

## BAB VI

### KESIMPULAN DAN SARAN

#### 6.1. Kesimpulan

Penelitian ini bertujuan untuk menerapkan gamifikasi pada aplikasi pembelajaran musik (*music mobile learning*). Berikut adalah kesimpulan dari penelitian ini yang terbagi menjadi dua poin berdasarkan perumusan masalah dan tujuan yang telah ditetapkan.

- 1) Merancang dan mengimplementasikan desain berdasarkan analisa kebutuhan yang telah dipaparkan berupa aplikasi pembelajaran musik dengan penerapan gamifikasi. Mekanika gamifikasi yang diterapkan pada aplikasi adalah *points*, *levels* dan *badges*. Jenis poin yang digunakan dalam gamifikasi adalah *Experience Point (XP)*. *Levels* yang digunakan dalam gamifikasi adalah *level (status)* dan *level (progress)*. Sedangkan pengembangan *badges* berdasarkan pada *gamer personality* menurut BrainHex model.
- 2) Hasil *usability* secara umum berdasarkan SUS memperoleh nilai sebesar 82.75%. Hasil *usability* secara detail menggunakan matriks yaitu

*effectiveness* mendapat nilai 89.04%, nilai untuk *efficiency* adalah 89.21% dan *satisfaction* mendapat nilai 81.33%. Hasil dari interpretasi data tersebut menunjukkan bahwa penerapan gamifikasi pada aplikasi pembelajaran musik dapat diterima dengan baik oleh pengguna serta termasuk kedalam sistem yang *reliable* untuk memotivasi belajar.

#### **6.2. Saran**

Berdasarkan analisa kekurangan sistem yang didapatkan, saran yang dapat diberikan pada penelitian ini adalah perlunya melakukan analisa secara khusus pada konten aplikasi seperti mekanika *game* maupun subyek pembelajaran yang digunakan. Tujuannya adalah memperoleh data kualitatif dari dampak penerapan gamifikasi pada *mobile learning*. Selain itu, pemerataan persona pengguna dapat dilakukan dengan menambahkan kuantitas persona 1 dan persona 2 sehingga terjadi keseimbangan kuantitas persona pengguna.

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## LAMPIRAN

### Lampiran 1: Sample Code (thinking\_game.lua)

```
1 local composer = require( "composer" )
2 local scene = composer.newScene()
3
4 local widget = require( "widget" )
5 local utility = require( "utility" )
6 local myData = require( "mydata" )
7 local sqlite3 = require( "sqlite3" )
8 local score = require( "score" )
9
35 local function handleAnswerEvent( event )
36     if ( "ended" == event.phase ) then
37         print( "Music theory quiz no. " .. currentLevel .. " answered" )
38         if ( event.target.answer == quest_table[currentLevel].true_choice ) then
39             if ( myData.settings.levelName == "BEGINNER" ) then
40                 myData.beginner.level = myData.beginner.level + 1
41                 myData.beginner.score = myData.beginner.score + 10
42                 --print( myData.beginner.score )
43             elseif ( myData.settings.levelName == "INTERMEDIATE" ) then
44                 myData.intermediate.level = myData.intermediate.level + 1
45                 myData.intermediate.score = myData.intermediate.score + 10
46                 --print( myData.intermediate.score )
47             elseif ( myData.settings.levelName == "ADVANCED" ) then
48                 myData.advanced.level = myData.advanced.level + 1
49                 myData.advanced.score = myData.advanced.score + 10
50                 --print( myData.advanced.score )
51             end
52
53             myData.currentLevel = myData.currentLevel + 1
54             composer.removeScene( "next_level_musicologist", false )
55             composer.gotoScene( "next_level_musicologist", { effect = "slideLeft", time = 350} )
56
57             -- True sound effect
58             if ( myData.settings.soundOn == true ) then
59                 local true_sound = audio.loadSound( "assets/quest_asset_sounds/true_sound.mp3" )
60                 audio.play( true_sound )
61             end
62         else
125     if event.phase == "will" then
126         -- Database connection
127         local path = system.pathForFile( "musicologist.db", system.ResourceDirectory )
128         local db = sqlite3.open( path )
129         local sql
130
131         if ( myData.settings.levelName == "BEGINNER" ) then
132             sql = "SELECT * FROM tbl_thinking_quest q JOIN tbl_difficulty d ON q.thinking_
133                 currentLevel = myData.beginner.level
134
135         elseif ( myData.settings.levelName == "INTERMEDIATE" ) then
136             sql = "SELECT * FROM tbl_thinking_quest q JOIN tbl_difficulty d ON q.thinking_
137                 currentLevel = myData.intermediate.level
138
139         elseif ( myData.settings.levelName == "ADVANCED" ) then
140             sql = "SELECT * FROM tbl_thinking_quest q JOIN tbl_difficulty d ON q.thinking_
141                 currentLevel = myData.advanced.level
142
143     end
144
```

## Lampiran 2: Sample Code (next\_level\_musicologist.lua)

```
-- Function to handle button events
local function handleButtonEvent( event )
    if ( "ended" == event.phase ) then
        --Per difficulty level scoring interface
        if ( currentLevel > 20 ) then
            if ( myData.settings.menu == "thinking_music_theory" ) then
                if ( myData.settings.levelName == "BEGINNER" ) then
                    if ( myData.beginner.score < 40 ) then
                        myData.beginner.grade = "E"
                    elseif ( myData.beginner.score > 39 and myData.beginner.score < 80 ) then
                        myData.beginner.grade = "D"
                    elseif ( myData.beginner.score > 79 and myData.beginner.score < 120 ) then
                        myData.beginner.grade = "C"
                    elseif ( myData.beginner.score > 119 and myData.beginner.score < 160 ) then
                        myData.beginner.grade = "B"
                    else
                        myData.beginner.grade = "A"
                    end
                elseif ( myData.settings.levelName == "INTERMEDIATE" ) then
                    if ( myData.intermediate.score < 40 ) then
                        myData.intermediate.grade = "E"
                    elseif ( myData.intermediate.score > 39 and myData.intermediate.score < 80 ) then
                        myData.intermediate.grade = "D"
                    elseif ( myData.intermediate.score > 79 and myData.intermediate.score < 120 ) then
                        myData.intermediate.grade = "C"
                    elseif ( myData.intermediate.score > 119 and myData.intermediate.score < 160 ) then
                        myData.intermediate.grade = "B"
                    else
                        myData.intermediate.grade = "A"
                    end
                elseif ( myData.settings.levelName == "ADVANCED" ) then
                    if ( myData.advanced.score < 40 ) then
                        myData.advanced.grade = "E"
                    elseif ( myData.advanced.score > 39 and myData.advanced.score < 80 ) then
                        myData.advanced.grade = "D"
                    elseif ( myData.advanced.score > 79 and myData.advanced.score < 120 ) then
                        myData.advanced.grade = "C"
                    elseif ( myData.advanced.score > 119 and myData.advanced.score < 160 ) then
                        myData.advanced.grade = "B"
                    else
                        myData.advanced.grade = "A"
                    end
                end
                composer.removeScene( "level_grade", false )
                composer.gotoScene( "level_grade", { effect = "slideLeft", time = 350 } )
            elseif ( myData.settings.menu == "listening_ear_training" ) then
                148         if ( myData.settings.menu == "thinking_music_theory" ) then
                149             if ( myData.settings.levelName == "BEGINNER" ) then
                150                 currentLevel = myData.beginner.level
                151                 currentScore = myData.beginner.score
                152             elseif ( myData.settings.levelName == "INTERMEDIATE" ) then
                153                 currentLevel = myData.intermediate.level
                154                 currentScore = myData.intermediate.score
                155             elseif ( myData.settings.levelName == "ADVANCED" ) then
                156                 currentLevel = myData.advanced.level
                157                 currentScore = myData.advanced.score
                158             end
                159             elseif ( myData.settings.menu == "listening_ear_training" ) then
                160                 if ( myData.settings.levelName == "BEGINNER" ) then
                161                     currentLevel = myData.listening.beginner.level
                162                     currentScore = myData.listening.beginner.score
            end
        end
    end
end
```

### Lampiran 3: Sample Code

(thinking\_difficulty\_level\_musicologist.lua)

```
68 -- Function to handle beginner level button
69     local function beginnerButtonState( state )
70         if state == "active" then
71             transparency = 1
72             default_file = "assets/difficulty_level/beginner_musicologist@3x.png"
73             event = handleDifficultyButtonEvent
74         else
75             transparency = 1
76             default_file = "assets/difficulty_level/beginner_musicologist_2.png"
77         end
78
79         local beginnerButton = widget.newButton
80         {
81             id = "beginnerButton",
82             width = 300,
83             height = 75,
84             defaultFile = default_file,
85             onEvent = event
86         }
87         beginnerButton.x = display.contentCenterX
88         beginnerButton.y = display.contentHeight*0.4
89         beginnerButton.alpha = transparency
90         sceneGroup:insert( beginnerButton )
91
92         local result = state .. transparency
93         return result
94     end
95
214 function scene:show( event )
215
216     local sceneGroup = self.view
217     local phase = event.phase
218
219     if ( phase == "will" ) then
220         -- Button activator
221         if ( myData.beginner.grade == "E" ) then
222             beginnerButtonState( "active" )
223             intermediateButtonState ( "inactive" )
224             advancedButtonState( "inactive" )
225         elseif ( myData.beginner.grade ~= "E" and myData.intermediate.grade == "E" ) then
226             beginnerButtonState( "active" )
227             intermediateButtonState ( "active" )
228             advancedButtonState( "inactive" )
229         elseif ( myData.beginner.grade ~= E and myData.intermediate.grade ~= "E" ) then
230             beginnerButtonState( "active" )
231             intermediateButtonState ( "active" )
232             advancedButtonState( "active" )
233         end
234     end
```

#### Lampiran 4: Sample Code (thinking\_level\_selection.lua)

```
26 -- Function to handle level select
27 local function handleLevelSelect( event )
28     if ( "ended" == event.phase ) then
29         if ( myData.beginner.level >= 20 and myData.settings.levelName == "BEGINNER" ) then
30             composer.removeScene( "level_grade", false )
31             composer.gotoScene( "level_grade", { effect = "crossFade", time = 333 } )
32         elseif ( myData.intermediate.level >= 20 and myData.settings.levelName == "INTERMEDIATE" ) then
33             composer.removeScene( "level_grade", false )
34             composer.gotoScene( "level_grade", { effect = "crossFade", time = 333 } )
35         elseif ( myData.advanced.level >= 20 and myData.settings.levelName == "ADVANCED" ) then
36             composer.removeScene( "level_grade", false )
37             composer.gotoScene( "level_grade", { effect = "crossFade", time = 333 } )
38         else
39             composer.removeScene( "thinking_game", false )
40             composer.gotoScene( "thinking_game", { effect = "crossFade", time = 333 } )
41             --print( myData.settings.levelName, " Level ", myData.currentLevel, " selected" )
42         end
43     end
44 end
45

94 if ( phase == "will" ) then
95     local x = 0
96     local y = display.contentCenterY - 50
97     local buttons = {}
98     local buttonBackgrounds = {}
99     local buttonGroups = {}
100     local levelSelectGroup = display.newGroup()
101     local cnt = 1
102
103     if ( myData.settings.levelName == "BEGINNER" ) then
104
105         -- print( myData.beginner.level .. myData.settings.levelName )
106
107         for i = 1, myData.maxLevels do
108             buttonGroups[i] = display.newGroup()
109             buttonGroups[i].id = i
110
111             -- Next Level Logic
112             if ( i <= myData.beginner.level ) then
113                 buttonBackgrounds[i] = display.newCircle( x + 70, y - 39, 22 )
114                 buttonBackgrounds[i]:setFillColor( 1, 1, 1 )
115                 buttonGroups[i]:insert( buttonBackgrounds[i] )
116                 buttons[i] = display.newText( tostring(i), 0, 0, native.systemFontBold, 28 )
117                 buttons[i]:setFillColor( 0.27, 0.66, 0.8 )
118
119                 buttonGroups[i].alpha = 1.0
120                 buttonGroups[i]:addEventListener( "touch", handleLevelSelect )
121             else
122                 buttons[i] = display.newImageRect( "assets/lock_icon/lock@3x.png", 48, 48 )
123             end
124
125             buttons[i].x = x+70
126             buttons[i].y = y-40
127             buttonGroups[i]:insert( buttons[i] )
128
129             x = x + 55
130             cnt = cnt + 1
131             if cnt > 5 then
132                 cnt = 1
133                 x = 0
134                 y = y + 72
135             end
136             levelSelectGroup:insert( buttonGroups[i] )
137         end
138
139     elseif ( myData.settings.levelName == "INTERMEDIATE" ) then
140
```

## Lampiran 5: Sample Code (badges\_musicologist.com)

```
76 -- Database connection
77 local path = system.pathForFile( "musicologist.db", system.ResourceDirectory )
78 local db = sqlite3.open( path )
79 local sql_badges
80
81 sql_badges = "SELECT * FROM tbl_badges"
82
83 for row in db:nrows( sql_badges ) do
84     badges_table[#badges_table+1] =
85     {
86         id = row.id,
87         badge_name = row.badge_name,
88         badge_info = row.badge_info,
89         img_url = row.img_url,
90         img_url_locked = row.img_url_locked
91     }
92 end
93
94 local function onSystemEvent( eEvent )
95     if ( event.type == "applicationExit" ) then
96         if ( db and db:isopen() ) then
97             db:close()
98         end
99     end
100 end
101 Runtime:addEventListener( "system", onSystemEvent )
102
110 function scene:show( event )
111     local sceneGroup = self.view
112     local badge1_image, badge2_image, badge3_image, badge4_image, badge5_image, badge6_image
113
114     params = event.params
115
116     if event.phase == "will" then
117         print( composer.getSceneName("current") )
118
119         -- All about that badges
120
121         -- Thinking Explorer -----
122
123         if( myData.beginner.grade ~= "E" ) then
124             badge1_image = badges_table[1].img_url
125         else
126             badge1_image = badges_table[1].img_url_locked
127         end
128
129         local badge1 = widget.newButton(
130         {
131             id = 1,
132             x = display.contentWidth * 0.2,
133             y = display.contentHeight * 0.35,
134             width = display.contentHeight * 0.2,
135             height = display.contentHeight * 0.2,
136             defaultFile = badge1_image,
137             overFile = badge1_image,
138             onEvent = handleBadgeEvent
139         }
140         )
141         sceneGroup:insert( badge1 )
142
143         local badge1_title = display.newText( badges_table[1].badge_name, display.contentWidth * 0.2,
144         sceneGroup:insert( badge1_title )
145
146
147         -- Listening Explorer -----
148
149         if( myData.listening.beginner.grade ~= "E" ) then
150             badge2_image = badges_table[2].img_url
151         else
152             badge2_image = badges_table[2].img_url_locked
153         end
154
155         local badge2 = widget.newButton(
156         {
```

## Lampiran 6: Kuesioner SUS

### A. Kata Pengantar

Dengan hormat,

Sehubungan dengan penyelesaian skripsi yang sedang saya lakukan di Universitas Atma Jaya Yogyakarta, dengan judul “PENERAPAN GAMIFIKASI PADA APLIKASI PEMBELAJARAN MUSIK”. Adapun salah satu cara untuk mendapatkan data pada penelitian ini adalah dengan menyebarkan kuesioner kepada responden.

Sehubungan dengan maksud di atas, saya mengharapkan kesediaan mahasiswa/mahasiswi Universitas Atma Jaya Yogyakarta untuk mengisi kuesioner ini sebagai data yang digunakan dalam penelitian. Kuesioner yang dikumpulkan tidak akan disebarluaskan atau dijual, hanya digunakan untuk keperluan penelitian. Atas kesediaan dan kerjasamanya, saya ucapkan terima kasih.

Peneliti,

Boby Haryanto

### B. Data Responden

- Usia : .... tahun
- User type :

### C. Kuesioner Aplikasi Pembelajaran Musik “Musicologist”

Keterangan:

1. Sangat tidak setuju
2. Tidak setuju
3. Netral
4. Setuju
5. Sangat setuju

#### I. Musicologist System Usability Scale

No.	Pernyataan	1	2	3	4	5
1.	Sistem mudah digunakan.					
2.	Saya menemukan fungsi/fitur sudah terintegrasi dengan baik.					
3.	Sistem tidak konsisten (penggunaan warna, icon, menu, dll).					
4.	Saya yakin orang lain akan belajar dengan cepat saat menggunakan sistem ini.					
5.	Sistem sangat susah dipakai.					
6.	Saya harus belajar banyak hal sebelum menggunakan aplikasi ini.					
7.	Saya pikir, saya membutuhkan bantuan dari seorang ahli untuk mengoperasikan aplikasi ini.					
8.	Saya menemukan fungsi/fitur dari system yang tidak berguna					

Lampiran 7: Analisa Data Kuesioner Berdasarkan Pedoman

Likert Scale

Berikut adalah tahap-tahap perhitungan *likert scale*:

- 1) Menginputkan hasil jawaban responden ke dalam tabel.

<b>Responden (Rn)</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>
R1	4	4	2	4	2	2	2	2
R2	5	5	2	4	2	2	1	1
R3	5	4	1	5	1	2	2	1
R4	5	5	1	3	1	1	1	1
R5	4	5	2	4	2	2	2	2
R6	4	4	1	4	2	3	2	2
R7	5	4	2	5	1	2	2	2
R8	5	5	3	5	2	2	1	1
R9	5	5	2	4	2	3	2	2
R10	4	3	2	3	2	2	2	2
R11	4	4	4	5	2	2	2	2
R12	3	3	2	2	2	3	4	2
R13	4	4	2	4	2	3	2	2
R14	5	5	5	4	1	4	1	1
R15	4	5	2	5	4	3	3	2
R16	4	4	2	4	2	2	2	2
R17	4	4	2	5	2	2	3	2
R18	5	4	2	5	2	2	2	2
R19	4	4	1	3	2	1	2	2
R20	4	4	1	3	2	1	2	2
R21	4	3	2	3	2	3	2	3
R22	4	4	1	3	2	2	2	1
R23	4	5	1	4	2	3	2	1
R24	5	5	2	5	2	2	2	2
R25	4	5	1	5	1	1	1	1
R26	5	5	2	4	2	2	2	2

R27	4	4	2	4	2	2	2	2
R28	5	4	3	5	1	2	1	1
R29	5	5	1	4	5	2	2	3
R30	4	5	2	4	1	1	2	1

Keterangan:

P1 - P8 adalah pernyataan yang berdasarkan SUS dengan range penilaian menggunakan *likert scale* seperti yang dipaparkan pada Lampiran 1. Score tertinggi adalah 5, sedangkan score terendah adalah 1. Tabel pada tahap ini digunakan untuk menghitung jumlah responden pada tahap 2.

2) Menghitung jumlah responden berdasarkan jawaban yang diberikan.

Pernyataan (Pn)	Jumlah Responden Berdasarkan Jawaban (Sn)				
	S1	S2	S3	S4	S5
P1	0	0	1	17	12
P2	0	0	3	14	13
P3	1	1	2	17	9
P4	0	1	6	13	10
P5	1	1	0	21	7
P6	0	1	7	17	5
P7	0	1	2	21	6
P8	0	0	2	18	10

3) Mengalikan setiap sel (Pn, Rn) dengan bobot yang telah ditentukan.

Pn	Hasil Pn   Sn * Bobot					$\sum Pn   Sn *$ Bobot
	P1 S1*1	P2 S2*2	P3 S3*3	P4 S4*4	P5 S5*5	

P1	0	0	3	68	60	131
P2	0	0	9	56	65	130
P3	1	2	6	68	45	122
P4	0	2	18	52	50	122
P5	1	2	0	84	35	122
P6	0	2	21	68	25	116
P7	0	2	6	84	30	122
P8	0	0	6	72	50	128

- 4) Menentukan skor tertinggi (X) sebagai variabel bantu dalam perhitungan. Rumus untuk mencari nilai X adalah skor tertinggi *likert scale* \* jumlah responden.

$$X = 5 * 30$$

$$= 150$$

- 5) Menginterpretasikan hasil ke dalam persentase menggunakan rumus

$((\sum P_n | S_n * \text{Bobot}) / X) * 100\%$ , sehingga diperoleh hasil sebagai berikut:

Pernyataan (P <sub>n</sub> )	Hasil (%)
P1	87.33%
P2	86.67%
P3	81.33%
P4	81.33%
P5	81.33%
P6	77.33%
P7	81.33%
P8	85.33%



Lampiran 9: Data Responden Berdasarkan Persona Pengguna

Persona	Waktu mulai	Waktu selesai	Waktu (Completing Tasks)	Waktu in second	Jumlah Interaksi	Gagal	Berhasil
Persona 1	15:58:02	16:00:10	0:02:08	128	6	0	6
	17:53:11	17:56:17	0:03:06	186	6	0	6
	11:30:47	11:33:31	0:02:44	164	6	0	6
	13:40:43	13:45:41	0:04:58	298	6	0	6
	21:53:06	21:55:31	0:02:25	145	6	0	6
Persona 2	15:31:39	15:35:59	0:04:20	260	7	1	6
	15:32:04	15:35:43	0:03:39	219	6	0	6
	18:15:07	18:17:27	0:02:20	140	6	0	6
	21:05:57	21:08:28	0:02:31	151	6	0	6
	21:10:04	21:12:25	0:02:21	141	6	0	6
	21:29:56	21:34:14	0:04:18	258	6	0	6
	21:40:45	21:42:58	0:02:13	133	6	0	6
	15:21:52	15:24:40	0:02:48	168	6	0	6
	18:43:47	18:46:05	0:02:18	138	6	0	6
	18:46:50	18:48:56	0:02:06	126	6	0	6
Persona 3	15:51:42	15:54:03	0:02:21	141	6	0	6
	18:21:08	18:23:37	0:02:29	149	6	0	6
	22:54:53	22:57:46	0:02:53	173	6	0	6

21:31:06	21:35:42	0:04:36	276	6	0	6
21:39:11	21:43:38	0:04:27	267	7	1	6
12:27:39	12:30:50	0:03:11	191	6	0	6
11:45:39	11:49:35	0:03:56	236	6	0	6
13:52:42	13:55:57	0:03:15	195	6	0	6
10:28:25	10:31:19	0:02:54	174	6	0	6
10:13:07	10:15:56	0:02:49	169	6	0	6
10:08:37	10:11:39	0:03:02	182	6	0	6
17:34:20	17:37:34	0:03:14	194	6	0	6
20:23:47	20:26:56	0:03:09	189	6	0	6
21:43:04	21:45:41	0:02:37	157	6	0	6
21:48:25	21:50:57	0:02:32	152	6	0	6

Lampiran 8: Contoh *log data* yang diexport dalam *log file*

Responden: Kinanthi

**Task 1 (Success): Melakukan kustomisasi pada game settings**

Apr 14 11:30:47 Teguh-iPad Musicologist[1546] <Warning>: Platform: iPad / iPad4,5 / 9.2.1 / Apple A7 GPU / OpenGL ES 2.0 Apple A7 GPU - 75.11.5 / 2015.2731

Apr 14 11:30:50 Teguh-iPad Musicologist[1546] <Warning>: 2988.216

Apr 14 11:30:50 Teguh-iPad Musicologist[1546] <Warning>: menu\_musicologist

Apr 14 11:31:16 Teguh-iPad Musicologist[1546] <Warning>: Sound effect is false

**Task 2 (Success): Melihat badges**

Apr 14 11:31:25 Teguh-iPad Musicologist[1546] <Warning>: menu\_musicologist

Apr 14 11:31:51 Teguh-iPad Musicologist[1546] <Warning>: badges\_musicologist

**Task 6 (Success): Menjawab soal kuis**

Apr 14 11:33:13 Teguh-iPad Musicologist[1548] <Warning>: menu\_musicologist

Apr 14 11:33:21 Teguh-iPad Musicologist[1548] <Warning>: thinking\_difficulty\_level\_musicologist

Apr 14 11:33:25 Teguh-iPad Musicologist[1548] <Warning>: thinking\_level\_selection

Apr 14 11:33:31 Teguh-iPad Musicologist[1548] <Warning>: Music theory quiz no. 1 answered