Project Title: SkillSwap Campus

A Skill-Based Exchange Platform for Students

CS 157A Sec 1, Team 16

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1 Project Description

1.1 Overview of the Project

SkillSwap Campus is a web-based platform designed to allow university students to exchange skills without the use of money. The system enables peer-to-peer learning through a structured skill-bartering model where students trade knowledge and abilities instead of making financial payments. Its primary goal is to promote collaboration, accessibility, and community engagement within the campus environment.

The motivation for this project arises from two common challenges faced by students: limited access to affordable tutoring and underutilized personal talents. Many students need academic or technical assistance but cannot afford paid services, while others possess valuable skills that could benefit their peers. SkillSwap Campus addresses this gap by providing a centralized platform where students can offer skills, request help, and participate in mutually beneficial exchanges.

The platform introduces a credit-based or hour-based exchange system, eliminating monetary transactions while ensuring fairness. A reputation-based rating and review system is incorporated to promote trust, accountability, and quality interactions among users.

Primary stakeholders include students, who serve as the main users, and administrators, who oversee system integrity and enforce guidelines. The application falls within the domains of Education Technology (EdTech) and campus community platforms.

By enabling free skill exchange, SkillSwap Campus supports resume building, networking opportunities, reputation development, and collaborative learning, ultimately strengthening the university community.

Goal

- Create a web-based platform where students exchange skills instead of money.
- Enable peer-to-peer learning and collaboration.

Motivation

- Many students need help but can’t afford tutoring.
- Students have unused talents.
- Encourages community engagement and collaborative learning.

Innovative Idea

- No monetary transactions.
- Credit-based or hour-based exchange system.
- Reputation-based trust system.
- Skill bartering instead of payments.

Stakeholders

- Students (primary users)
- Admin
- University community
- Student organizations

Application Domain

- Education Technology (EdTech)
- Campus Community Platform
- Peer Learning Systems

Benefits to Users

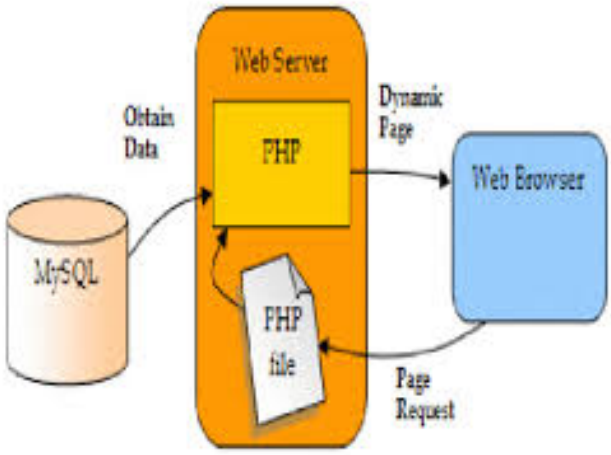
- Free skill exchange
- Build resume
- Networking
- Reputation building
- Learn new skills

2 System Environment

This section explains the technical environment.

2.1 System Architecture

SkillSwap Campus follows a three-tier client-server architecture model. This structure separates the user interface, application logic, and database management into independent layers to improve scalability, maintainability, and security.



- Presentation layer: Web interface accessed through a browser (login page, dashboard, skill search, messaging).
- Application Layer: Handles business logic, authentication, exchange processing, and credit calculation.
- Database Layer: MySQL database storing users, skills, exchanges, reviews, and messages.

2.2 Hardware / Software

Operating System: Laptop running Windows 11 or macOS
Web Server: Apache Tomcat 9.0
RDBMS: MySQL Community Server 8.0 (Relational Database), Normalized schema (3NF), Enforce referential integrity
Application Languages: Java, SQL, HTML

3 Functional Requirements

SkillSwap Campus offers several functions for its users (students and administrators), with each user group having a different level of access. Only registered university students can create accounts and participate in skill exchanges, while administrators manage and monitor the platform to ensure safety and fairness. The system is designed to allow students to trade skills instead of money, promoting collaboration and peer learning within the campus community.

In SkillSwap Campus, students are tied to individual profile pages that display the skills they offer, the skills they want to learn, their availability, and their reputation rating. Through their profile dashboard, students can manage their skills, update personal information, and track ongoing exchanges. Administrators oversee the system by monitoring activity logs, moderating reviews, and enforcing community guidelines.

3.1 Student View

Register Account

- To access the system, each student must create a unique account using a valid university email address. This requirement ensures that only verified campus members can participate.
- The registration form includes the following fields:
    - Full Name (Required)
    - University Email (Required)
    - Password (Required, encrypted upon storage)
    - Major
    - Skills Offered
    - Skills Wanted
- The system validates the university email domain and checks for duplicate accounts before completing registration. If an account with the same email already exists, the registration process will be canceled and an error message will appear.

Account Login

- Registered students can log into the system using their email and password.
- The login functionality requires:
    - Email: Verified against stored records.
    - Password: Checked against the encrypted hash stored in the database.
- After successful verification, students gain access to their personal dashboard where they can manage skills and exchanges.

Account Logout

- The system allows students to securely log out of their active session. This ensures that session data is invalidated and access to protected features is revoked.

Delete Account

- Students have the option to permanently delete their account from the platform.
- Upon confirmation, the system will:
    - Remove all associated profile information.
    - Cancel pending exchange requests.
    - Invalidate active sessions.
- This operation is irreversible and will remove the student's presence from the platform.

Manage Profile Information

- Logged-in students can update their profile information. The following fields are editable:

    - Profile Picture
    - Bio or Personal Description
    - Major
    - Availability Schedule
    - Skills Offered
    - Skills Wanted
- All updates are stored in the database upon submission and reflected in real-time across the system.

View Listed Skills

- Students can view all skills they are currently offering on a single dashboard page.
- The page displays each skill along with its category, description, experience level, and availability.

Add New Skill

- Students are able to add new skills to their public profile.
- Each skill entry must include:
    - Skill Title
    - Category (Academic, Technical, Creative, Sports, etc.)
    - Description
    - Experience Level
- Once added, the skill becomes searchable by other students on the platform.

Update Skill Information

- Students can modify details of previously listed skills.
- Any changes made will immediately update the database and be reflected in search results to ensure accurate information.

Delete Skill

- Students can remove a listed skill from their profile if they no longer wish to offer it.
- This action will remove the skill from public search results and prevent other users from requesting it.

Perform Search

- Students can enter keywords, categories, or availability preferences into the search bar to view a list of available skills offered by other students.
- Search results are displayed in an organized list format.
- The system may allow sorting by rating, availability, or relevance.

View Student Skill Profile

- After performing a search, students can click on a skill listing to view the provider's profile.
- The profile page displays:
    - Student Name
    - Skill Description
    - Availability Schedule
    - Average Rating
    - Reviews from previous exchanges

Send Skill Exchange Request

- Students can request a skill exchange by selecting a skill and proposing a return skill in exchange.
- The request form includes:
    - Selected Skill
    - Proposed Skill in Return
    - Optional Message
    - Preferred Date and Time
- Once submitted, the system stores the request and marks its status as "Pending."

Accept or Reject Exchange Request

- The recipient of a request can either accept or reject the exchange.
- If accepted, the request status changes to "Accepted."
- If rejected, the status changes to "Rejected."
- The system notifies the original sender of the decision.

Track Exchange Status

- Students can track all their exchange requests through their dashboard.
- Exchange statuses include:
    - Pending
    - Accepted
    - In Progress
    - Completed
    - Cancelled

Complete Exchange

- After both students finish their session, they must confirm completion within the system.
- Once both confirmations are received, the exchange status changes to "Completed."

Leave Review and Rating

- After an exchange is completed, students can leave a rating and written review for their partner.
- Ratings are displayed publicly and contribute to the student's overall average rating.
- The system automatically calculates the average rating using all submitted reviews.

Messaging System

- Students can send direct messages to other users for coordination and communication.
- The system stores message history and allows users to view past conversations related to exchanges.

3.2 Administrator View

View All Users

- Administrators can access a list of all registered student accounts.
- This view includes account details and activity status.

Monitor Exchange Activity

- Administrators can review logs of exchange requests and completed transactions to ensure system integrity.

Suspend or Remove User

- Administrators have the authority to suspend or permanently remove students who violate community guidelines.
- Removing a user deletes their profile and cancels active exchanges.

Moderate Reviews

- Administrators can remove inappropriate or abusive reviews to maintain a respectful campus environment.

4 Non-Functional Issues

4.1 Graphical User Interface Description

Describe each screen:

Login Page

- Email
- Password
- Login button

The login page will include fields for the user to type in the email address and the password. After entering the login info, users will be able to click on the login button, which will direct them to the dashboard page.

Dashboard

- Credit balance
- Active exchanges
- Notifications

Once a user logs in, they will be able to see their credit balance, which is the points used for skills exchange. The active exchanges are shown below the credit score. There will also be a notifications button at the top corner where users can view any updates they have received.

Skill Listing Page

- Skill title
- Description
- Rating
- Request button

On the skill listing page, the user will be able to select a skill title and see a description of what it is. Under the skill title and description, there will be a list of profiles, with ratings showing their ability level of the skill. On the side of the page, there will be a request button that allows the user to request a new skill they would like to see.

Profile Page

- Skills offered
- Skills requested
- Edit button

On each user's profile, there will be two tabs. Under the "Skills offered" tab, it will list the skills a user has to offer. Under the "Skills requested" tab, it will show the skills that the user has requested help for. There is also an edit button that allows the user to make changes to the skills offered and requested.

4.2 Security Description

- Password hashing
    - Passwords will be stored in an encrypted method to prevent leakage of sensitive data.
- Email verification
    - After creating an account, users will verify their email through a code sent to their email. This is to ensure that the email is valid and that someone isn't creating an account without their permission.
- SQL Injection prevention
    - SQL injections will be prevented by using parametrized SQL statements
- HTTPS:
    - This website protocol ensures the website traffic flow is smooth and the data travels safely.
- Input validation
    - The website will verify that the data entered is valid. It will check if a username already exists and whether the password is correct.
- Secure session management
    - The user's account will be au.tomatically logged out after 1 hour of inactivity.

4.3 Access Control

Define roles clearly:

Role	Permissions
Student	CRUD own profile, send requests
Admin	View all, delete users
Guest	Browse limited content

Use:

- Role-based access control (RBAC)
- Session-based authentication

To control access, role-based access control and session-based authentication will be used. There will be 3 roles assigned to different users: student, admin, and guest. The student is assigned to users who logged in using the student mode, who will be able to view their own profile and send requests. The admin is assigned to the developers, who will be able view all users and delete them if requested. The guest role, which is assigned to all users not logged in,

will only be able to browse limited content on the site, which includes public user profiles already created.