

Adi in the Shape Town Learning Application Using Gamification Features

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Abstract: The conventional medium used in learning or teaching through book is less interactive. Thus, Adi in the Shape Town learning application is proposed to help children who aged six years old to learn about basic 2D shapes in an interactive way. The project aims to design the application by using educational gamification approach, to develop the application on Android platform, and to test the developed application to target users. The proposed application would have three game modules, and in each game module, there will be five levels provided. Also, Multimedia Mobile Content Development (MMCD) methodology is chosen as the methodology that helps in the whole process of finishing the project. The testing result has shown that 88% of the respondents have left positive feedback towards the proposed application. Thus, Adi in the Shape Town application will help users to learn basic 2D shapes through a variety of game approaches.

Keywords: 2D Shapes, Mobile Application, Educational Gamification

1. Introduction

Shapes can be classified into two-dimensional (2D) shapes and three-dimensional (3D) shapes. In which, based on the objects around us, a variety of shapes can be defined easily through their properties [1]. Hence, before children formally attend preschool or kindergarten, they have encountered a variety of shapes through the objects they have seen in their everyday lives. However, children may not know how to classify the shapes based on the objects they have encountered. Therefore, learning shapes as early education for young children is important to help them classify the different types of shape. Also, learning shapes could help them in other educational areas such, mathematic and art [1]. In which, based on the case study location, which is Tadika Ilmu Pintar Bistari, which placed in Pasir Gudang, Johor, has been teaching its students about shapes under the syllabus, 2D shapes of the subject mathematic. Thus, it can be defined that shape and mathematic are closely related [1]. However, the method used in teaching the subject is through the book, which is less interactive. Thus, an educational application can be proposed as an additional learning method as it is more engaging, interactive, and helpful, especially during self-learning [2].

However, the impact of the ongoing pandemic has brought a lot of changes in our lives, where education is not an exception. Hence, online learning is conducted remotely during this new norm, as the prevention against the spread of the coronavirus. However, online learning isn't always as effective as

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compared to traditional learning, as not all children can keep up with the pace of learning online [3]. Thus, a strategic method of teaching and learning need to be proposed to protect early childhood education [4]. Therefore, learning application can be introduced as a method of learning where it can encourage children to learn at home even after school hours, where their learning progress can be monitored by parents.

Moreover, based on the case study location, it can be identified the methods used in learning and teaching during online learning are through books, Google Meet, WhatsApp, and YouTube, which are less interactive. Nevertheless, during traditional learning, it can be defined that the study location uses books as their teaching and learning method, which are less interactive too. Hence, an educational application can be proposed as additional learning and teaching medium to the children, whereby the multimedia element features that are often applied in the educational application are more interactive. Thus, this application could motivate the children to learn in a fun and interactive way.

In addition, there are a lot of educational applications of learning shapes in the market, even so, there are not a lot of applications that fully follow the actual syllabus that is taught in kindergarten. Based on an application called Smart Bunny [5], it uses a full gamification approach in the application. In which, the users of the Smart Bunny application follow the main character Bunny on his journey to meet his friend, wherein along the journey users have to complete the given tasks. Nevertheless, due to not following an actual syllabus, hence the content of learning basic 2D shapes is not quite suitable for young children. Moreover, another application similar to Smart Bunny is called Bimi Boo Baby shapes and colours for kids [6], where it uses a full gamification approach too. In which, unlike Smart Bunny, this application follows more than one character and there are several game modules given that users can play to learn about shapes and colors. However, there are shapes included in the application which does not quite suitable for young children to learn such as pentagon, hexagon, and more.

The objective of Adi in the Shape Town is to design the application by using educational gamification approach, to develop the application on Android platform, and to test the developed application to target users.

Hence, the target users of Adi in the Shape Town learning application are kindergarteners aged six years old, thus any related information is to be retrieved from the case study location. Thus, the content of the application will be based on the syllabus taught for kindergarten, which the syllabus is called 2D shapes of the subject mathematic.

Therefore, this application is to be developed using Unity software in a 2D environment, where its proposed mobile interactive application is Android mobile. Also, the language to be used in this application is the English language. Next, the concept of this application is scenario-based where users will follow the main character, Adi on an adventure around Shape Town and the objects in the game scenes will be based on everyday objects that users may often encounter. Thus, the concept arts of the game will be a cartoon-like style which is more approachable for young children. Thus, this application will be having three game modules, where it represents the locations in Shape Town and each game module will consist of five-game scenes. In which, users need to perform the task according to the instruction given by Adi. The arrangement of the four-game scenes is through the basic shapes that target users need to be learned, where the basic shapes include triangle, square, rectangle, and circle. Also, the last or the fifth game scene will test users' full understanding of the basic shapes, where all basic shapes will be provided in the game scene and users need to sort accordingly. Thus, the game approaches that will be applied include, puzzle and sorting for Adi's house game module, maze and sorting for Shape Town Supermarket game module, and match card and sorting for Adi's kindergarten game module.

2. Related Work

2.1 Educational gamification

Gamification in education has been progressively increasing along with the advancement of technology, wherein educational gamification could produce enhancing and engaging learning

experiences for students [7]. Therefore, developing a game-based learning application required more than one individual, for such, developers, subject matter experts, and students, which to ensure the success of delivering the content to the target users [8]. Consequently, game-based learning could help students to develop problem solving skills and expand their knowledge, which could help their academic performance [9]. Moreover, the availability of game-based learning regardless of time and place, students could utilize the full use of educational gamification application for self-learning at home [9][10].

2.2 Learning model

The learning model is used to determine the possible approach that can be applied to students with different traits or personalities, wherein a person can be derived into five-principle, human nature, dispositional traits, characteristic adaptations, self-defining life narratives, and cultural or social contexts [11].

Hence, a learning model introduced by Fleming [12], which is the VARK model, is a learning based on the sensory model which includes, Visual (V), Aural (A), Read or Write (R), and Kinesthetic (K). In which, through VARK learning styles, visual learners would prefer to visualize while learning, thus colors and pictures are preferable. While aural learners would prefer the use of audio or voice while learning. Also, read or write learners prefer to read which is effective for them while learning. Lastly, kinesthetic learners would prefer having hands-on experiences which help them understand better from the trial and error they have experienced. Therefore, the VARK learning model can be applied to mobile learning where the use of multimedia elements in mobile learning are aligned with the VARK learning styles. In which, multimedia elements include, text, audio, animation, video, and animation, wherein these elements could help students to learn effectively.

In addition, according to Piaget's theory [13], a child's cognitive development stages are divided into four stages include, sensorimotor, preoperational, concrete operational, and formal operational. In which, preoperational stage include child who aged from two to seven years old, where at this stage they are keen to perceive objects in the world symbolically. Thus, they enjoy pretend play, where they get to imagine to play roles that symbolize real life roles such as, doctor, policeman, teacher, and more. Thus, Piaget's theory can be applied to mobile learning where scenario-based game approach may attract their attention to engage in the pretend play, and to learn efficiently.

2.3 Comparison of similar existing applications

The three existing applications that will be discussed in this section include, Smart Bunny [5], Bimi Boo Baby Shapes and Color for Kids [6], and Shapes Puzzle for Kids [14]. In which, these applications have similar learning content, which to help children to learn about shapes through gamification features. Thus, Table 1 shows the comparison of the three applications with the proposed application.

Table 1: Comparison of three existing applications with the proposed application

Elements	Smart Bunny [5]	Bimi Boo Baby Shapes and Colors for Kids [6]	Shapes Puzzle for Kids [14]	Adi in the Shape Town
Platform	Android and iOS	Android and iOS	Android	Android
Game style	Sort and match cards	Puzzle and sort	Puzzle and sort	Sort, puzzle, maze and match cards

Table 1: (continued)

Elements	Smart Bunny [5]	Bimi Boo Baby Shapes and Colors for Kids [6]	Shapes Puzzle for Kids [14]	Adi in the Shape Town
Restriction	Good, users cannot move to the next task, if they have not completed the current task	Good, users cannot move to the next task, if they have not completed the current task	Poor, users can move to the next task, even if they have not completed the current task	Good, users need to complete the current task to move to the next task
Exit control	Poor, there is no exit button to exit application	Poor, there is no exit button to exit application	Good, there is exit button to exit application	Good, exit button will be provided to exit application
Consistency	All background interfaces are the same	Each game module has different background interface	Each game module has different background interface	Each game module will have different background interface

Based on the comparison of Table 1, all the applications do have their strengths and drawbacks as well. Therefore, Adi in the Shape Town is to be developed to provide with more interactive game style and to provide with more suitable content which based on a syllabus taught for kindergarten.

3. Methodology

In this section, the methodology used will be discussed. Thus, Multimedia Mobile Content Development (MMCD) methodology will be used in developing Adi in the Shape Town, wherein MMCD methodology helps to speed up the development process [15]. Figure 1 shows the MMCD methodology model.

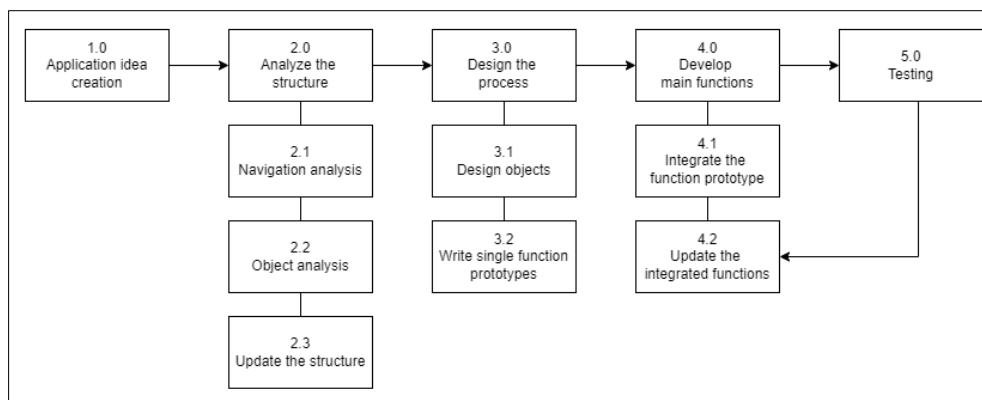


Figure 1: Multimedia Mobile Content Development (MMCD) [15]

3.1 Application Idea Creation Stage

The first stage of MMCD methodology is application idea creation stage. In which, in this stage there are two tasks that are required to complete which include, identifying user requirements, and application requirements. Thus, Table 2 shows the application idea creation checklist, which presented the information about the application. While Table 3 shows the system analysis requirement checklist,

which tabulated data based on the result from the questionnaire distributed to the Subject Matter Expert and target users. Also, the sample of the questionnaires will be presented in Appendix A.

Table 2: Application idea creation checklist

Item	Note
Type of application	<ul style="list-style-type: none"> • Mobile Learning
Target device	<ul style="list-style-type: none"> • Smartphones that run Android operating system
Target users	<ul style="list-style-type: none"> • Kindergarteners who aged six years old
GUI	<ul style="list-style-type: none"> • Main page, game module selection, game scene selection
Images	<ul style="list-style-type: none"> • Icons, background images, game objects
Video	<ul style="list-style-type: none"> • None
Animation	<ul style="list-style-type: none"> • Game character
Audio	<ul style="list-style-type: none"> • Narration, background music, and sound effects
Application synopsis	<ul style="list-style-type: none"> • Adi in the Shape Town learning application is a mobile learning application, where it emphasizes on learning basic 2D shapes for kindergarteners. In which, this application applies gamification features to engage users' attention while learning.

Table 3: System analysis requirement checklist

Stakeholder Category	Role in product	Design implications	Actions Needed
Subject Matter Expert	Content consultant	Based on questionnaire, user interface design	<ul style="list-style-type: none"> • Apply bright colours for example, primary colours. • Apply multimedia elements, for such text, audio, animation, and graphic.
		Reliable content	<ul style="list-style-type: none"> • Content must be based on the syllabus for kindergarten.
Target users	End-user of the application	Based on questionnaire survey, attractive gamification features	<ul style="list-style-type: none"> • Apply gamification features for such, drag-and-drop, puzzle, match cards, and maze.
		User interface design	<ul style="list-style-type: none"> • Apply simple button designs that represent its function. • Apply attractive animation and audio.

3.2 Structure Analysis Stage

The second stage of MMCD methodology is structure analysis. In which, in this stage there are two tasks that need to be completed which include, navigation analysis and object analysis. Thus, Figure 2 shows the navigational structure of Adi in the Shape Town, and Table 4 shows the content structure checklist.

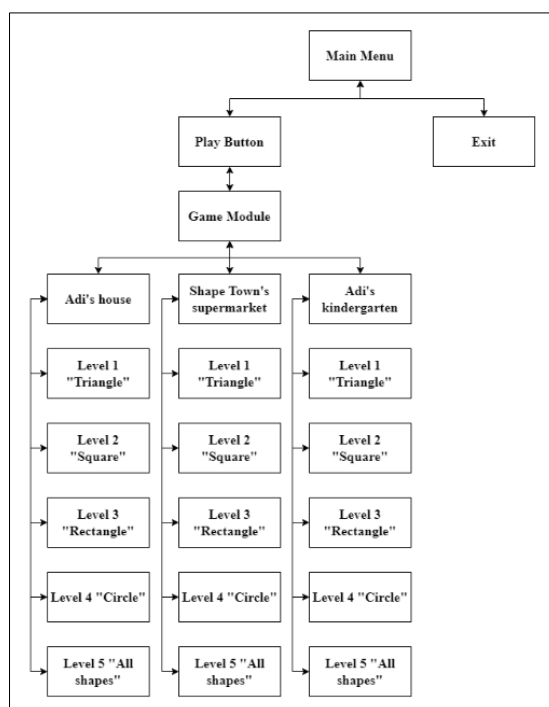


Figure 2: Navigational structure of Adi in the Shape Town

Table 4: Content structure checklist

Item	Note
Menu and Navigation	<ul style="list-style-type: none"> • Home button • Back button • Next button • Replay button • Exit button
Number of main GUI	Application logo
Sub GUI	None
Images	<ul style="list-style-type: none"> • Background images • Icon and buttons
Placing audio	<ul style="list-style-type: none"> • Narrator voice • Sound effects in button clicking • Sound effects in correct and wrong answer • Background music
Placing video	None
Placing animation	Game characters

3.3 Process Design Stage

The third stage of MMCD methodology is process design stage, where there are two tasks that need to be completed which include, designing game objects and single function prototype. Thus, a few tools that need to be used during designing processes. In which, Adobe Illustrator is used to design assets for such, UI buttons, sprites, and background images. Also, Unity is used to integrate assets and develop the application, and Microsoft Visual Studio is used to write script for the functions of the application. Figure 3 shows the flow chart of Adi in the Shape Town application. In which, the application contains three game modules, and there are five levels in each game module.

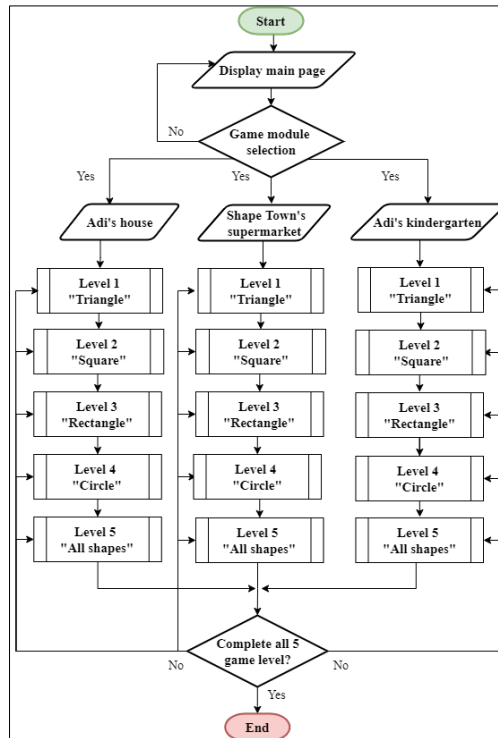



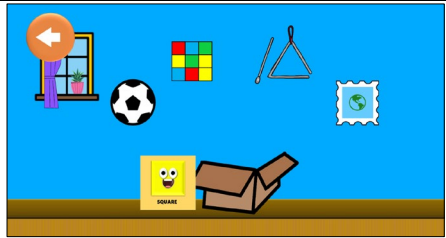

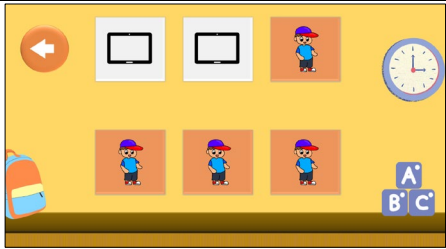
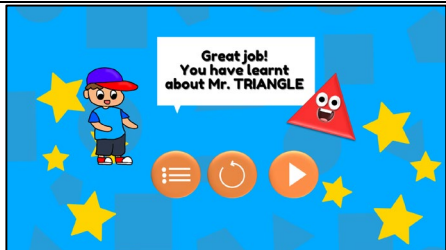
Figure 3: Flow chart of Adi in the Shape Town

Therefore, Table 5 shows the user interface designs with its description. In which, the interfaces include, the main menu page, exit page, introduction page, game module selection page, game scene in Adi’s house, Shape Town’s supermarket, and Adi’s kindergarten game modules respectively.

Table 5: List of user interface designs

User Interface	Description
	<p>Main menu page</p> <ul style="list-style-type: none"> • It has two buttons, play, and exit. • Play button will navigate users to introduction page. • Exit button will navigate users to exit page.
	<p>Exit page</p> <ul style="list-style-type: none"> • It has two buttons, yes and no. • Yes button will exit the application. • No button will navigate users to main menu page.
	<p>Introduction page</p> <ul style="list-style-type: none"> • It has animation, and two buttons, home and go. • Home button will navigate users to main menu page. • Go button will navigate users to game module selection page.

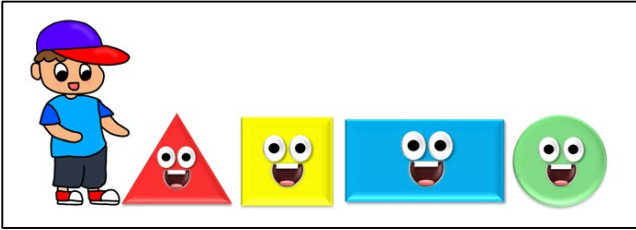
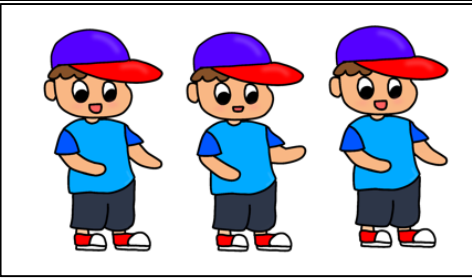
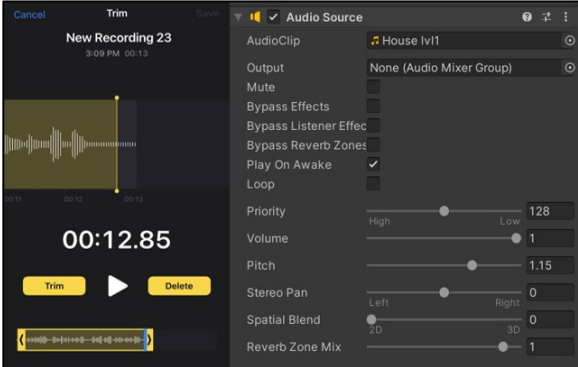
Table 5: (continued)

User Interface	Description
	<p>Game module selection page</p> <ul style="list-style-type: none"> • It has four buttons, home, Adi’s house, Shape Town’s supermarket, and Adi’s kindergarten. • Adi’s house button will navigate users to Adi’s house game module. • Shape Town’s supermarket button will navigate users to Shape Town’s supermarket game module. • Adi’s kindergarten button will navigate users to Adi’s kindergarten game module.
	<p>Adi’s house game scene</p> <ul style="list-style-type: none"> • It has a back button, and four draggable game objects. • Back button will navigate users to Adi’s house game module. • Only the correct game objects placed in the box will pop-up the reward panel.
	<p>Shape Town’s supermarket game scene</p> <ul style="list-style-type: none"> • It has a back button, and a draggable game object. • Back button will navigate users to Adi’s house game module. • Dragging the game object to its target placeholder and the reward panel will pop-up.
	<p>Adi’s kindergarten game scene</p> <ul style="list-style-type: none"> • It has a back button, and six pairs of card game objects that can be flipped. <p>Tap to flip the card game object to find all its match, and the reward panel will pop-up</p>
	<p>Reward page</p> <ul style="list-style-type: none"> • It has three buttons, list, replay, and next. • List button will navigate users to list of game level. • Replay button will navigate users back to game scene. <p>Next button will navigate users to next game scene.</p>

3.4 Main Function Development Stage

In this stage, the development of the game assets and integration of the game assets in Unity using scripting are done. Thus, Table 6 shows the list of developed assets of Adi in the Shape Town.

Table 6: List of game assets development

Assets	Description
	<p>Game characters design</p> <ul style="list-style-type: none"> The characters are designed by using Adobe Illustrator. In which, the main character Adi is created digitally by tracing the initial design that is drawn manually. The other characters are designed by using the basic 2D shapes, triangle, square, rectangle, and circle. Moreover, primary colours such as, red, yellow, blue, and green, are applied to the characters.
	<p>Adi's talking animation</p> <ul style="list-style-type: none"> The process of animation is started by designing each sprite of desired movement. In which, the animation is completed by applying sprite-changing animation in Unity. The talking animation include, the mouth and hands movements.
	<p>Audio development</p> <ul style="list-style-type: none"> The process of recording voice is done by using a recording application. In which, the recorded voices are edited through Unity by adding pitch to the audio to imitate the child-like voice.

Moreover, the navigate feature, drag-and-drop function, and match card function will be further discussed in Table 7.

Table 7: List of main function development

Main function	Description
<pre> using System.Collections; using System.Collections.Generic; using UnityEngine; using UnityEngine.SceneManagement; public class change_scene : MonoBehaviour { public string SceneName; public void ChangeToScene() { SceneManager.LoadScene(SceneName); } } </pre>	<p>Navigate feature scripting</p> <ul style="list-style-type: none"> The important function applied is <i>ChangeToScene()</i>, and <i>SceneManager.LoadScene()</i>. The script is applied to all buttons to allow navigation between interfaces.

Table 7: (continued)

Main function	Description
<pre> public void pizzaDrag() { if(Drop1 == false) { pizza.transform.position = Input.mousePosition; } } public void pizzaDrop() { float Distance = Vector3.Distance(pizza.transform.position, bowl.transform.position); if (Distance < 100) { pizza.transform.position = bowl.transform.position; Drop1 = true; audioSrc.clip = correct; audioSrc.Play(); Check1(); } else { pizza.transform.position = itemPos1; audioSrc.clip = wrong; audioSrc.Play(); } } public void watermelonDrop() { float Distance3 = Vector3.Distance(watermelon.transform.position, bowl.transform.position); if (Distance3 < 100) { watermelon.transform.position = bowl.transform.position; Drop2 = true; audioSrc.clip = correct; audioSrc.Play(); Check1(); } else { watermelon.transform.position = itemPos3; audioSrc.clip = wrong; audioSrc.Play(); } } </pre>	<p>Drag-and-drop function scripting</p> <ul style="list-style-type: none"> • The important functions include, <i>pizzaDrag()</i>, <i>pizzaDrop()</i>, <i>watermelonDrag()</i>, and <i>watermelonDrop()</i>. • The input is the mouse position input, where the game objects would follow the mouse position. • Correct sound effect will be played if correct game object is placed at the placeholder. • Wrong sound effect will be played if wrong game object is placed at the placeholder.
<pre> 54 private int[] ShuffleArray(int[] numbers) 55 { 56 int[] newArray = numbers.Clone() as int[]; 57 for (int i = 0; i < newArray.Length; i++) 58 { 59 int tmp = newArray[i]; 60 int r = Random.Range(i, newArray.Length); 61 newArray[i] = newArray[r]; 62 newArray[r] = tmp; 63 } 64 return newArray; 65 } 80 public void CardRevealed(MainCard card) 81 { 82 if (_firstRevealed == null) 83 { 84 _firstRevealed = card; 85 } 86 else 87 { 88 _secondRevealed = card; 89 StartCoroutine(CheckMatch()); 90 scorePanel(); 91 } 92 } 109 public IEnumerator CheckMatch() 110 { 111 if (_firstRevealed.id == _secondRevealed.id) 112 { 113 _score++; 114 scoreLabel.text = "Score: " + _score; 115 audioSrc.clip = correct; 116 audioSrc.Play(); 117 } 118 else 119 { 120 yield return new WaitForSeconds(0.8f); 121 122 _firstRevealed.Unreveal(); 123 _secondRevealed.Unreveal(); 124 audioSrc.clip = wrong; 125 audioSrc.Play(); 126 } 127 128 _firstRevealed = null; 129 _secondRevealed = null; 130 } 131 } 132 } </pre>	<p>Match card function scripting</p> <ul style="list-style-type: none"> • The important functions include, <i>ShuffleArray()</i>, <i>CardRevealed()</i>, and <i>CheckMatch()</i>. • The function <i>ShuffleArray()</i> allow the cards to be placed randomly. • <i>CardRevealed()</i> allow the card to transform if clicked. • <i>CheckMatch()</i> function is to verify the answer, where correct match will produce correct sound effect and conversely for wrong match.

3.5 Testing Stage

In this stage, the alpha testing will be further discussed. In which, this testing is constantly conducted along the development process of the application. Whereas, the functionality of the application can be ensured to function well until the completion of the project. Thus, the testing is done based on the functionality of the buttons, and Table 8 shows the result obtained. Apart from alpha testing, beta testing has been conducted to determine user acceptance towards the developed application, where the questionnaire is designed based on Technology Acceptance Model (TAM). Thus, beta testing will be further discussed in the next section.

Table 8: List of main function development

Test	Expected Result	Actual Result	Actions Taken
Play Button	Navigate to game modules page, and to next game scene.	Not playing the next game scene.	Applying change scene script to the button.
Exit Button	Navigate to confirmation exit page.	Works well as planned.	Not taken.
Home Button	Navigate to main page.	Works well as planned.	Not taken.
Back Button	Navigate to previous page.	Works well as planned.	Not taken.
Go Button	To start game scene.	Works well as planned.	Not taken.
Replay Button	Navigate back to the game scene.	Works well as planned.	Not taken.
List Button	Navigate to the list of level of respective game module.	Works well as planned.	Not taken.
Yes Button	Exit application	Works well as planned.	Not taken.
No Button	Navigate back to main page.	Works well as planned.	Not taken.
Button Sound Effect	To produce sound effect	Background music overlaps the sound effect.	Reduce the volume of the background music.

4. Results and Discussion

In this section, the result obtained from the beta testing that has been conducted to target users will be discussed. Based on Technology Acceptance Model (TAM), the questionnaire is designed based on Perceived of Usefulness (PU), Perceived of Ease of Use (PEOU), and User Satisfaction (US). Thus, the prepared questionnaire has 3 sections include, learning outcome acquisition, user acceptance level, and functionality. Hence, a total of 10 kindergarteners aged 6 years are picked to undergo the testing process, and Figure 4 shows the result of the first section of the questionnaire.

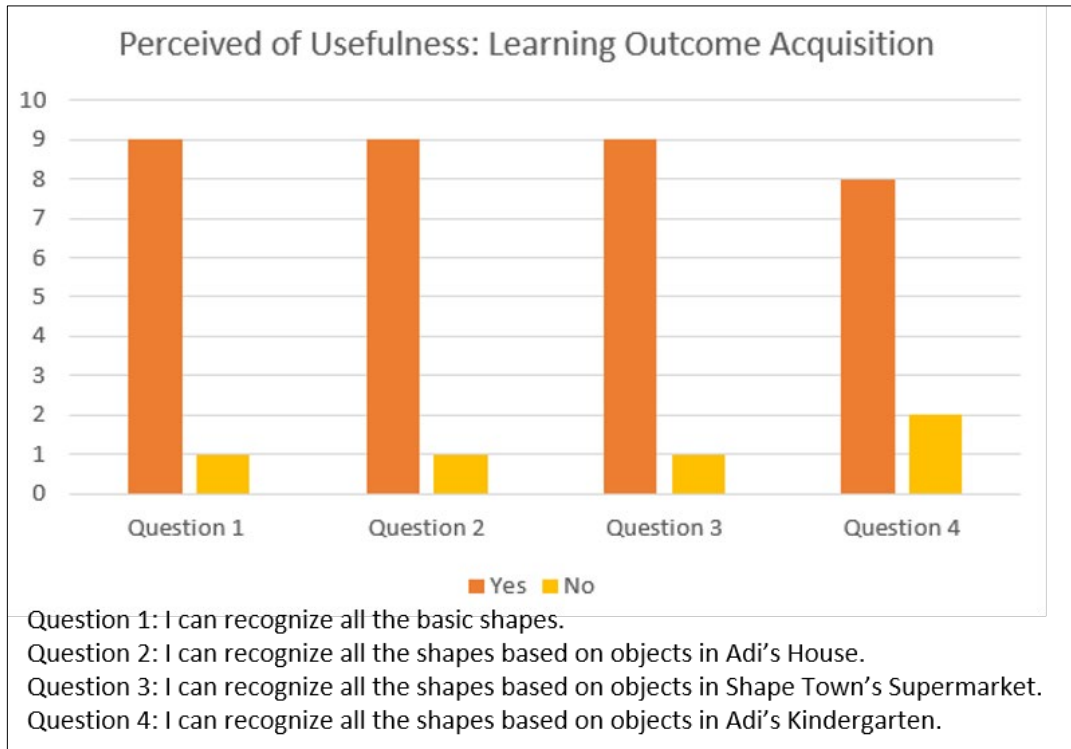


Figure 4: Result on learning outcome acquisition section

In addition, Figure 5 shows the result of the second section of the questionnaire, which to determine the user acceptance level among respondents.

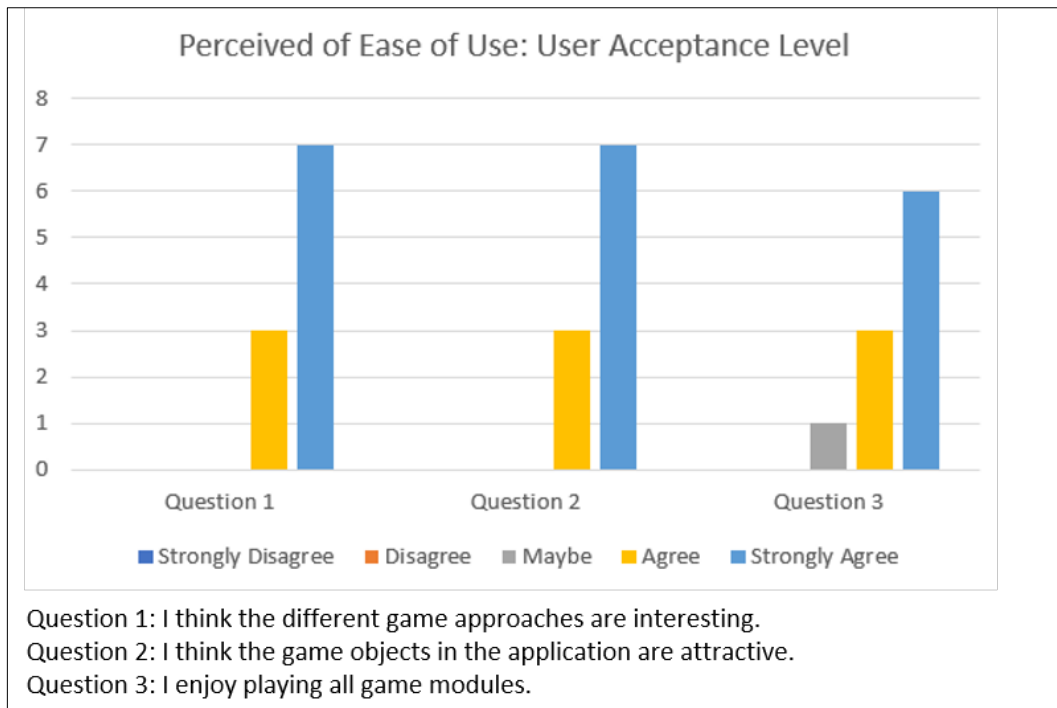


Figure 5: Result on user acceptance level

Furthermore, Figure 6 shows the result of the last section of the questionnaire, which to determine respondents' opinion on the functionality of the application.

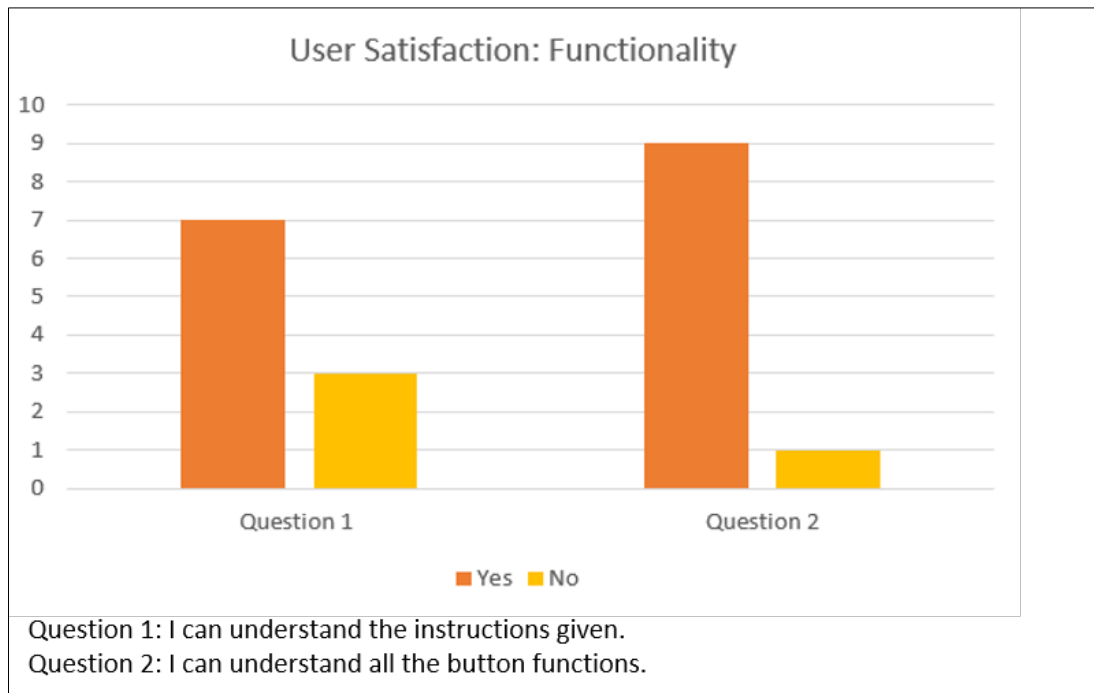


Figure 6: Result on functionality

Therefore, based on Figure 4, the positive feedbacks received is 88%. Whereas, based on Figure 5, the positive feedbacks received is 97%, while based on Figure 6, the positive feedbacks received is 80%. Hence, it can be summarized from the testing that this application has received 88% of positive feedbacks from the respondents.

In addition, according to the Subject Matter Expert (SME), Ms Nurdini Dania binti Hishammuddin, which is a kindergarten teacher at Tadika Ilmu Pintar Bistari, she agreed that the application has attractive design and reliable content. She also agreed that this application is suitable to be used for children especially during self-learning at home with the guide of their parents. She has also suggested a few improvements that can be implemented to the application for future enhancement, firstly, she suggested to add additional guide in the game scene to ensure that users fully understand the given instructions. Also, she suggested to add timer to record the time taken for users to perform each task, which would help in tracking users' performance. Thus, it can be concluded that Adi in the Shape Town application has received positive feedbacks from both target users and SME.

5. Conclusion

In conclusion, based on the beta testing that has been conducted, it can be determined the objectives of this project are achieved as the application has been successfully developed to meet users' needs. Also, it can be concluded that Adi in the Shape Town application is suitable to be implemented as an additional learning medium to learn about basic 2D shapes. Moreover, there are a few advantages and limitations that have been discovered during the process of development and testing. In terms of advantages, the application is viewed as attractive to users as it has high multimedia interactivities such as, graphical buttons, textual instruction, voice instruction, sound effects, background music and animation. Apart from the multimedia interactivities, the application also consists of variety of game approach which are attractive to users. However, there are a few limitations, where limited game scene provided in each game level, limited movements of the animation and less competence and challenge for users. Therefore, as for future work, there will be more game scenes provided for each game level. Also, there will be more additional movements added to the animation to make it more attractive. In addition, score and timer will be implemented to assist in collecting users' achievements and to track


their learning progress. Hence, it is hoped that Adi in the Shape Town application will continue help kids aged 6 years old to learn basic 2D shapes in an interactive way.

Acknowledgment

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Appendix A

1) A set of questionnaires for target users.

<p>Section A - Respondent Demography</p> <p>Age</p> <p><input type="radio"/> 4 years old</p> <p><input type="radio"/> 5 years old</p> <p><input type="radio"/> 6 years old</p> <p>Gender</p> <p><input type="radio"/> Male</p> <p><input type="radio"/> Female</p> <p>School attended</p> <p><input type="radio"/> Kindergarten</p> <p><input type="radio"/> Terna</p> <p><input type="radio"/> Preschool</p> <p>Relationship with children</p> <p><input type="radio"/> Teacher</p> <p><input type="radio"/> Parents</p> <p><input type="radio"/> Guardian</p>	<p>Section B - Information Regarding to the Content</p> <p>1) Have you used any learning application during self-learning at home or learning at school?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>2) Do you face any problem while learning 2D shapes?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>3) Can you differentiate the basic shapes for example, triangle, square, rectangle and circle?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>4) Can you classify the basic shapes for example, triangle, square, rectangle and circle?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>5) Can you recognize the shapes based on the objects around you?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Section C - Parents/No. Respondents to the Learning Application</p> <p>1) What multimedia elements you would like to have in a learning application?</p> <p><input type="checkbox"/> Text</p> <p><input type="checkbox"/> Audio</p> <p><input type="checkbox"/> Animation</p> <p><input type="checkbox"/> Images</p> <p><input type="checkbox"/> Other</p> <p>2) Please select the main character of the learning app called Adi, what kind of implementation you would like the character to have?</p>  <p><input type="checkbox"/> Animation</p> <p><input type="checkbox"/> Non-interactive</p> <p><input type="checkbox"/> Other</p> <p>3) Do you prefer to have gamification feature in a learning application?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>4) What kind of game features you would like to have?</p> <p><input type="checkbox"/> Progress map</p> <p><input type="checkbox"/> Points</p> <p><input type="checkbox"/> Time-based cards</p> <p><input type="checkbox"/> Avatars</p> <p><input type="checkbox"/> Other</p>
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2) A set of questionnaires for Subject Matter Expert.

<p>BIC31602 - PROJEK SARJANA MUDA</p> <p>Jassalamualikum wbt. dan selamat sejahtera, saya, Nur Sabrina binti ABE. ROUF, merupakan seorang tahun akhir dari Fakulti Sains Komputer dan Teknologi Maklumat, UTHM, ingin melaksanakan satu kajian tentang keberkesanan aplikasi pembelajaran dengan menggunakan pendekatan gamifikasi.</p> <p>Bagi Projes Sarjana Muda (PSM) ini, satu aplikasi pembelajaran yang dinamakan Adi in the Shape Town akan dibangunkan dengan menggunakan pendekatan gamifikasi dan elemen-elemen multimedia sebagai alat bantu belajar tambahan bagi kanak-kanak yang berumur 4 hingga 6 tahun.</p> <p>Terima kasih diucapkan kerana sudi meluangkan masa bagi menjawab beberapa soalan kaj berikut.</p> <p>Bagian A - Demografi responden</p> <p>Sila isi maklumat di responden</p> <p>Nama</p> <p>Your answer:</p> <p>Nama tempat mengajar</p> <p>Your answer:</p> <p>Nama subjek yang diajar oleh responden</p> <p>Your answer:</p>	<p>Soalno 8 - Apakah berkesan dalam pendidikan?</p> <p>Apakah istilah responden tentang subjek yang mengajar terbaik?</p> <p><input type="radio"/> Ya</p> <p><input type="radio"/> Tidak</p> <p>Jika ya, sila nyatakan subjek terbaik tersebut!</p> <p>Tu answer:</p> <p>Apakah murid menghadapi sekurang-kurangnya masalah semasa belajar terbaik?</p> <p><input type="radio"/> Ya</p> <p><input type="radio"/> Tidak</p> <p>Sila nyatakan medium yang digunakan bagi mengajar subjek tersebut!</p> <p><input type="checkbox"/> Buku</p> <p><input type="checkbox"/> Buku elektronik</p> <p><input type="checkbox"/> Video</p> <p><input type="checkbox"/> Other</p> <p>Deriakah 1 hingga 5 tempatan keberkesanan medium yang digunakan?</p> <p>1 2 3 4 5</p> <p>Target tidak berkesan <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Target berkesan</p> <p>Apakah medium yang digunakan secara percubaan atau lain?</p> <p><input type="checkbox"/> Sangat hebat</p> <p><input type="checkbox"/> Hebat</p> <p><input type="checkbox"/> Sangat biasa</p> <p><input type="checkbox"/> Other</p> <p>Deriakah 1 hingga 5 sejauh mana keberkesanan medium yang digunakan?</p> <p>1 2 3 4 5</p> <p>Target tidak berkesan <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Target berkesan</p>	<p>Soalno 9 - Apakah berkesan dalam pembelajaran?</p> <p>Apakah responden parent menggunakan mana-mana aplikasi pembelajaran sebagai salah satu medium pengajaran?</p> <p><input type="radio"/> Ya</p> <p><input type="radio"/> Tidak</p> <p>Apakah responden high menggunakan aplikasi pembelajaran sebagai salah satu medium pengajaran?</p> <p><input type="radio"/> Ya</p> <p><input type="radio"/> Tidak</p> <p>Apakah responden yang akan menggunakan gamifikasi dalam eksperimen pembelajaran?</p> <p><input type="radio"/> Ya</p> <p><input type="radio"/> Tidak</p> <p>Apakah nama-memorial yang dapat menarik perhatian murid semasa belajar?</p> <p><input type="radio"/> Ya</p> <p><input type="radio"/> Tidak</p> <p>Suapakah nama-memorial yang dapat menarik perhatian murid?</p> <p><input type="checkbox"/> Membran (membran kulit, tulang)</p> <p><input type="checkbox"/> Membran (juga, anggota, otot)</p> <p><input type="checkbox"/> Membran (juga, anggota, membran)</p> <p>Apakah nama-memorial yang dapat menarik perhatian murid?</p> <p><input type="checkbox"/> Tidak menarik</p> <p><input type="checkbox"/> Tidak menarik</p> <p><input type="checkbox"/> Tidak menarik</p>
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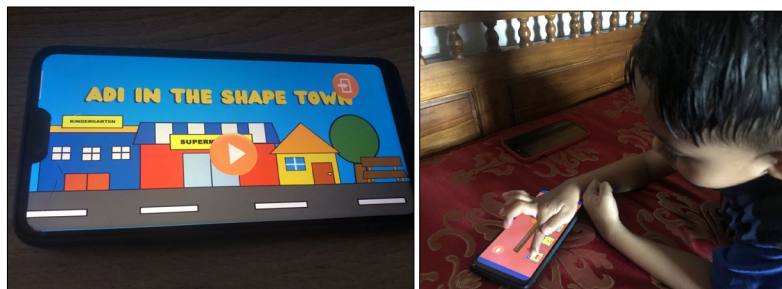
3) A set of questionnaires for target users, during beta testing.

<p>Beta testing on Adi in the Shape Town application</p> <p>Assalamualaikum wbt. and good day, my name is Nur Sabrina binti Abd. Rouf, and I am a final year student from Faculty of Computer Science and Information Technology (FSKTM) of Universiti Tun Hussein Onn Malaysia (UTHM). I am currently conducting a beta testing to determine user acceptance towards the developed application. Hence, this application called, Adi in the Shape Town, is to help children aged six (6) years old to learn basic 2D shapes in an interactive way. Thus, this learning app will be applying gamification feature, which to engage children's full attention while learning.</p> <p>Therefore, this questionnaire is designed based on Technology Acceptance Model (TAM) include, Perceived of Usefulness (PU), Perceived of Ease of Use (PEOU), and User Satisfaction (US). Thus, this questionnaire has three (3) section which to determine the learning outcome acquisition, user acceptance level, and functionality.</p> <p>This questionnaire will take you about three (3) minutes to answer all the provided questions. All responses will be kept confidential as this study is only meant for research purpose. Any report of the data will be aggregated and will not identified the respondent.</p> <p>Thank you for taking your time to take part in this testing.</p>	<p>Learning Outcome Acquisition</p> <p>School attended *</p> <p><input type="radio"/> Kindergarten</p> <p><input type="radio"/> Terna</p> <p><input type="radio"/> Preschool</p> <p>Gender *</p> <p><input type="radio"/> Female</p> <p><input type="radio"/> Male</p> <p>I can recognize all the basic shapes. *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>I can recognize all the shapes based on objects in Adi's House. *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>I can recognize all the shapes based on objects in Shape Town's Supermarket. *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>I can recognize all the shapes based on objects in Adi's Kindergarten. *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>User Acceptance Level</p> <p>I think the different game approaches are interesting. *</p> <p>1 2 3 4 5</p> <p>Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Agree</p> <p>I think the game objects in the application are attractive. *</p> <p>1 2 3 4 5</p> <p>Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Agree</p> <p>I enjoy playing all game modules. *</p> <p>1 2 3 4 5</p> <p>Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Agree</p> <p>Functionality</p> <p>I can understand the instructions given. *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>I can understand all the button functions. *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
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4) A set of questionnaires for Subject Matter Expert (SME), during beta testing.

<p>Beta testing on Adi in the Shape Town application</p> <p>Assalamualaikum wbt. and good day, my name is Nur Sabrina binti Abd. Rouf, and I am a final year student from Faculty of Computer Science and Information Technology (FSKTM) of Universiti Tun Hussein Onn Malaysia (UTHM). I am currently conducting a beta testing to determine user acceptance towards the developed application. Hence, this application called, Adi in the Shape Town, is to help children aged six (6) years old to learn basic 2D shapes in an interactive way. Thus, this learning app will be applying gamification feature, which to engage childrens full attention while learning.</p> <p>Thus, this form is to identify the acceptance of Adi in the Shape Town application as an additional learning medium for kindergarteners in learning basic 2D shapes. All information will be kept confidential as this study is only meant for research purposes.</p>	<p>Perceived of Usefulness (Learning Outcome Acquisition)</p> <p>The shapes can be recognized easily.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>	<p>Perceived of Ease of Use (User Acceptance Level)</p> <p>The game objects are attractive.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>
	<p>The application would help students in learning 2D shapes.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>	<p>The game approaches are attractive.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>
	<p>The application would help in learning in an interactive way.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>	<p>Users Satisfaction (Functionality)</p> <p>The instructions are easy-to-understand for students.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>
		<p>The button designs are easy-to-understand.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Strongly Agree</p>

5) Beta testing.



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