Proposal for C4GT DIKSHA – Digital Learner's Passbook

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Technical skills with level *(Mention tech skills/languages known and level - Novice/Intermediate/Expert)*	C : Expert, C++ : Expert, Ruby : Expert, Python 3 : Expert, Bashscript : Expert, **Java** : Expert, Dart : Expert, Perl : Intermediate, HTML : Expert, CSS : Expert, GoLang : Intermediate , Haskell : Intermediate , Ruby on Rails : Intermediate , Flutter : Intermediate , JavaScript : Intermediate , TypeScript : Intermediate , **Angular** : Expert , Express Js : Intermediate , **Node Js** : Expert , Machine Learning : Expert Data Science : Expert , Latex : Expert

Sunbird ED Digital Learner Passbook :
Empowering Learners with Verifiable Credentials and Competency Tracking

Summary

The project aims to enhance the Sunbird ED platform by implementing a Digital Learner Passbook. This passbook will serve as a digital profile and repository for learners, containing their demographic details, verifiable credentials, and captured skills/competencies. The passbook will be developed using Sunbird RC and integrated with Digi Locker for obtaining verifiable credentials from various sources. My approach involves developing an interface that leverages Digi Locker APIs to extract learner progress information such as 10th and 12th board mark sheets, with the learner's consent through OTP verification, then processes the data to generate a summarized view of the learner's achievements and competency level (referred to as the Learner Progress; Benefits Passbook - LPBP), and enables the LPBP to be shared via digital mediums. Additionally, the project should allow assessors to verify relevant credentials through the LPBP using Digi Locker, ensuring the claims made by learners can be validated with user consent via OTP. We will carefully plan the integration with Digi Locker, ensuring data privacy and security measures are in place. Obtaining user consent and seamless acquisition of learner data will be prioritized. Through milestone-driven implementation, we will create a robust and user-friendly Digital Learner Passbook solution that empowers learners and enhances the capabilities of the Sunbird ED platform. The project aims to adhere to the NDEAR (National Digital Educational Architecture) principles for issuing and managing credentials.

Project Details

1. **Project Overview :**

   (a) **Understanding of Project**

   - The project aims to extend the existing Sunbird ED platform to create a pluggable Digital Learner Passbook.
   - The Digital Learner Passbook will serve as a digital profile and docket for learners, containing their demographic details, verifiable credentials, and captured skills/competencies.
   - The passbook will leverage DigiLocker APIs to extract learner progress information and generate a summarized view of achievements and competency levels. This will be done with user consent via OTP.

- Additionally, the passbook(LPBP) will be shareable via digital mediums.
- Assessors will be able to verify relevant credentials through the passbook(LPBP), ensuring the claims made by learners.
- The project aims to adhere to the NDEAR (National Digital Educational Architecture) principles for issuing and managing credentials.
- The passbook will enhance the existing capabilities of the Sunbird ED platform by enabling learners to consolidate their achievements and competencies in a single digital profile.

(b) **Problems**

i. Integration challenges : Integrating DigiLocker APIs with the Sunbird ED platform may require careful coordination and technical expertise.

ii. Data privacy and security : Ensuring the security and privacy of user data, especially when leveraging OTP-based authentication, is crucial.

iii. User consent and data acquisition : Obtaining user consent for accessing and processing learner progress information, along with acquiring verifiable credentials from external sources, needs to be handled seamlessly.

(c) **Solutions**

i. Integration Challenges :
- Thoroughly study the documentation and specifications of DigiLocker APIs to understand the integration requirements and data formats.
- Develop an API layer that acts as an intermediary between the Sunbird ED platform and DigiLocker, facilitating data extraction, verification, and synchronization.
- Implement error handling and logging mechanisms to address any integration issues and ensure smooth data flow between systems.
- Utilize data transformation and mapping techniques to align the data formats between Sunbird and DigiLocker for seamless integration.

ii. Data Privacy and Security :
- Implement secure data transmission protocols (HTTPS) while interacting with DigiLocker APIs.
- Employ encryption mechanisms to protect learner data both during transmission and storage.
- Utilize authentication and authorization mechanisms to control access to the passbook and learner data.

iii. User Adoption :
- Design an intuitive and user-friendly interface for the passbook, focusing on ease of use and providing clear instructions and visual cues for learners.
- Conduct user research and usability testing to gather feedback and make iterative improvements to the passbook's interface and features.
- Educate learners about the benefits of the passbook, such as easy verification, document portability, and streamlined processes. Create educational materials, including user guides and tutorials for the same
- Collaborate with educational institutions and assessors to conduct training sessions and workshops, demonstrating the value of the passbook and providing guidance on its usage and verification process.

2. **Implementation Details with timelines :**

(a) **Milestone 1 (Weeks 1-2) :**

i. Conduct detailed discussions with project mentors to finalize the requirements and scope of the Digital Learner Passbook.
- This milestone involves engaging with project mentors to gather their input and understand their expectations for the Digital Learner Passbook. Discussions should cover aspects such as desired features, user interface design, integration requirements, data privacy considerations.

ii. Analyze the existing Sunbird RC and Sunbird ED platform to identify necessary modifications for integrating DigiLocker APIs.

- Review the technical architecture of the Sunbird RC and Sunbird ED platforms to identify the areas that need to be modified or enhanced to integrate DigiLocker APIs seamlessly. This analysis will ensure compatibility and smooth integration between the platforms.

iii. Develop a technical specification document outlining the required functionalities and integration points.

- Create a detailed technical specification document that outlines the specific functionalities and integration points to be developed. This document will serve as a guide for the whole development process and will help ensure that all the necessary features and requirements are met.
- **Sample Technical Specification Document**
  - **Objective :** The objective of this project is to extend the Sunbird ED platform to create a Digital Learner Passbook.
  - **Requirements :**
    - Integration with DigiLocker APIs for extracting learner progress information
    - Generation of a 1-pager summarised view of learner achievements and competencies
    - Secure sharing of the passbook via digital mediums
  - **Itegration Points :**
    - Modify User Registration and Profile modules to integrate with DigiLocker APIs
    - Develop a separate module for processing learner information and generating the LPBP
    - Implement secure data sharing protocols for sharing the passbook

Technologies utilized: Project mentor engagement and discussions, requirements gathering, analysis and review of existing platforms, technical documentation.

(b) **Milestone 2 (Weeks 3-5) :**

i. Integrate DigiLocker APIs into the Sunbird ED platform to enable extraction and verification of learner progress information.

- Implement the necessary code changes and integration points to connect the Sunbird ED platform with the DigiLocker APIs. This integration will enable the retrieval of learner progress information, such as verifiable credentials, from DigiLocker.

ii. Design and develop the interface for processing learner information and generating the 1-pager summarised view of the LPBP.

- Create an intuitive and user-friendly interface that can process the learner progress information extracted from DigiLocker. Design the layout and flow of the LPBP,focusing on usability, accessibility, and adherence to NDEAR principles and ensuring that it provides a concise and comprehensive overview of the learner's achievements and competencies (e.g., 10th Board marksheet, 12th Board marksheet) with user consent via OTP.
- Implement the consent mechanism, allowing learners to provide consent for data extraction through OTP verification.

iii. Implement secure sharing functionalities to enable the LPBP to be shared via digital mediums.

- Develop the necessary features and functionalities to allow the LPBP to be securely shared through digital mediums, such as email or messaging applications. Implement secure sharing protocols and encryption techniques to protect the privacy and integrity of the learner's data during transmission.

Technologies utilized: API integration, backend development, frontend development, user interface design, secure data sharing protocols.

(c) **Milestone 3 (Weeks 6-7) :**

i. Conduct rigorous testing and debugging to ensure the functionality, performance, and security of the Digital Learner Passbook.

- Thoroughly test the developed functionalities and features of the Digital Learner Passbook to identify and fix any issues or bugs. Perform various test scenarios to validate the functionality, performance, and security aspects of the passbook.

ii. Collaborate with assessors and stakeholders to verify the relevant credentials through DigiLocker and address any integration or verification issues.

- Engage with assessors and stakeholders to validate the verification process for relevant credentials through DigiLocker. Collaborate closely to address any integration issues, ensure smooth verification, and resolve any concerns raised by the assessors or stakeholders.

iii. Prepare comprehensive documentation and user guides for the Digital Learner Passbook functionality.

- Create detailed documentation that explains the functionality and usage of the Digital Learner Passbook. This documentation will serve as a guide for users and administrators, providing instructions on how to navigate and utilize the passbook effectively.
- **Sample Documentation - Digital Learner Passbook**
  - **Introduction**

    The Digital Learner Passbook is a feature-rich module in the Sunbird ED platform that provides learners with a comprehensive digital profile and docket. This document serves as a user guide and reference manual for utilizing the Digital Learner Passbook functionality effectively.
  - **Contents**
    A. Overview of the Digital Learner Passbook
    B. Accessing and Navigating the Passbook
    C. Viewing Learner Information
    D. Verifying Credentials and Achievements
    E. Sharing the Passbook via Digital Mediums
    F. Frequently Asked Questions (FAQs)

Availability

Number of hours available to dedicate to this project per week	**35-48 hours**
Do you have any other engagements during this period ? (projects/internships)	**No**

Personal Information

About me:

I am an good listener and fast learner, as well as a perfectionist who is industrious and wants to do everything flawlessly. I am also a computer science lover and I enjoy learning new technologies and have a strong interest in all computer science technologies whether it's IOT, Computer Architecture, Data Science, Game Development, Algorithms, AI, Blockchain, etc.

Motivation for Project:

Since my father is a government teacher and has been working on the DIKSHA app since it first launched, I have been assisting him in using it ever since. The app also requires the unique code and password for the relevant education portal login, which redirects to the mpeducation portal for logging in, and my father has completed numerous certificates, roughly 70 certificates. Since that time I have found the app fascinating and curious to learn how each of these functionalities works, and I have observed how the software gets periodically updated since it has been lauched in Madhya Pradesh.

I am really interested in contributing to the DIKSHA project, which I have been familiar with for a long time and which I find very interesting, and this curiosity serves as inspiration for my efforts. When I saw the

DIKSHA project on the C4GT projects list, I immediately checked it out, and this is my first and possibly final project proposal.

Previous Experience:

Project Name	Project Description
Today's Meal	An android app developed on Flutter framework (dart language) **Description :** • App Created for Students and individual who are far from home and dependent on the mess system. • Uses a AWS RDS postgreSql for storage which makes it scalable for large number of users. • Highly Flexible for both the customer and mess owner as provides update mess , edit details simple login using mobile number, for register only takes name also different login system for mess owner, customer, tiffinwala. • Implemented Google Maps API for storing precise address also to track distance of mess from users locality. • Implemented Razorpay Payment method for payment.
Housing Price Prediction (Kaggle competion)	A Machine learning Project for prediction of house sale prices for given dataset **Description :** • Performed Data Wrangling task such as updated null values, perform correlation check, normalize the data. • Performed hot encoding of the data for converting categorical data to numerical data. • Applied various cross validation techniques and by splitting the data into training set and testing set. • Applied Linear Regression Model for sale price prediction • Also implemented Neural Network for sale price prediction. • Evaluation was done on Root Mean Squared Value (RMSE) and Neural Network performed better than linear Regression with RMSE of 0.005
Today's Meal	Implemented same on Angular

Thankyou