# Table of Contents

- Background, Benefits, Testimonials .......................... 3
- Problem Statement, Problem Characteristics, Current Process Flow ........................................... 4
- The Solution, Proposed Process Flow .......................... 5
- Work Breakdown Structure (WBS), WBS: User Interfaces .................................................. 6
- WBS: Algorithms ...................................................... 7
- WBS: Algorithms (Continued) ........................................ 8
- WBS: Database .......................................................... 9
- WBS: Deployment, Development Tools ......................... 10
- Risk Matrix ............................................................ 11
Background

- Share Solutions
- Test Others
- Unite for Success
- Don’t Delay
- You Are Not Alone
- Goal-Oriented
- Respect Each Other
- Organize for Learning
- Understand the Process
- Participate Often

Benefits

• Sharing talent and knowledge
• Having more fun
• Motivating each other to stay focused

Testimonials

“Study groups are so effective because they provide a way for students to make the lecture notes their own”
  - Keith Sawyer, Ph.D., associate professor of education in Arts & Sciences at Washington University

“Having someone to debrief with, who understands the demands and is there to motivate you, can be the difference between passing and failing”
  - Lynden Barry Online Student at SCU
Problem Statement

- Understanding learning styles between like-minded peers to form a study group is a challenge to students.

Problem Characteristics

- **Different Motivations**
  - Get a head start
  - Meet deadlines
  - Review assessments

- **Different Responsibilities**
  - Family responsibility
  - Work commitment
  - Military
  - Schedule conflict

- **Different Study Habits**
  - Prioritizing study
  - Socialize and study
  - Study better during the day or at night.

- **Learning Styles:**
  - Visual
  - Auditory
  - Kinesthetic
  - Reading/Writing

Current Process Flow

![Flowchart diagram showing the process flow for forming a study group.](image)
Solution

A platform that helps students and people pursuing new knowledge find the perfect match for study groups to achieve academic success.

Proposed Process Flow

Legend

- Beginning
- Decision
- Process
- Termination
- Flow
Work Breakdown Structure (WBS)

User Interface

- Home Screen
  - Returning User
    - Enter Email, Password
  - Sign Up
    - Create New Account. Enter Full Name, Password, Email and Phone Number

- Main Menu
  - Study Buddy
    - Message, Schedule Time/Location, Rate Study Partners
    - Select Availability
      - Select Study Preference
      - Select Course/Major
  - Exit Screen
Intelligent Buddy Matching

Preprocessing is done

Access the possible matched list

Access each possible matched buddies’ study preferences vectors

Compute similarity of two vectors

Add the result to similarity score

Sort possible matched list by similarity scores

Possible match list is created
Similarity Score

Learning Style

<table>
<thead>
<tr>
<th>Visual</th>
<th>User: Jamal Williams</th>
<th>User: John Crotzer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory</td>
<td>[1]</td>
<td>[1]</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>[0]</td>
<td>[1]</td>
</tr>
<tr>
<td>Reading/Writing</td>
<td>[1]</td>
<td>[0]</td>
</tr>
</tbody>
</table>

\[
\cos \theta = \frac{\bar{W} \cdot \bar{C}}{\|\bar{W}\| \|\bar{C}\|} \\
= \frac{2}{\sqrt{2} \times \sqrt{3}} \\
= \frac{2}{\sqrt{6}} \\
\approx 0.8165
\]

Similarity Scores - Computing cosine of an angle between two vectors:

- Two vectors with the same orientation have a cosine similarity of 1
- Orthogonal vectors have a similarity of 0
- Two vectors diametrically opposed have a similarity of -1

Forming A Study Group

Case 1: No matches found
Case 2: Match found
  2.1 Existing groups
  2.2 No existing group
    2.2.1 Only matched with blocked buddies
    2.2.2 Not only matched with blocked buddies
Database (WBS)

Personal Information

- age: 19
- email: "mattissmith555@odu.edu"
- firstName: "Matthew"
- lastName: "Smith"
- phoneNumber: 757355555
- profileImage: "image"
- school: "Old Dominion University"
- username: "mattisStud"

Blocked List

- billyban9: true
- ifail2x: true
- scholar1: true

Study Preferences

- studyHabits
  - dayOrNight: "day"
  - eatDrinkDuringStudy: true
  - indoorOutdoorEnvironment: "outdoor"
  - introverted: false
  - music: true
  - outgoing: true
  - quietEnvironment: true

Availability

- classSchedule
  - days
    - monday: "1300-1415"
    - thursday: "1300-1450"
Deployment (WBS)

Development Tools

- **Java Server Faces (JSF)**
  - A foundation for the Study Buddy app to be built upon
  - Support of expression language allows for communication of data between the view and back end server

- **Java Persistence API (JPA)**
  - API defines Object-relational Mapping for persistence of objects to database tables.
  - Tables are modeled from entity classes which are simple Java classes.
  - JPA supplies mechanism for SQL query construction.
### Risk Matrix

<table>
<thead>
<tr>
<th>Impact</th>
<th>Probability</th>
<th>Very Low 1</th>
<th>Low 2</th>
<th>Medium 3</th>
<th>High 4</th>
<th>Very High 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High 5</td>
<td>T3, T4</td>
<td>T3</td>
<td>T4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High 4</td>
<td>T5</td>
<td></td>
<td>T2, C3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium 3</td>
<td></td>
<td>T1</td>
<td></td>
<td>C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Low 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Technical Risks:
- **T1** Lack of technical knowledge
- **T2** Equipment Issues (serious issues with backend equipment)
- **T3** Software Bugs
- **T4** Database/ Mobile & Web Application Failure
- **T5** Security Vulnerabilities

### Customer Risks:
- **C1** Customer dissatisfaction
- **C2** Inaccurate data input by end users
- **C3** User Personal information getting released