EdTech for Learning

GitLab Foundation Final Report

Bridging Skills and Opportunities for Navajo People with AI-enhanced Employment Matching

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Summary	This is the Final Report for the completion of the GitLab Foundation funded project *Bridging Skills and Opportunities for Navajo People with AI-enhanced Employment Matching*. This $100,000 funded project, active between 1st November 2023 and 30th September 2024 was successfully completed producing an extensive proof-of-concept demonstration Workforce Web-app.
Distribution	● GitLab Foundation ● EdTech For Learning Team ● Aspire Ability Team ● File
TOC	1. Milestones 2. Impact Analysis 3. Next Steps Attachment A – Impact Analysis Slide Deck

1. MILESTONES

The [EdTech for Learning](#) team thank GitLab Foundation for their support of this project. In particular we thank Matt Zieger and Spencer MacColl for their support throughout the project. We also thank the Project Evident team for their support in the development of our Impact Metrics materials.

All of the major milestones for the project were successfully completed. The major achievements of the project are the:

- Creation and deployment, by EdTech For Learning, of the Workforce Web-app at https://edtechforlearning.app. Access to this app is available through the login page (note this is a proof-of-concept demonstrator and NOT an operational service deployment);

- User evaluations of the Workforce Web-app managed by Aspire Ability. Fourteen (14) Job Seekers and six (6) Employers, from the Navajo People, user evaluations were undertaken over a period of three weeks.

A detailed explanation of the Impact Metrics approach for this work is given in Attachment B. The functionality supported by the Workforce App is:

- The App contains nearly 1500 job descriptions obtained from the Job Board maintained by Aspire Ability on behalf of the Navajo Reservation. The app has identified the set of competencies required by a Job Seeker who wants to apply for the job. An Employer can use the app to manually amend the competencies or use generative-AI to refine the competencies associated with the job description;

- A Job Seeker can upload a copy of their resume and use the app to create the set of competencies that reflect the statements in their resume (these competencies are created using generative-AI). The Job Seeker can use the app to manually amend the competencies or use generative-AI to refine the competencies. A Job Seeker can then use the app to identify the top 20 Job Descriptions that fit their own competency profile;

- Access to the app is available either through direct login or via other platforms using the 1EdTech Learning Tools Interoperability® (LTI®) standard (the Workforce app is an LTI Tool). Integration with the Aspire Ability Community Talent Marketplace using LTI is still to be completed

A range of materials describing the project and demonstrating the Workforce App are available at: https://edtechforlearning.org/workforce-services-app/.

Our experiences and conclusions on the use of the OpenAI Generative-AI ChatGPT API in the functionality of the Workforce Web-app are:

- Uploading and competency analysis of the 1500 job descriptions, using generative-AI, takes between 3-10 hours depending on which version of ChatGPT API is used. A manual approach would take, typically, 1-2 weeks of effort, by the experienced Aspire Ability staff, per job description;

- The different versions of the ChatGPT API released during the 9-month period of the project have resulted in significant changes to the generative-AI Prompt Engineering. This means that the detailed ways in which the human-in-the-loop activities are supported have undergone several revisions;

- The costs for each of the various versions of the ChatGPT API vary significantly. The generative-AI and related technology, e.g. vector database, are undergoing significant revision. This makes it difficult to establish a stable business model for the cost/price provision of the Workforce Web-app.

The use of generative-AI, in the form of the ChatGPT API, is essential to the functionality provided in the Workforce Web-app.

2.   IMPACT ANALYSIS

The set of Impact Analysis questions assigned by GitLab Foundation to this project and our response is shown in Table 2.2.

Impact Question	Response
How will *EdTech for Learning* know if a member of the Navajo community has found a new job because of their AI job-matching platform?	- Creation/usage of Job Seeker survey (initial survey has been created to obtain user evaluation feedback) - Creation/usage of the Employer Survey (initial survey has been created to obtain user evaluation feedback) - Tracking of the Job Seeker usage of the Workforce app.
How will *EdTech for Learning* know what the starting salary of the new job is?	- Creation/usage of Job Seeker survey (initial survey has been created to obtain user evaluation feedback) - Creation/usage of the Employer Survey (initial survey has been created to obtain user evaluation feedback).
How will *EdTech for Learning* obtain baseline data on the level of income / salary / wage that job-seekers are earning before they join the AI job-matching platform?	- Creation/usage of Job Seeker survey (initial survey has been created to obtain user evaluation feedback) - Tracking of the Job Seeker usage of the Workforce app using user profile for access to the app.
When are you expecting to have the first user be able to match with a new job on the AI job-matching platform? Six months from now? One year from now?	- End of Project – 20 users participated in the User Evaluations - Within 6 months of End of Project (March 2025) – formal launch of the Workforce App to support the Aspire Ability Community Talent Platform - One-two Years (2025/2026) – 200-500 Job Seekers.

| Is there any other type of impact data that *EdTech for Learning* will collect to demonstrate the social impact of their AI job-matching platform? | When operational we plan to collect the following information:

● Number of jobs on Aspire Ability Connect Platform

● Number of Job Seekers

● Number of jobs applied for through the Aspire Ability Connect Platform

● Number of upskilling plans created, worked on, and completed

● Number of digital credentials earned/added to job seekers' competency profiles

● Number of employers engaged with Aspire Ability Connect Platform

    o Posting jobs

    o Using Connect matching reports to hiring decisions. |

A more detailed explanation of the Impact Metrics approach for this work is given in Attachment A (slides 10-19). This work was produced using consultation with the Project Evident Team.

The key feedback from the user evaluations was that most users wanted to be able to use an operational version of this new app as soon as possible.

3.   NEXT STEPS

Next steps for the technical work are the accruing benefits are:

- Undertake a full reworking of the User Interface/User Experience to the level of an operational app;

- Update the solution to make use of the latest versions of the Weaviate Vector database and the Open AI ChatGPT API;

- Establish the data collection infrastructure to enable creation of operational analytics to optimize the user experience and capabilities of the Generative-AI;

- Develop the systems administration/management interface for the app;

- Undertake requirements capture in preparation for transitioning from a Workforce Web-app to a Workforce Services Platform to enable sustainable scalability.
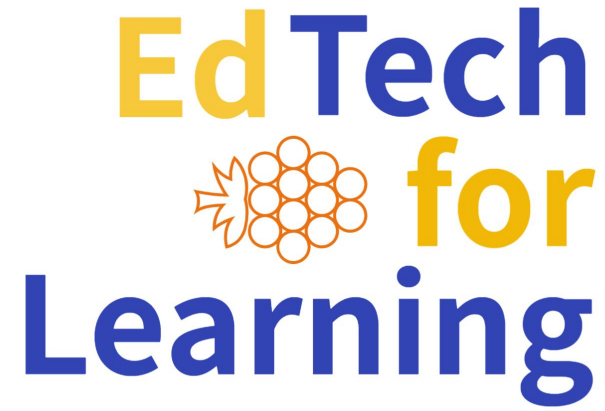
Enabling access to the benefits
of edtech for everyone,
everywhere

Project Navajo Impact Analysis

Collecting and Analysing the Right Data to Reflect the Best
Impact Metrics for Our GitLab Foundation Project

GitLab Foundation Project

Bridging skills and Opportunities for Navajo People with AI-enhanced Employment Matching

Our objective is to place 200-500 Navajos into net-new 'Thriving Wage Jobs' or better paying jobs in 2024 and for this number to increase annually as the range of jobs with validated competency maps and the number of Navajo job seekers complete guided upskilling plans increases. Traditional methods for creating job competency maps and job-seeker profiles are labor-intensive. Usage of AI and large job-related data stores will accelerate the gathering of data about both jobs and job seekers. We will create matching reports to show job seekers the jobs for which they are best prepared and provide them with pathways in learning aligned with their missing competencies. We will scale and localize job candidate data with novel, AI-driven "interview" tools. We anticipate a factor of 10 increase (cf. the current manual process) in the number of job maps and job seeker profiles created in the Navajo context and beyond.

GitLab Foundation

Creating Opportunities, Addressing Bias

THE NAVAJO "OPPORTUNITY DESERT"

50%

Unemployment on the Reservation

~75k

Un- or Underemployed Individuals

Current Navajo Nation Realities

- ~2000 high school graduates per year; Only ~200 New Jobs created annually

- Currently ~3500 vacant jobs on the reservation
  - Very traditional JDs & hiring processes
  - Negligible collaboration w/ schools RE pathways for / to jobs

- Widespread beliefs that
  - Available jobs are (almost) exclusively in government
  - "Only family members need apply"

Next Generation L ^{3} Framework

Olivia

If Olivia wants to prepare and qualify for a job in the community she lives in, she faces specific challenges:

1. Identifying the competencies (and related knowledge, skills, & abilities) required for specific job opportunities at employers in her community

2. Identifying the competencies she currently has and which ones she needs to acquire to qualify for one or more of these jobs

3. Identifying courses or programs, ideally at a school or schools in her community, that will enable her to acquire the competencies she needs

Next Generation L³ Framework

And what course or program she needs to acquire KSAs she's missing for that job:

Finally, we need an organizing tool that helps Olivia use this data smartly throughout her career:

And specifically, what competencies (& KSAs) are required for a particular job:

L³ AGENT

Curriculum Agent

SCHOOL A

ORGANIZATION 1

To make this data visible and actionable, we need to provide "insight tools" …

To build a support system for Olivia, we first need to …

… that empower Olivia to make accurate, timely decisions about school & work.

ORGANIZATION 2

And details about multiple KSA-aligned learning opportunities available to …

Then … to know about …

To provide this information at scale, we need tools for quickly, accurately mapping multiple jobs:

We also need to structure data about learning experiences …

Then we enable employers to find and hire people like Olivia who match their job needs:

… and jobs so we can quickly match them to Olivia's interests & needs.

COMMUNITY X
Labor Demand & Opportunities

EMPLOYER-SPECIFIC Opportunities & Job Competency Profiles

Behind the scenes, we need to automatically update Olivia's competency profile as she progresses:

LMS

LABOR MARKET DATA & INTELLIGENCE

Leading v Lagging Indicators

From decades of research and observation, we know that individuals with accurate, timely data about jobs and learning experiences will be better equipped to prepare and qualify for increasingly better career opportunities. We will monitor several leading & lagging indicators to measure our progress:
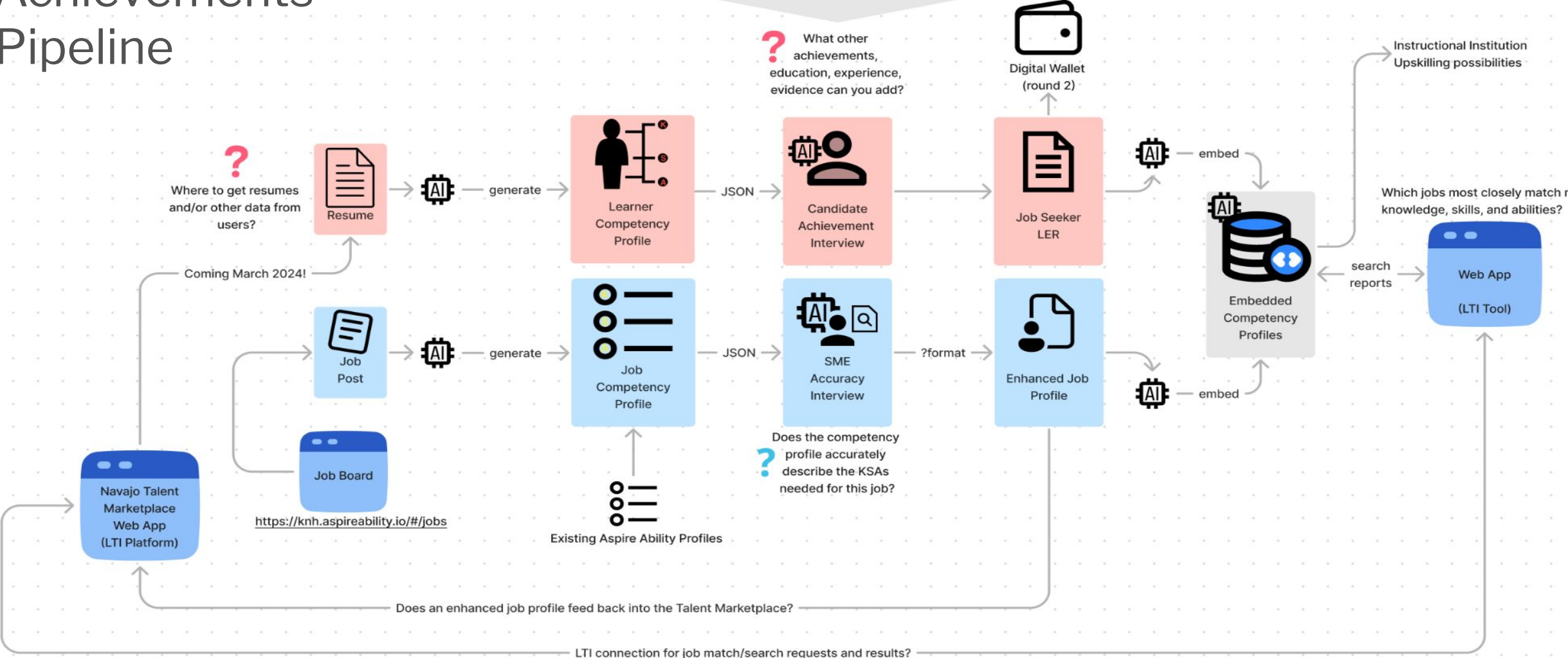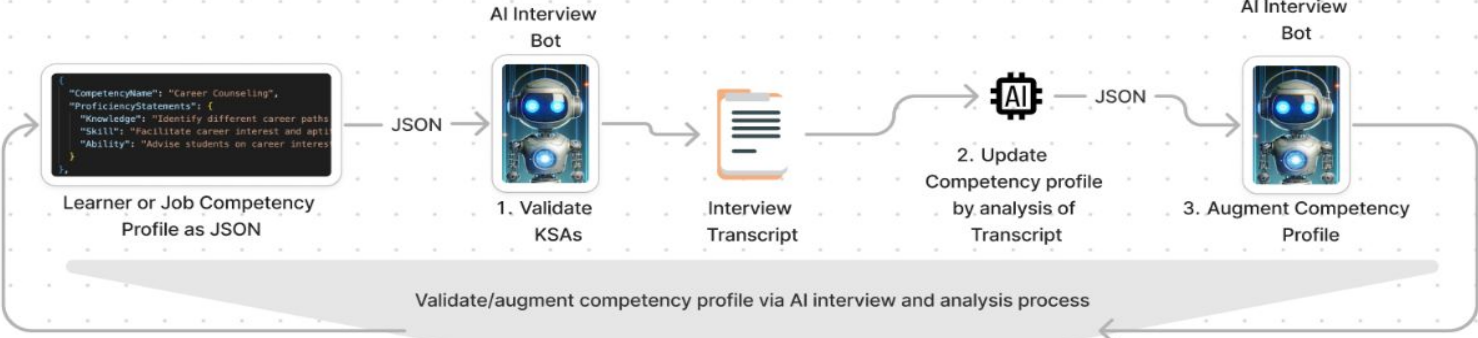
LEADING INDICATORS

1. More jobs mapped accurately and quickly;
2. More learning opportunities mapped to job-aligned KSAs;
3. More individuals creating competency profiles, job matching reports, & upskilling plans;
4. Number of individuals actively engaged in upskilling (for "first" better jobs and across their careers);
5. Number of employers using tools & processes to engage in skills-based hiring & promotion.
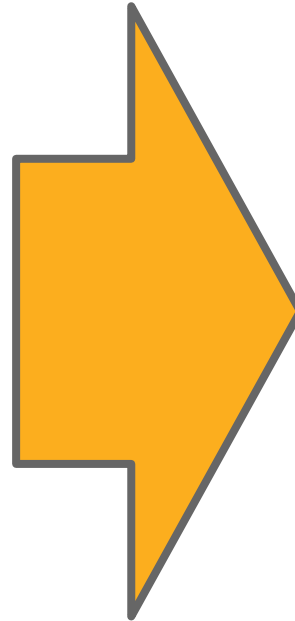
LAGGING INDICATORS

1. Number of Navajos hired into better, higher-paying jobs;
2. Number of Navajos progressively advancing through this process across their careers;
3. Lower unemployment rate;
4. New, thriving-wage jobs coming to the reservation.

Partial Achievements Pipeline

EdTech for Learning

AI Interview Bot
Learner or Job Competency Profile as JSON
→ JSON → 1. Validate KSAs → Interview Transcript → AI → JSON →

AI Interview Bot
2. Update Competency profile by analysis of Transcript
3. Augment Competency Profile

Validate/augment competency profile via AI interview and analysis process

? What other achievements, education, experience, evidence can you add?

Digital Wallet (round 2)

Instructional Institution Upskilling possibilities

? Where to get resumes and/or other data from users?

Resume → AI → generate → Learner Competency Profile → JSON → Candidate Achievement Interview → Job Seeker LER → AI → embed →

Coming March 2024!

Which jobs most closely match my knowledge, skills, and abilities?

Job Post → AI → generate → Job Competency Profile → JSON → SME Accuracy Interview → ?format → Enhanced Job Profile → AI → embed →

Embedded Competency Profiles

← search reports →

Web App (LTI Tool)

Job Board

https://knh.aspireability.io/#/jobs

Existing Aspire Ability Profiles

? Does the competency profile accurately describe the KSAs needed for this job?

Navajo Talent Marketplace Web App (LTI Platform)

Does an enhanced job profile feed back into the Talent Marketplace?

LTI connection for job match/search requests and results?

How Can We Demonstrate Impact?

What is the effect of your AI products on participant (users) financial outcomes?

1. Do your tools enable organizations to **reach** more people?

2. Do your tools enable participants to **earn** more income?

3. How can you start to think about collecting **baseline data** to demonstrate the social impact of your innovations?

"Our objective is to place 200-500 Navajos into net-new 'Thriving Wage Jobs' or better paying jobs in 2024 and for this number to increase annually as the range of jobs with validated competency maps and the number of Navajo job seekers complete guided upskilling plans increases."

Project North Star Outcomes

| Job Seeker	Employer	Aspire Ability
Throughout their career, individuals will have access to a wider range of better paid jobs on the Navajo Reservation.	Navajo Reservation employers will have increased numbers of, better qualified, people applying for more of the advertised jobs	To significantly reduce the labor-intensive effort for creating job competency maps and job-seeker profiles.

IMPACT METRICS & OUTCOMES

OUR IMPACT METRICS

The GitLab Foundation's questions related to Impact Measurement of the Navajo Project
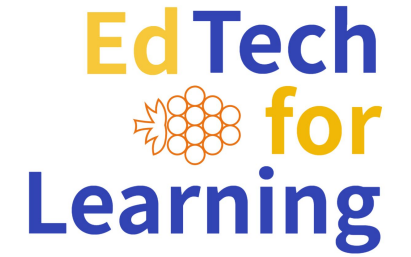
Impact Question	Response
How will *EdTech for Learning* know if a member of the Navajo community has found a new job because of their AI job-matching platform?	**A**
How will *EdTech for Learning* know what the starting salary of the new job is?	**B**
How will *EdTech for Learning* obtain baseline data on the level of income / salary / wage that job-seekers are earning before they join the AI job-matching platform?	**C**
When are you expecting to have the first user be able to match with a new job on the AI job-matching platform? Six months from now? One year from now?	**D**
Is there any other type of impact data that *EdTech for Learning* will collect to demonstrate the social impact of their AI job-matching platform?	**E**

Context for Outcomes

❖ Systemic under-employment on the Navajo Reservation

❖ No pathways to training on the Navajo Reservation

❖ Navajo Reservation does not collect employment statistics

❖ No Income Tax on the Navajo Reservation

Ideal User Pathways

Job Seeker
❖ **Minimize**   ▪ Single Visit Job Seeker   ❖ **Preferred**   ▪ Multiple Visit Job Seeker for set of Jobs   ❖ **Ideal**   ▪ Guided Career Development for Job Seeker

Employer
❖ **Minimize**   ▪ One-off Advertised Job   ❖ **Preferred**   ▪ Many advertised Jobs/Roles   ❖ **Ideal**   ▪ Supporting Career Development in Advertised Jobs

Impact Metric A

How will *Edtech for Learning* know if a member of the Navajo community has found a new job because of their AI job-matching platform?

❖ **User Tracking of Platform Usage & Surveys of Job Seekers**

❖ **Employer Surveys**

ACTIONS
1. Create Job Seeker Survey (COMPLETED)
2. Create Employer Survey
3. (COMPLETED)
4. Establish User Tracking of Platform Usage (Online)

Impact Metric B

How will *EdTech for Learning* know what the starting salary of the new job is?

❖ Surveys of Job Seekers
❖ Surveys of Employers

ACTIONS
1. Create Job Seeker Survey (COMPLETED)
2. Create Employer Survey (COMPLETED)

Impact Metric C

How will *EdTech for Learning* obtain base-line data on the level of income / salary / wage that job-seekers are earning before they join the AI job-matching platform?

❖ **Through User Profile & Survey Responses**

ACTIONS
1. Create Job Seeker Survey (COMPLETED)
2. Establish User Profile (Online)

Impact Metric D

When are you expecting to have the first user be able to match with a new job on the AI job-matching platform? Six months from now? One year from now?

End of Project	Six Months	One-Two Year
3-6 users will be part of the Generative AI app Proof-of-Concept demonstrator evaluation.	Launch of the Aspire Ability Connect Platform using the New Generative AI app.	Full operation. (200-500 Job Seekers)

Impact Metric E

Is there any other type of impact data that *EdTech for Learning* will collect to demonstrate the social impact of their AI job-matching platform?

❖ Number of jobs on Aspire Ability Connect Platform

❖ Number of Job Seekers

❖ Number of jobs applied for through the Aspire Ability Connect Platform

❖ Number of upskilling plans created, worked on, and completed

❖ Number of digital credentials earned/added to job seekers' competency profiles

❖ Number of employers engaged with Aspire Ability Connect Platform

▪ Posting jobs

▪ Using Connect matching reports to making hiring decisions

Impact Analysis Initial Findings

Job Seeker	Employer	Aspire Ability
Positive response from Job Seeker evaluations of PoC Demonstrator Workforce App. Want access to real App as soon as possible.	Uncertainty on usefulness from Employer evaluations of PoC Demonstrator Workforce App.	Confirm creation of the competency profiles reduced from several weeks human effort to a few hours human effort.

OUTPUTS

Desired Outputs

Job Seeker	Employer	Aspire Ability	ET4L
❖ More comprehensive Resume ❖ KSA-based resume	❖ More comprehensive job descriptions ❖ KSA-based job descriptions	❖ Increased number of matches of job seekers to job descriptions	❖ Identification of the benefits and effectiveness of the usage of Generative AI

Measurement

| Job Seeker	Employer	Process
❖ Usage of the Workforce App ❖ Number of Job Applications & Success ❖ Details of Resume Refinement ❖ Usage of the Community Marketplace	❖ Usage of the Community Marketplace ❖ Usage of the Workforce App ❖ Number of applicants per Job ❖ Details of Job Description Refinement	❖ Time taken to complete various tasks ❖ Tracking of pathways through the various processes

Feedback Collection Architecture

Building a data collection architecture for feedback based upon open standards

❖ 1EdTech Caliper
❖ IEEE xAPI
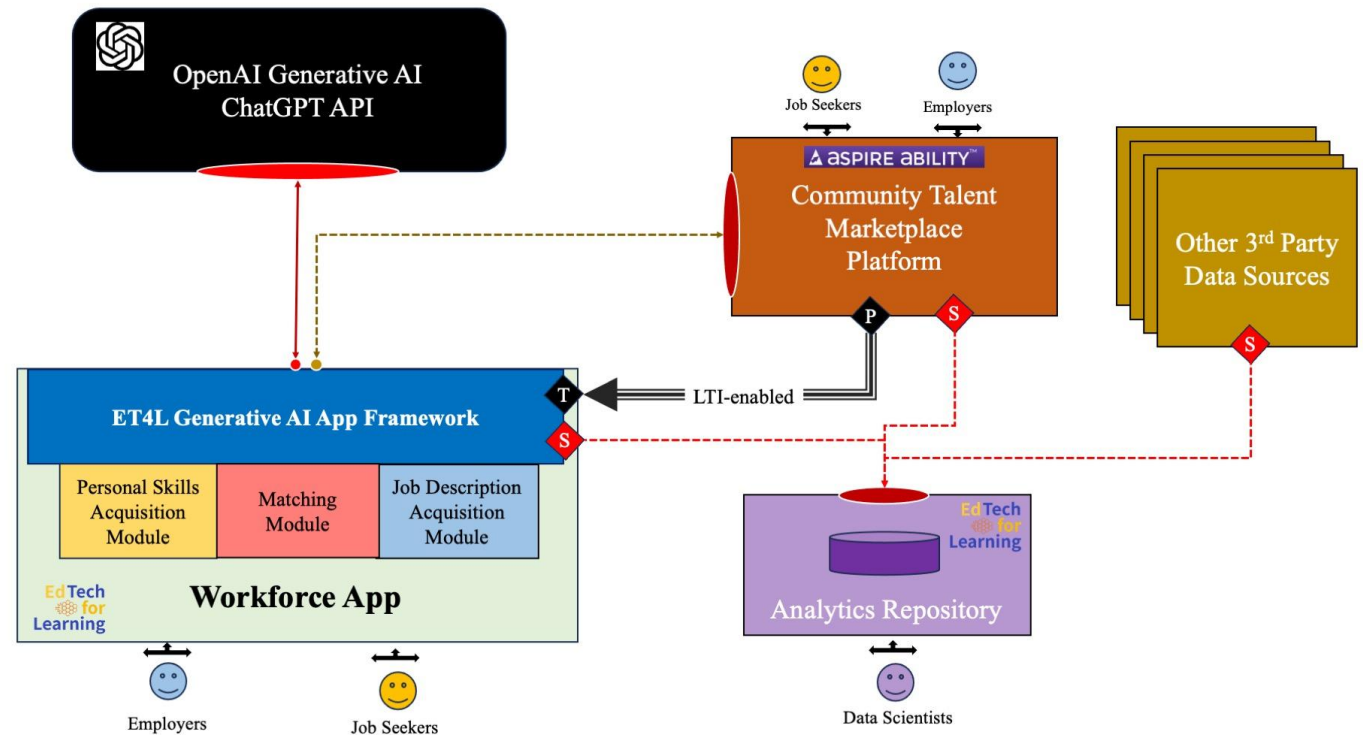
Generative AI & Surveys

Using Generative AI to change the way User Surveys are created and used.
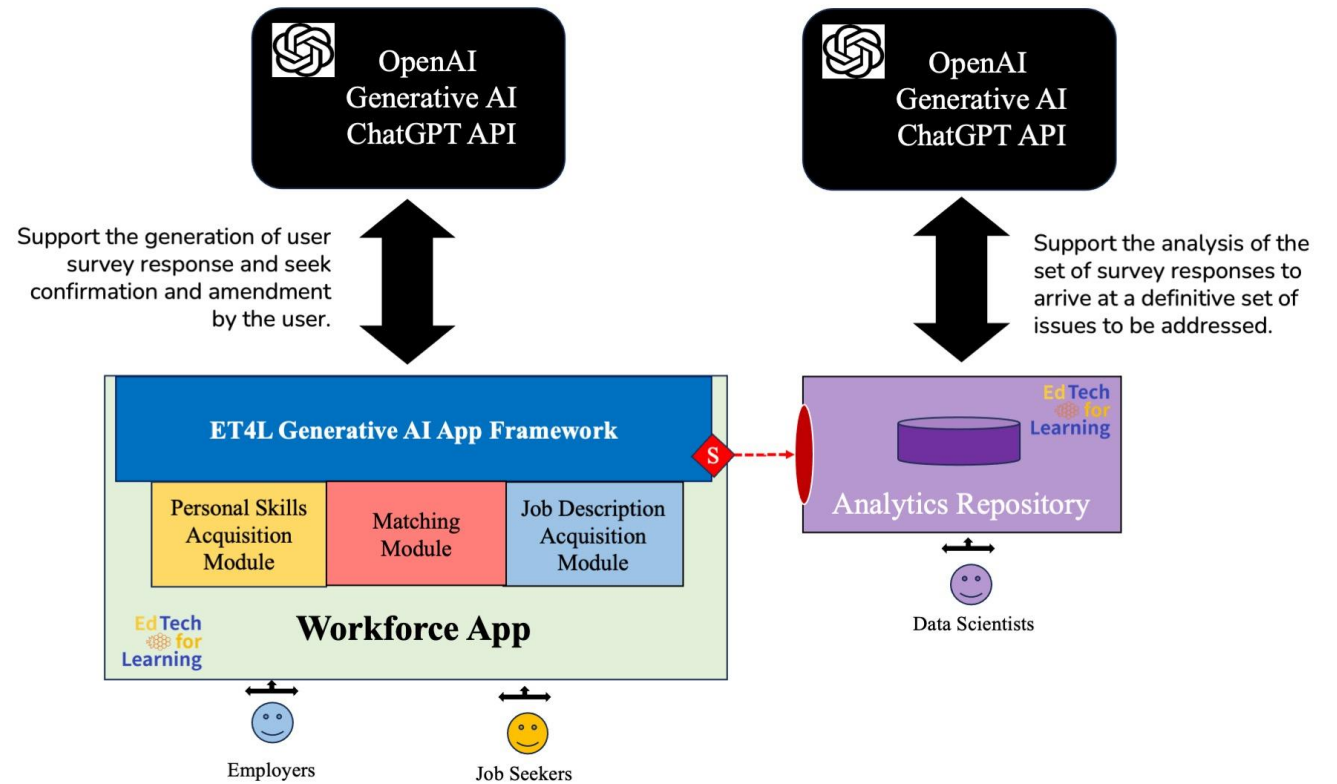
Measuring Benefits of Generative AI

❖ Evaluation of the effectiveness of the Prompt Engineering

❖ Complexity of defining Prompts to maximise effectiveness and minimise problems

❖ Qualitative interpretation of the Vector Comparisons

❖ Costs in terms of Token usage for:

▪ Processing of each Prompt

▪ Processing of the Job Descriptions

▪ Processing of a Resume

❖ Effectiveness and accuracy of Skills Gap Analysis

Surveys

EdTech for Learning

Job Seeker Survey

- ❖ Job Related
  - Salary of previous job
  - Salary of new job
- ❖ App Related
  - Ease of Use of Workforce App
  - Usefulness of Competency Breakdown
  - Missing Feature(s)

Employer Survey

- ❖ Job Related
  - Proposed starting salary range
  - Actual starting salary
  - Date Job originally advertised
  - Date job filled
  - Start date of employee
- ❖ App Related
  - Ease of Use of Workforce App
  - Usefulness of Competency Breakdown
  - Missing Feature(s)

Job Seeker Evaluation Results

❖ Evaluations are from 14 Job Seekers

❖ Top 5 findings are

➢ Excellent support for resume expansion

➢ Make the Generative-AI detailed suggestions more concise

➢ Increase the amount of support from the Generative-AI

➢ The User Interface needs significant improvements

➢ Enable identification of skills gap

Employer Evaluation Results

❖ Evaluations are from 5 Employer organizations

❖ Top 5 identified weaknesses are

➢ Provide clarification on meaning of Knowledge, Skills & Abilities

➢ Improve the separation of Generative-AI and Human-in-the-Loop

➢ Make the Generative-AI detailed suggestions more concise

➢ The User Interface needs significant improvements

➢ Enable creation of the original Job Description in the app