



# **NORTH SOUTH UNIVERSITY**

**Department of Electrical & Computer Engineering**

**CSE299: Junior Design**

**Project Report**

**(Group-1)**

**Project Title: Web-Based Educational Game for Children**

Submitted By	Submitted To
<b>Member 1:</b> Name: Md. Rakibul Hasan ID: 2111127642 <b>Member 2:</b> Name: Yeamin Hassan ID:2131637642	<b>Faculty: Omar Ibne Shahid</b>  <b>North South University, Dhaka, Bangladesh</b>

## **Introduction:**

In today's digital age, educational games play a crucial role in enhancing children's learning experiences. As part of our CSE 299 course, we developed a web-based educational game designed to make learning fun and interactive for young students. This project combines education with entertainment, helping children develop essential skills in an engaging way. The game focuses on fundamental subjects such as mathematics, language, and problem-solving, targeting primary school students. Our goal is to increase learning motivation and retention by using gamification components.

## **Objective:**

1. To create an interactive and user-friendly educational game for children.
2. To enhance learning through gamification techniques.
3. To develop a responsive web application with a colorful background.
4. To implement a secure database for storing user ID and Data.
5. To encourage self-paced learning in a fun and engaging manner.

## **Implementation:**

### **Technical Details:**

Frontend: HTML, CSS, JavaScript

Backend: PHP

Database: MySQL

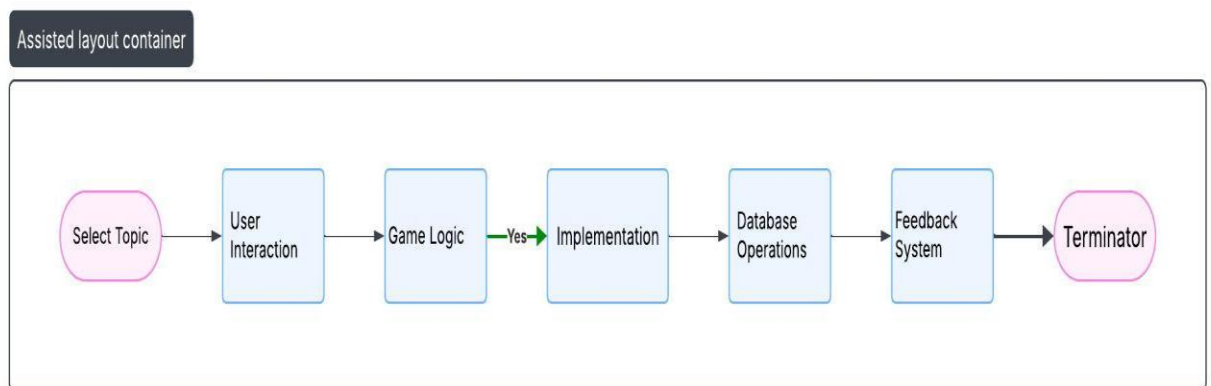
## Process Diagram:

1. **User Interaction:** The child interacts with the game interface
2. **Game Logic:** We find the game logic of how this game should be interactive for the children.
3. **Implementation:** Frontend: HTML, CSS, JavaScript.

Backend: PHP

Database: MySQL

4. **Database Operations:** The backend stores User ID and User Data.
5. **Feedback System:** The game provides feedback and wishes.



## Screenshots:

## Codes:

```
1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="UTF-8">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>Game Home</title>
8   <script src="https://cdn.tailwindcss.com"></script>
9 </head>
10
11 <body class="text-white w-full h-full bg-no-repeat bg-cover"
12   style="background-image: url('./images/Slidesdocs-childrens\ day\ children\ playing\ games_cba6ed0c08.jpg');">
13   <div class="h-screen flex flex-col items-center justify-center text-center p-6">
14     <h1 class="text-5xl font-extrabold bg-gradient-to-r from-blue-500 to-purple-500 text-transparent
15       bg-clip-text">
16       Welcome!</h1>
17     <p class="text-lg mt-4 text-black">Learn with fun!</p>
18
19     <div class="mt-6 grid grid-cols-1 space-y-4">
20       <a href="/login.html"
21         class="px-6 py-3 bg-blue-500 text-white font-bold rounded-lg shadow-lg hover:bg-blue-400
22         transition">Login</a>
23       <a href="/signup.html"
24         class="px-6 py-3 bg-blue-500 text-white font-bold rounded-lg shadow-lg hover:bg-blue-400
25         transition">Sign
26       Up</a>
27     </div>
28   </div>
29 </body>
30 </html>
```

```
1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="UTF-8">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>Game Dashboard</title>
8   <script src="https://cdn.tailwindcss.com"></script>
9 </head>
10
11 <body class="text-white backdrop-blur-2xl w-full h-full bg-no-repeat bg-cover"
12   style="background-image: url('./images/vecreezy_nature-landscape-vector-illustration-with-a-cute-and-13549621-1.jpg');">
13   <div class="flex h-screen">
14     <main class="flex-1 p-6">
15       <div class="grid lg:grid-cols-4 md:grid-cols-2 gap-6">
16         <a href="/science_game.html">
17           <div class="bg-gradient-to-r from-purple-500 to-indigo-500 p-5 rounded-xl shadow-lg">
18             <h2 class="text-lg font-semibold">Science</h2>
19             
20           </div>
21         </a>
22         <a href="/math.html">
23           <div class="bg-gradient-to-r from-red-500 to-pink-500 p-5 rounded-xl shadow-lg">
24             <h2 class="text-lg font-semibold">Math</h2>
25             
26           </div>
27         </a>
28         <a href="/language.html">
29           <div class="bg-gradient-to-r from-yellow-500 to-orange-500 p-5 rounded-xl shadow-lg">
30             <h2 class="text-lg font-semibold">Language</h2>
31             
32           </div>
33         </a>
34         <a href="/puzzle.html">
35           <div class="bg-gradient-to-r from-green-500 to-teal-500 p-5 rounded-xl shadow-lg">
36             <h2 class="text-lg font-semibold">Puzzle & Logic</h2>
37             
38           </div>
39         </a>
40       </div>
41     </main>
42   </div>
43 </body>
44 </html>
```

```
File Edit Selection View Go Run Terminal Help
CS2199_PROJECT
  images
  SQL Codes
  biology.html
  chemistry.html
  dashboard.html
  desktop.ini
  index.html
  language.html
  login.html
  login.php
  math.html
  physics.html
  puzzle.html
  science_game.html
  signup.html
  signup.php
  test.html

dashboard.html
chemistry.html X
index.html
language.html
science_game.html
biology.html
physics.html
test.html

<html lang="en">
<head>
</head>
<body class="flex flex-col items-center justify-center h-screen bg-gradient-to-r from-orange-100 via-green-400 to-green-700">
<h1 id="create-text" class="text-3xl font-bold mb-2">Create</h1>
<p id="target-name" class="text-xl font-bold text-blue-800 mb-4"></p>
<div id="experiment-container" class="center-container"></div>
<div class="beaker bg-gray-300 w-32 h-40 relative mt-10" id="result-beaker">
<div class="liquid" id="result-liquid" style="height: 0%;></div>
</div>
<p id="reaction" class="mt-4 text-lg font-bold text-green-600 hidden"></p>
<p id="wrong-message" class="mt-4 text-lg font-bold text-red-600 hidden">Wrong reaction!</p>
<button id="nextStep" class="mt-4 px-4 py-2 bg-gray-500 text-white rounded disabled:opacity-50 disabled">Next</button>
<!-- Game Over Section -->
<div id="game-over" class="mt-4 text-xl font-bold text-purple-800 hidden flex flex-col items-center justify-center">
<p>Correct Reactions: <span id="correct-count">0</span></p>
<a href="/dashboard.html"><button id="homeButton" class="mt-2 px-4 py-2 bg-gray-500 text-white rounded">Home</button></a>
</div>
<script>
let experiments = [
{ reactants: ['H2', 'O2'], product: 'H2O', equation: '2H2 + O2 -> 2H2O', color: 'bg-blue-400' },
{ reactants: ['Na', 'Cl2'], product: 'NaCl', equation: '2Na + Cl2 -> 2NaCl', color: 'bg-yellow-400' },
{ reactants: ['C', 'O2'], product: 'CO2', equation: 'C + O2 -> CO2', color: 'bg-gray-500' },
{ reactants: ['Fe', 'O2'], product: 'Fe2O3', equation: '4Fe + 3O2 -> 2Fe2O3', color: 'bg-red-500' },
{ reactants: ['Ca', 'CO2'], product: 'CaCO3', equation: 'Ca + CO2 -> CaCO3', color: 'bg-gray-400' }
];

let correctCount = 0;
let currentExperiment = 0;
const container = document.getElementById('experiment-container');
const targetName = document.getElementById('target-name');
const createText = document.getElementById('create-text');
const reactionText = document.getElementById('reaction');
const wrongMessage = document.getElementById('wrong-message');
const nextButton = document.getElementById('nextStep');
const resultBeaker = document.getElementById('result-beaker');
const resultLiquid = document.getElementById('result-liquid');
const gameOverDiv = document.getElementById('game-over');
const correctCountSpan = document.getElementById('correct-count');
const homeButton = document.getElementById('homeButton');
```

```
File Edit Selection View Go Run Terminal Help
CS2199_PROJECT
  images
  SQL Codes
  biology.html
  chemistry.html
  dashboard.html
  desktop.ini
  index.html
  language.html
  login.html
  login.php
  math.html
  physics.html
  puzzle.html
  science_game.html
  signup.html
  signup.php
  test.html

dashboard.html
chemistry.html
index.html
language.html
science_game.html
biology.html
math.html X
physics.html
test.html

<html lang="en">
<head>
<style>
</style>
</head>
<body class="flex flex-col items-center justify-center h-screen bg-gradient-to-r from-orange-100 via-green-400 to-green-700">
<div id="game-container" class="p-8 rounded-lg shadow-2xl text-center w-96">
<p id="question" class="text-2xl font-bold mb-4 text-gray-800"></p>
<div id="options" class="grid grid-cols-2 gap-4 mb-4">
</div>
<p id="result" class="mt-4 text-xl font-bold"></p>
<button id="next" class="mt-4 bg-green-500 text-white px-4 py-2 rounded-lg hover:bg-green-600 hidden">Next</button>
</div>
<script>
let currentProblem = 0;
let problems = [];
let score = 0;

function generateProblem() {
const num1 = Math.floor(Math.random() * 10) + 1;
const num2 = Math.floor(Math.random() * 10) + 1;
const operators = ['+', '-', '*', '/'];
const operator = operators[Math.floor(Math.random() * operators.length)];

let answer;
switch (operator) {
case '+':
answer = num1 + num2;
break;
case '-':
answer = num1 - num2;
break;
case '*':
answer = num1 * num2;
break;
case '/':
answer = (num1 / num2).toFixed(2);
break;
}

const wrongAnswers = [];
while (wrongAnswers.length < 3) {
const wrongAnswer = Math.floor(Math.random() * 20) + 1;
if (wrongAnswer !== answer && !wrongAnswers.includes(wrongAnswer)) {
wrongAnswers.push(wrongAnswer);
}
}
```

```
File Edit Selection View Go Run Terminal Help
CS229_project
dashboard.html chemistry.html index.html language.html science_game.html biology.html puzzle.html physics.html test.html
EXPLORER
CS229_PROJECT
  images
  SQL Codes
  biology.html
  chemistry.html
  dashboard.html
  desktop.ini
  index.html
  language.html
  login.html
  login.php
  math.html
  physics.html
  puzzle.html
  science_game.html
  signup.html
  signup.php
  test.html
  > OUTLINE
  > TIMELINE
  > @ 0 0 0 3
1 <!--DOCTYPE html-->
2 <html lang="en">
3 <head>
4 <meta charset="UTF-8">
5 <meta name="viewport" content="width=device-width, initial-scale=1.0">
6 <title>Puzzle Game</title>
7 <script src="https://cdn.tailwindcss.com"></script>
8 <style>
9 @keyframes pop {
10 0% { transform: scale(1); }
11 50% { transform: scale(1.1); }
12 100% { transform: scale(1); }
13 }
14 .tile {
15 transition: transform 0.2s ease, background-color 0.2s ease;
16 }
17 .tile:hover {
18 transform: scale(1.05);
19 }
20 .win-animation {
21 animation: pop 0.5s ease;
22 }
23 </style>
24 </head>
25 <body class="flex items-center justify-center h-screen w-full h-full bg-no-repeat bg-cover bg-gradient-to-r from-orange-100 via-green-400 to-green-700">
26 <div class="text-center">
27 <h1 class="text-4xl font-bold mb-6 text-white">Number Puzzle</h1>
28 <div id="puzzle-grid" class="grid grid-cols-3 gap-3 w-72 h-72 mx-auto mb-6">
29 </div>
30 <div class="flex flex-col gap-6">
31 <button id="shuffle-btn" class="bg-yellow-400 text-white px-6 py-3 rounded-full text-lg font-bold hover:bg-yellow-500 transition-all">
32 Shuffle
33 </button>
34 <a href="/dashboard.html">
35 <button class="bg-gray-400 text-white px-6 py-3 rounded-full text-lg font-bold hover:bg-gray-500 transition-all">
36 Home
37 </button>
38 </a>
39 </div>
40 <p id="message" class="mt-6 text-2xl font-bold text-white"></p>
41 </div>
42
43 <script>
44 const gridSize = 3;
45 let tiles = [];
46 let emptyTile = { row: gridSize - 1, col: gridSize - 1 };
47
48 function initializePuzzle() {
```

```
File Edit Selection View Go Run Terminal Help
CS229_project
dashboard.html signup.php X index.html language.html science_game.html biology.html physics.html test.html
EXPLORER
CS229_PROJECT
  images
  SQL Codes
  biology.html
  chemistry.html
  dashboard.html
  desktop.ini
  index.html
  language.html
  login.html
  login.php
  math.html
  physics.html
  puzzle.html
  science_game.html
  signup.html
  signup.php
  test.html
  > OUTLINE
  > TIMELINE
  > @ 0 0 0 3
1 <?php
2 $host = 'localhost';
3 $dbname = 'myapp';
4 $username = 'root';
5 $password = '';
6 try {
7 $conn = new PDO("mysql:host=$host;dbname=$dbname", $username, $password);
8 $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
9 } catch (PDOException $e) {
10 die("Database connection failed: " . $e->getMessage());
11 }
12
13 if ($_SERVER['REQUEST_METHOD'] === 'POST') {
14 // Get form data
15 $username = $_POST['username'];
16 $email = $_POST['email'];
17 $password = $_POST['password'];
18 $confirmPassword = $_POST['confirm-password'];
19
20 if ($password !== $confirmPassword) {
21 die("Passwords do not match.");
22 }
23
24 $hashedPassword = password_hash($password, PASSWORD_DEFAULT);
25
26 try {
27 $sql = "INSERT INTO users (username, email, password) VALUES (:username, :email, :password)";
28 $stmt = $conn->prepare($sql);
29 $stmt->bindParam(':username', $username);
30 $stmt->bindParam(':email', $email);
31 $stmt->bindParam(':password', $hashedPassword);
32 $stmt->execute();
33
34 $url = "../login.html";
35 header("Location: ".$url);
36
37 } catch (PDOException $e) {
38 die("Error registering user: " . $e->getMessage());
39 }
40 }
41 }
42 }
43 }
44 }
45 }
46 }
47 }
48 }
49 }
50 }
```

The screenshot shows a code editor with a file explorer on the left. The file explorer lists files like `login.php`, `index.html`, `language.html`, `science_game.html`, `biology.html`, `physics.html`, and `test.html`. The main editor displays the code for `login.php`. The code is a PHP script that connects to a MySQL database, checks if the user is logged in, and if not, it checks the email and password against the database. If the credentials are correct, it redirects to `dashboard.html`; otherwise, it shows an error message.

```
1 <?php
2 $host = 'localhost';
3 $dbname = 'myapp';
4 $username = 'root';
5 $password = '';
6
7 try {
8     $conn = new PDO("mysql:host=$host;dbname=$dbname", $username, $password);
9     $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
10 } catch (PDOException $e) {
11     die("Database connection failed: " . $e->getMessage());
12 }
13
14 if ($_SERVER['REQUEST_METHOD'] === 'POST') {
15     $email = $_POST['email'];
16     $password = $_POST['password'];
17
18     try {
19         $sql = "SELECT * FROM users WHERE email = :email";
20         $stmt = $conn->prepare($sql);
21         $stmt->bindParam(':email', $email);
22         $stmt->execute();
23
24         if ($stmt->rowCount() > 0) {
25             $user = $stmt->fetch(PDO::FETCH_ASSOC);
26
27             if (password_verify($password, $user['password'])) {
28                 header("Location: dashboard.html");
29                 exit();
30             } else {
31                 header("Location: login.html?error=Incorrect password");
32                 exit();
33             }
34         } else {
35             header("Location: login.html?error=User not found");
36             exit();
37         }
38     } catch (PDOException $e) {
39         die("Error fetching user: " . $e->getMessage());
40     }
41 }
42 >>
```

## Database:

The screenshot shows the phpMyAdmin interface. The left sidebar shows the database structure with a tree view. The main area displays the 'users' table. The table has columns: `id`, `username`, `email`, `password`, and `created_at`. The table contains one row with the following data:

id	username	email	password	created_at
16	rakibul	rakibul@gmail.com	\$2y\$10\$Eb69TVMdx0OtlpQqreBuDx25yIQvdyJNpplwH...	2025-04-19 23:23:04

Below the table, there are options to perform operations on the query results, such as Print, Copy to clipboard, Export, Display chart, and Create view. There is also a section to bookmark the query.

## **Challenges:**

During development, we faced several challenges:

1. **Balancing Education and Fun:** Ensuring the game was both educational and enjoyable.
2. **Responsive Design:** Making the game work smoothly on different screen sizes.
3. **Database Security:** Protecting user data.

## **Limitations:**

1. Limited number of games due to time constraints.
2. Basic graphics due to limited resources.
3. No multiplayer or social features.

## **Future Work:**

1. More games will be added.
2. The games will be more graphical.
3. Multiplayer feature will be added.



## **Discussion:**

Our web-based educational game successfully demonstrates how technology can make learning more engaging for children. The integration of gamification elements helps maintain interest, while the responsive design ensures accessibility. However, further testing with real users (children and educators) could provide valuable feedback for improvements.

## **Conclusion:**

This project was a valuable learning experience in full-stack web development and educational technology. We successfully built a functional game that combines education and entertainment with the potential for future enhancements. By continuing to refine the application, we can create an even more effective tool for children's learning.

**GitHub:** [https://github.com/rakibulhasanme09/CSE299\\_Project.git](https://github.com/rakibulhasanme09/CSE299_Project.git)