content repurposing
Cohere	Browser-based and GitHub-integrated collaborative spaces	Team prompt analysis, real-time iteration logs, version-controlled prompt scripts	Enhanced team collaboration and prompt iteration
HuggingFace	Integrates online and offline environments. Supports a vast range of transformer models.	Custom model testing, tokenizer experiments, and training prompt- response pipelines.	Cost-effective prompt prototyping, deployment without heavy infrastructure

3. Feasibility Analysis and Integration Strategies

Tools were evaluated against key feasibility dimensions including Technical Compatibility, Operational Scalability, Cost Implications, Security & Privacy, and Al Adaptability.

3.1 Tool Feasibility Overview

Tool	Compatibility	Operational Requirements	Barriers	Proposed Solutions
ChatGPT	High	Basic team training uses the OpenAl API	API call limits on the free tier	Upgrade to the Plus plan or explore rate limits optimization
Chore	Moderate	Requires integration via GitHub and VSCode	Intermediate technical learning curve	Provide guided tutorials and templates
DeepSeek	High	Simple UI, fast deployment, self-host options	Limited documentation compared to GPT	Include onboarding documentation; host community sessions
HuggingFace	High	Minimal operational overhead for hosted models	May need GPU for local fine- tuning	Use HuggingFace Spaces or hosted Inference API

3.2 Integration Strategy Recommendations

Strategy Type	Applicability	Benefits
Phased Integration	Suitable for Chore and DeepSeek (for advanced use)	Helps manage risks, allows user adaptation
Parallel Integration	Ideal for HuggingFace during the testing phase	Ensures fallback if issues arise
Big Bang Integration Suitable for ChatGPT (for immediate pilot)		Instant transition due to the tool's readiness
Incremental Approach	Use for tools requiring configuration, such as DeepSeek	Allows step-by-step refinement

4. Recommendations Categorized by Implementation Phase

This section provides a phased roadmap for the strategic integration of new tools to enhance Excelerate's digital learning and engagement. This approach prioritizes managing risks, optimizing for scalability, cost-effectiveness, and security.

Phase 1: Initial Pilot and Foundation Setup

This phase focuses on establishing the core technical infrastructure and conducting initial pilot tests with low-risk, high-impact tools.

- ChatGPT: Immediate Pilot Testing
 - Recommendation: Proceed with immediate pilot testing for ChatGPT.
 - **Reasoning:** ChatGPT is highly compatible, scales effectively with the user base, and is ideal for everyday experimentation and real-time feedback with minimal setup.

- Integration Strategy: A "Big Bang Integration" is suitable due to its readiness, allowing for an instant transition.
- Blueprint Connection: This phase aligns with the initial task of converting the syllabus into a gamified format, a foundational step that will leverage all tools in subsequent phases.

HuggingFace: Parallel Integration for Testing

- Recommendation: Begin testing HuggingFace using a "Parallel Integration" approach.
- Reasoning: HuggingFace integrates with both online and offline environments, supports a vast range of transformer models, and offers HuggingFace Spaces for deployment without heavy infrastructure. It's cost-effective for prompt prototyping and is ideal for custom model testing and training prompt-response pipelines. Parallel integration ensures a fallback if issues arise during the testing phase.
- Blueprint Connection: Simultaneously, introduce OpenAI chatbots for basic support, such as AI tutor integration for answering student questions and providing examples.

Phase 2: Targeted Rollout and Feature Enhancement

This phase expands on the initial foundation, integrating more complex tools and enhancing core learning features.

Chore: Phased Integration with Modular Training

- Recommendation: Implement "Chore" using a "Phased Integration" approach, with a significant focus on developing modular, phased training sessions. Chore can be introduced after basic onboarding to help interns collaborate and iterate on prompts.
- Reasoning: "Chore" has moderate compatibility as it requires integration via GitHub and VSCode, and presents an intermediate technical learning curve. Phased integration helps manage risks and allows for user adaptation.
- Blueprint Connection: Begin integrating Cohere analytics to provide real-time insight dashboards, summarizing strengths, weaknesses, and emotional tone in progress reports.
- Core Al Integration (OpenAl, Cohere, DeepSeek) for Gamification and Feedback

- Recommendation: Actively integrate OpenAI, Cohere, and DeepSeek to enable core gamified course design elements and AI-based feedback.
- Reasoning: These tools are central to the Engagement Enhancement Blueprint's objective of improving student engagement through gamification and AI-enhanced learning.
 - OpenAI: Utilize for generating dynamic quizzes and scenarios, providing real-time feedback on essays or answers with suggestions, and as an AI tutor.
 - Cohere: Employ for recommending next content based on learner interests, summarizing progress, and identifying areas for revision through drop-off analysis.
 - DeepSeek: Integrate to power mini-games for coding tasks, provide coding assistance (checking logic, syntax, code snippets in multiple languages), handle auto-grading, and break down complex topics using Retrieval-Augmented Generation (RAG).
- Blueprint Connection: This phase directly supports the development of coding and language games, quiz arenas, and multilingual quizzes, enhancing the interactive learning experience. This includes elements like "Code Debugging Time Trial" minigames and "Weekly Coding Battles".

Phase 3: Advanced Features and Compliance Readiness

This final phase focuses on maximizing the potential of the integrated tools for personalized learning and ensuring robust compliance.

- DeepSeek (Advanced Interns): Incremental Approach with Strict Data Security
 - Recommendation: Integrate DeepSeek using an "Incremental Approach", prioritizing the immediate implementation of strict data security protocols. DeepSeek is valuable for advanced interns exploring multilingual or open-ended prompt performance.
 - **Reasoning:** DeepSeek is a lightweight tool for experimenting with large language models, customizable for individual projects, and ideal for internships with batch testing of prompts. While it's a free/open-source model, infrastructure costs depend on deployment, and limited documentation compared to GPT is a barrier. Strict data security protocols are crucial.

- Integration Strategy: "Phased Integration" is also suitable for DeepSeek to help manage risks.
- **Blueprint Connection:** This aligns with the final phase of launching and reviewing learner metrics, which will involve embedded surveys and leaderboard updates.
- Personalized Learning Paths and Interactive Challenges (OpenAI, Cohere, DeepSeek)
 - Recommendation: Fully implement personalized learning paths and interactive challenges, leveraging the advanced capabilities of OpenAI, Cohere, and DeepSeek.
 This includes:
 - **OpenAI:** Content reordering based on past quiz performance and learner interest, and AI Quiz-Offs.
 - Cohere: Smart recommendations for relevant topics, videos, and activities, as well as storytelling competitions with originality scoring using topic modeling.
 - **DeepSeek:** Weekly Coding Battles with real-time problem-solving and autofeedback, and multilingual support for global learning content.
 - Blueprint Connection: This phase focuses on maximizing dynamic engagement through interactive challenges and events, as well as providing a personalized learner interface with dashboards, heatmaps, and interest vs. performance trackers. This includes unlocking new avatars, levels, or helper bots after each challenge.

Engagement Enhancement Blueprint: Strategies for Leveraging Tools to Improve Participation

Objective: To present a simplified, well-organized, and deeply researched strategy to improve student engagement by integrating OpenAI, Cohere, and DeepSeek in a gamified and AI-enhanced learning ecosystem.

I. Why Dynamic Engagement Matters

Traditional learning methods often result in low attention spans and passive knowledge retention. This blueprint introduces an interactive, tool-powered approach to:

- Motivate learners through gamification
- Personalize content for individual learners
- Provide real-time, constructive feedback

II. Tool Overview

Tool	Key Features	Example Use Cases
OpenAl	Conversational AI, Essay feedback, Quiz generation	Al tutor, writing assistant, adaptive assessments
Cohere	Semantic search, Summarization, Topic modeling, Emotion tagging	Personalized content, progress reports, and emotion-aware learning
DeepSeek	Code generation, Multilingual support, Auto-grading	Coding tutor, global learning content, quiz assessments

III. Engagement Strategy Framework

A. Gamified Course Design

Component	Description
Levels/Missions	Break down the syllabus into stages with XP and achievements
Points & Badges	Incentivize progress and track mastery
Leaderboards	Foster healthy competition
Mini-Games	Include time trials, coding races, and story battles

Tools Used:

• OpenAl: Generates dynamic quizzes and scenarios

• Cohere: Recommends next content based on interests

• DeepSeek: Powers mini-games for coding tasks

B. Al-Based Feedback & Support

Feature	Tool	Description
Real-Time Feedback	OpenAl	Reviews essays or answers with suggestions
Weekly Progress Reports	Cohere	Summarizes strengths, weaknesses, and emotional tone
Coding Assistant	DeepSeek	Checks logic, syntax, and provides code snippets in multiple languages

Interactive Add-ons:

- Emoji-based self-checks
- Dialogue-based guidance

C. Personalized Learning Paths

Feature	Tool	Benefit
Content Reordering	OpenAl	Based on past quiz performance and learner interest
Drop-off Analysis	Cohere	Identifies content areas needing revision or support
Smart Recommendations	Cohere	Suggests relevant topics, videos, and activities

Learner Interface:

- Personal dashboard
- Performance heatmap
- 'Interest vs Performance' tracker

D. Interactive Challenges and Events

Event Type	Description	Tool
Al Quiz-Offs	Compete against OpenAl in timed quizzes	OpenAl
Weekly Coding Battles	Solve problems in real-time with auto feedback	DeepSeek
Storytelling Competitions	Get scores based on originality using topic modeling	Cohere

Bonus: Unlock new avatars, levels, or helper bots after each challenge.

IV. Sample Gamified Course Designs

Python Programming

Element	Description
Level 1	Variables & Data Types
XP & Badge	"100 XP + "Python Novice" Badge"
Mini-Game	Code Debugging Time Trial (DeepSeek)
Al Assistant	OpenAl tutor with progressive hint system

Creative Writing

Element	Description
Level 2	500-word Short Story
XP & Badge	"200 XP + "Wordsmith" Badge"
Companion Bot	OpenAl coach gives tone, structure feedback
Score Basis	Originality check via Cohere topic modeling

Global Communication

Element	Description
Level 3	Case Study in Native Language
XP & Badge	"150 XP + "Cultural Connector" Badge"
Translator	DeepSeek handles multilingual support
Auto-Grading	DeepSeek applies rubric scoring

V. Implementation Roadmap

Phase	Task Description	Tools Used	Interactive Element
Phase 1	Convert syllabus into a gamified format	All	Roadmap with unlockable paths

Phase	Task Description	Tools Used	Interactive Element
Phase 2	Add OpenAl chatbots for support	OpenAl	Conversational tutor avatars
Phase 3	Integrate Cohere analytics	Cohere	Real-time insight dashboards
Phase 4	Develop coding & language games	DeepSeek	Quiz arenas, multilingual quizzes
Phase 5	Launch & review learner metrics	All	Embedded surveys, leaderboard updates

VI. Success Measurement Metrics

Metric Type	Indicator	
Engagement	Average session duration, module revisit frequency.	
Performance	Pre- vs Post-assessment improvement	
Satisfaction	Emoji ratings, chatbot interaction quality	
Retention	Cohere-tracked drop-offs, resume rate	
Recognition	Number of badges unlocked, top ranks on the leaderboard	

Visual Dashboards:

- Progress bars
- Module mastery indicators
- Weekly achievement heatmaps

VII. Conclusion: Future-Ready Education

This blueprint bridges intelligent automation with meaningful learning. By leveraging OpenAI, Cohere, and DeepSeek:

- Learners stay motivated and challenged
- Educators gain insight into progress and pain points
- · Institutions can scale impactful engagement globally

Let's not just teach—let's transform learning experiences.

Appendix: Tool Access Summary

Tool	Access Mode	Integration Notes
OpenAl	GPT-4 API, Assistant SDK	Use in LMS for chatbots, generators, and feedback
Cohere	Python SDK, REST API	Plug into dashboards, summarizers, NLP pipelines
DeepSeek	ModelScope, HuggingFace access	Ideal for coding, translation, auto-grading workflows

Implementation Plan: AI Tools for Enhanced Digital Learning

1. Executive Summary

This document outlines a four-week pilot implementation plan for integrating AI tools (ChatGPT, DeepSeek, and Cohere) into Excelerate's digital learning environment. The objective is to enhance student engagement and operational efficiency by leveraging AI for personalized content, real-time feedback, and gamified learning experiences. The plan details key tasks, responsibilities, timelines, resources, and success metrics, aiming for rapid deployment to demonstrate value and address skill needs driven by automation.

2. Basic Overview: Pilot Phases

Our pilot will proceed through two main phases, spanning four weeks from July 7 to August 3, 2025.

Phase 1: Planning and Initial Deployment (Weeks 1-2: July 7-20, 2025)

• **Focus:** Laying the groundwork, technical setup, content planning, and initial deployment of core AI features to a small group of learners.

Key Activities:

- ChatGPT: Generate 5 career-focused modules (e.g., resume building, critical thinking) and deploy a virtual mentor for the Tech Career Prep program.
- **DeepSeek:** Develop 3 coding challenges (e.g., Python basics) for the same program.
- Cohere: Set up a semantic search for 50 career resources.
- Target Audience: Test with 20 learners
- **Rationale:** Rapid deployment leverages free tools to demonstrate value and address automation-driven skill needs.

Phase 2: Pilot Expansion and Evaluation (Weeks 3-4: July 21 - August 3, 2025)

• **Focus:** Scaling the pilot, collecting feedback, refining features, and evaluating overall outcomes.

Key Activities:

- ChatGPT: Scale mentor to 50 learners, add 2 modules, and collect engagement feedback via surveys.
- DeepSeek: Add 2 coding challenges and test with 50 learners.
- Cohere: Test search with 50 learners and measure resource access efficiency.
- **Rationale:** Quick pilots validate impact and inform future scaling for Excelerate's global audience.

3. Detailed Implementation Plan: Timeline, Milestones, and Responsibilities

This section breaks down each week's objectives, tasks, deliverables, and assigned responsibilities.

Week 1: Planning and Requirements (July 7-13, 2025)

Objective: Define goals, align stakeholders, and prepare infrastructure for the pilot.

Key Tasks:

Stakeholder Alignment (July 7-8):

- Hold a virtual workshop with 10 stakeholders (e.g., teachers, employers) to set goals: 15% increase in participation (time on site), 80% module completion rate.
- Deliverable: Requirements document specifying use cases (e.g., resume construction, programming proficiency), success criteria, and technical requirements (e.g., API integration).
- Responsibility: Project Manager (PM), Education Lead (EL), Project Lead
 (PL).

Technical Setup (July 9-10):

- Set up Excelerate's platform (custom LMS or VEmpower's system) for API integrations.
- Identify and acquire free-tier API keys for ChatGPT, DeepSeek, and Cohere.
- Test connectivity with a 99% uptime target.
- Deliverable: Platform ready for API integration.
- Responsibilities: IT Lead (ITL), Platform Administrator (PA).

Content Planning (July 11-13):

- Create 5 outlines for career modules (resume building, interview skills, critical thinking, etc.) and 3 outlines for coding challenges (e.g., basics of Python).
- Identify 50 career resources for semantic search.
- Deliverable: Content plan for Tech Career Prep.
- Responsibility: Education Lead (EL), Content Developer (CD).
- Resources: PM (1), EL (1), ITL (1), PA (1), CD (1);

Budget: \$800 (software, API credits).

Week 2: Initial Deployment and Testing (July 14-20, 2025)

Objective: Deploy pilot features for 20 learners and validate functionality.

Key Tasks:

ChatGPT Deployment (July 14-16):

- Initiate ChatGPT API integration for a virtual mentor and create 5 modules (10 tasks each; resume drafting, mock interviews, etc.).
- Test mentor with 5 learners (performance accuracy target 85%; engagement,
 10 minutes average per session).
- **Deliverable:** Functional mentor and 5 modules in the platform.
- Responsibility: Developer Team (DT), PA, EL.

• DeepSeek Deployment (July 17-18):

- Integrate the DeepSeek API for 3 coding challenges (for example, sorting data and string problems)
- Test the accuracy of the feedback (goal of 90% accuracy) with 5 learners.
- Deliverable: Coding sandbox with 3 challenges and "Skill Star" badges.
- Responsibility: DT, ITL, EL.

• Cohere Deployment (July 19-20):

- Integrate Cohere's semantic search API to 50 resources (tutorials, career guides, etc.).
- Test the speed of search (goal of <3 seconds) and relevance (goal of 80%)
 with 5 learners
- Deliverable: Search feature on the platform.
- Responsibility: DT, PA, Data Privacy Officer (DPO).
- Resources: DT (2), PA (1), EL (1), ITL (1), DPO (1);

Budget: \$600 (API credits, testing).

Week 3: Pilot Expansion and Refinement (July 21-27, 2025)

- Objective: Scale pilot to 50 learners, refine features based on feedback.
- Key Tasks:
 - ChatGPT Expansion (July 21-23):

- Scale mentor to 50 learners, and add 2 modules.
- Collect feedback via in-platform surveys (target: 90% response rate).
- Deliverable: Mentor supporting 50 learners, 7 modules total.
- Responsibility: DT, PA, EL.

DeepSeek Expansion (July 24-25):

- Add 2 coding challenges (e.g., loops, data analysis). Test with 50 learners, and award badges for completion.
- Measure completion rate (target: 80%).
- Deliverable: 5 challenges with gamified rewards.
- Responsibility: DT, ITL, EL.

• Cohere Refinement (July 26-27):

- Refine search based on feedback, expand to 100 resources.
- Test with 50 learners, measure access rate (target: 85% resource usage).
- **Deliverable:** Optimized search feature.
- Responsibility: DT, PA, DPO.
- Resources: DT (2), PA (1), EL (1), ITL (1), DPO (1);

Budget: \$600 (testing, analytics).

Week 4: Evaluation and Reporting (July 28 - August 3, 2025)

- Objective: Assess pilot outcomes and recommend next steps.
- Key Tasks:

Data Collection (July 28-30):

- Collect feedback from 50 learners and 3 facilitators via surveys and 1 focus group.
- Measure engagement (target: 15% increase in platform time, baseline: 1 hour/week/learner) and completion (target: 80%).
- Deliverable: Dataset with engagement metrics and feedback.
- Responsibility: Data Analyst (DA), EL.

Security Review (July 31):

- Conduct audit of API integrations, ensuring basic encryption and GDPR compliance.
- Deliverable: Compliance checklist confirming data security.
- Responsibility: DPO, ITL.

• Final Report (August 1-3):

- Analyze data, compare to goals (15% engagement increase, 80% completion).
- Recommend scaling (e.g., add programs) or refinements (e.g., improve search relevance).
- Deliverable: Report with metrics, feedback, and roadmap.
- Responsibility: PM, DA, EL.
- Resources: PM (1), DA (1), EL (1), ITL (1), DPO (1);

Budget: \$500 (analytics, reporting).

4. Resources Summary

- **Personnel:** PM (1), EL (1), ITL (1), PA (1), CD (1), DT (2), DPO (1), DA (1).
- Total Budget: \$2,500 (software, API credits, testing, analytics).
- **Tools:** ChatGPT free tier, DeepSeek free API, Cohere trial API, Excelerate platform, survey tools (e.g., Google Forms).

5. Success Metrics

Our pilot's success will be measured across several key areas:

Engagement Metrics

- **Platform Usage Time:** 15% increase in average platform usage time (baseline: 1 hour/week/learner; target: 1.15 hours/week/learner). Measured via platform analytics tracking session time for 50 learners.
- Interaction Frequency: At least 80% of learners interact with the virtual mentor or coding challenges at least 3 times a week (target: 120 total interactions across 50 learners).

 Measured using API logs and platform user reports of activity.

• **Resource Usage Rate:** 85% of learners will access the semantic search at least once per session (42/50 learners per session corresponds to the target). Measured using search query logs.

Skill Acquisition Metrics

- **Module Completion Rate:** 80% of learners complete at least 5 of the 7 career modules (target: 40/50 learners). Measured through platform completion tracking.
- Challenge Completion Rate: 80% of learners complete at least 4 of the 5 coding challenges (target: 40/50 learners). Measured through DeepSeek API submission logs.
- **Skill Improvement:** 75% of learners improved their performance on post-module assessments (for example, the quality of their resume and the correctness of their coding), compared to the learners' performance at pre-module baselines (target: 38/50 learners). Measured through pre/post-assessment scores.

Learner and Facilitator Satisfaction

- **Learner Satisfaction:** 85% of learners report on the platform as "effective" or "very effective" for career preparation (4 or 5 on a 5-point scale). Measured through surveys (expected: 43/50 learners).
- Facilitator Satisfaction: 100% of facilitators report the AI tools as "useful" or "very useful" for promoting learner results (3/3 facilitators). Measured via facilitator focus group and surveys.
- **Usability:** 90% of learners report the platform as "easy to use" (4 or 5 on a 5-point scale). Measured via survey feedback.

Technical Performance Metrics

- **Platform Availability:** 99% availability for all AI features (ChatGPT mentor, DeepSeek sandbox, and Cohere search), as verified through platform monitoring services.
- **Response Time:** ChatGPT mentor and DeepSeek feedback was available in less than 2.0 seconds (target: 95% of queries), as measured with API response logs.
- **Search Duration:** Cohere semantic search returned results < 3.0 seconds (target: 98% of queries), as measured with query logs.
- **Data Privacy:** 100% compliance with GDPR regarding learner data; there were never any records of security incidents per DPO audit.

Alignment with Automation Goals

- Relevance to Automation Skills: 80% of learners reported the modules and challenges were relevant to automation-related job functions (e.g., data analysis, soft skills). This was measured with the survey question, "Do these activities help prepare you for the types of workplaces that will experience automation?".
- Career Preparedness: 75% of learners reported they feel "more prepared" for automation-related jobs at the conclusion of the pilot (4 or 5 on a 5-point scale). This was measured with the survey question, "Do you feel better prepared for work roles in the future?".
- **Employer Feedback:** At least two stakeholders reported that the pilot met industry needs, such as the technical and soft skills required for automation. This information was gathered through stakeholder interviews.