

Implementation of the Decision Tree Algorithm as an English Learning Media at SD Negeri 1 Senenan

Gun Sudiryanto¹, R. Hadapiningradja Kusumodestoni^{2*}, Gentur Wahyu Nyipto Wibowo³, Charles Firmansyah⁴ Universitas Islam Nahdlatul Ulama Jepara

ABSTRACT: This research is motivated by the declining interest of students in learning English because teaching the old or traditional way more or less hinders the ability of many students to understand certain languages. The purpose of this research is to design an English learning media in the form of educational games to attract students' interest in learning English further. This research uses the waterfall development method which is combined using the Decision Tree algorithm. In its application the *Waterfall* method has five stages, namely, Requirements Analysis, System Design, Program Code Writing, Testing, and Maintenance, while the application of the Decision Tree algorithm lies in the first game to choose what path or scan will each player get. The results of this study showed that 90.85% of people who took part in the survey through respondent questionnaires were interested in learning more English.

Keywords : Educational game, Decision tree Algorithm, English

Submitted: 01-06-2022; Revised: 07-06-2022; Accepted: 19-06-2022

Corresponding Author: kusumodestoni@unisnu.ac.id

INTRODUCTION

Language has an important role in individual life, especially in early childhood. because language is a child's effort to express thoughts and feelings to others as opposed to speaking. Based on field results, children live in the 21st century where children must be required to compete internationally, so that it has an impact on children's language skills in the future, especially foreign languages. That one of the international languages that needs to be mastered is English. English is a language that is almost used in many countries of the world to communicate, so mastery of English needs to be considered for today's society to expand the information needed in the international world [1]. As a means of communication between global communities, English must be actively mastered both spoken and written. Given that English language skills are very important in the era of global competition, which is supported by technological advances [3]. Education must be able to bridge the good will between teachers or teachers and students in technological progress. This can lead to an innovation in utilizing media using smartphones or better known as mobile learning [4]. At SDN 1 Senenan the delivery of English learning still uses print media and conventional lessons so that students often feel bored with the lessons. By using the Decision Tree Algorithm is one of the algorithms that can be applied in the game. Researchers want to make an interactive English learning media application. The application of games as learning media or better known as Educational Games can give its own impression.

REVIEW OF LITERATURE

1. Educational Games

Educational game is a game designed and made specifically to be used as a learning medium through material that contains sound, text, images, animation, and video whose material discusses a particular subject, which aims to provide a better understanding and expand the concept of the material. which teaches a historical or cultural event conventionally or with print media, and can also teach users of this educational game well, because they can play while learning easily.[12]

2. Decision Tree

Decision Tree is one of the decision analysis techniques. Decision Tree itself was first published in the 1960s by Fredkin which comes from the word tries or digital tree, which is a retrieval or retrieval. Etymologically this word is pronounced as 'Tree'. Although it is similar to the use of the word 'try' but this aims to distinguish it from the general tree. Decision Tree is a tree structure, where each tree node represents an attribute that has been tested, each branch is a division of the test results, and a leaf node represents a particular class group. The highest node level of the Decision Tree is the root node, which is mostly an attribute that has the most influence on a particular class. In general, Decision Trees perform a top-down search strategy for solutions. During the process of classifying unknown data, attribute values will be tested by finding or tracing the path from the root node (root) to the final node (leaf) and then predicting the class owned by a certain new data. In Decision Tree data processing there are 2 steps that must be applied 1. Changing the Form of the Data (Table) into a Data Tree Model 2. Changing the Tree into Rules (rules).[17]

3. Construct 2

Construct 2 is an HTML5-based game engine or tool developed by Scirra for the 2D platform.[15] The minimum requirements to run this application are Windows XP or later, 512 MB RAM, 1 GHz Processor, HTML5 compliant browser, and graphics card. In addition to being HTML5-based, Construct 2 can also create games for Wii U, iOS, Android, Windows 8 and RT, Windows Phone 8, Windows Desktop, Mac Desktop, Linux Desktop, Blackberry 10, Firefox Marketplace, Tizen, Facebook, Chrome Web Store, and Amazon. Appstore.[16]

4. Black Box Testing

This test focuses on the functional requirements of the software. This test allows RPL actors to obtain a series of input conditions that meet the functional requirements of a program.

METHODOLOGY

The research was developed using the waterfall method. The waterfall method was chosen because it uses a systematic and sequential approach in building software starting from the analysis, design, coding, testing and maintenance stages.[24] So that the existing stages must be done sequentially to minimize errors made.

The research method stage has 5 processes, the processes are:

- 1. Needs Analysis (analysis) This stage aims to understand, learn something and evaluate a form of problem that exists in the SDN 1 Senenan environment. This information can be obtained through direct observation, interviews, discussions or surveys in the field. After collecting the existing data, the researcher will present the main points of the problem.
- 2. System Design At this stage the researcher draws, plans and designs or arrangements from several separate displays in the Educational Game.
- 3. Writing Program Code At this stage the researcher applies the results of the design to the game maker software, where the researcher will enter the design along with the logic used to build an educational game.
- 4. Testing At this stage the researcher conducts testing of the development of a system which at this stage will be tested whether there are errors or not in the application. So that this application is feasible or not used by users.
- 5. Stages of Support (maintenance) This stage is the last stage of the Waterfall method. At this stage the finished educational game will be run and carried out maintenance, namely the process of repairing the system that is suitable for the user.

RESEARCH FINDINGS

The steps taken in completing this research are:

Design Stage

In designing this English Educational Game application, the researcher uses the system development method, namely Water Fall, which consists of 5 stages. The implementation of the entire procedure for developing this research in detail can be seen as follows:

1. Needs Analysis

This application is intended for fourth grade elementary school children who are studying English subjects. With this application, it will be a learning medium that will help teachers in teaching and learning activities because educational games will provide students with knowledge about English subjects, especially on the subject of further introduction of Pet's or pets.

- 2. System Design
- a. depiction

The following is a description of the educational game application design: The home page is the start page of the application which contains buttons, Play, Animal Information, About and Exit.



Figure 1. Home page

The play page is a game selection at the beginning. The player will play chapter 1 if the player gets a good score then chapter A will open (top), and if the player gets a good score then chapter B will open (bottom).



Figure 2. Menu All Games

Chapter 1 ayau game awal sendiri model permainannya adalah menebak nama hewan dalam bahasa inggris dengan media gambar.



Figure 3. Chapter 1

Like the selection of chapters, players will be treated to scans A1 (Selec Level) and so on, but the difference here is that players will be able to buy characters to play educational games.



Figure 4. Chapter A

In-game descriptions, players will search for animals based on illustrations and pictures.



Figure 5. Chapter A . game model

In Chapter B, players will be treated to a guessing game, but not pictures but the characteristics of the animal.

Deskripsi Brita Koli Sofi advances Progi Scalada Martina Scala	Bedasar deskripsi hewan apa ilu (************************************	
 (D		

Figure 6. B . game model

In the animal information display, players can learn about the types of animals.



Figure 7. Animal Information Menu

3. Writing Program Code

At this stage, all components of the development of English educational game applications that have been prepared at the design stage are then assembled or combined into a single unit. This English educational game application is designed using Construct 2 software.

command code used to display the Home Menu.

	lnclude: gla	bal		
1日	 System 	On start of layout	C Function	Call "fade_in" ()
			🛱 System	Set layer "ul_informasi_hewan" Invisible
			🗱 System	Set layer "ui_exit" Invisible
			🛱 System	Set layer "ui_about" invisible
			🛱 Function	Call "pinhome" ()
2	O 🕼 System	n For each 🚥	-tombol	Set savex to Self. Width
		tombolhome	-tombol	Set savey to Self.Height
	📢 Audio	X Tag "musik"	Audio	Play bg_musik looping at volume -20 dB (tag "mus
1		is playing		
	ui informasi	hewan		
4	B		Add action	
5	H		🜔 kanan	📌 Pin Pin to 😑 ui_inform_hewan (Position & an
			🐓 əyəm_i	📌 Pin Pin to 📕 kotakKayu2 (Position & angle)
	System 2	🗙 Layer		
		"ul_informasi_hewan" is visible		
91	🛱 System	X Layer "ul_about" is visible		
	🖨 System	X Layer "ui_exit" is visible		
	🛱 System	Layer		
200		is visible		
40	🖨 System	Layer "ui_about" is visible		
	System 3	Layer "ui_exit" is visible		
40				

Figure 8. Display of Home Menu Code

The following is the command code used to display the All Games Menu.

Lei	nuagame sem	wagame ×		
- 1	Tinclude: es o	same awai		
	Include: glo	bal		
1 🖽	 System 	On start of layout	C Function	Call "fade_in" ()
			System 3	Set layer "a" Invisible
			G System	Set layer "b" Invisible
3日	🗢 💭 Touch	On touched -		
		play_semua_game		
5⊞	🗢 少 Touch	On touched back2		
7⊞	🗢 💭 Touch	On touched SpriteFont		
10	SpriteFont	Pick instance with UID 90	5priteF	Set text to "High Score : "&WebStorage.LocalValue("hiscore")
	System	🗙 Layer "a" is visible		
	🛱 System	🗙 Layer "b" is visible		
12⊞	System 2	Every tick	Add action	
15⊞	🗢 💭 Touch	On touched 🥝 a		
18⊞	🗢 🗳 Touch	On touched 😑 b		
21	🗄 drag and	l drop semua game		

Figure 9. Display Menu Code All Games

The following is the command code used to display the Early Game in the form of a guessing game for guessing animal pictures.

game awal ×	game_awai		
Include: alo	bal		
😨 Giebai con	nhar waktu = 40		
Giobai cura	ober iawabaosoal = 0		
Gipbai run	nber IDgame = 0		
Global nun	nber pilihan - 0		
😗 Global run	nber gamemulai = 0		
😵 Global ran	nber data_score = 0		
😌 Giebai nun	nber simpan_data_hisco	ore = 0	
🕑 Glebai nun	nber data_soal = 0		
😌 Giebai nun	nbar star = 0		
🐨 Globai run	nber darah = 5		
B System	On start of layout	S Function	Call "fade_in" ()
		🛱 System	Set waktu to 40
		Smainmens2	Set savex to Self.Walth
		🙁 mainmenu2	Set savey to Self.Height
		-kayu4	Set saves to SelCivish
		kayo4	Set savey to SetUrleght
		🛱 System	Set layer "notificenarsalah" (misible
		System	Set laver "menupause" Invisible
		System	Set laver "menuakhir" invisible
		Service Function	Call "pieposisiakhir" ()
		C Function	Call "Setdatahewan" 0
		System	Wait 0.1 seconds
		C Function	Call "setdatarandomsoal" ()
		System	Wait 0.1 seconds
		C Function	Call "setsoal" ()
		System	Set data_score to 0
		🛱 System	Set simpan_data_hiscore to WebStorege.LocalVolue("hiscore")
		🛱 System	Set gamemulai to 1
el 🗢 🚅 Function	On "Setdatahewan"		
• Function	On	🛄 data acak	Clear
	"setdatarandomsoal"	E data acak	Set size to (4, 1, 1)
		Add without	
	On "setsoal"	System	Set lawabansoal to date popliAtiO-1
		Stratem.	Set niliban to charge (7.2.2.4)

Figure 10. Display of the Initial Game Menu Code

The following is the command code used to display the Scan Menu Game B.

	Inc	ude: glot	al			
1	• 嶽 :	ystem	On st	art of layout	🛱 Function	Call "fade_in" ()
					System	Set layer "a" Invisible
					System	Set layer "b" invisible
					- kayu 3	Set savex to Self Width
					-kayu3	Set savey to Self.Height
					Add action	
2	1.5	priteFo	Pick i	nstance with UID	SpriteF	Set text to "High Score : "&WebStorageLocalValue("hiscore
		_	153		Add action	
	•	ouch	On to	ouched -		
			кауц	3		
6 8	dr	ag and	dro	p B awal		
7 8	••	 gamba 	0	n 🛼 DragDrop		
			d	op		
8		🔲 gan	bar	Pick instance with UID 148	System 3	Wait 1.3 seconds
					m gambar	Set X to 143
					🗰 gambar	Set Y to 187
					Add action	
9		ee gan	bar	with UID 151	CD System	Wat 1.3 seconds
					m gambar	Set X to 443
					- gambar	Set Y to 258
				Rich Instance	And action	100 1 1
0		i gan	Dar	with UID 149	se system	Valt 1.3 seconds
					m gambar	Set V to 206 504
					Add action	381110 304394
		the name	har	Pick instance	8 System	Wait 13 seronds
1		you you		with UID 150	ne oambar	Set X to 1093
					ganicara	

Figure 11. Scan Code Display Game Menu B

The following is the command code used to display In Game Scane B in the form of a game to guess the name of the animal based on the existing description.

-51	82 ×			
	Include: gla	bal		
	🚱 Gløbal nu	nber waktu_b1 - 30		
	🖑 Global nu	nber pilihan_b1 = 0		
	🕑 Glebai nu	nber ID game b1 = 0		
	🛇 Glebai nu	nber Jawaban_soal_b1 = 0		
	😵 Global na	nder gamemulai_b1 = 1		
	🕑 Global nu	nder data_soal_B = 0		
	Glebai nu	nőer data_score_b1 = 0		
	Global nu	nber simpan_data_hiscore_b1 - 0		
	Cilebai nu	nber darah_b1 = 5		
- 10 -	Gilebal nu	nber star b1 = 0	and as a set	
	System.	On start of layout	Function	Call tade in ()
			System .	Set waktu b1 to 50
			Omainmenu3	Set savex to Self Wisth
			Comainmenu3	Set savey to Self.Height
			— кауъ З	Set savex to Self Width
			-kayu3	Set savey to SettHeight
			System .	Set layer "notifbenarsalah_b1" invisible
			🛱 System	Set layer "menupause_b1" avisible
			🕸 System	Set layer "menuakhir_b1" invisible
			C Function	Call "pin_posisi_akhir_b1" ()
			😅 Function	Call "set_data_hewan_b1" ()
			System .	Wait 0.1 seconds
			C Function	Call "set_data_random_soal_b1" ()
			🛱 System	Wait 0.1 seconds
			C Function	Call "set_soal_b1" ()
			System .	Set gamenulai b1 to 1
			System .	Set data_score_b1 to 0
			System	Set simpan_data_hiscore_b1 to WebStorageLocalValue("hiscore_b7
e 🖽 🔹	C Function	On "set data hewan b1"		
5 EE -	Cunction	On "set_data_random_soal_b1"	🔛 data_acak_b 1	Clear
			data_acak_b1	Set size to (4, 1, 1)
• E	Function	On "set_soal_b1"	🚭 System	Set Jawaban_soal_b1 to date_ocok_b1.40(0) - 1
			CE System	Set pilihan b1 to choose(1,2,3,4)

Figure 12. In-game Scan B code display

The following is the command code used to display the Selec Level which is used to select a level and buy Characters.

1				
- 10	eCithei eCheeCh	ipa x		
	🔚 Include: global			
	Slobal number	player_kucing = 0		
	Slobal number	player_anjing = 0		
1⊞	🍽 🖾 System	On start of layout	😅 Function	Call "fade_in" ()
			📇 LocalStorage	Check item "koin" exists
			HocalStorage	Check item "anjing" exists
			LocalStorage	Check item "kucing" exists
			🙀 System	Set layer "charakter" invisible
			-kayu5	Set saves to Self.Width
			-kayu5	Set savey to Self-Height
			-tombol_beli	Set saves to Self.Width
			-tombol_beli	Set savey to Self.Height
6日	+ 🖓 Touch	On touched 🙆 tombol_selec	🗱 System	Set level_now to tombol_selec.id+1
7	Combol_sel	ec Animation frame # 0	🗱 System	Go to layout "A"&tombol_selec.id+1
	tonbol reset + kemb	ali + karakter		
8⊞	🕈 💭 Touch	On touched - kayu5		
	save koin + karakter			
11⊞	🗱 System	Every tick		
13	• System	On end of layout	LocalStorage	Set item "koir" to koin
			LocalStorage	Set item "kucing" to player_kucing
			LocalStorage	Set item "orging" to player anjing
14	• TocalStorage	On item "kois" exists	LocalStorage	Get item "koin"
			Add action	
15	• To calstorage	On item "onling" exists		Get item "apijoa"
	-		Add action	
16		On item "Aurina" exists		Get item "huring"
			Add action	
17	• Si Lora Storaga	On item "Inis" aut	a Sectem	Sat kein to JoralDecom Benilehe
	constant of age	on the law Alt	Add action	and many to account of a day have
10	at all a subliments	On Association 1 and	All Contant	Fat always seriling to Local Neuron Republicher
10	- Intrastorage	Ciritain byog ga	als system	set prayer_anying to cocostore/converter

Figure 13. Display Code Selec Level

The following is the command code used to display In game Scane A in the form of a Platformer game.

_				
A1	A2 A3	A6 M A5 es_a1-a6	×	
	Include: ala	bal		
	untuk level			
	Global au	other level now = 1		
	Global au	mber simpan koin = 0		
	Global nu	mber game mulai a1 = 0		
	Global nu	mber waktu a1 = 50		
	Global nu	ober koin = 0		
	Global nu	mber koinfull a = 0		
	Global nu	mber kunci_al = 0		
	Global tex	t state = "		
	Global nu	mber nyawa_A1 = 5		
11	-> 🏰 System	On start of layout	C Function	Call "fade_in" ()
			D System	Set nyawa A1 to 5
			System	Set waktu al to 50
			All System	Set name mulai al to 1
			and Surface	Set state to "
			All Custom	Cat Januar "advandation" (deible
			all system	Set layer charakter visible
			System .	Set layer "pause_a1" Mivisible
			System	Set layer "menu_akhir_a1" hws/die
			Function	Call "pin_posisi_akhir_a1" ()
			LocalSt	Check item "koin" exists
з	Player_g	irey		
12	Player_k	ucing		
21	Player a	niina		
30	- control			
	m player e	ontrol		
35	⊞ player_c			
37	⊕ musuh+	jebakan		
62	destroy			
78	🗄 pergera	kan_musuh		
96	⇒ 🖗 player	On collision with 😑 gold_3	gold_3	Destroy
			🛱 System	Add 7 to koin
			di antis	Next select an apple 4.4 and leaving at university of the second selection

Figure 14. In Game Scan Code Display A

4. Testing

The test involves Media Experts, Material Experts and 40 respondents so that this application is feasible or not to be used by users.

5. Maintenence

This stage is the last stage of the Waterfall method. At this stage the finished educational game will be run and carried out maintenance, namely the process of repairing or adding a system that is suitable for the user.

DISCUSSION

The implementation of Game Application

1. Display the English Educational Game Application Icon after it is installed on the smartphone.



Figure 15. Icon

2. This splash screen display displays an illustrated image of the application for a few seconds before entering the application.



Figure 16. Splash Screen Tampilan

3. The Home screen displays the menu options available in the application. In the main menu displays the Animal Information menu, Play, Exit, and About.



Figure 17. Home Display

4. Animal Information Display displays the material contained in this Bajasa English educational game application, namely Animal Pictures, and Animal Characteristics that can be changed from English (originally) to Indonesian (after changes).



Figure 18. Animal Information Display

5. The All Games menu displays all existing games starting from the initial game, Scane B (if the Player or player scores less than 70) and Scane A (If the Player or player scores more than equal to 70).



Figure 19. Display menu All games

6. The initial game display shows a game of guessing animal names with pictures in English (Score in this game will be a reference to get or open Scane A or Scane B).



Figure 20. Initial Game Display

7. The Scane B menu display displays the prefix or Home for Scane B.



Figure 21. Display Menu Scan B

8. Display In Game Sacne B displays a game to guess the name of the animal with the characteristics of the animal in English.



Figure 22. In-game Scan B . display

9. The Selec Level display displays the Scane A menu which is used to select the level and purchase the characters in the Scane A game.



Figure 23. Display Selec Level

10. In Game Sacne A display shows Platformer or adventure games where the player or players will look for animals with the characteristics that are displayed.



Figure 24. In Game Scan A . Display

Application Testing:

1. Algorithm testing

This Scane selection system uses a Decision Tree as a method that will classify existing data. These data include gender, preferred language, score, scan.

2. Training Data

Name	Gender	Preferred Language	Score	Scane
Rava	Male	Indonesian	Medium	b
Kaiza	Perempuan	English	High	а
Valen	Male	Indonesian	Low	b
Dilla	Perempuan	English	Medium	а
Laras	Perempuan	Indonesian	Low	b
Bayu	Male	English	Medium	b
Gendis	Perempuan	English	Medium	а
Kiki	Male	Indonesian	High	а

Table 1	Training	Data
i ubic 1	. IIummig	Dutu

After going through the calculations, it can be concluded that the highest hierarchy is held by the score and the following is the course of the Decision tree in the game:



Figure 25. Result of branching

1. If the player has a High Score, gender is male or female, who likes English or likes Indonesian, they will enter Scan A.

- 2. If the player has a Medium Score, female gender, who likes English, they will enter Scan A.
- 3. If the player has a Medium Score, gender is male or female, who likes English or Indonesian, they will enter Scan B.
- 4. If the player has a Low Score, gender is male or female, who likes English or Indonesian, they will enter Scan B.

		Input			Output
No.	Score	Gender	Preferred Language	Scane	Description
1.	High	L	English	А	In accordance
2.	High	Р	Indonesian	А	In accordance
3	Low	Р	English	В	In accordance
4.	Medium	Р	Indonesian	А	In accordance
5.	Medium	L	English	В	In accordance
6.	Medium	L	Indonesian	В	In accordance

There are again the to the the

Black Box Test

Black Box Testing is carried out to check the feasibility as a quality assurance process at the implementation stage based on the functional table. From the test results obtained a 100% validity level so that the game meets all test scenarios with expert validation.

The feasibility of the let's see the pets application has been tested and assessed by 2 material experts and 2 media experts and the questionnaire was distributed to 40 people with the following results:

No	Examiner	Name of Examiner	Score	Criteria
1.	Media	1. Muhammad Husen, S. Kom	91,6%	Very Worthy
	Expert	2. Ellenia Kotinda, S.Kom		
2.	Material	1. Faiz Tri Pujiono	95,8%	Very Worthy
	Expert	2. Innocento Dyah N S.pd		
3	Public	40 Responden	90,85%	Very Worthy

Berdasarkan tabel hasil pengujian dapat disimpulkan bahwa untuk ahli media mencapai 91,6% dan berkriteria sangat baik, responden ahli materi / guru pengampu 95,8% dan berkriteria sangat baik serta responden masyarakat / wali peserta didik 90,85% yang menghasilkan kesimpulan sangat layak sehingga aplikasi dapat digunakan oleh SDN 1 Senenan untuk digunakan dalam pembelajaran.

Based on the table of test results, it can be concluded that for media experts it reached 91.6% and had very good criteria, 95.8% material expert respondents /

tutors had very good criteria and community respondents / guardians of students 90.85% which in a very feasible conclusion. so that the application can be used by SDN 1 Senenan for use in learning.

CONCLUSION AND RECOMENDATION

After the process of developing English educational game technology was used as a learning medium, which was named "Let's See The Pet" by the researchers, it was concluded that this application could make it easier for students to understand and increase students' interest in learning English subjects. This application is also equipped with appropriate audio, and there is game material that has been adapted to the existing lessons. With 92% of people stating that the English Educational Game application can attract interest to learn more English in accordance with the purpose of this application.

ADVANCED RESERACH

This research is still far from perfect, so the researcher gives suggestions for further research, namely: using more data sets so that the prediction accuracy becomes more accurate and the graphic display in the game can be further beautified to further increase the attractiveness of children to learn while playing games.

REFERENCES

- S. K. Alam and R. H. Lestari, "Pengembangan Kemampuan Bahasa Reseptif Anak Usia Dini dalam Memperkenalkan Bahasa Inggris melalui Flash Card," J. Obs. J. Pendidik. Anak Usia Dini, vol. 4, no. 1, p. 284, 2019, doi: 10.31004/obsesi.v4i1.301.
- W. Q. Fatima, L. Khairunisa, D. C. Priatna, and B. Prihatminingtyas,
 "Pembelajaran Bahasa Inggris Melalui Media Game Pada Panti Asuhan Al Maun Di Desa Ngajum," Semin. Nas. Sist. Inf., no. September, p. 1728, 2019.
- N. A. Subekti, "Keberadaan Bahasa Indonesia Dan Bahasa Inggris Dalam Menunjang Ilmu Pengetahuan Di Era Global." 2019, doi: 10.31227/osf.io/mgfpn.
- A. Hidayat and E. R. Prasetya, "Belajar Reflektif Berbasis Sistem Android Untuk Meningkatkan Pembelajaran E-Learning," J. Gammath, vol. 4, no. 2, pp. 79–87, 2019.
- I. P. A. SUHARDIANA, "Peran Teknologi Dalam Mendukung Pembelajaran Bahasa Inggris Di Sekolah Dasar," Adi Widya J. Pendidik. Dasar, vol. 4, no. 1, p. 92, 2019, doi: 10.25078/aw.v4i1.934.
- N. K. Augustianingrum and A. C. Padmasari, "Implementasi Algoritma Decision Tree Boardgame Dwipantara sebagai Media Pembelajaran Sejarah Kerajaan untuk Meningkatkan Minat Belajar Siswa SD," Edsence J. Pendidik. Multimed., vol. 2, no. 1, pp. 57–64, 2020, doi:

10.17509/edsence.v2i1.25036.

- A. Nurhuda and R. Andrea, "Penerapan Decision Tree Dalam Agen Cerdas 'Unda Anak Pintar' Permainan Edukasi Muatan Lokal Bahasa Banjar," J. Ilm. Matrik, vol. 22, no. 2, pp. 147–152, 2020, doi: 10.33557/jurnalmatrik.v22i2.986.
- U. T. Hunter, A. C. Padmasari, A. K. K, and I. Anggraeni, "Penerapan Model Decision Tree Untuk Rancangan Game Multiplayer Berbasis Jaringan," vol. 1, no. 1, pp. 19–24, 2019.
- P. sokibi Sukanto and Ady Widjaja, "Game Edukasi Pembelajaran Bahasa Inggris Berbasis Android Untuk Sdit Sabilul Qur'an Cendikia," J. Bhs. Rupa, vol. 3, no. 2, pp. 83–94, 2020, doi: 10.31598/bahasarupa.v3i2.440.
- R. R. Santika, K. Ramadhan, M. Andri, A. Solehuddin, and S. Juanita, "Implementasi Game Edukasi Belajar Bahasa Inggris Dengan Metode Game Development Life Cycle Dan Pendekatan Taksonomi Bloom," Sebatik, vol. 23, no. 2, pp. 392–402, 2019, doi: 10.46984/sebatik.v23i2.788.
- H. Almuafiry, E. Jurusan, T. Informatika, T. Adhi, and T. Surabaya, "Game Edukasi Bahasa Indonesia Kelas 1 Sekolah Dasar Berbasis Android Menggunakan DGBL-ID Model," Integer J., vol. 2, no. 1, pp. 10–20, 2017, [Online]. Available: https://ejournal.itats.ac.id/integer/article/view/93.
- I. I. Purnomo, "Aplikasi Game Edukasi Lingkungan Agen P Vs Sampah Berbasis Android Mengunakan Construct 2," Technol. J. Ilm., vol. 11, no. 2, p. 86, 2020, doi: 10.31602/tji.v11i2.2784.
- S. R. Nurhalimah, S. Suhartono, and U. Cahyana, "Pengembangan Media Pembelajaran Mobile Learning Berbasis Android pada Materi Sifat Koligatif Larutan," JRPK J. Ris. Pendidik. Kim., vol. 7, no. 2, pp. 160–167, 2017, doi: 10.21009/jrpk.072.10.
- A. A. A. 1 B. S. 2 and 2 1, "Desain Kemasan Produk Sebagai Penunjang Media Promosi Dengan Menggunakan Aplikasi Corel Draw X7," pp. 565–569, 2019.
- B. Label, Edukasi Edukasi. 2016.
- H. A. W and A. Y. Rahmadhani, "Pengenalan Game Edukasi Berbasis Construct 2 Pada Objek Wisata Daerah Kota Bandar Lampung," vol. 1, no. 1, pp. 1– 16, 2021.
- B. Asrun, U. C. Palopo, and D. Tree, "Page 455 of 464," vol. 04, pp. 455–464, 2017.
- P. T. Andaru and A. Agung, "Analisis Perancangan Sistem Informasi Penjualan Berbasis Web Pada," no. April, pp. 61–66, 2021.
- R. Sukmawati and Y. Priyadi, "Perancangan Proses Bisnis Menggunakan UML Berdasarkan Fit/Gap Analysis Pada Modul Inventory Odoo," INTENSIF J. Ilm. Penelit. dan Penerapan Teknol. Sist. Inf., vol. 3, no. 2, p. 104, 2019, doi: 10.29407/intensif.v3i2.12697.
- I. Budiman, S. Saori, R. Nurul Anwar, Fitriani, and M. Y. Pangestu, "Analisis Pengendalian Mutu di Bidang Industri Makanan (Studi Kasus: UMKM Mochi Kaswari Lampion Kota Sukabumi)," JIP (Jurnal Inov. Penelitian), vol. 1, no. 10, pp. 2185–2190, 2021.

- P. Mangunsong, L. Tanti, and R. Dewi, "Aplikasi Game Catur Multiplayer Via Bluetooth Berbasis Android Multiplayer Chess Game Via Android-Based Bluetooth App," 118. IT J., vol. 5, no. 2, pp. 2252–746, 2017.
- Y. Firmansyah and U. Udi, "Penerapan Metode SDLC Waterfall Dalam Pembuatan Sistem Informasi Akademik Berbasis Web Studi Kasus Pondok Pesantren Al-Habib Sholeh Kabupaten Kubu Raya, Kalimantan Barat," J. Teknol. dan Manaj. Inform., vol. 4, no. 1, 2017, doi: 10.26905/jtmi.v4i1.1605.
- Anggi Oktavian, "269717-Perancangan-Aplikasi-Penjualan-Dengan-Me-457C839F," J. PETIR, vol. 11, no. 1, pp. 9–24, 2018.
- W. N. Cholifah, Y. Yulianingsih, and S. M. Sagita, "Pengujian Black Box Testing pada Aplikasi Action & Strategy Berbasis Android dengan Teknologi Phonegap," STRING (Satuan Tulisan Ris. dan Inov. Teknol., vol. 3, no. 2, p. 206, 2018, doi: 10.30998/string.v3i2.3048.
- S. Muhammad, R. Rohayati, and S. A. Z. Hairi, "Aplikasi Game Media Pembelajaran Bahasa Inggris Pada Anak - Anak Sdn Melayu 2 Banjarmasin Menggunakan Adobe Flash Cs6," POSITIF J. Sist. dan Teknol. Inf., vol. 6, no. 1, p. 47, 2020, doi: 10.31961/positif.v6i1.905.
- R. E. N. Arifah, S. Sukirman, and S. Sujalwo, "Pengembangan Game Edukasi Bilomatika untuk Meningkatkan Hasil Belajar Siswa pada Mata Pelajaran Matematika Kelas 1 SD," J. Teknol. Inf. dan Ilmu Komputer., vol. 6, no. 6, p. 617, 2019, doi: 10.25126/jtiik.2019661310.