LearnLocal

Final Report

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Declaration

I declare that the work which follows is my own, and that any quotations from any sources (e.g. books, journals, the internet) are clearly identified as such by the use of 'single quotation marks,' for shorter excerpt and identified italics for longer quotations. All quotations and paraphrases are accompanied by (author, date) in the text and a fuller citation is the bibliography. I have not submitted the work represented in this report in any other course of study leading to an academic award.

Signature of Student:

Rodrigo Machado da Silva

Date: 02/04/2023

Contents

Contents

Table of Figures

1. Abstract

LearnLocal is a platform designed to facilitate connections between users seeking to share and acquire knowledge and skills within their local communities.
The platform aims to empower users to discover new skills, pursue personal growth and cultivate meaningful relationships with like-minded individuals.
With its commitment to encourage a culture of continuous learning, LearnLocal wants to redefine the way communities come together to share, learn and grow.

2. Introduction

2.1. Backstory

I often catch myself wondering how much better our society could be if we all could share our knowledge and skills with our community. How small contributions to the community could influence and change the life of many people. Growing up in a big city, I always admired the variety of skills and talents around us, but never really knew how to access those skills. However, these talents often remained hidden, and the notion of creating an online space to share them intrigued me. There is where the LearnLocal initiative comes from.

2.2. Issue Identification

Communities are reservoirs of diverse skills, but often, these talents go unnoticed. LearnLocal aims to bridge this gap by providing a platform for individuals to share their expertise. While there's an abundance of knowledge out there, accessing it within a community can be challenging.

In today's digital age, the increase of online learning platforms and patterns of acquiring new skills has created a disconnected experience. People are eager to learn, but finding local experts or accessing community-driven knowledge becomes extremely difficult.

2.3. Proposed Solution

LearnLocal proposes a solution where community members can showcase and share their skills. This concept extends beyond traditional learning platforms,

emphasizing a community-centric approach. By creating a space where people can connect for local skill-sharing, LearnLocal aims to encourage a sense of togetherness and make the most of the expertise within a community.

The proposed solution is a Web App, accessible through web browsers and installable on various devices.

3. Project Scope

The project scope includes a range of features to provide users with an engaging experience while being part of or organizing learning events.

User Registration and Authentication

The platform allows users to register for an account using their email address and password. After registration, users can log in to access the platform's features securely. User authentication is implemented to ensure User accounts and data are secure.

Profile Management

Registered users have the ability to manage their profiles by updating their personal information, such as name, profile picture and bio. This feature enables users to customize their profiles and provide relevant information to other users within the community.

User Discovery

Users can find and connect with other users by searching for specific names or browsing through suggested profiles. They have the option to follow or unfollow other users to receive updates on their posts.

Interaction and Engagement

Users can create and interact with posts, through likes and comments, to engage with other users and share information or insights related to learning

topics. This feature promotes community interaction and encourages a sense of belonging and collaboration among users.

Group Creation

User can create or join groups based on geographic locations. The users in those neighborhoods or communities can join the groups and create events related to the skills they want to share, organize meetings and learn collaboratively.
In the future, Group administrators will be able to manage group membership and events creation.

Event Creation and Management

Users can create learning events based on their interests, expertise or local community needs. Event organizers have the flexibility to define event details, such as title, description, date, time, location and any additional information. They can also manage event attendance, accept or reject participant requests.

Event Discovery and Participation

The platform offers users the opportunity to discover and participate in the learning events hosted by others in their community.

Search Functionality

The search functionality allows users to find other users, groups and events.

4. Security Measures

4.1. Secure Verification Methods

Utilize advanced and secure methods for admin and user verification, prioritizing data protection. Implement encryption and secure channels to safeguard sensitive information.

4.2. Privacy Controls

Incorporate privacy controls to empower users, allowing them to manage the visibility of personal information within local hubs.

5. Investigation and Analysis

5.1 Project tools

The tools I picked for this project were decided by looking at the tools used in the modules of this course and the repositories available in the internet that offered the basic project's structure. I've checked what tools from the course lectures could be used in this project and still could be a good fit for LearnLocal. It made sense to use tools I was already familiar with from the lectures.
On top of that, I chose a repository called "Instagram Clone", developed by burakorkmez and found at https://github.com/burakorkmez/instagram-clone, to be used as base for this project.

Initial Tech Choices

- React
- Chakra
- Vit
- Zustand
- Firebase (Auth + Database + Storage)

Front-End

React:

'React, a JavaScript library, is used for building user interfaces.' (koenig-solutions.com, n.d.) It's user-friendly and simplifies the creation of dynamic web

applications. 'React allows developers to create reusable UI components, making it easier to manage the different parts of the application' such as homepage, listings, profiles, messaging, etc. (Zhr, 2023)

Other front-end technologies like Angular and Vue have their merits, but React is widely adopted, making it a sensible choice for LearnLocal.

In the case of LearnLocal, React will be used to create the frontend or the user interface of the platform.

One benefit of React is that it helps to make the platform interactive and dynamic. For example, if the user comments in a post or click on an event, React can quickly update the platform to show the new information without having to reload the entire page.

Other parts of the frontend implementation for the LearnLocal project are Vite, Chakra UI, and Zustand, each serving a specific purpose and working together to create a seamless user experience.

Vite is a utility-first CSS framework built for React. Vite provides a set of pre-designed, responsive components and styles that can be easily customized to match the design requirements of LearnLocal. By leveraging Vit, developers can rapidly prototype and implement UI components without worrying much about CSS styling. This accelerates the development process and ensures consistency across the platform.

Chakra UI complements Vite by offering a collection of accessible and customizable UI components for React applications. It focuses on providing a good developer experience by enabling them to create interfaces with minimal effort. Chakra UI's design system, combined with its support for theme customization and responsive layouts, empowers developers to build visually stunning and user-friendly interfaces for LearnLocal.

Finally, Zustand comes into play as a lightweight state management solution for React applications. Zustand simplifies state management by offering a simple

and intuitive API for defining, updating, and accessing application state. By centralizing the state logic within Zustand stores, developers can ensure data consistency and streamline the flow of information across different components of the LearnLocal platform.

In the context of LearnLocal, React serves as the primary framework for building the frontend components, while Vit and Chakra UI provide the necessary styling and UI components to create a visually appealing and responsive user interface. Zustand handles the management of application state, ensuring that data is efficiently shared and updated across the platform.

So, imagine LearnLocal as a puzzle and React as the box of puzzle pieces. Each puzzle piece represents a part of the LearnLocal platform i.e. homepage, user profiles, groups, posts, etc.

I intend to take these puzzle pieces and put them together to build the platform, and hopefully, be able to reuse a few of those pieces or components in different parts of the project.
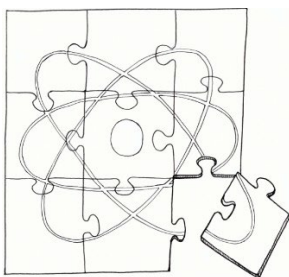

Figure 2 - React puzzle (DevinDetails.com, n.d.)

Basically, in this project, React is going to work as the glue that keeps the platform parts or the "puzzle" together.

Vite and Chakra UI provide the colors, shapes, and designs for these puzzle pieces, making them visually appealing and cohesive.

Zustand, on the other hand, ensures that all the puzzle pieces fit together seamlessly by managing the flow of data and maintaining application state.

The combination of React, Vite, Chakra UI, and Zustand creates a modern, interactive, and user-friendly platform for LearnLocal. By leveraging these technologies together, developers can efficiently build and maintain a robust frontend architecture that meets the needs and expectations of users.

Back-End

Firebase

Firebase is a google platform for building mobile and web applications. In this project Firebase will be used for Authentication, Realtime Database and Storage, to ensure smooth user authentication, data storage, and image hosting.

Authentication: Firebase authentication will be used to handle user authentication, allowing users to sign up, log in and manage their accounts. By integrating Firebase Authentication into the LearnLocal project, users can access the platform securely, ensuring that their personal information remains protected.

Real-time Database: Firebase Realtime Database is another key component of the LearnLocal backend, providing a NoSQL cloud database solution for storing and synchronizing data in real time. Firebase Realtime Database allows developers to store structured data and sync it across multiple clients in real time, enabling collaborative and interactive experiences for users. In the context of LearnLocal, Realtime Database is utilized to store user profiles, groups, posts, comments, and other application data. This ensures that users have access to up-to-date information and enables seamless communication and collaboration within the platform.

Cloud Storage: Firebase Cloud Storage, offered by Firebase, addresses the need for secure file uploads and downloads, making it an ideal solution for storing user-generated content such as profile pictures, post images, and other multimedia assets. Firebase Cloud Storage provides a scalable and reliable storage infrastructure, allowing developers to store and retrieve files with ease. By leveraging Cloud Storage, LearnLocal can securely host and manage user-

generated content, enhancing the overall user experience and enabling rich media interactions within the platform.

Integration

Figure 3 - Firebase and React Integration (Yonathan, 2017)

The frontend, developed in React, will communicate with the backend, Firebase services, through the Firebase JavaScript SDK, which provides a set of APIs for interacting with Firebase services. For example, when a user signs up or logs in to LearnLocal, React will make a request to Firebase Authentication to handle the authentication process securely.

Similarly, when a user creates a new group or comment in a post, React will use Firebase Realtime DB to store the data and make it available to other users in real time.

To summarize, Firebase plays a crucial role in the LearnLocal project, providing robust authentication, data storage, and file hosting capabilities. By integrating Firebase services into the project's architecture, LearnLocal ensures smooth user interactions, real-time data synchronization, and secure storage of user-generated content. This seamless integration of Firebase with React frontend builds a scalable, interactive, and user-friendly platform for LearnLocal users.

Deployment

Once the frontend and backend were running and working together, the application was deployed to Vercel.

Deploying the LearnLocal application on Vercel is a crucial step in bringing the project to life and making it accessible to users worldwide. Vercel, a popular

platform for hosting and deploying web applications, offers a seamless and efficient deployment process, enabling developers to deploy their projects with ease. Let's delve into the deployment process of LearnLocal on Vercel and explore the key steps involved.

Setting Up Vercel Account: Before deploying LearnLocal on Vercel, I had to create an account on the Vercel platform. Signing up for a Vercel account is straightforward and can be done through the Vercel website. Once the account is created, I could access the Vercel dashboard, where I can manage projects and deployments.

Connecting GitHub Repository: LearnLocal's codebase was hosted on GitHub control system. To deploy the application on Vercel, I connected the GitHub repository containing the LearnLocal project to the Vercel account. This connection enables Vercel to automatically fetch the latest changes from the GitHub repository and deploy the application accordingly.

Configuring Deployment Settings: Usually, before initiating the deployment process, we configure various deployment settings in the Vercel dashboard. These settings include specifying the branch to be deployed, defining environment variables, setting up custom domains, and configuring deployment triggers. By customizing these settings, we can ensure that the deployment process aligns with the requirements of the project. In the case of LearnLocal, I've used the standard configuration.

Initiating Deployment: With the GitHub repository connected and deployment settings configured, I started the deployment process on Vercel. This can be done directly from the Vercel dashboard with a simple click of a button. Upon initiating the deployment, Vercel begins fetching the latest code from the connected GitHub repository and building the LearnLocal application.

Building and Packaging: During the deployment process, Vercel automatically builds and packages the LearnLocal application based on the specifications defined in the project's configuration files. This includes installing dependencies, compiling source code, and optimizing assets for production. Vercel's build

process ensures that the deployed application is optimized for performance and scalability.

Deployment Status and Logs: Throughout the deployment process, we could monitor the deployment status and view detailed logs in the Vercel dashboard. This allows us to track the progress of the deployment, identify any errors or warnings encountered during the build process, and troubleshoot issues as needed. Vercel provides real-time feedback on the deployment status, helping us to ensure a smooth and successful deployment.

Deployment Completion and Verification: Once the deployment process is complete, Vercel gives a unique deployment URL where the LearnLocal application is hosted. I accessed this URL to verify that the application has been deployed successfully and is functioning as expected. Vercel also offers built-in preview functionality, allowing developers to preview the deployed application in various environments before making it live.

Continuous Deployment and Updates: With Vercel's continuous deployment capabilities, I can set up automatic deployments triggered by changes pushed to the connected GitHub repository.
This ensures that the LearnLocal application is always up-to-date with the latest changes and enhancements. We can focus on improving the application, knowing that Vercel will handle the deployment process properly.

Deploying the LearnLocal application on Vercel is a streamlined process facilitated by Vercel's powerful deployment platform. By connecting the GitHub repository, configuring deployment settings, and initiating the deployment process, anyone can deploy the application with ease. Vercel's build and packaging process, deployment status monitoring, and continuous deployment capabilities ensure a smooth and efficient deployment experience for LearnLocal, making the application accessible to users worldwide.

Project Data:

All data used in this project is test/dummy data created for this purpose.

6.   Navigating the Learning World

I went exploring online to see if there's a nice place where people can swap skills in their local communities, like LearnLocal dreams to be. Turns out, I found Skill Swap, that is a mobile app that connects people seeking to share and acquire skills.

Both, LearnLocal and Skill Swap, facilitate skill sharing but they have different features and focuses.

LearnLocal
Focuses on providing a pla1orm for local communities to share skills and knowledge.
Allows users to create events related to the skills they want to share, which others can browse and join.
Provides a space for arranging in-person or virtual skill sharing sessions.
Aims to build stronger local communi4es by encouraging knowledge exchange and collaboration.

Skill Swap
Focuses specifically on swapping skills and services between users.
Users can list the skills or services they offer and what they expect in return.
Facilitate the exchange between users where they negotiate the swap.
Not focused on building community connections.

Another find was Neighbourhood Network (https://neighbourhoodnetwork.ie/), a hub for local connections.

But here's the thing – the swap idea is like a superhero with many identities. LearnLocal was created for skills exchange but could be used for other cool knowledge swaps too.

7.   Feature Comparison

Feature	LearnLocal	Skill Swap	Neighbourhood Network
User Registration	✓	✓	✓
Events Creation	✓	✓	✓
Swapping Functionality	✓	✓	X

Chat Functionality	✓	✓	✓
Forum	X	X	✓
User Ratings	X	✓	✓
Project To-Do List	X	✓	X
Requesting Services	X	✓	✓

LearnLocal buddies up with Skill Swap and Neighbourhood Network with the basics – user registration and events creation.

 LearnLocal is all about making learning a cool, community thing.

8. Planning - Agile

Using Agile methodology in the process of building LearnLocal involves breaking down the project into smaller, manageable tasks and iterating on them in short cycles or manageable sprints, sculpting the vision incrementally. Agile allows flexibility and adaptation as the project progresses.

8.1. Agile Implementation

First step in this project is to create a list of all the features, functionalities and tasks required for LearnLocal. This list is going to be used as the Product Backlog, which will continuously evolve throughout the project.

Next step is to define and prioritize user stories as they represent specific functionalities or features from the perspective of end-users.

Following step is to plan sprints dividing the development timeline into short iterations.

Based on the sprints created previously, manage project's progress and challenges.

8.2. Utilizing Jira

In this project I am going to use Jira to create and manage tasks as well as track progress.

'JIRA is an issue management platform that allows teams to easily manage their issues throughout their entire lifecycle. It is highly customizable and can be tailored to fit any workflow needed. It is primarily used in software development to manage and track development efforts.' (Robinson, n.d.)

Jira is going to be used to break down the work into smaller tasks like writing code, testing and fixing issues. These tasks will be grouped into sprints, which are short periods of work, lasting in this case 2 weeks each. Each sprint will have its own set of tasks to focus on. That will help me staying organized and continue to make steady progress on the project.

8.3. Sprints Breakdown

In this section, I am going to break down the development process for this project into manageable two week sprints. Each sprint will focus on specific tasks and activities aimed at achieving key milestones in the project timeline. By organizing the work in sprints, it's easier to maintain focus, adapt to changes and progress towards launching LearnLocal.

Sprint	Dates	Tasks
1	Jan 21st, 2024 - Feb 03rd	• Set up the project repository on GitHub: Create a central location to store project files. • Create wireframes for user interface: Sketch out the layout and design of the application's screens. • Research React components for frontend development: Explore components for building the user interface. • Define database schema for Firebase integration: Plan the structure of the database to store user and listing data. • Initial setup of Firebase project: Create a Firebase project to integrate authentication, database and storage services.

2	Feb 04th – Feb 17th	• Implement user authentication with Firebase: Allow users to register and log in securely. • Develop the landing page and user registration form: Create the initial interface for users to access and sign up for the platform. • Design database structure for storing user data: Define how user information will be organized and stored in the Firebase database. • Begin development of the groups creation feature: Lay the foundation for core functionalities of the platform.
3	Feb 18th - Mar 02nd	• Complete core features development: Implement essential features such as creating user profiles, browsing groups, etc. • Test user registration and authentication: Ensure that the registration and login processes work smoothly and securely. • Begin work on community engagement features: Start developing features to encourage user interaction and collaboration within the platform.
4	Mar 03rd - Mar 16th	• Enhance user experience: Improve user interface design and usability. • Implement additional functionalities: Add features such as post, comments and events creation to enhance the platform. • Conduct user testing: Gather feedback from users to identify and address any usability issues or bugs. • Begin work on advanced features: Start planning and development of more advanced features.
5	Mar 17th - Mar 31st	• Finalize advanced feature development: Complete the implementation of advanced features. • Test and debug: Test the platform to ensure all features are functioning correctly. • Refine user interface and user experience: Make final adjustments to the UI/UX. • Prepare for project presentation and demonstration: Prepare materials and presentation.

9. Expected Features

I've planned several features for the LearnLocal project, unfortunately, many of those features will be implemented only in future versions.

The following features have been implemented to LearnLocal project creating a Minimum Viable Product (MVP):

Register: Users sign up for an account by providing basic information such as name, email, and password. They may also have the option to sign up using their google account.

Login: Users log in to their accounts using their registered email and password or through their linked google account.

Explore User Profiles: Users can view profiles of other app users to learn more about their interests, expertise and learning goals.

Follow and Unfollow Users: Users have the option to follow or unfollow other users to stay updated on their posts and activities.

Add Posts and Comments: Users can create posts about learning topics, events or experiences. They can also comment on posts made by other users to share insights or ask questions.

Remove Own Comments and Delete Own Posts: Users have the ability to manage their own content by deleting comments they've made on posts and removing posts they've created.

Discover Learning Events and Topics: Users explore posts made by others about learning events or topics they're interested in. They can browse through posts in their feed.

Search for Users and Groups: Users can search for other users or look for groups in their location or community. This helps them connect with like-minded individuals and join relevant learning communities.

Create Groups: Users have the option to create groups based on specific locations and topics. All groups are initially public.

Join Groups: Users can join groups that align with their location and interests. Interact within Groups:
Within groups, users can create and join learning events organised by group members, as well as search for events that match with their interests.

Create Learning Event: Users can create events providing details such as the subject, date, and location (online or physical) of the event.

Request to Join Learning Events: Users within a group can request to join learning events created by other group members. They must justify why they want to join the event.

Accept or Reject Join Requests: The owner of the learning event can review and accept or reject requests from users who want to join the event. This helps ensure that participants live in the same community.

10. Future Features

In the development process of LearnLocal several features couldn't be implemented due to technical challenges or knowledge gaps. Despite these difficulties, I'll try to address these challenges in future versions of LearnLocal.

Below are the features that I intend to implement in future versions of this project:

Group Management Features

Initially, there's only 1 administrator for the full platform. The intention is to transfer that power to group administrators to efficiently manage their local hubs. Admins will be able to schedule events, highlight top contributors and customize their hub pages creating an engaging and dynamic environment.

Verification System

Implement a secure process for group admins to confirm their identity and location, building trust within the community. Admins provide details and undergo verification through trusted methods, ensuring the legitimacy of local hubs.

Community Challenges

Introduce friendly learning competitions where local hubs can actively participate and contribute. Recognize and reward groups for their engagement, promoting a sense of achievement within the LearnLocal community.

Beta Testing with Communities

Conduct beta testing with selected communities to gather valuable feedback. Adjust features based on user suggestions, ensuring a user-friendly and community-driven platform.

Educational Partnerships

Explore collaborations with local educational institutions to encourage student involvement in local hubs. Tailor special features to support student groups and enhance the learning experience.

11.   Reflection

What I Learned

In this project, I've learned a lot about building Web Apps. I found new ways to use tools like react and Chakra UI to create a nice-looking and user-friendly platform.
I also learned how to connect a new web App to Firebase, so users can sign up, log in and share information. It was exciting to see how all these pieces fit together to bring a new project to life. And even though there were many tough parts, like figuring our how to handle Groups creation, Events creation and authorization to join the events, I learned a lot along the way.
This project taught me a lot of new skills that I expect to use in my future project.

Achievements and Future Goals:

With LearnLocal, I've made big steps in building a platform that fosters community engagement and learning. Despite my basic coding skills, I created a functional application that helps people to share knowledge and facilitates meaningful interactions. During this project, I've faced many challenges and couldn't add everything I initially planned but I've laid down a strong foundation for future improvements.

Looking ahead, I hope to bring further enhancements to LearnLocal. Many of those enhancements were mentioned on the Future Features section of this document.
So, the next versions of LearnLocal will be even better with more features and possibilities for everyone to enjoy sharing and acquiring skills.

Technical Hurdles

The first technical challenges in this project was the integration of various technologies and frameworks. Combining React for the frontend, Firebase for authentication, storage, and database management, along with Chakra UI for the design system, introduced complexities in orchestrating the interactions between these components. Understanding the nuances of each technology and ensuring compatibility and optimal performance posed significant hurdles, particularly for a developer with basic skills.

Conceptual Complexity

Beyond technical intricacies, conceptual challenges also emerged during the project's development. Designing an intuitive user interface (UI) and crafting user experiences (UX) that align with the platform's objectives required careful consideration of user personas, user journeys, and accessibility principles. Balancing functionality with simplicity posed a constant struggle, as catering to diverse user needs while maintaining coherence in design demanded iterative prototyping and feedback gathering.

Conceptualizing and implementing features like group creation, event management, and user interactions necessitated a deep understanding of the platform's core functionalities and user expectations. Ensuring that these features seamlessly integrate with the existing architecture while delivering value to users posed significant conceptual hurdles.

Logistical Challenges

In addition to technical and conceptual obstacles, various logistical challenges surfaced throughout the project's lifecycle. Time management emerged as a critical concern, especially balancing project development with other commitments and deadlines. Prioritizing tasks, allocating resources effectively, and adhering to project timelines required disciplined planning and organization.

Learning Curve:

Perhaps the biggest challenge encountered was the steep learning curve associated with mastering new technologies and methodologies. Learning to navigate the intricacies of React, Firebase, Chakra UI, and other frameworks while simultaneously grappling with project requirements and deadlines posed a giant challenge. Overcoming this hurdle necessitated dedication, perseverance, and a growth mindset.

Adaptation to Change:

Lastly, the project's dynamic nature and evolving requirements presented challenges in adapting to change. As project objectives evolved, I had to revisit and revise existing code, incorporating new features, and pivoting strategies accordingly. This necessitated agility, flexibility, and resilience in responding to shifting priorities and unforeseen challenges.

In conclusion, the development of LearnLocal was not without its share of difficulties. From technical complexities and conceptual challenges to logistical hurdles and the learning curve, I've encountered several obstacles throughout the project's lifecycle. However, by approaching these challenges with determination and a growth mindset, I was able to overcome them, ultimately enriching my skills, fostering innovation and delivering an impactful platform for learning and community engagement.

12.   References

DevinDetails.com. (n.d.). *Learn React function components by building a Checkers board*. Retrieved from Dev In Details, accessed February 01, 2024, https://devindetails.com/react-function-components/

koenig-solutions.com. (n.d.). *koenig-solutions.com*. Retrieved from koenig-solutions.com, accessed February 03, 2024, https://www.koenig-solutions.com/modern-react-with-redux-training

Robinson, J. (n.d.). *What is JIRA? What is it used for?* Retrieved from quora.com, , accessed February 07, 2024, https://www.quora.com/What-is-JIRA-What-is-it-used-for#:~:text=JIRA%20is%20an%20issue%20management,manage%20and%20track%20development%20efforts.

Yonathan, M. (2017, 10 25). *Get Started with Firebase in React Native*. Retrieved from mitrais, accessed February 05, 2024, https://www.mitrais.com/news-updates/get-started-with-firebase-in-react-native/

Zhr, M. (2023, August 30). *React for dummies.* Retrieved from Medium.com, accessed February 09, 2024, https://medium.com/@monazhr/react-for-dummies-fa5a37e269c2

Sudhakar, V. (2024, 01 10). *Firebase*. Retrieved from Linkedin pulse, accessed February 11, 2024, https://www.linkedin.com/pulse/firebase-vijay-sudhakar-5hhzc

Initial Requirements for LearnLocal Web Application Development

1.   User Management

- The system shall provide user registration and login functionality for all users.
- The system shall allow users to reset their password if forgotten.
- The system shall differentiate access levels for different user types.

2.   Group Management

- The system shall allow users to create learning groups and join existing ones.
- The system shall enable users to browse and search for groups based on interests, topics, or location.
- The system shall allow group owners to manage group settings, members, and events.

3.   Event Management

- The system shall enable group owners to create learning events within groups.
- The system shall allow users to search for events based on keywords, location, or date.
- The system shall provide event details including date, time, location, description, and attendee list.

4.   Interaction Features

- The system shall allow users to interact within groups and events through comments and discussions.

- The system shall enable users to like and share posts, events, and group content.
- The system shall provide real-time notifications for new posts, comments, and event updates.

5.   Admin Management

- The system shall include an admin dashboard for site administrators to manage users, groups, and events.
- The system shall allow admins to moderate group content, remove inappropriate posts or comments, and suspend users if necessary.
- The system shall provide analytics and reports on user activity, group engagement, and event participation.

6.   Security

- The system shall implement robust security measures to protect user data and prevent unauthorized access.
- The system shall use encryption for sensitive data transmission and storage, such as user credentials and personal information.
- The system shall enforce access controls to ensure only authorized users can perform specific actions and access certain features.

7.   Scalability and Performance

- The system shall be designed to handle a large number of users, groups, and events.
- The system shall optimize performance to ensure fast page loading and responsiveness.
- The system shall be scalable to accommodate increasing user activity, new features, and future growth.

Normal Use Cases for LearnLocal Web Application:

1.   User Registration:

- Users, including learners and teachers, can register to use the system.
- Users that want to be part of events need to provide personal details like name, email address and password.
- Users who want to share their skills need to provide personal details and details about the subjects they can teach.

2.   User Login:

- Users can log in to the system using their registered email address and password.
- Browse Groups and Events:
- Users can browse all available learning groups and events.
- Users can filter groups and events based on categories or search using keywords.

3.   Join Groups and Events:

- Users can request to join learning groups or enroll in events they are interested in.
- Group owners or event organizers can accept or reject user requests.

4.   Create Groups and Events:

- Teachers or community organizers can create new learning groups.
- Teachers or organizers can schedule and create events within groups.

5.   Participate in Groups and Events:

- Users can participate in group discussions, share resources, and collaborate with other members.
- Users can attend events, participate in workshops, and engage in learning activities.

6. Interact with Community:

- Users can like, comment, and share posts within groups and events.
- Users can follow other members and receive updates on their activities.

7. Administrator Functions:

- Administrators can manage users, groups, and events in the system.
- Administrators can moderate content, remove inappropriate posts or comments, and suspend users if necessary.

This section specifies the requirements for the LearnLocal web application, which facilitates community-based learning by connecting users who want to share their skills with users that want to acquire new skills. The system allows users to discover, join, and create learning groups and events tailored to their interests and needs.
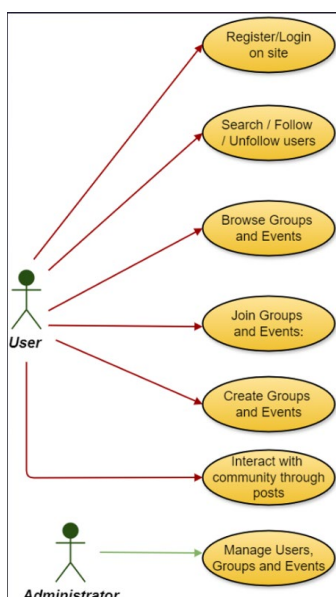
In this diagram:

User Actions represent the actions that users can perform within the LearnLocal app, such as registration, login, browsing, joining groups/events, creating groups/events, participating in activities, and interacting with the community.

Administrator Actions represent actions that administrators can perform, such as managing users, groups, and events, as well as moderating content.

Database Actions represent interactions with the database to store and retrieve user data, group/event information, and other relevant data.

Please note that this diagram provides a high-level overview of the main use cases in the system. Depending on the complexity of the application, additional use cases and interactions may need to be considered.

Misuse case

1.   Event Manipulation: An individual, whether an attendee or event organizer, attempts to manipulate the event process by creating multiple user accounts to artificially increase the number of attendees or disrupt the event's integrity by preventing genuine participants from joining.

2.   False Group / Event: An individual, either an event organizer or a malicious user, creates a false event for an event that does not exist or is not intended to occur, or that misrepresents the details provided in the listing, misleading potential attendees.

3.   Code Injection: A malicious actor exploits vulnerabilities in the LearnLocal web application to inject harmful code, such as JavaScript or SQL, into the web pages accessed by users. This injected code may be used to steal sensitive information, compromise user accounts, or disrupt the functionality of the platform.

4.   Denial of Service (DoS): An attacker overwhelms the LearnLocal platform with an excessive volume of traffic or requests, rendering it unavailable to legitimate users and disrupting the normal operation of the platform.

5.   Data Breach: An unauthorized individual gains access to the LearnLocal platform and exfiltrates sensitive user data, including personal information, event details, compromising the privacy and security of users.

6.   Account Compromise: An attacker gains unauthorized access to a user's LearnLocal account, either through password guessing or stolen credentials, and exploits the compromised account to engage in fraudulent activities, such as creating false events or manipulating event attendance.

7.   Insider Threat: An individual with authorized access to the LearnLocal platform misuses their privileges to steal data or disrupt the platform's

operations, posing a threat to the system's integrity and the safety of its users.
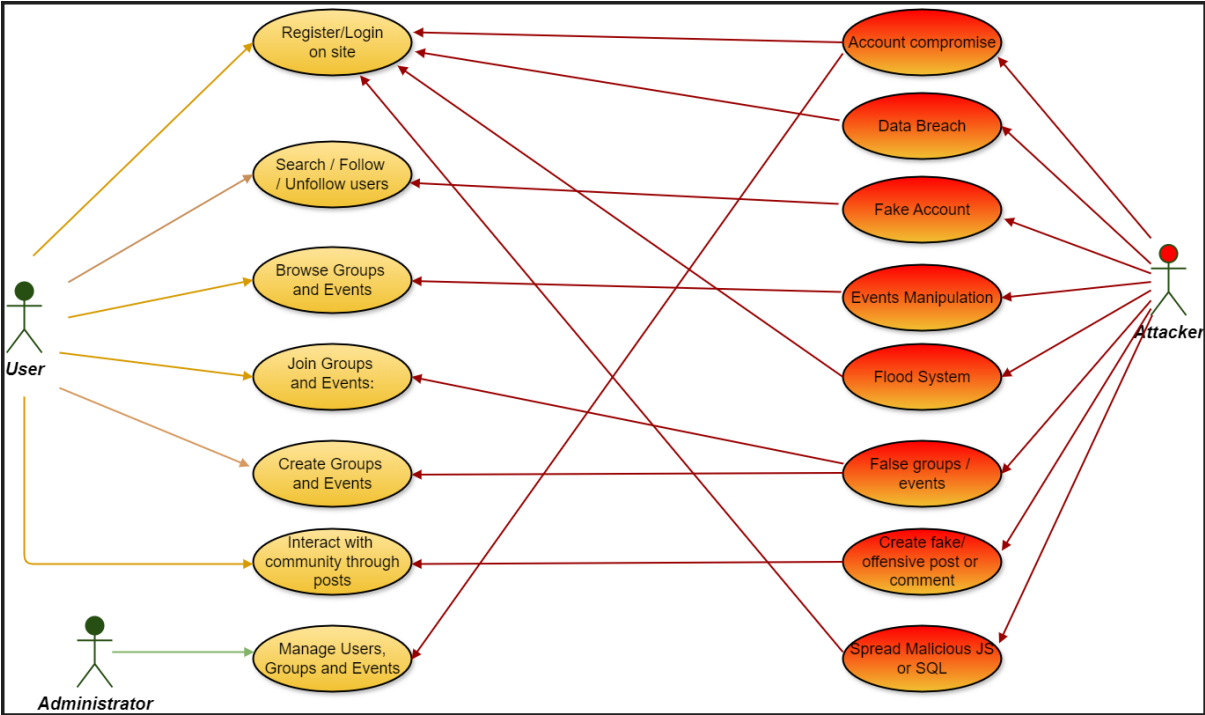
Below are the augmented requirements and use cases tailored for the LearnLocal platform to mitigate the identified threats:

Augmented Use Cases:

1.   User Registration:

- Implement robust password policies and ensure the uniqueness of usernames to fortify user authentication.
- Enforce multi-factor authentication for actions involving sensitive data or high-value transactions.

2.   User Authentication:

- Authenticate users securely using strong encryption protocols and MFA mechanisms.
- Enforce access controls to restrict unauthorized users from accessing sensitive functionalities.

3.   Event Creation:

- Allow only authorized users to create learning events.
- Implement Role-based access control (RBAC) to assign appropriate permissions to event organizers and participants.

4.   Event Participation:

- Enable users to join learning events only after authentication and authorization checks are completed.
- Monitor user activities within groups to detect any suspicious behavior or violations of community guidelines.

5.   Data Transmission:

- Secure all data transmissions using encryption protocols to prevent interception or tampering by malicious entities.
- Validate and sanitize user inputs to mitigate the risk of injection attacks and data manipulation.

6.   Logging and Monitoring:

- Log all user interactions and system activities to facilitate auditing and incident response procedures.
- Set up real-time monitoring systems to detect and respond to security threats promptly.

By integrating these measures into the LearnLocal platform, we aim to enhance its security posture and mitigate potential risks associated with misuse cases.
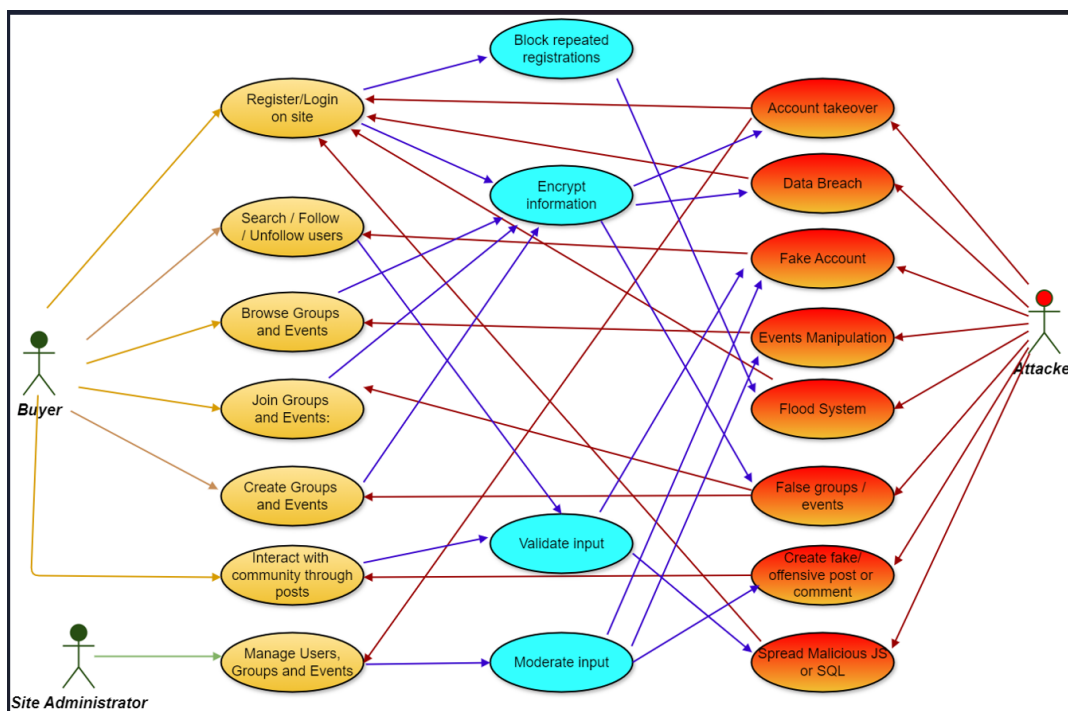
In this diagram, each block represents an augmented requirement for the LearnLocal platform. These requirements are interconnected to form a

comprehensive security framework aimed at mitigating potential threats and vulnerabilities.

Vercel:
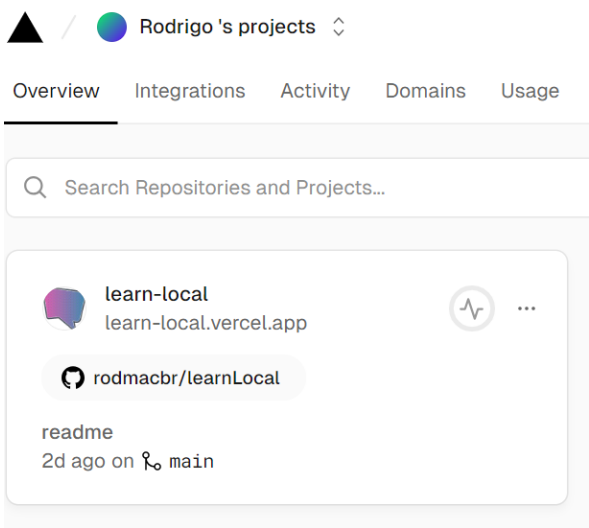
LearnLocal login page:

LearnLocal Initial Page
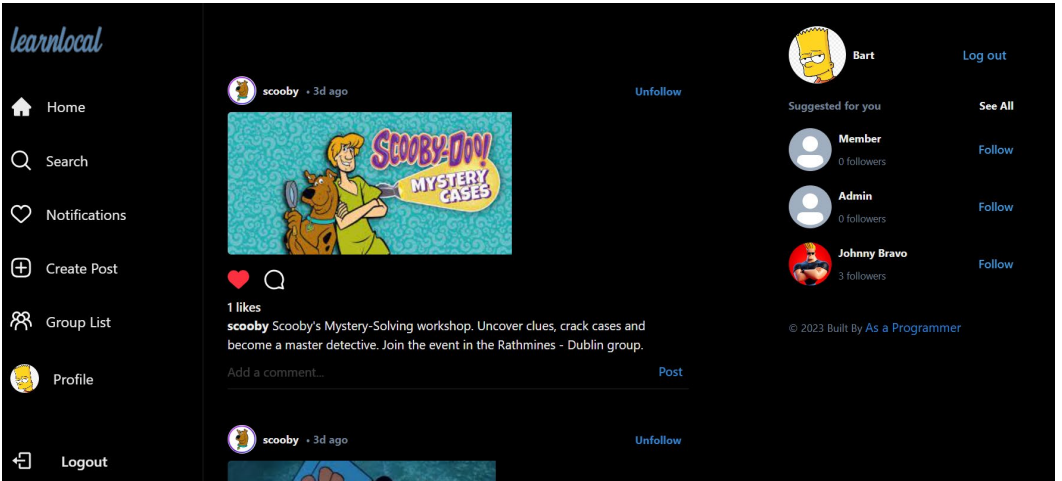
Profile Page

Search User

Create Post

List of Groups

List of Events

Create Group

Create Event

Follow or Unfollow user

Comments
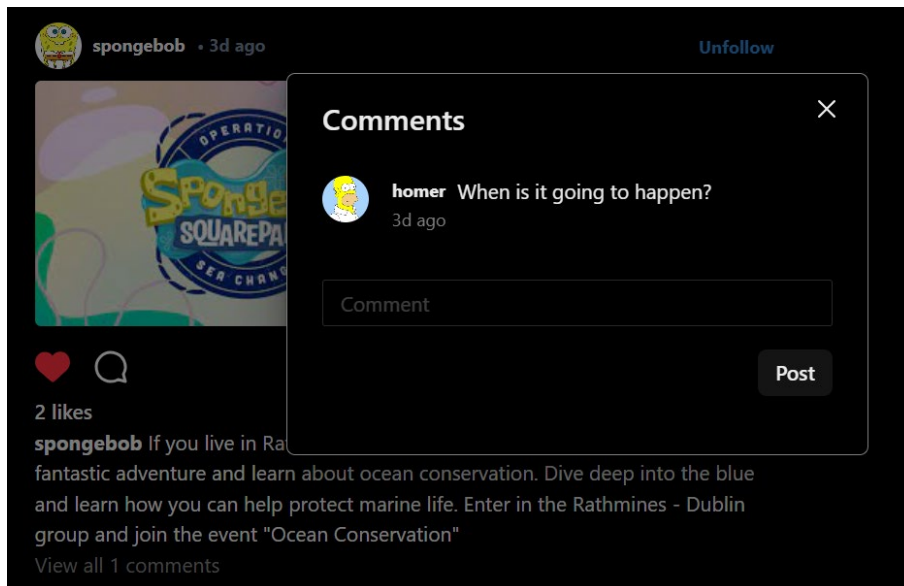
This Ethics Checklist must be completed for all final year undergraduate, taught postgraduate and research projects in the School of Science and Computing.

View your response(s)

🖶 Respondent: **Rodrigo Machado da Silva** (Group: CM-HDIPCS) Submitted on: Saturday, 25 November 2023, 5:27 PM

Ethics Checklist for Undergraduate, Taught Postgraduate and Research Projects in the School of Science and Computing

All students in the School of Science and Computing who are either (1) in the final year of an undergraduate/BSc degree, or (2) on a taught postgraduate/MSc programme **must complete this Ethics Checklist before conducting their project** regardless of the project type or discipline. The Checklist should also be completed by anyone (whether staff member or student) conducting a **research project** (whether programmatic or not) within the School.

The purpose of this Ethics Checklist is to **identify projects that will require formal ethical approval** from the School Research Ethics Committee, or the SETU Research Ethics Committee, before they can proceed.

Students/applicants should note that this Ethics Checklist is a **formal declaration**, and great care must be taken to **answer all questions accurately**. Students should consult with their project supervisors/advisors regarding any aspects or questions that they are unsure of before completing and submitting the Ethics Checklist.

Students/applicants must **answer all questions** presented to them until the Checklist questionnaire is completed.

Feedback Report

No human experimentation issues (UG).

No animal experimentation issues (N/A).

No issues regarding the use of human tissues.

No animal tissue or biological fluids issues.

No ionising radiation issues.

No primary data collection issues (N/A).

No underage/vulnerable people issues (UG).

?

No issues regarding existing/secondary data use (N/A).

No controversial data issues.

No issues related to the collection of rare or protected plants.

No issues regarding the use of genetically modified (GM) plant material.

Instructions:

1. If the above feedback is **entirely green** then, based on your answers, there is **no need to apply for ethical approval** for your project.
2. If **any** part of the above feedback is **yellow/amber**, then there is at least one issue with your project that needs to be reviewed and **you must apply for ethical approval** to continue your project.
3. If **any** part of the above feedback is **red** then there is a serious ethical issue and **you cannot continue your project** as currently planned.

It is recommended that you print this Feedback Report to a PDF file for your records. You should also forward and discuss this Feedback Report PDF with your project supervisor. They will be able to advise if you have any further questions or if you need to apply for ethical approval.

1 * Are you a student on a **final year undergraduate** programme, a **taught postgraduate** programme, or are you conducting a **research project**?

- ◉ Final Year Undergraduate
- ○ Taught Postgraduate
- ○ Postgraduate Research Project
- ○ Other Research Project

2 * What is the **working title** of your project?

LearnLocal: Community Skill Sharing Platform

3 * Who are the project **supervisors/advisors/principal investigators**?

Colm Dunphy / TBC

4 * Does your project involve **human experimentation**?

○ Yes ◉ No

5 * Does your project involve **live animal experimentation**?

○ Yes ◉ No

(6) * Is the planned animal experimentation limited to **non-invasive procedures only** (such as feeding, weighing, or taking naturally voided faecal or hair samples), and does **not** involve any invasive procedures (such as taking rectal faecal samples or blood) from live animals?

○ Yes ○ No

7 * Does your project involve the use of **human** remains/cadavers/tissues/cells/biological fluids/embryos/foetuses?

○ Yes ◉ No

(8) * Do you intend to only use established **commercial human cell lines**, and no other **human** remains/cadavers/tissues/cells/biological fluids/embryos/foetuses in your project?

○ Yes   ○ No

9 * Does your project involve the use of **animal cells, tissues** or **biological fluids**?

○ Yes   ◉ No

(10) * Do you intend to only use (1) **established commercial animal cell lines**, or (2) **slaughterhouse–derived tissues/fluids**, or (3) **fluids collected as part of routine animal husbandry** (e.g. milk) and no other animal tissues or biological fluids in your project?

○ Yes   ○ No

11 * Does your project involve the **collection of rare or protected plants**?

○ Yes   ◉ No

12 * Does your project involve the generation or use of **genetically modified (GM) plant material**?

○ Yes   ◉ No

(13) * Do you agree to (1) only use **established genetically modified (GM) plant cell lines, seeds, or plant products** in your project, (2) **not generate new plant mutations** using chemical or other means, and (3) follow specified SETU **containment and use protocols** for GM plant materials at all times?

○ Yes   ○ No

14 * Does your project involve the use of **ionising radiation**? (e.g. use of gamma ray spectrometry)

○ Yes   ◉ No

(15) * Do you agree to carefully **follow the instructions** of the SETU designated **Radiation Protection Officer (RPO)**, and **adhere to all legal requirements** as set out in the Radiological Protection Act 1991 (Ionising Radiation) Regulations ([2019](#)), regarding the use of ionising radiation materials and equipment?

○ Yes   ○ No

16 * Does your project involve the **collection of any new (or primary) data** from **individual people or groups**?

○ Yes   ◉ No

(17) * Does your project involve the **collection of any new (or primary) individual or group data** that is **personally or uniquely identifying**? (e.g. data about people or organisations/companies/groups that could be used to identify those individuals or groups; data collection might take any form, including internet and social media data, etc.)

○ Yes   ○ No

(18) * Will you ensure that participants who you are collecting data from are provided with **fair warning** and must provide **explicit informed consent** for any data collected?

○ Yes   ○ No

(19) * Will you ensure that any project–related data collection, data storage, and data use is in **full compliance** with the **EU General Data Protection Regulation ([GDPR](#))** and the **Data Protection Act ([2018](#))**?

○ Yes   ○ No

(20) * Does any of the data that you intend to collect include **sensitive or private personal information** about individuals, or **commercially sensitive information** about organisations/companies/groups?

○ Yes   ○ No

21 * Does your project involve **persons under the age of 18 years** (i.e. minors), or **any vulnerable groups**? (e.g. prisoners, refugees, those in care, addiction service users, etc.)

○ Yes   ◉ No

22 * Does your project involve the use of **existing (or secondary) human data**? (i.e. data originally collected for another purpose)

○ Yes   ◉ No

(23) [*] Is the existing or secondary human data you intend to use either (1) **anonymous/non–personally identifying** and in the **public domain**, or (2) available with **explicit and specific informed consent or permission** for the data to be **legally** reused in the way you intend?

     ○ Yes   ○ No

(24) [*] Are any aspects of the primary/secondary data you intend to use for the project **controversial** in nature?

     ○ Yes   ○ No

25 [*] Before you submit the Ethics Checklist, you must **confirm all of the following**:

     ☑ I understand that the Ethics Checklist is a formal declaration.
     ☑ I have answered all questions on the Ethics Checklist carefully and truthfully.
     ☑ The supervisor/advisor (or principal investigator) for the project is present as the Ethics Checklist is being submitted, or they have given me explicit permission to submit it in their absence.
     ☑ I have had adequate ethics training and/or instruction prior to completing the Ethics Checklist.
     ☑ I understand, and agree to abide by, the general ethical principle of "do no harm" for this project.
     ☑ I will follow the instructions given in the Feedback Report.

26 [*] Authentication Code (ask your project supervisor/advisor for this code)

Enter Student Number: [ ]

Enter the Authentication Code below and click "Verify Code" [Verify Code]

Note: If an INVALID authentication code is used then this submission is NULL and VOID

6452