Lab 1 - Study Buddy Description

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CS 411

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1. Introduction

Study Buddy will be an application designed to match users with study partners based on study habits and preferences. The application will aid the user in finding study buddies that will be better suited to their studying needs.

Study groups are small groups of people, usually students, that have the same goal of meeting up and learning/reviewing material for either classes or exams. There are many benefits to joining a study group. One of the most important benefits is the ability for members to share their knowledge of the subject with one another for a better understanding. Study groups are also a good way of making studying fun and entertaining because it is a social and interactive experience. Study groups help members stay motivated to study. Having multiple people all working on the same goal helps maintain focus on the task at hand.

The typical way study groups are formed is shown in Figure 1. Someone will either post in a discussion board or a forum looking for a group, then if they receive a positive response from someone, they then form a date and time to meet up. If they receive a negative response, then they have to repeat the process. Currently, few options exist for study groups that conform to either online or shy students. Study Buddy will hopefully be an application that can change this.
With the release of Study Buddy, a whole new option will become available for students, of all kinds, to find study groups. If a student is searching for a study group, all they would need to do is either create an account or log in if they are an existing user. Once in, they can enter in their classes, topics of interest, and study preferences. The system will then try and find a compatible study partner for them based on their input. Figure 2 shows the process people would go through of finding a study buddy using the Study Buddy application.
2. Study Buddy Product Description

Study Buddy will be an application that will allow anyone using a device capable of accessing the internet to find a study buddy that is compatible to their learning styles. They enter their information such as study preferences, classes, and availability. The system will then analyze the information and match them with a partner with compatible habits and preferences.

2.1. Key Product Features and Capabilities

One of most important features unique to Study Buddy is the Intelligent Buddy Matching algorithm. The Intelligent Buddy Matching system stores user study preferences inside matrices where it is analyzed and compares the similarities between other users. The score is computed by using the matrices where the user’s preferences are stored. The full equation for calculating the
score is shown below in Figure 3. The system will then assign a score based on similarities and sort the matches based on the corresponding score.

$$\cos \theta = \frac{\vec{W} \cdot \vec{C}}{||\vec{W}|| ||\vec{C}||}$$

$$= \frac{2}{\sqrt{2} \times \sqrt{3}}$$

$$= \frac{2}{\sqrt{6}}$$

$$\approx 0.8165$$

Figure 3: Intelligent Buddy Matching Algorithm

Study Buddy will include integrated collaboration tools such as Google Drive, Google Hangouts, Codeshare, Git, Slack, and Jupyter Notebook. These tools will assist users in connecting with study buddies and give them the resources necessary to maximize their studying efforts.

### 2.2. Major Components (Hardware/Software)

Study Buddy will need a few main components, the first will be a device with internet access. The user will access the application through any device with internet access such as a smartphone or computer. They will be able to use the mobile app with any smartphone device running either iOS or Android.
Study Buddy will be built on Java Server Faces (JSF). This allows for communications between the front and back end server. Study Buddy also will use JPA or Java Persistence API which will supply the mechanism for SQL query construction.

Study Buddy will use a database to store all user accounts and study preferences. Figure 4 shows how each component interacts with each other and how end users access the Study Buddy application.

Figure 4: Major Functional Components Diagram

3. Identification of Case Study

The main target for Study Buddy will be students, but anyone who wishes to further their knowledge can use it. It is especially great for online and shy students because they are the ones who rarely get to participate in study groups due to their nature.

Schools and other organizations can utilize Study Buddy. Schools can use Study Buddy to assist their students in either learning and reviewing material for classes, or preparing them for big exams such as the SAT, ACT, MCAT, GRE, PCAT, and many more. Study Buddy will be a beneficial application for people seeking certifications or licensing. People can use Study Buddy to help study for things such as the Bar Exam, CompTIA, and AWS Certifications. Some schools
have already tried implementing an application similar to Study Buddy as shown below with ODU’s Find a Study Group. This shows the need for the Study Buddy application.

![ODU Student Success Center](https://example.com/odu-find-a-study-group)

Example: John Doe
john.doe@odu.edu
ACCT 201
I'm taking Dr. X's ACCT 201 class this semester and would love to start a study group. Email me if interested.

Please check out the campus tutoring web page below for available tutoring.

Don't see anyone you can study with?
Connect with a Peer Academic Coach to help you.

Spring 2019 - PSYC 317 + 304
Hey, I'm Kristine, I'm taking 317 with Prof. Murphy and 304 with Dr. Phillips. Want a study buddy?

Email me: kbm0019@odu.edu

4. Study Buddy Product Prototype Description

The Study Buddy prototype will be a limited version of the final product. Users will be able to create their accounts and be matched with a study buddy in the prototype, but the amount of features will be limited in this version. Users will be able to get matched with partners by similarities, but the compatibility will be further off than it would in the end product due to a lack of preference options given in the prototype.

4.1. Prototype Architecture (Hardware/Software)

The Study Buddy prototype will only be accessible as a web application. It will need a device with internet access such as a smartphone device or a computer. The components for the prototype will be similar to the end product with the application using JSF, JPA, and a database
for storing user information. The prototype will not contain all of the integrated collaboration tools, the only one available in the prototype will be Google Hangouts.

The prototype will feature the Intelligent Buddy Matching System which will be limited due to the limited range of preferences available in this version.

4.2. Prototype Features and Capabilities

The Study Buddy prototype will be accessible as a web application which mostly just contains the minimum core features of the application. The prototype will have the ability for users to create their new accounts or allow users to login if they have an existing account. Once logged in, users will have the ability to set their study preferences, but the prototype will only feature a limited range of preferences. Users will also be able to search for study buddies and create study groups.

The prototype will also feature the Intelligent Buddy Matching System and will match partners by their subjects of interest. As for the integrated collaboration tools, Google Hangouts will be used for assisting in setting up times and dates for meetups or meetings. The full list of features and capabilities of the Study Buddy application is shown below in Table 1.
<table>
<thead>
<tr>
<th>Features</th>
<th>STUDY BUDDY Final Product</th>
<th>STUDY BUDDY Prototype</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Login</td>
<td>Allows user entry of authentication credentials</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>New User</td>
<td>Allows a user to create an account</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Study Preference Setting</td>
<td>Allows users to set study preferences for intelligent buddy matching algorithm</td>
<td>Will be implemented with limited study preference fields</td>
</tr>
<tr>
<td>Search for buddies</td>
<td>Allows user to search for study buddies</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Create a study group</td>
<td>Allows user to create a study group</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Set wait time</td>
<td>Allows user to set wait time in case of no matched buddies found</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web Application</td>
<td>The way in which the user will interact with the Study Buddy application using a web browser</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Mobile Application</td>
<td>The way in which the user will interact with the Study Buddy application using their smartphone device</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Private Message</td>
<td>Allows users to send and receive private messages within the Study Buddy App</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Block buddies</td>
<td>Allows users to block buddies with different goals</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Partner match by subject of interest</td>
<td>Matching Study Buddies by their own subject interest</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Intelligent Buddy Matching</td>
<td>Matching Study Buddies with the proprietary algorithm</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Google Hangout Integration</td>
<td>Allows users to integrate their Google Hangouts accounts for setting meeting times and web conferencing</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Slack Integration</td>
<td>Allows users to integrate their Slack accounts, allowing channels to be made to aid in communication between Study Buddies</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Codeshare integration</td>
<td>Allows users to share their code real time with their Study Buddies</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Schedule syncing with “Buddy”</td>
<td>Allows users to make matches with Study Buddies based on the availability they input</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Rate your buddy</td>
<td>Allows users to provide feedback on their Study Buddies</td>
<td>Will not be implemented</td>
</tr>
</tbody>
</table>

Table 1: Prototype Features

4.3. Prototype Development Challenges

Some of the main challenges we will face when developing the prototype for Study Buddy are language unfamiliarity, framework unfamiliarity, and having to learn a new
development platform. These problems can occur if some of the members have a lack of experience or knowledge of the language or services used in developing the application.
5. Glossary

**Auditory Learner** - best comprehend information by listening to information rather than reading it or seeing it visually.

**Business Logic** - The programming that manages communication between an end user interface and a database.

**CRUD** - Stands for Create, Read, Update, and Delete. Basic database/application operations.

**Entity Class** - A simple Java Class with member variables and getter and setter methods defined.

**JPA** - Java Persistence Application Programming Interface is an API for handling all database operations such as storing or retrieve entities from the database.

**JSF** - Java server faces is a java framework that couples the view and servlet into one managed component.

**Kinesthetic Learner** - best comprehend information by participating in activities or solving problems in a hands-on manner.

**ORM** - Object-relational mapping. Technique for persisting objects into a database table. Tables are modeled after Entity classes.

**Procrastination** - delaying or postponing a task, which needs to be completed, often to the detriment of the procrastinator.

**Prototype** - the prototype of Study Buddy will be a reduced scale version of the final product, and will demonstrate the functionality of the completed product in a simulated environment.

**Reading/Writing Learner** - best comprehend information by reading texts to further absorb information by condensing and rephrasing it in traditional lecture and note-taking environments.

**Study Group** - a small group of students with similar goals who meet regularly to review course material and prepare for exams.

**Visual Learner** - best comprehend information by visualizing relationships and ideas through
maps, charts, diagrams and even essays.

**Web Application** - an application that uses a website as the interface
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