

**EXPERIENTIAL ENGINEERING EDUCATION /
PROJECT BASED LEARNING
REPORT
ON**

PeerPrep (An online study platform)

A Report Submitted

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1. Problem Statement:

Online group study refers to a collaborative approach to studying where individuals gather virtually, typically through videoconferencing platforms or online collaboration tools, to study together. This method allows participants to share resources, discuss concepts, ask questions, and support each other in their learning endeavor.

2. Abstract

This project focuses on developing PeerPrep, an online platform designed to help students connect with their peers through study groups. Key features include the ability to create and join public or private study groups, enabling collaborative learning. The platform also offers an invite system for users to invite others based on their usernames. A user-friendly interface allows easy navigation between group creation, joining, and interaction. PeerPrep aims to enhance student engagement by fostering subject-specific discussions and knowledge sharing. The system showcases how technology can facilitate peer collaboration and support efficient learning, providing a dynamic space for students to share resources, ask questions, and collaborate on academic goals.

Keywords:

1. Study Groups
2. Peer Collaboration
3. Online Learning
4. User Invitations
5. Group Privacy
6. Collaborative Learning

3. Objective

The objective of the PeerPrep project is to create an interactive platform that enables students to connect with peers through online study groups, promoting collaborative learning and academic success. Key goals include:

1. **Creating and Joining Study Groups:** Allow users to easily create and join public or private study groups tailored to specific subjects.
2. **Invite System:** Implement an invitation feature that lets users invite others based on usernames, enhancing group membership management.
3. **User-Friendly Interface:** Provide an intuitive, easy-to-navigate interface to enhance user experience and facilitate group interactions.
4. **Support Peer Collaboration:** Foster collaborative learning by enabling students to engage in subject-specific discussions and share resources efficiently.
5. **Privacy Management:** Offer privacy settings to ensure secure and controlled group interactions, with private groups requiring invitations for access.

4. Introduction

PeerPrep is an innovative platform designed to foster collaborative learning by enabling students to create, join, and interact within study groups. The project aims to create an engaging online environment where students can connect with their peers for academic support, resource sharing, and subject-specific discussions.

Existing System:

1. Traditional Study Groups:

- Most current platforms rely on static discussion forums and group chats that lack personalization.
- Group creation and joining are typically managed manually, and privacy controls are often limited or basic.

2. Manual Invitations:

- Invites for private study groups are usually sent manually, and users are required to share links or email addresses, which can be time-consuming and error-prone.
- Lack of efficient invitation management systems to track pending invites.

3. Limited Collaboration Features:

- Existing platforms may not fully support real-time collaboration or specialized group features.
- Users often struggle to find suitable groups based on specific academic interests or subjects.

Proposed System:

1. Dynamic Study Group Creation and Management:

- Users can create and manage study groups easily, with options to make them public or private.
- Groups can be centered around specific subjects, and members can join based on their interests.

2. Invite System Based on Usernames:

- A streamlined system for inviting users by their usernames, ensuring efficient group management.
- Private groups require invitations, and the platform supports both manual and system-generated invites.

3. Enhanced Collaboration Tools:

- Integrated tools for sharing resources, posting questions, and engaging in peer discussions, ensuring an interactive learning environment.
- Real-time notifications and updates for group members on new discussions or resource uploads.

4. Privacy Controls and User Security:

- The platform provides advanced privacy settings, with the ability to control who can join a group and how they interact with other members.
- A robust user authentication system ensures secure participation.

5. Literature Survey:

S.No	Paper title	Methodology	Advantages	Limitations
1.	Collaborative Learning: A Review of the Literature D. Johnson, R. Johnson	Literature review analyzing collaborative learning strategies across various educational contexts.	Identifies positive effects on student engagement, communication, and problem-solving skills	Limited empirical evidence in certain contexts; reliance on studies with varying methodologies.
2.	Peer Instruction: A Review and Analysis Eric Mazur	Systematic review of peer instruction strategies, especially in STEM disciplines.	Demonstrated effectiveness in enhancing student learning, promoting engagement.	Effectiveness may vary depending on the discipline and teaching environment
3.	The Impact of Peer Learning on Academic Motivation and Self-Efficacy S. Topping, D.Ehly	Meta-analysis of peer learning studies in diverse academic settings.	Shows significant improvements in academic motivation, self-efficacy, and learning outcomes.	Results are more applicable to certain subjects and may not be generalized across all fields.
4.	Exploring the Benefits of Collaborative Learning: A Literature Survey J. S. McGroarty	Comprehensive survey of the impact of collaborative learning on student outcomes.	Highlights improvements in communication, critical thinking, and problem-solving.	Limited insights into the implementation challenges and group dynamics in diverse settings.
5.	Collaboration in Online Learning Environments: A Systematic Review R. B. R. Loertscher, D. B. Schenke	Systematic review analyzing peer collaboration practices in online learning settings.	Identifies successful peer collaboration strategies for remote education.	Limited attention to individual learner differences and contextual variability.

6. Methodology

Data Collection:

- Utilize various educational resources and surveys to gather data on peer collaboration effectiveness.
- Collect user feedback on peer interactions to assess the platform's usability and effectiveness.

System Design:

- **User Registration Module:** Allow users to create profiles and specify their expertise or subjects for peer assistance.
- **Matching Algorithm:** Develop an algorithm to match users based on their expertise and requested help.
- **Collaboration Module:** Facilitate real-time communication and collaboration through chat or video conferencing features.
- **Feedback Mechanism:** Implement a system for users to provide feedback on their peer interactions and the quality of assistance received.

Development:

- Use web technologies (e.g., HTML, CSS, JavaScript) for the front-end interface and a back-end framework (e.g., Flask or Django) for server-side logic.
- Integrate real-time communication libraries (e.g., WebRTC) to support live interactions between users.
- Develop a user-friendly interface that promotes easy navigation and interaction among peers.

Testing:

- Conduct user acceptance testing to gather feedback on the platform's functionality and user experience.
- Test the matching algorithm for accuracy in connecting users with relevant peers.
- Validate the effectiveness of communication tools for collaboration, ensuring clarity and reliability in interactions.

7. Class Diagram:

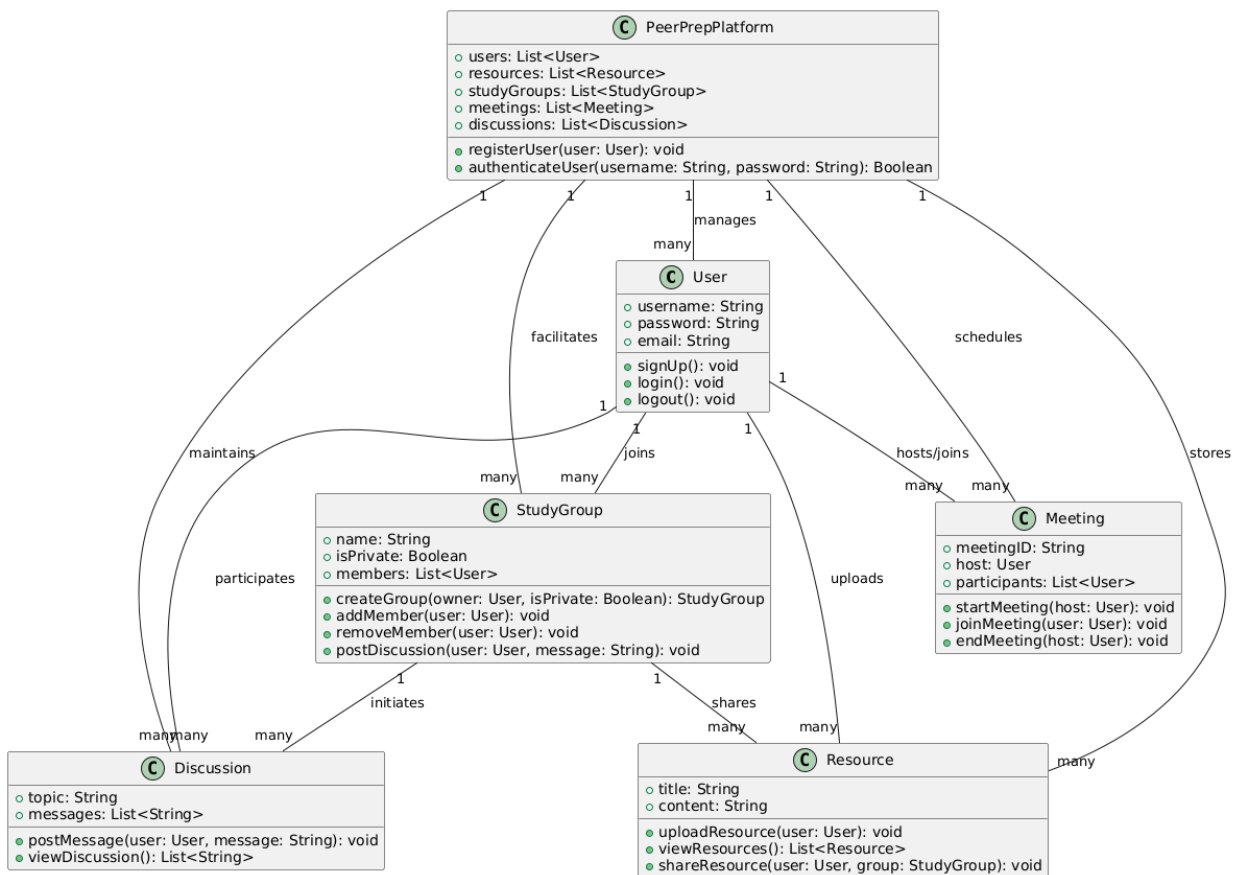


Fig 1: Class diagram for PeerPrep

8. Description Of Classes:

- **User:** Manages user authentication and profile information, including login, sign-up, and account settings.
- **ResourceManager:** Handles the uploading, sharing, and accessing of study materials among peers or groups.
- **StudyGroupManager:** Facilitates the creation and management of public and private study groups, including adding members and managing group activities.
- **MeetingManager:** Manages scheduling, starting, and joining of online meetings for collaborative study sessions.
- **DiscussionForum:** Enables users to participate in open doubt discussions, including posting questions and responding to peers.
- **Dashboard:** Acts as a central hub for navigating between features like resources, study groups, meetings, and discussions.
- **NotificationManager:** Sends notifications about group updates, resource shares, meeting schedules, or discussion activity to users.
- **Admin:** Provides administrative functionality for monitoring platform activity and managing user and group data.

9. Activity Diagram:

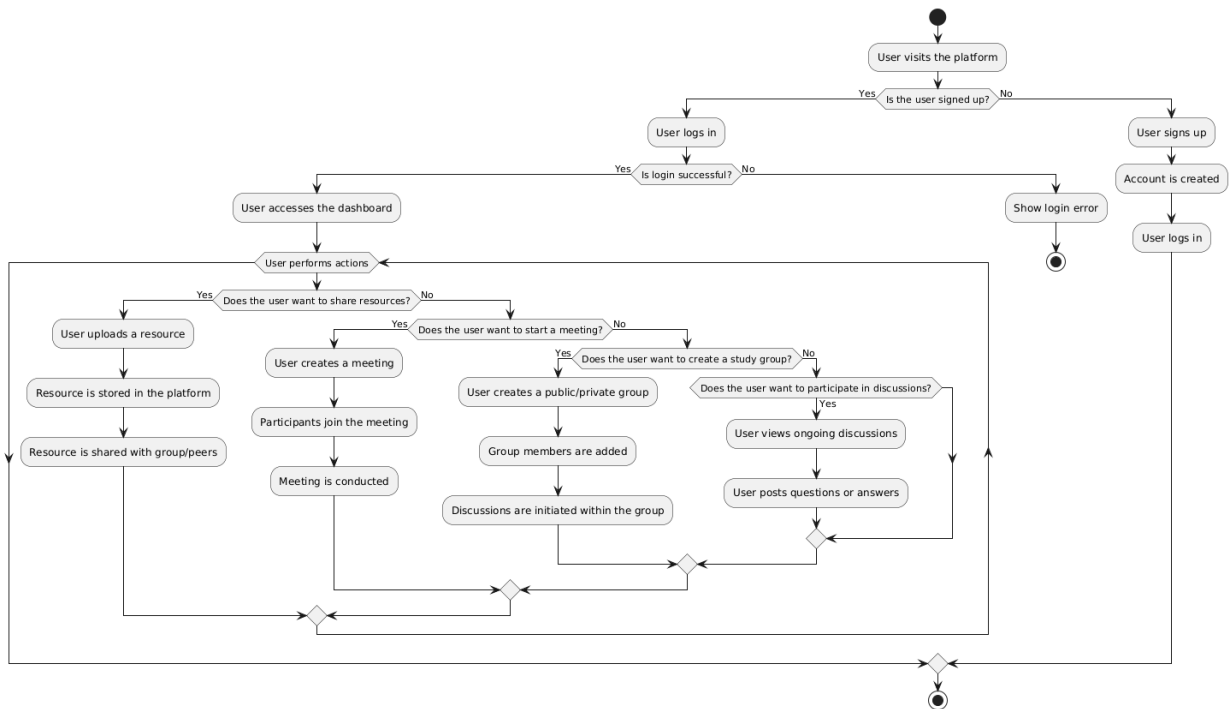


Fig 2: Activity diagram for PeerPrep

10. Description Of Activity Diagram

- **Start:** The system initializes and loads modules like login, sign-up, resource sharing, and collaboration features.
- **Login/Sign-Up:** Users either log in with existing credentials or sign up by providing the necessary details.
- **Access Dashboard:** Upon successful login, users are directed to the dashboard where they can navigate the platform's features.
- **Choose Action:** Users select an action from options like sharing resources, accessing resources, starting a study group, or participating in discussions.
- **Share or Access Resources:**
 1. If sharing, users upload a file and define its visibility
 2. If accessing, users browse or search for resources shared by peers.
- **Start or Join Study Group:**
 - a. Users create a public or private study group and invite peers, Alternatively, they join an existing group.
- **Start Online Meeting:** Users schedule and start an online meeting or join a scheduled session for collaboration.
- **Participate in Doubt Discussions:** Users post questions or contribute answers in the discussion forum.
- **Provide Feedback:** The system sends notifications or updates about completed actions via the GUI.
- **End:** The user logs out, or the system session ends.

11. Implementation:

```
<div class="container">
  <!-- Access Resources Section -->
  <h2 class="section-title">Access Resources</h2>
  <form id="access-resources-form">
    <div class="row dropdown-container">
      <div class="col-md-6">
        <label for="domain" class="form-label">Select Domain</label>
        <select class="form-select" id="domain" required>
          <option value="" hidden>Choose a Domain...</option>
          <option value="Science">Science</option>
          <option value="Maths">Maths</option>
          <option value="Humanities">Humanities</option>
          <option value="Technology">Technology</option>
          <option value="Coding">Coding</option>
        </select>
      </div>
      <div class="col-md-6">
        <label for="pdf-title" class="form-label">Search by Title</label>
        <input type="text" class="form-control" id="pdf-title" placeholder="Enter PDF title...">
      </div>
    </div>
    <button type="submit" class="btn btn-primary">Search</button>
  </form>
```

```
document.getElementById('share-resources-form').addEventListener('submit', function (e) {
  e.preventDefault();

  const shareDomain = document.getElementById('share-domain').value;
  const pdfTitle = document.getElementById('pdf-upload-title').value;
  const fileInput = document.getElementById('pdf-file').files[0];

  if (fileInput) {
    const fileURL = URL.createObjectURL(fileInput);
    const sharedResources = JSON.parse(localStorage.getItem('sharedResources')) || [];
    sharedResources.push({
      domain: shareDomain,
      title: pdfTitle,
      fileURL: fileURL
    });
    localStorage.setItem('sharedResources', JSON.stringify(sharedResources));

    alert(`Resource "${pdfTitle}" has been successfully shared!`);
    document.getElementById('share-resources-form').reset();
  } else {
    alert('Please upload a PDF file before submitting.');
```

Fig 3: Implementation of Resource Sharing/Accessing

```

<main>
  <section class="doubt-form">
    <h2>Submit a Doubt</h2>
    <form id="doubt-form">
      <label for="subject">Subject</label>
      <select id="subject" name="subject" required>
        <option value="Math">Math</option>
        <option value="Science">Science</option>
        <option value="History">History</option>
      </select>

      <label for="question">Your Question</label>
      <textarea id="question" name="question" rows="4" placeholder="Enter your question..." required></textarea>

      <button type="submit">Submit</button>
    </form>
  </section>

  <section class="submitted-doubts">
    <h2>Recent Doubts</h2>
    <ul id="doubts-list">

    </ul>
  </section>
</main>

```

```

document.addEventListener('DOMContentLoaded', function () {
  const form = document.getElementById('doubt-form');
  const doubtsList = document.getElementById('doubts-list');

  const storedDoubts = JSON.parse(localStorage.getItem('doubts')) || [];
  renderDoubts(storedDoubts);

  form.addEventListener('submit', function (event) {
    event.preventDefault();

    const subject = document.getElementById('subject').value;
    const question = document.getElementById('question').value;

    if (!question.trim()) {
      alert('Please enter a valid question!');
      return;
    }

    const doubt = {
      subject,
      question,
      timestamp: new Date().toLocaleString(),
      upvotes: 0,
      reported: false,
      comments: [],
      answers: [],
      resolved: false,
      liked: false, // Track if the doubt is liked
    };

    storedDoubts.push(doubt);
    localStorage.setItem('doubts', JSON.stringify(storedDoubts));
    renderDoubts(storedDoubts);

    form.reset();
  });

```

Fig 4: Implementation of Doubts Section

12. Result:

The screenshot shows the PeerPrep web application interface. At the top is a dark brown header with the 'PeerPrep' logo on the left and a user profile icon on the right. Below the header, the page is divided into three main sections. The first section, 'Share a Resource', contains a 'Select Domain' dropdown menu with 'Choose a Domain...' as the selected option, a 'PDF Title' input field with 'Enter PDF title...' as a placeholder, an 'Upload File' section with a 'Choose File' button and 'No file chosen' text, and a green 'Submit Resource' button. The second section, 'Search for Resources', has a 'Select Domain' dropdown menu with 'Choose a Domain...' selected, a 'Search by Title' input field with 'Enter title...' as a placeholder, and a blue 'Search' button. The third section, 'Available Resources', displays a list of resources. Each resource entry includes a 'Domain' (Coding or Maths), a 'Title' (Java Programming Lecture Notes or Discrete Mathematics Lecture Notes), and two buttons: a red 'Delete' button and a blue 'Download' button.

PeerPrep

Share a Resource

Select Domain: Choose a Domain... PDF Title: Enter PDF title...

Upload File: Choose File No file chosen

Submit Resource

Search for Resources

Select Domain: Choose a Domain... Search by Title: Enter title...

Search

Available Resources

Domain: Coding	Title: Java Programming Lecture Notes	Delete	Download
Domain: Maths	Title: Discrete Mathematics Lecture Notes	Delete	Download

Fig 5: Result of resources section when executed

The screenshot shows the 'Submit Your Doubts' web application interface. At the top is a dark brown header with the text 'Submit Your Doubts' on the left and a user profile icon on the right. Below the header, the page is divided into two main sections. The first section, 'New Doubt Submission', contains a 'Subject' dropdown menu with 'Math' selected, a 'Your Question' text area, and an 'Attach File (Optional)' section with a 'Choose File' button and 'No file chosen' text. A blue 'Submit' button is located at the bottom of this section. The second section, 'Recent Doubts', displays a list of recent doubts. Each entry includes a 'Subject' (math or history), a 'Question' (e.g., 'Can anyone tell the answer of Part 8 5th question?' or 'How many planets are present in the universe according to this chapter?'), a 'Status' (Unchecked), a blue 'View Answer' button, and a red 'Delete' button.

Submit Your Doubts

New Doubt Submission

Subject: Math

Your Question:

Attach File (Optional): Choose File No file chosen

Submit

Recent Doubts

Subject: math	Question: Can anyone tell the answer of Part 8 5th question?	Status: Unchecked	View Answer	Delete
Subject: history	Question: How many planets are present in the universe according to this chapter?	Status: Unchecked	View Answer	Delete

Fig 6: Result of doubts section when Executed


13. Conclusion:

Peer Prep effectively showcases the potential of online platforms in facilitating collaborative learning and resource sharing. By incorporating features like real-time access to shared resources, collaborative study groups, and online meetings, the system fosters a dynamic environment for peer interaction. The integration of features such as doubt discussions, resource uploads, and access management enables seamless learning and enhances the overall educational experience. This project highlights the importance of building user-centric systems that prioritize easy navigation, efficient task management, and real-time communication. With continued development, Peer Prep can evolve into a comprehensive solution for peer-assisted learning, fostering collaboration and knowledge-sharing in an interactive and accessible way.

14. Reference Pages:

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Johnson, D. W., & Johnson, R. T. (2009). Collaborative Learning and Peer Interactions in Online Education. *Educational Technology Research and Development*, 57(5), 535-552.
2. **Peer-to-Peer Learning and Collaboration: Theory and Practice**
Topping, K. J. (2005). Peer-to-Peer Learning and Collaboration: Theory and Practice. *The Journal of Educational Psychology*, 97(4), 1309-1320.
3. **Designing Collaborative Learning Systems: Insights and Experiences from Peer-to-Peer Education**
Saldaña, M., & Garcia, M. (2016). Designing Collaborative Learning Systems: Insights and Experiences from Peer-to-Peer Education. *Computers & Education*, 96, 1-14.
4. **Challenges and Benefits of Peer-to-Peer Learning in Virtual Environments**
Zimmerman, B. J. (2009). Challenges and Benefits of Peer-to-Peer Learning in Virtual Environments. *Journal of Educational Psychology*, 101(2), 471-483.
5. **Development of Interactive Educational Systems for Collaborative Learning**
Zhang, Y., & Wang, T. (2018). Development of Interactive Educational Systems for Collaborative Learning. *International Journal of Educational Technology in Higher Education*, 15(1), 1-12.
6. **The Role of Online Study Groups in Peer Learning and Knowledge Sharing**
Hwang, G. J., & Chang, S. C. (2015). The Role of Online Study Groups in Peer Learning and Knowledge Sharing. *Computers in Human Behavior*, 52, 207-217.
7. **Enhancing Peer Collaboration Through Virtual Learning Environments**
Lundeberg, M. A., & Levin, J. R. (2010). Enhancing Peer Collaboration Through Virtual Learning Environments. *Journal of Computer Assisted Learning*, 26(6), 457-467.
8. **Peer-Based Learning Platforms: A Review and Future Directions**
Kabilan, M. K., & Lai, F. (2013). Peer-Based Learning Platforms: A Review and Future Directions. *Journal of Educational Technology & Society*, 16(3), 86-98.

15. Business Canvas (IR2025-933755):

<p>Theme :</p> 	<p>Define the problem and its relevance to today's market / society / industry need:</p> <p>Most of the students often find it difficult to have access to study materials or become detached from peer support, mainly when they are enrolled in distance learning or lack physical study groups.</p> <p>Is there any IP or Patentable Component associated with the Solution?:</p> <p>NO</p>	<p>Describe the Solution / Proposed / Developed</p> <p>Online group study refers to a collaborative approach to studying where individuals gather virtually, typically through video conferencing platforms or online collaboration tools, to study together. This method allows participants to share resources, discuss concepts, ask questions, and support each other in their learning endeavors.</p>	<p>Explain the uniqueness and distinctive features of the (product / process)</p> <p>Our online group study platform stands out by offering a collaborative learning ecosystem with diverse domain coverage, interactive resources, and expert integration, fostering a dynamic community for students globally.</p> <p>Target customer segment</p> <p>Students across various educational levels (high school, college, university), educators seeking collaborative teaching tools, and professionals looking for continuous learning and skill development</p>	<p>How your proposed / developed (product / process / service) solution is different from similar kind of product by the competitors if any:</p> <p>As of now there aren't many online study group platforms, but our website covers a wide range of domains and topics, providing users with a diverse selection of educational resources and study materials.</p>
<p>Has the Solution Received any Innovation Grant/Seedfund Support?:</p>	<p>Our idea solution hadn't received any innovation grant or seed fund support.</p>	<p>Cost and revenue streams</p> <p>As the website gains popularity, Offer premium subscription plans with additional features, exclusive content, and enhanced collaboration tools. Collaborate with educational product vendors and earn through affiliate marketing.</p>		