

Supplementary Information

The Development of HUPROSED (Human Reproductive System and Sex Education) as an Android Game to Exercise Students' Critical Thinking Skills

Putri Sekar Melati^{1*}, Eka Cahya Prima¹, Eliyawati¹

¹International Program on Science Education (IPSE) Study Program, Faculty of Mathematics and Science Education, Universitas Pendidikan Indonesia, Bandung, Indonesia

Table Lists

Table 1 Expert Judgment Rubric

Aspect	No	Sub-aspect	Score			
			1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)
Display (Sukariasih et al., 2019)	1	Menu display				
	2	Button usage				
	3	Layout				
	4	Type and size of text				
	5	Colour composition				
	6	Quality of photos, images, and graphics				

Aspect	No	Sub-aspect	Score			
			1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)
	7	The suitability of video and audio				
	8	Animation quality				
	9	Cover design				
	10	Quality of interaction				
	11	Attractiveness and motivation				
Program (Masril et al., 2018)	1	Navigation				
	2	Button Consistency				
	3	Clarity of instructions for use				
	4	The efficiency of screen usage				
	5	Efficiency of text				
The implementation of critical thinking subskills in the game (Facione,2015)	1.	There is interpretation subskills in the concept of the game,and the quiz, to comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria.				
	2.	There is analysis subskills in the concept of the game, and the quiz, to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief,				

Aspect	No	Sub-aspect	Score			
			1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)
		judgment, experiences, reasons, information, or opinions.				
	3.	There is inference subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.				
	4.	There is evaluation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.				
	5.	There is explanation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or				

Aspect	No	Sub-aspect	Score			
			1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)
		intended, inferential relationships among statements, descriptions, question, or other forms of representation.				

Table 2 Teachers' Questionnaire

Aspect	No	Sub-aspect	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
Curriculum (Sukariasih et al., 2019)	1.	The compatibility of the material with core competencies contained in the applicable curriculum.				
	2.	Compatibility of material with basic competencies contained in the applicable curriculum.				
	3.	Clarity of learning objectives.				

Aspect	No	Sub-aspect	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
	4.	The suitability of the order of material contained in learning media with scientific concepts.				
	5.	Clarity of learning media users.				
	6.	Adequacy of material description in clarity of scientific concepts.				
	7.	Adequacy of examples given.				
	8.	Material conformity with learning objectives.				
Learning (Sukariasih et al., 2019)	1.	Clarity of learning instructions.				
	2.	Ease of understanding sentences in text/writing.				
	3.	Ease of understanding material (content) lessons.				
	4.	The accuracy of the order of presentation.				
	5.	Clarity of feedback/response.				
	6.	Suitability of material with student characteristics.				
	7.	Ease of media users.				
	8.	Interesting media used.				
Benefits for teacher	1.	Can be a reference for the teacher to activate the student in learning;				
	2.	Can support teacher's activities in fulfilling K13's demands;				

Aspect	No	Sub-Aspect	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
(Masril et al., 2018)	3.	Can be used to motivate student learning				
	4.	Can make learning more interesting.				
Opportunities for Implementation (Sukariasih et al., 2019)	1.	Facilitates students to work following the scientific method				
	2.	Help students to think critically;				
	3.	Makes learning time more efficient;				
	4.	Can help students learn independently;				
	5.	Evaluations can be used to measure students' mastery of learning materials.				
The implementation of critical thinking subskills in the game (Facione,2015)	1.	There is interpretation subskills in the concept of the game,and the quiz, to comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria.				
	2.	There is analysis subskills in the concept of the game, and the quiz, to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions.				
	3.	There is inference subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended,				

Aspect	No	Sub-aspect	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
		inferential relationships among statements, descriptions, question, or other forms of representation.				
	4.	There is evaluation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.				
	5.	There is explanation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.				

Table 3 Students' Questionnaire


No	Aspect	Statement	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
1	Display	The display in HUPROSED has an attractive color and appearance.				


No	Aspect	Statement	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
	(Masril et al., 2018)					
2	Use of buttons (Sukariasih et al., 2019)	The button in HUPROSED has a good function.				
3	Clarity of buttons (Sukariasih et al., 2019)	The button in HUPROSED has a useful function.				
4	Type and size of text (Sukariasih et al., 2019)	The type and size of the text in HUPROSED can be seen clearly.				
5	Colour sustainability (Masril et al., 2018)	The color sustainability in HUPROSED can be seen clearly.				
6	Image Suitability (Sukariasih et al., 2019)	The image in HUPROSED is shown clearly.				
7	Use of image (Sukariasih et al., 2019)	The images in HUPROSED represent clearly.				
8	Use of Animation	The animations in HUPROSED represent clearly.				

No	Aspect	Statement	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
(Masril et al., 2018)						
9	To prevent misunderstandings in this study, the operational definition is provided in the following terminology:(Sukariasih et al., 2019)	The delivery of the material of the “ <i>Human Reproductive System and Sex Education</i> ” in a HUPROSED game is delivered.				
10	Ease of understanding language (Sukariasih et al., 2019)	The language and writing used in HUPROSED game are easy to understand.				
11	Use The Navigation Buttons (Sukariasih et al., 2019)	The buttons on the HUPROSED game work well.				
12	Quality if interaction (Sukariasih et al., 2019)	Each level in the HUPROSED game has different levels of difficulty.				
13	Use of Multimedia (Sukariasih et al., 2019)	The use of Multimedia on the HUPROSED game works well.				


No	Aspect	Statement	Score			
			1 Poor	2 Fair	3 Good	4 Excellent
14	Problem adequacy (Sukariasih et al., 2019)	Each level in the HUPROSED game has different levels of difficulty.				
15	Attractiveness and motivation (Masril et al., 2018)	The HUPROSED game increases understanding of the material in <i>“Human Reproductive System and Sex Education”</i> .				


Table 4. Test item

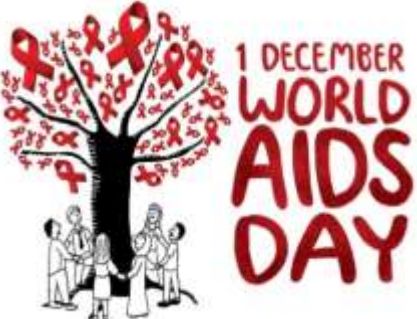
No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
1.	Interpretation (Decode significance)	C4 Analyze (Organizing)	Menstruation Cycle	 <p>On April 1, Scientia got her menstruation period where, the condition of her lining of the uterus wall has broken down. Scientia usually has her period around 7 days, The follicles in each ovary alternately develop during the follicular phase. Therefore the ovum is released one by one from the ovary. Based on the 28-day menstrual cycle graph, when will Scientia get her ovulation phase? and why does the ovulation phase happen on that day?</p>	B. Day 14, because follicle-stimulating hormone (FSH) and luteinizing hormone, or lutropin (LH). They act on a ripe follicle and stimulate maturation and release of the ovum.

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
				<p>Image Source: yourfertility.org.au</p> <p>A. Day 14, because progesterone, which affects the uterus lining in the same way as the estrogens, making it grow thicker and produce more blood vessels.</p> <p>B. Day 14, because follicle-stimulating hormone (FSH) and luteinizing hormone, or lutropin (LH). They act on a ripe follicle and stimulate maturation and release of the ovum.</p> <p>C. Day 24, because progesterone act on a ripe follicle and stimulate maturation and release of the ovum, since follicle-stimulating hormone (FSH) and luteinizing hormone, or lutropin (LH) also release.</p> <p>D. Day 28, because estrogens produced by the ovary increases by the time follicle-stimulating hormone (FSH) and luteinizing hormone, or lutropin (LH) increase.</p>	
2.	Analysis (Identify arguments)	C4 Analyze (Atributting)	Sexual Transmitted Disease	<p>Please read this passage carefully :</p> 	A. Because they do unsafe sexual intercourse and change sex partners most of the time.

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
				<p><i>Populasi penyuka sesama jenis (lesbian, gay), biseksual atau transgender (LGBT) merupakan kelompok yang berisiko tinggi mengalami berbagai masalah kesehatan, termasuk infeksi virus Hepatitis B (HBV), Hepatitis C (HCV) dan Human Immunodeficiency Virus (HIV). Risiko ini meningkat akibat perilaku seksual yang tidak aman seperti memiliki lebih dari satu pasangan seksual, hubungan seksual melalui anal maupun vagina yang tidak menggunakan pelindung, penggunaan obat-obatan dan alkohol, yang umum ditemukan pada populasi LGBT. (Pratiwi & Sukmawati, 2019)</i></p> <p>Image source: https://www.pexels.com/</p> <p>From the passage above, we can conclude that LGBT (Lesbian, Gay, Bisexual, Transgender) is categorized as unhealthy sexual behavior, also still being forbidden in some countries, such as Indonesia, because LGBT behaviour is not in line with norms and culture in Indonesia. Why LGBT (Lesbian, Gay, Bisexual, Transgender) is categorized as unhealthy sexual behavior?</p> <p>A. Because they do unsafe sexual intercourse and change sex partners most of the time. B. Because they live in a country that is against their personality. C. Because people don't supply their way. D. Because they are discriminated against by other people.</p>	

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
3.	Inference (Draw logically valid or justified conclusions)	C5 Evaluate (Critiquing)	Sperm	<p>Please read this news carefully :</p>  <p><i>Komisioner KPAI Sitti Hikmawatty mengatakan pemikiran ini ia dapatkan dari referensi jurnal luar negeri. Namun, Sitti belum mengungkap lebih jelas referensi yang dibacanya. Ia mengatakan secara tidak langsung misalnya ada sebuah mediasi di kolam renang, perempuan bisa saja hamil. Ada jenis sperma tertentu yang sangat kuat, meski tidak terjadi penetrasi tapi ada pria yang terangsang saat di kolam renang dan mengeluarkan sperma. Pertemuan yang tidak langsung, misalnya, ada sebuah mediasi di kolam renang. Kalau perempuannya sedang fase subur, itu bisa saja terjadi,"ucap Sitti Hikmawatty, Komisioner KPAI dilansir dari TribunJakarta.com pada 21 Februari 2020.</i></p> <p>Source: https://www.cnnindonesia.com/nasional/ Image source: https://www.pexels.com/</p> <p>This news became controversial in Indonesia, some people agree, rest of them disagree. How about you?</p>	C. Disagree, because the water pool is not a good place for sperm to live, due to the seminal fluid that automatically dries after coming out into the water.

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
				<p>Do you agree with her opinion? what is your reason based on a scientific view?</p> <p>A. Agree, sperm can swim throughout the water and come into the vagina's woman while she swims in the same place.</p> <p>B. Disagree, because sperm could not be ejaculated from a male's penis when in the water.</p> <p>C. Disagree, because the water pool is not a good place for sperm to live, due to the seminal fluid that automatically dries after coming out into the water.</p> <p>D. Agree, because pool water has a good pH for the sperm fertilize the ovum.</p>	
4.	<p>Evaluation (Assess the quality of arguments that were made using inductive or deductive reasoning assess the credibility of claims)</p>	C5 Evaluate (Checking)	Twin	 <p>In the new maternity, a wife wants to have a twin baby, and her husband said that we might have a twin because he has any twin trait from his parents. They go to the obstetrician and check whether they have twin babies or not. The obstetrician check by ultrasonografi (USG), then said father's sperm fertilized the same single ovum, then divided into two zygot. In your opinion based on the scientific sources that you have been learning on this game, Do they have twin babies?</p>	

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
				<p>Image source: https://www.pexels.com/</p> <p>A. Yes, they will have fraternal twins, because twins formed from a single ovum and sperm must be of the same sex because only one sperm (X or Y) fertilized the ovum.</p> <p>B. No, they don't have any twins, because father's sperm fertilized the same single ovum, then divided into two zygot.</p> <p>C. Yes, they will have identical twins, because twins formed from a single ovum and sperm must be of the same sex because only one sperm (X or Y) fertilized the ovum.</p> <p>D. No, they don't have any babies, because these 'one-egg twin's are sometimes turn into one zygot.</p>	
5.	Explanation (Present arguments)	C6 Create (Generating)	HIV	 <p>Please read this news carefully :</p>	

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer
				<p data-bbox="992 296 1563 724"><i>Saat peringatan Hari Aids se-Dunia di Boyolali. Agar pendataan bisa maksimal, ia mengimbau masyarakat, terutama kepada kelompok yang rentan terserang HIV/AIDS, untuk berani melakukan tes. Sehingga bila terdeteksi, penanganan bisa segera dilakukan. Di Boyolali sendiri saat ini sudah memiliki fasilitas kesehatan yang bisa menangani ODHA (Orang Dengan HIV/AIDS), diantaranya RSUD Pandanaran, Puskesmas I Boyolali, Puskesmas Banyudono I, RSUD Andong, RSUD Simo, dan Puskesmas Ngemplak. "Sistem kekebalan tubuh ODHA akan melemah, namun bisa tetap terjaga lewat pemeriksaan dan penanganan medis secara rutin," jelasnya.</i></p> <p data-bbox="992 759 1525 815">Source: https://www.cnnindonesia.com/Boyolali/ Image source: https://bernas.id</p> <p data-bbox="992 850 1563 906">Based on scientific views, Should ODHA be discriminated?</p> <p data-bbox="992 941 1563 1246"> A. Yes , because the transmission of HIV / AIDS by saliva, or aerosol in the air. B. No, because HIV is a can not transmitted by risky behavior (sex, offspring and sharing needles). C. Yes, because ODHA can kills the human immune system. D. No, because ODHA will not be able to transmit the virus that kills the human immune system by saliva, or aerosol in the air. </p>	

No.	Sub Skills of Critical Thinking Skills	Cognitive Level	Concept	Question	Answer

Table 5. Expert Judgement Results

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
Material	1.	The accuracy of the contents	3	4	4	3,67		0,58
	2.	Depth of material	3	4	3	3,33		0,58
	3.	Accuracy of examples	3	4	4	3,67		0,58
	4.	Suitability of the picture	2	4	4	3,33		1,15
	5.	Completeness of information.	2	4	4	3,33		1,15
	6.	Conformity tests with essential competencies and indicators	2	4	4	3,33	3,44	1,15
Quiz	7.	Interactivity (stimulus and response);	2	4	4	3,33	3,56	1,15

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
Display	8.	Suitability test with answer key	3	4	4	3,67		0,58
	9.	Accuracy response	3	4	4	3,67		0,58
	1	Menu display	2	4	4	3,33		1,15
	2	Button usage	2	4	4	3,33		1,15
	3	Layout	3	4	4	3,67		0,58
	4	Type and size of text	3	4	3	3,33		0,58
	5	and	4	4	4	4,00		0,00
	6	Quality of photos, images, and graphics	2	4	4	3,33		1,15
	7	The suitability of video and audio	2	4	4	3,33		1,15
	8	Animation quality	3	4	4	3,67		0,58
	9	Cover design	3	4	4	3,67		0,58
Program	10	Quality of interaction	2	4	4	3,33		1,15
	11	Attractiveness and motivation	2	4	4	3,33	3,48	1,15
	1	Navigation	2	4	4	3,33		1,15
	2	Button Consistency	1	4	4	3,00		1,73
	3	Clarity of instructions for use	2	4	3	3,00		1,00
The implementation of critical thinking subskills in the game	4	The efficiency of screen usage	2	4	3	3,00		1,00
	5	Efficiency of text	2	4	4	3,33	3,13	1,15
	1.	There is interpretation subskills in the concept of the game, and the quiz, to comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria.	3	3	4	3,33	3,13	0,58

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
	2.	There is analysis subskills in the concept of the game, and the quiz, to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions.	2	3	4	3,00		1,00
	3.	There is inference subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.	2	3	4	3,00		1,00
	4.	There is evaluation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.	3	3	4	3,33		0,58

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
	5.	There is explanation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.	2	3	4	3,00		1,00
		Average Score	2,40	3,83	3,87			
		Average All Judge's Score		3,37				

Table 6. Teacher Response

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
Curriculum	1.	The compatibility of the material with core competencies contained in the applicable curriculum.	3	2	4	3,00	3,08	1,00

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
	2.	Compatibility of material with basic competencies contained in the applicable curriculum.	3	1	4	2,67		1,53
	3.	Clarity of learning objectives.	2	4	4	3,33		1,15
	4.	The suitability of the order of material contained in learning media with scientific concepts.	4	1	4	3,00		1,73
	5.	Clarity of learning media users.	4	2	4	3,33		1,15
	6.	Adequacy of material description in clarity of scientific concepts.	3	2	4	3,00		1,00
	7.	Adequacy of examples given.	3	3	4	3,33		0,58
	8.	Material conformity with learning objectives.	3	2	4	3,00		1,00
Learning	1.	Clarity of learning instructions.	3	3	3	3,00	3,25	0,00
	2.	Ease of understanding sentences in text/writing.	4	3	4	3,67		0,58
	3.	Ease of understanding material (content) lessons.	4	2	4	3,33		1,15
	4.	The accuracy of the order of presentation.	4	2	3	3,00		1,00
	5.	Clarity of feedback/response.	4	2	4	3,33		1,15
	6.	Suitability of material with student characteristics.	2	3	4	3,00		1,00

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
	7.	Ease of media users.	3	2	4	3,00		1,00
	8.	Interesting media used.	3	4	4	3,67		0,58
Benefits for teacher	1.	Can be a reference for the teacher to activate the student in learning;	3	2	4	3,00	3,33	1,00
	2.	Can support teacher's activities in fulfilling K13's demands;	3	2	4	3,00		1,00
	3.	Can be used to motivate student learning	3	4	4	3,67		0,58
	4.	Can make learning more interesting.	3	4	4	3,67		0,58
Opportunities for Implementation	1.	Facilitates students to work following the scientific method	2	2	4	2,67	3,40	1,15
	2.	Help students to think critically;	4	2	4	3,33		1,15
	3.	Makes learning time more efficient;	4	4	4	4,00		0,00
	4.	Can help students learn independently;	4	4	4	4,00		0,00
	5.	Evaluations can be used to measure students' mastery of learning materials.	3	3	3	3,00		0,00

Aspect	No	Sub-aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
The implementation of critical thinking subskills in the game	1.	There is interpretation subskills in the concept of the game, and the quiz, to comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria.	4	3	4	3,67	3,20	0,58
	2.	There is analysis subskills in the concept of the game, and the quiz, to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions.	4	1	4	3,00		1,73
	3.	There is inference subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.	4	1	4	3,00		1,73
	4.	There is evaluation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.	2	4	3	3,00		1,00

Aspect	No	Sub-Aspect	Score			Average Aspect	Average Indicator	Deviation Standard
			A	B	C			
	5.	There is explanation subskills in the concept of the game, and the quiz, to assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgments, beliefs, opinion and to assess the logical strength of the actual or intended, inferential relationships among statements, descriptions, question, or other forms of representation.	4	2	4	3,33		1,15
		Average Score	3,30	2,53	3,87			
		Average All Judge's Score		3,23				

Table 7. Students' Response

No	Aspects	Statement	Score				Average Statement	Deviation Standard
			Σ1	Σ2	Σ3	Σ4		

1	Display	The display in HUPROSED has an attractive color and appearance.	1	8	15	22	3,26	7,83
2	Use of buttons	The button in HUPROSED has a good function.	1	11	21	13	3,00	7,12
3	Clarity of buttons	The button in HUPROSED has a useful function.	3	5	18	20	3,20	7,57
4	Type and size of text	The type and size of the text in HUPROSED can be seen clearly.	2	13	11	20	3,07	6,42
5	Colour sustainability	The color sustainability in HUPROSED can be seen clearly.	1	2	16	27	3,50	10,74
6	Image Suitability	The image in HUPROSED is shown clearly.	2	8	19	17	3,11	6,87
7	Use of image	The images in HUPROSED represent clearly.	1	8	15	22	3,26	7,83
8	Use of Animation	The animations in HUPROSED represent clearly.	1	7	14	24	3,33	8,56
9	To prevent misunderstandings in this study, the operational definition is provided in the following terminology	The delivery of the material of the “ <i>Human Reproductive System and Sex Education</i> ” in a HUPROSED game is delivered.	0	3	20	23	3,43	10,11
10	Ease of understanding language	The language and writing used in HUPROSED game are easy to understand.	1	8	18	19	3,20	7,43
11	Use The Navigation Buttons	The buttons on the HUPROSED game work well.	1	9	23	13	3,04	7,92
12	Quality of interaction	Each level in the HUPROSED game has different levels of difficulty.	0	5	21	20	3,33	9,18

13	Use of Multimedia		The use of Multimedia on the HUPROSED game works well.	1	6	24	15	3,15	8,79
14	Problem adequacy		Each level in the HUPROSED game has different levels of difficulty.	0	4	25	17	3,28	10,01
15	Attractiveness and motivation	and	The HUPROSED game increases understanding of the material in <i>“Human Reproductive System and Sex Education”</i> .	0	2	14	30	3,61	11,95
Average								3,25	

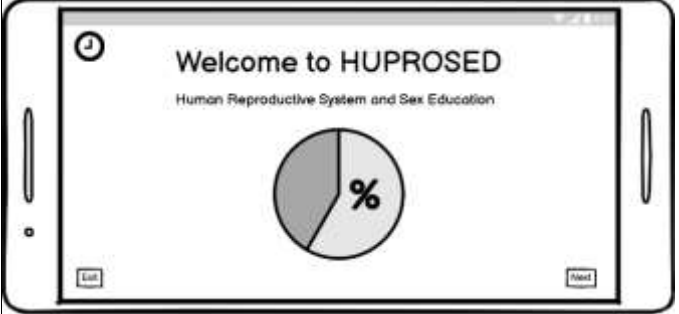
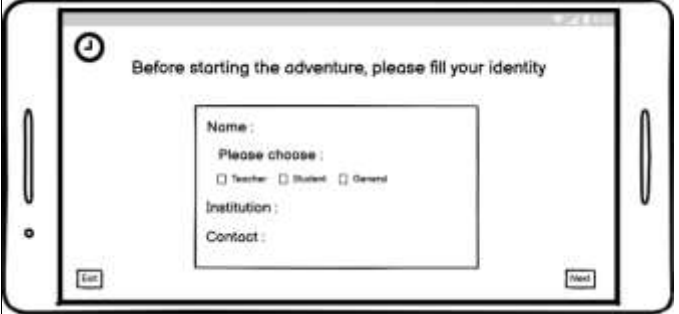
Table 8. The percentage of students' comment

No	Aspect	The amount of student	Percentage
1	Display (Masril et al., 2018)	12	26,1 %
2	Use of buttons (Sukariasih et al., 2019)	18	39,1 %
3	Clarity of buttons (Sukariasih et al., 2019)	5	10,9 %
4	Type and size of text (Sukariasih et al., 2019)	23	50 %
5	Colour sustainability (Masril et al., 2018)	10	21,7 %
6	Image Suitability (Sukariasih et al., 2019)	10	21,7 %
7	Use of image (Sukariasih et al., 2019)	9	19,6 %
8	Use of Animation (Masril et al., 2018)	14	30, 4 %
9	To prevent misunderstandings in this study, the operational definition is provided in the following terminology:(Sukariasih et al., 2019)	6	13 %
10	Ease of understanding language (Sukariasih et al., 2019)	10	21,7 %
11	Use The Navigation Buttons (Sukariasih et al., 2019)	7	15, 2%
12	Quality if interaction	7	15, 2%

	(Sukariasih et al., 2019)		
13	Use of Multimedia	4	8,7 %
	(Sukariasih et al., 2019)		
14	Problem adequacy	3	6,5 %
	(Sukariasih et al., 2019)		
15	Attractiveness and motivation	10	21,7 %
	(Masril et al., 2018)		

Figure Lists

Figure 1 Story board

Board	Explanation	Material/Script
	<p>1. Loading bar</p> <p>Loading bar as the first page of games. On this page, there are three buttons contain (exit and next). Below the title, there is a percentage button, it will direct to the main page after being 100 percent.</p>	
	<p>2. Main Page (Identity)</p> <p>There is a form of identity that is linked with email's developer game. Below this page, there are three buttons contain (exit and next). On this page, linked into Gmail.</p>	



3. Introducing HUPROSED

Introduce HUPROSED as the icon of this game. Below this page, there are three buttons contain (exit and next).



4. Home

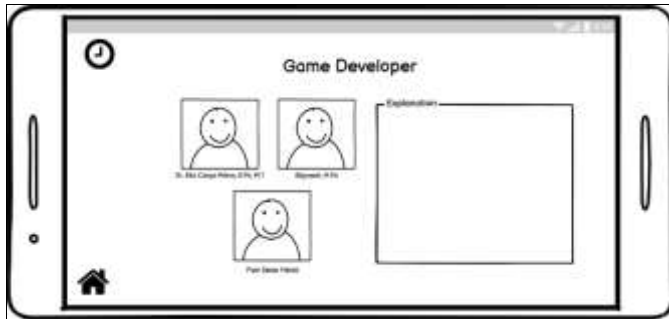
On this page, there are four main menus in this game, namely about the game, game developer, credit, and references. Below this page, there are three buttons contain (exit and go to the adventure). “Exit” is quit from the game, and “Go to the adventure” is going to “HUPROSED’s adventure (Slide 9).



5. About game

On this page, there is a video, and an explanation about this game, and why this game is developed. There is also a “Home” button to go back into “home” (Slide 4).

HUPROSED is abbreviation of “Human Reproductive System and Sex Education”. Based on the video, students needed media to support learning on human reproductive system and sex education material, it is necessary to develop media to exercise students’ human reproductive system and sex education learning through games, therefore "HUPROSED" was created to exercise critical thinking on the topic of biology on human reproductive system and sex education material with games android based application method that will give students new fun experience and additional material for students.



6. Game developer

On this page, there are three photos of the game developer, and there is an explanation about them. There is also a “Home” button to go back into “home” (Slide 4).

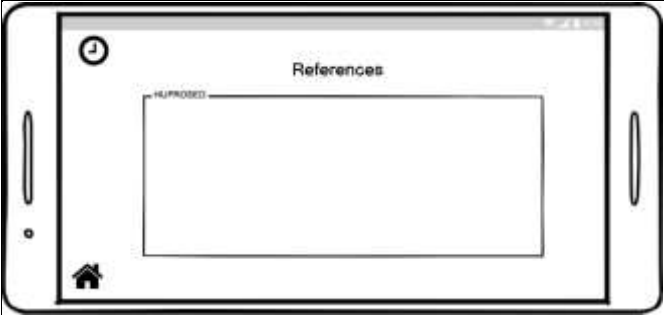
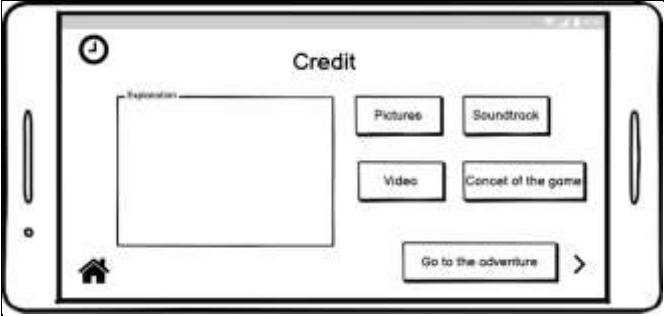
a. DR. Eka Cahya Prima, S.Pd, M.T

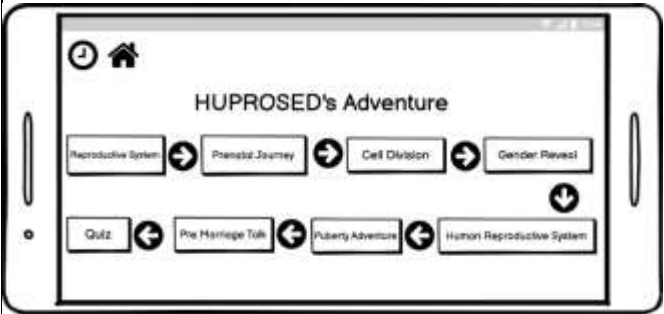
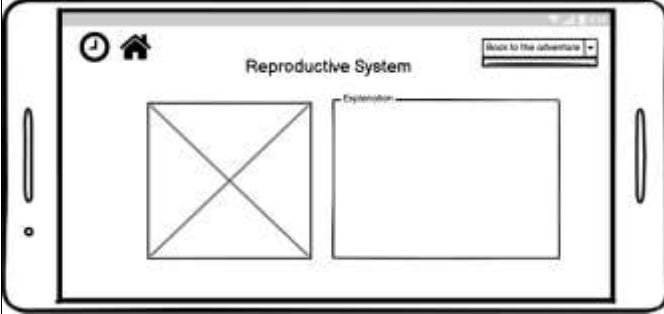
DR. Eka Cahya Prima, S.Pd, M.T as head of International Program on Science Education (IPSE) study program Faculty of Mathematics and Science Education, Universitas Pendidikan Indonesia. He lectures physics courses (Electricity and magnetism, Mathematics for science, School science, Earth and space science, and STEM education). The education as his previous background, he also concerns with developing science learning media for science education. He leads the Journal of Science Learning as editor-in-chief since 2017.

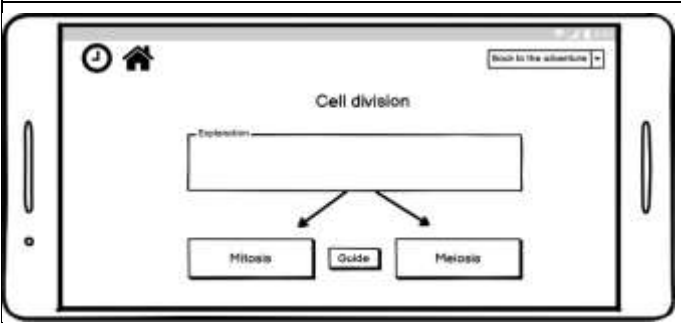
b. Eliyawati, M.Pd

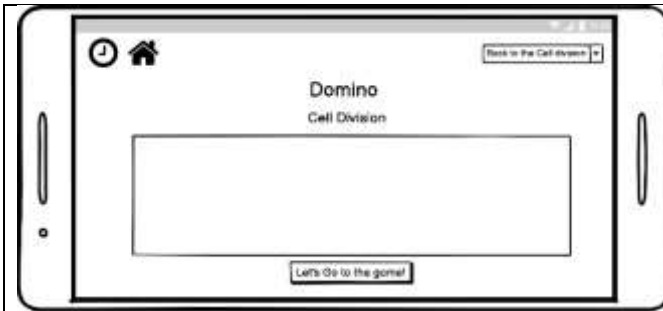
Eliyawati, M.Pd, as lecturer at International Program on Science Education (IPSE) study program. She has six years of research, teaching, and community service

		<p>experience in science education, especially in the chemical multiple representation field. She has conducted research funded by the UPI grant (2017-now) related to the chemical multiple representation, teaching media, teaching strategies, and entrepreneurship.</p> <p>c. Putri Sekar Melati</p> <p>Putri Sekar Melati is an undergraduate student at the International Program on Science Education (IPSE) study program, Faculty of Mathematics and Science Education, Universitas Pendidikan Indonesia. She awarded by Indonesian government scholarship “Beasiswa Unggulan Masyarakat Berprestasi” since 2017. She tries to implement Tridharma (three pillars) of higher education, which includes education, research, and community service on her academic record.</p>
--	--	---

		<p>She actively joins academical research, campus organization, also do community service. She interests in academic research, especially in the field of critical thinking, game-based learning, and science that is integrated with Al Quran.</p>
	<p>7. References</p> <p>On this page, there is a reference to the game’s materials. There is also a “Home” button to go back into “home” (Slide 4).</p>	
	<p>8. Credit</p> <p>On this page, there is credit, sources of pictures, soundtrack, video, and concept of the game. There is also a “Home” button to go back into “home” (Slide 4). On the right bottom, there is the button “Go to the</p>	<p>a. Picture</p> <p>b. Soundtrack</p> <p>c. Video</p> <p>d. Concept of the game</p> <ul style="list-style-type: none"> -Drag and drop -Matching -Fill in the blank

	<p>adventure” which means go to the next slide (slide 9).</p>	<p>-Fruit Ninja -3D Game</p>
	<p>9. HUPROSED’s Adventure</p> <p>This page, contain material about the human reproductive system and sex education. There is button “Reproductive system” (Slide 10), button “Cell division” (Slide 11), button “Prenatal Journey” (slide 21), button “Gender Reveal” (Slide 28), button “Human reproductive system” (Slide 33), button “Puberty adventure” (Slide 40), button “Pre-marriage talk”(Slide 49).</p>	
	<p>10. Reproductive System</p> <p>There is the picture, then an explanation. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).</p>	<p>Reproduction is the process of producing new individuals. The reproductive system of an organism, also known as the genital system, is the biological system made up of all the anatomical organs involved in sexual reproduction. In human reproduction there are two sexes, male and female, each produces special types of reproductive cells, called</p>

		<p>gametes. The male gametes are called sperm and the female gametes are called ovum or eggs. To produce a new individual, a sperm has to reach an ovum and fuse with it</p>
	<p>11. Cell Division</p> <p>There is an explanation on the box about cell division, Cell division is divided into two, there are mitosis and meiosis. There is a button “guide” about the guide Drag and drop game (slide 12).</p> <p>There is a button “Mitosis” that leads into game drag and drop (slide 13). There is a button “Meiosis” that leads into game drag and drop (slide 15).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).</p>	<p>Cell division is the process by which a parent cell divides into two or more daughter cells. When plants and animals grow, their cells increase in number by dividing. Both daughter cells may divide again, but usually, one of the cells grows and changes its shape and structure and becomes adapted to do one particular job – in other words, it becomes specialized. At the same time, it loses its ability to divide anymore. The other cell is still able to divide and so continue the growth of the tissue. Growth is, therefore, the result of cell division, followed by cell enlargement and, in many cases, cell specialization.</p>

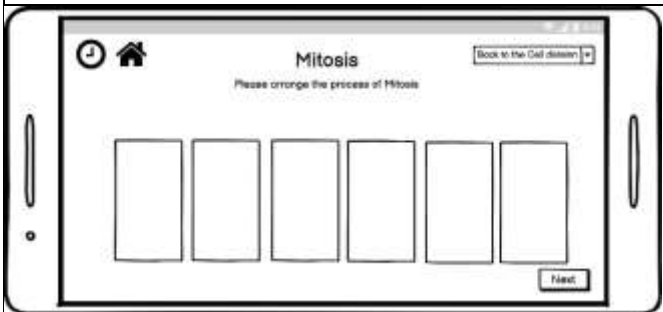


12. Guide Domino game

There is an explanation on the box about the drag and drop game. There is a button “Let’s go to the game” to guide the Domino game (slide 13).

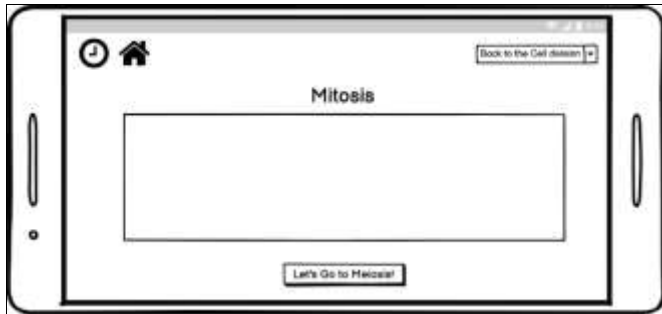
There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).

In this game, you can move the dominoes up and down, then match them according to their pair, after everything is matched, please click "check" to check the correct answer.



13. Mitosis *(Game Domino)

On this page, there is a game drag and drop to arrange the phase of mitosis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” (slide 11). There is a button “Next”, that leads into mitosis explanation (slide 14).

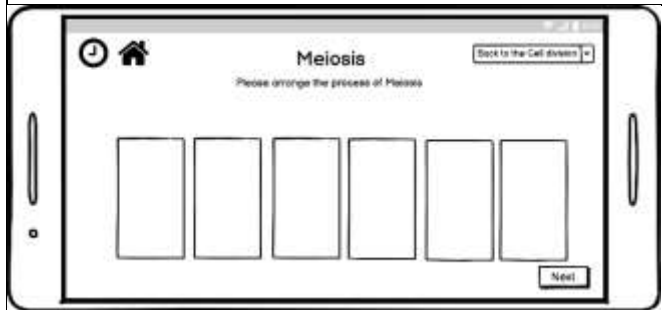


14. Mitosis (Explanation)

There is an explanation on the box about Mitosis. There is a button “Let’s go to the meiosis” about the guide domino game (slide 15).

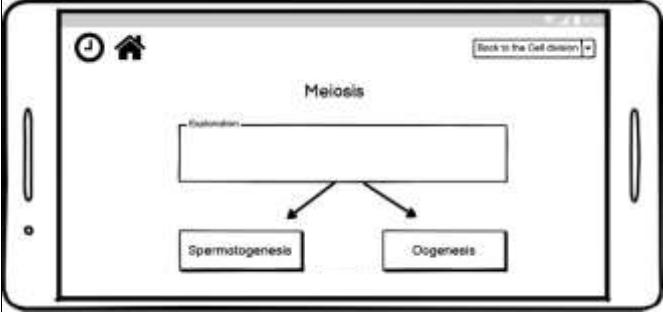
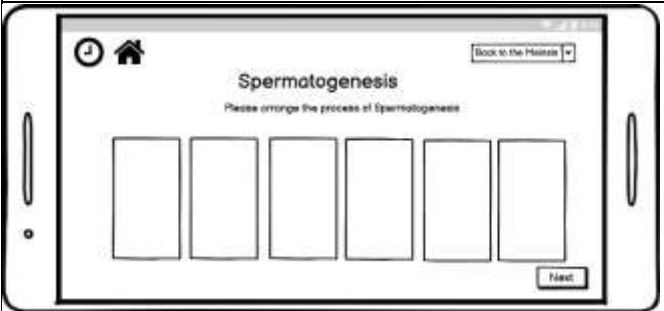
There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” (slide 11).

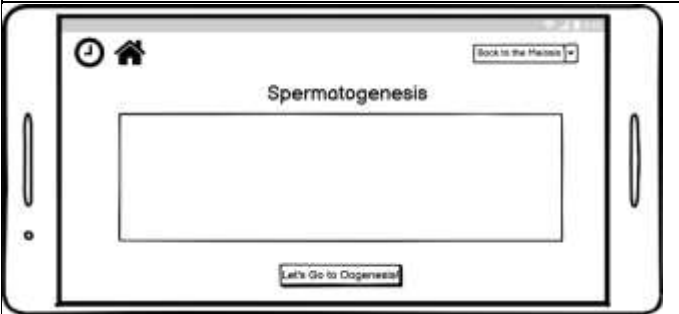
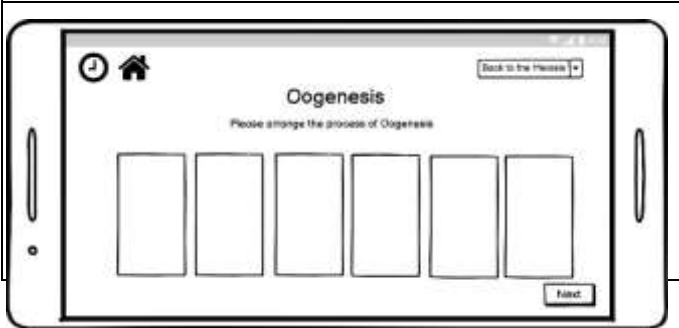
Mitosis is the process of cell division that produces the somatic cell. Genetics is the study of inheritance. It can be used to forecast what sorts of offspring are likely to be produced when plants or animals reproduce sexually

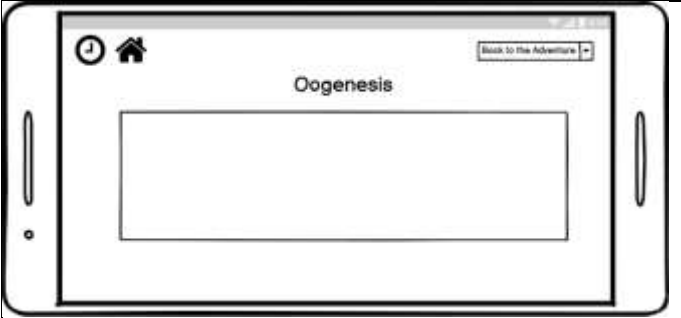


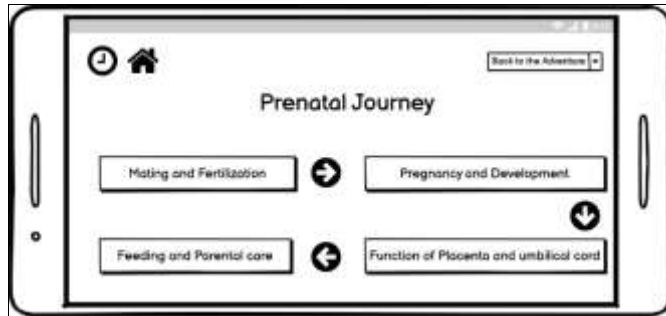
15. Meiosis *(Game Domino)

On this page, there is a game drag and drop to arrange the phase of meiosis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” (slide 11). There is a button “Next”, that leads into meiosis explanation (slide 16).

	<p>16. Meiosis</p> <p>There is an explanation on the box about meiosis. Meiosis is divided into two, there are spermatogenesis and oogenesis.</p> <p>There is a button “Spermatogenesis” that leads into game drag and drop (slide 17). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” which means go to the whole cell division (slide 11)</p>	<p>Meiosis is nuclear division, which gives rise to cells that are genetically different. The process of meiosis takes place in the gonads of animals (e.g. the testes and ovaries of mammals, and the anthers and ovules of flowering plants). The cells formed are gametes (sperm and egg cells in mammals; egg cells and pollen grain nuclei in flowering plants). Gametes are different from other cells because they have half the normal number of chromosomes (they are haploid).</p>
	<p>17. Spermatogenesis *(Game Domino)</p> <p>On this page, there is a game drag and drop to arrange the phase of spermatogenesis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the Meiosis” (slide 16). There is a button “Next”, that</p>	

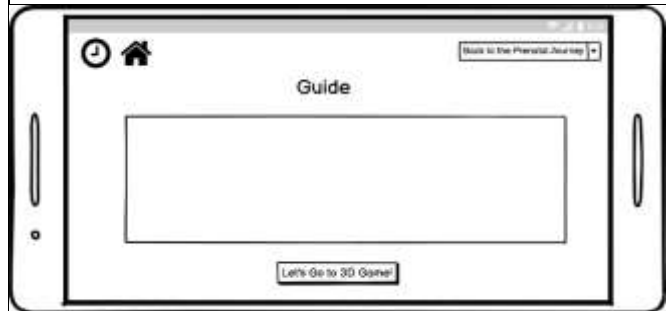
	<p>leads into spermatogenesis explanation (slide 18).</p>	
	<p>18. Spermatogenesis (Explanation)</p> <p>There is an explanation on the box about spermatogenesis. There is a button “Let’s go to the oogenesis” about guide domino (slide 19).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the meiosis” slide (slide 16).</p>	<p>The lining of the sperm-producing tubules in the testis consists of rapidly dividing cells. After a series of cell divisions, the cells grow long tails called flagella (singular: flagellum) and become sperm, which pass into the epididymis. During copulation, the epididymis and sperm ducts contract and force sperm out through the urethra. The prostate gland and seminal vesicle add fluid to the sperm. This fluid plus the sperm it contains is called semen, and the ejection of sperm through the penis is called ejaculation.</p>
	<p>19. Spermatogenesis *(Game Domino)</p> <p>On this page, there is a game drag and drop to arrange the phase of spermatogenesis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner,</p>	

	<p>there is a button “Back to the Meiosis” (slide 16). There is a button “Next”, that leads into spermatogenesis explanation (slide 18).</p>	
	<p>20. Oogenesis (Explanation)</p> <p>There is an explanation in the box about oogenesis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” slide (slide 9).</p>	<p>The egg cells (ova) are present in the ovary from the time of birth. No more are formed during the female’s lifetime, but between the ages of 10 and 14, some of the egg cells start to mature and are released, one at a time about every 4 weeks from alternate ovaries. As each ovum matures, the cells around it divide rapidly and produce a fluid-filled sac. This sac is called a follicle and, when mature, it projects from the surface of the ovary like a small blister. Finally, the follicle bursts and releases the ovum with its coating of cells into the funnel of the oviduct. This is called ovulation</p>



21. Prenatal Journey

This page, contain material about prenatal. There are buttons “Mating and fertilization” (Slide 23), button “Pregnancy and development” (Slide 24), button “Feeding and parental care” (Slide 25), button “Function of the placenta and umbilical cord” (Slide 26).

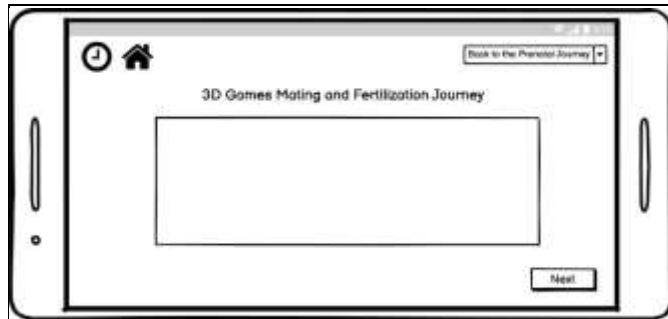


22. Guide 3D Games

There is an explanation on the box about the 3D game. There is a button “Let’s go to the game” about the guide Drag and drop game (slide 23).

There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” (slide 21).

In this game, you can move the control to explore the 3D experience of mating and fertilization journey.



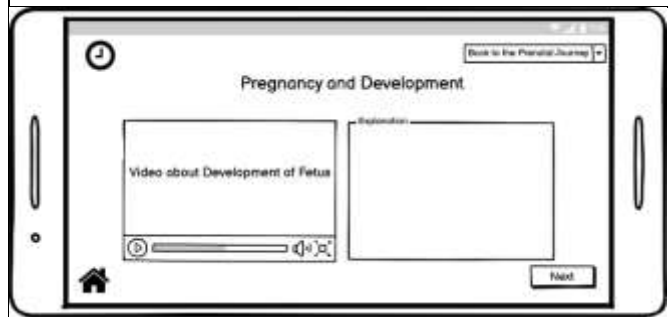
23. 3D Games Mating and Fertilization

Journey

There is an explanation about the mating and fertilization journey by 3Dimension.

Note :

Copulation needs a good environment, that is safe for sperm in pH 3,8 till 4,5 to make sure the sperm can fertilize the ovum. Pool water is not a good medium for Sperma to swim into the female's vagina in the same pool, because the water pool is not a good place for sperm to live, due to the seminal fluid that automatically dry after coming out into the water.



24. Pregnancy and Development

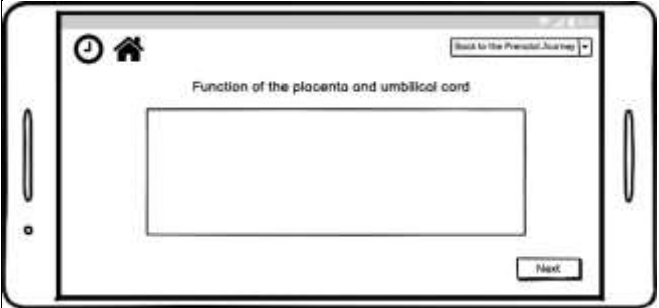
There is an explanation on the box about pregnancy and development, and a video about it. There is also a "Home" button to go back into "home" (Slide 4). On the right corner, there is a button "Back to the prenatal journey" slide (slide 21). There is a "Next" button, which goes to the next slide (25).

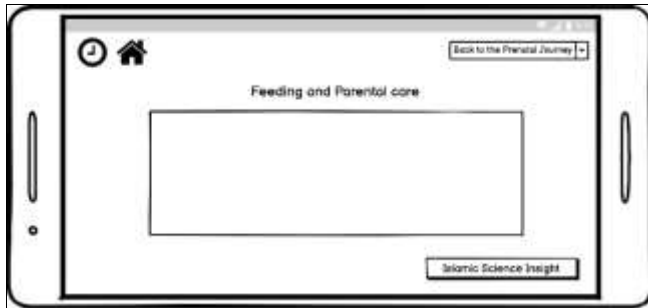
The fertilized ovum (zygote) first divides into two cells. Each of these divides again, so producing four cells. The cells continue to divide in this way to produce a solid ball of cells, an early stage in the development of the embryo. This early embryo travels down the oviduct to the uterus. Here it sinks into the lining of the uterus, a process called implantation. The embryo continues to grow and produces new cells that form tissues and

organs. After 8 weeks, when all the organs are formed, the embryo is called a fetus.

Twin

Sometimes a woman releases two ova when she ovulates. If both ova are fertilized, they may form twin embryos, each with its placenta and amnion. Because the twins come from two separate ova, each fertilized by different sperm, it is possible to have a boy and a girl. Twins formed in this way are called fraternal twins. Although they are both born within a few minutes of each other, they are no more alike than other brothers or sisters. Another cause of twinning is when a single fertilized egg, during an early stage of cell division, forms two separate embryos. Sometimes these may share a placenta and amnion. Twins formed from a single ovum and sperm must be of the same sex because only one sperm (X or

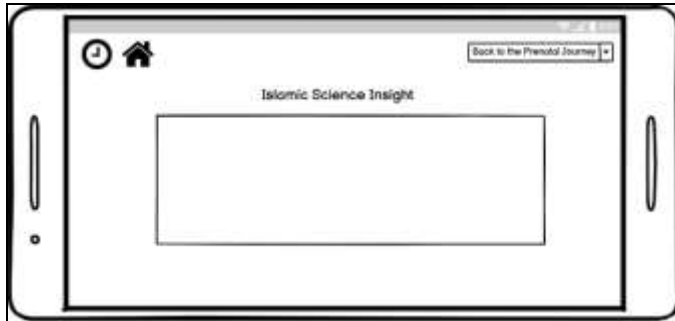
		<p>Y) fertilized the ovum. These 'one-egg twins' are sometimes called identical twins because, unlike fraternal twins, they will closely resemble each other in every respect.</p>
	<p>25. The function of the placenta and umbilical cord</p> <p>There is an explanation on the box about the function of the placenta and umbilical cord. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21). There is a “Next” button, which goes to the next slide (26).</p>	<p>The blood vessels in the placenta are very close to the blood vessels in the uterus so that oxygen, glucose, amino acids, and salts can pass from the mother’s blood to the embryo’s blood. So the blood flowing in the umbilical vein from the placenta carries food and oxygen to be used by the living, growing tissues of the embryo. Similarly, the carbon dioxide and urea in the embryo’s blood escape from the vessels in the placenta and are carried away by the mother’s blood in the uterus. In this way, the embryo gets rid of its excretory products.</p>



26. Feeding and Parental Care

There is an explanation on the box about feeding and parental care. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21). There is an “Islamic science insight” button, which goes to the next slide (27).

Within the first 24 hours after birth, the baby starts to suck at the breast. During pregnancy, the mammary glands (breasts) enlarge as a result of an increase in the number of milk-secreting cells. No milk is secreted during pregnancy, but the hormones that start the birth process also act on the milk-secreting cells of the breasts. The breasts are stimulated to release milk by the baby sucking the nipple. The continued production of milk is under the control of hormones, but the amount of milk produced is related to the quantity taken by the child during suckling. Milk contains the proteins, fats, sugar, vitamins, and salts that babies need for their energy requirements and tissue-building, but there is too little iron present for the manufacture of hemoglobin. All the iron needed for the first weeks or months is stored in the liver of the fetus during gestation.



27. Islamic science insight

There is an explanation on the box about Islamic science insight from feeding and parental care. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21).

1. Surah about process of human creation (Q.S. Al-Mukminun : 12-14)

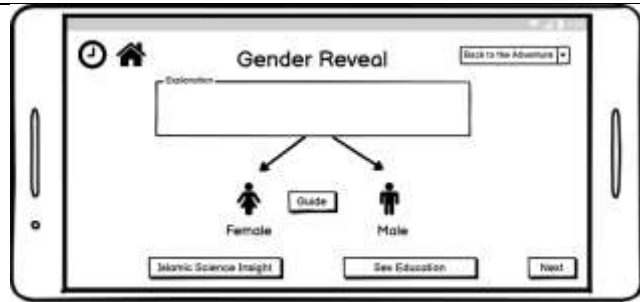
There is an ayat in Quran which explains human creation and development. Here it is.

2. Breastfeeding (Q.S Al-Baqarah: 233).

There is an ayat in Quran which explains breastfeeding. Here it is.

3. Obey the Parents (QS. Luqman: 14)

Based on the explanation before, parents, especially mothers sacrifice their life for their children. Therefore, we have to obey them, as the Quran said :



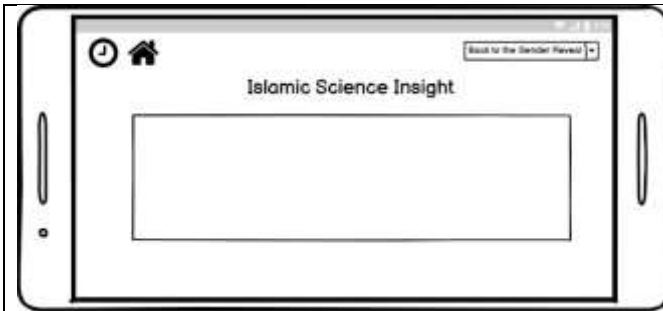
28. Gender Reveal

There is an explanation on the box about gender. Gender is divided into two, there are female and male. There is a button “guide” about the guide Drag and drop game (slide 30).

There is a button “Islamic science insight” about gender (slide 29). There is a button “Sex Education” that leads into (slide 32).

There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).

Sex refers to biological distinctions between people, such as genitals and chromosomes, and gender refers to those male and female differences. There are females and Male.



29. Islamic science insight

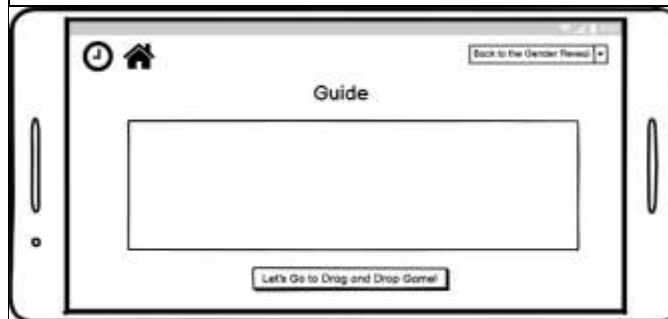
There is an explanation on the box about Islamic science insight from gender. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the gender reveal” slide (slide 28).

1. Human is the best creature (Q.S At-Tin: 4)

Human is the best creature, Allah gives the best function of our organ, our life is precious, therefore we have to be grateful

2. Surah about the creation of male and female (QS. Al-Hujurat: 13)

Allah creates us on two types, male or female.

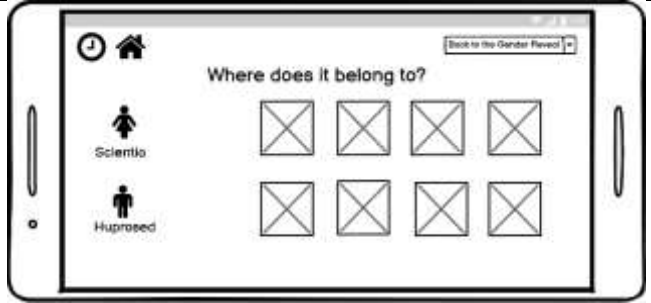
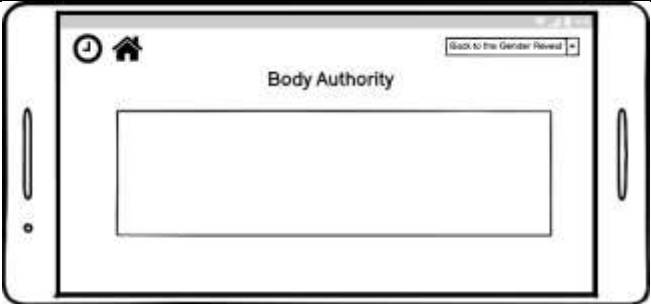


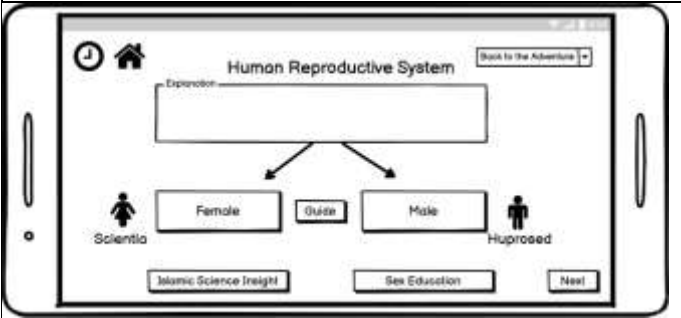
30. Guide drag and drop

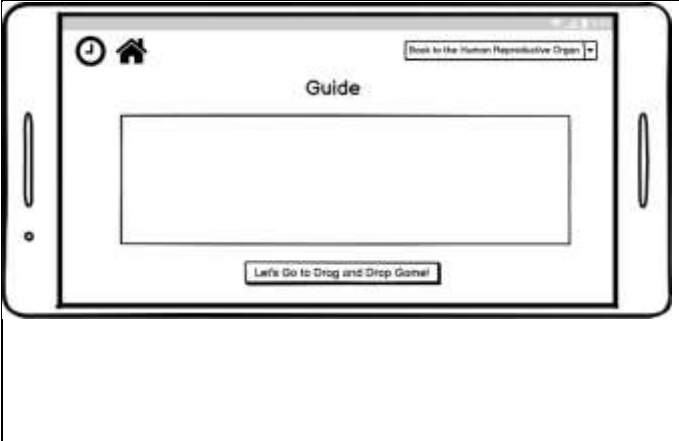
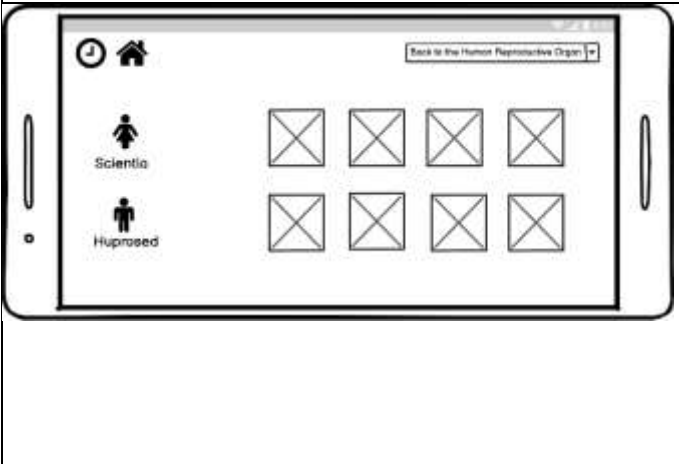
There is an explanation on the box about drag and drop. There is a button “Let’s go to the game” about the guide Drag and drop game (slide 31).

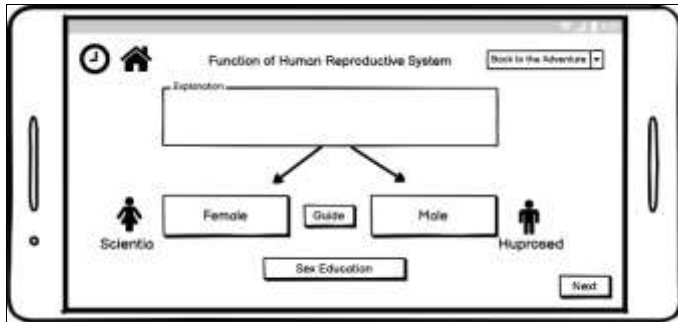
There is also a “Home” button to go back into “home” (Slide 4). On the right corner,

In this game, you can move the object “Scientia” and “huprosed” through their pair answer, you can move it up and down, then match them according to their pair, after everything is matched, please click "check" to check the correct answer.

	<p>there is a button “Back to the gender reveal” (slide 28).</p>	
	<p>31. Gender (Game Drag and drop)</p> <p>On this page, there is a game drag and drop to choose the stuff that belongs to. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the gender reveal” (slide 28).</p>	
	<p>32. Body Authority (Sex Edu)</p> <p>There is an explanation on the box about sex education, body authority. There is also a “Home” button to go back into “home” (Slide 4). there is a button “Back to the gender reveal” (slide 28).</p>	<p>3. Do not go with strangers</p> <p>If there are strangers who disturb you, just go, and ignore them.</p> <p>You need to be careful when :</p> <ol style="list-style-type: none"> 1. Your private parts are touched. 2. You are told to take off your clothes. 3. Asked to see other people's private parts. 4. Asked to see pictures or videos of naked people.

		<p>4. Body Parts that can and can not be touched.</p> <p>We have parts of the body that are not allowed to be seen by others and they are called "private parts". Our bodies have 4 personal parts that cannot be seen and touched by others, such as mouth, chest, genitals, and thighs to buttocks. Also, you should not touch this part on other people's bodies.</p>
	<p>33. Human reproductive system</p> <p>There is an explanation on the box about the human reproductive system. There are female and male reproductive systems. There is a button “guide” about the guide Drag and drop game (slide 34). There is a button “Sex Education” that leads into (slide 32). There is also a “Home” button to go back into “home” (Slide 4). On the right</p>	<p>Human reproductive system, consist of some organ. There is a female and male organ.</p>

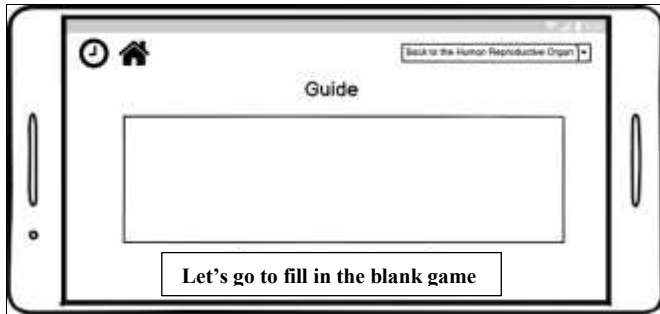
	<p>corner, there is a button “Back to the adventure” (slide 9).</p>	
	<p>34. Guide Drag and drop</p> <p>There is an explanation on the box about drag and drop. There is a button “Let’s go to the game” about the guide Drag and drop game (slide 35). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “human reproductive system” (slide 33).</p>	<p>In this game, you can move the object “Scientia” and “huprosed” through their pair answer, you can move it up and down, then match them according to their pair, after everything is matched, please click "check" to check the correct answer.</p>
	<p>35. Human reproductive organ (drag and drop)</p> <p>On this page, there is a game drag and drop to choose the organ to belong to. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the human reproductive system” (slide 33).</p>	



36. The function of the human reproductive system

There is an explanation on the box about the function of the human reproductive system. There are female and male reproductive systems. There is a button “guide” about guide “fill in the blank” game (slide 37). There is a button “Sex Education” that leads into (slide 39). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” (slide 9). There is a button “female” (slide 37) to go to female’s function (game fill in the blank), and also for male go to (Slide 38)

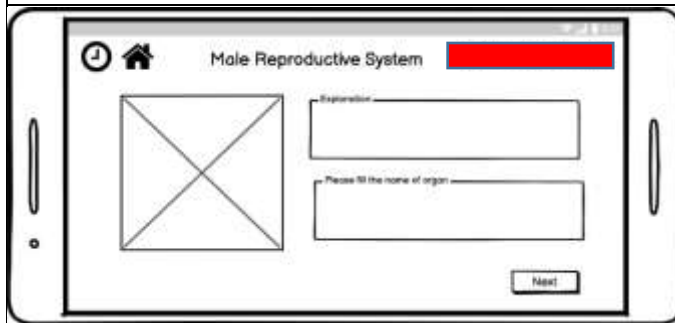
Those organs have each function. Here is the human reproductive system, which consists of each function.



37. Guide Fill in the blank

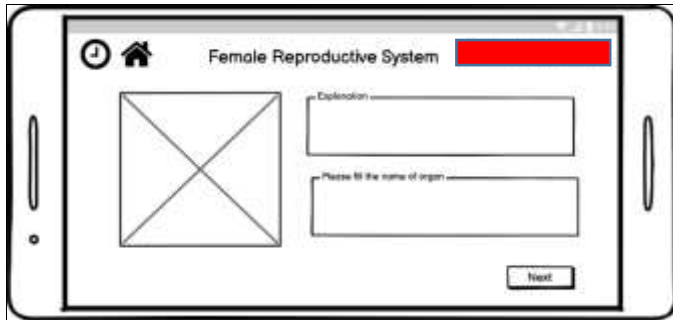
There is an explanation on the box about Fill in the blank. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “function of human reproductive system” (slide 36).
 Button “Let’s go to drag and drop game” (slide 38)

In this game, you can see the picture, then the function. You have to fill in the name of the organ on the blank form. Please click "check" to check the correct answer.



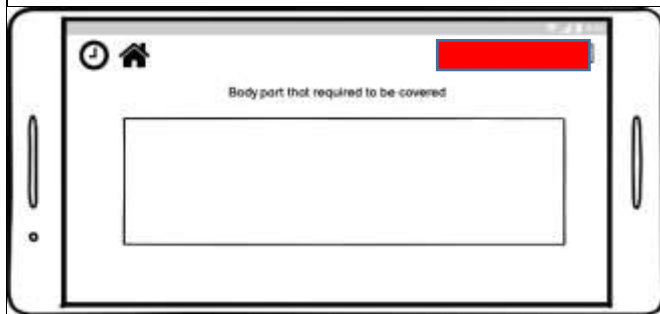
38. Male Reproductive System (Fill in the blank)

There is some function statement on the “explanation” box, then the user fills the name of the organ on the “fill in the blank” box. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “function of human reproductive system” (slide 36).



39. Female Reproductive System (Fill in the blank)

There is some function statement on the “explanation” box, then the user fills the name of the organ on the “fill in the blank” box. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “function of human reproductive system” (slide 36).



40. Aurat (Sex Edu)

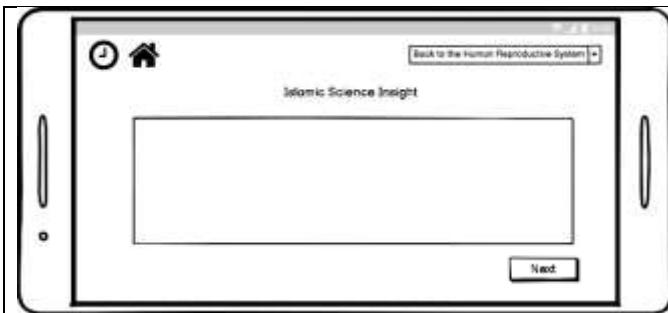
There is an explanation on the box about sex education. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “function of human reproductive system” (slide 36).

1. Body parts that are required to be covered.

Mention body parts that can and can not be touch-based on Islam.

- Female, all parts of the body except face and palm
- Male, Below umbilical cord till knee.

		<p>2. Asking for permission when coming into the bedroom.</p> <p>One of the manners of sexual education is asking for permission when coming into the bedroom, especially 3 times.</p> <p>Before dawn, mid-day, and after evening</p> <p>3. Separate the bedroom.</p> <p>Give understanding to the child to sleep separately between siblings, "Tell your children to pray when they are seven years old, and separate their beds." (Narrated by Abu Dawud). Siblings of the opposite sex must have separate rooms, if necessary, they must have different blankets.</p>
--	--	--

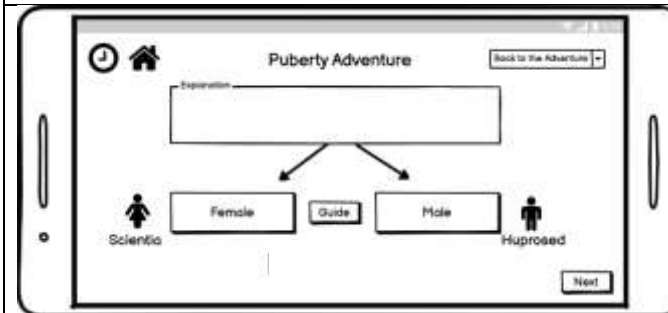


41. Islamic Science Insight

There is an explanation on the box about Islamic science insight from the human reproductive system. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the human reproductive system” slide (slide 33).

4. Surah about aurat QS. Al Ahzab 59, and An Nur ayat 31

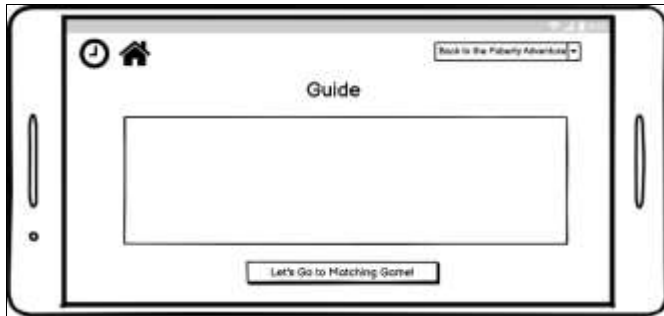
Based on that explanations, there are so many benefits if we keep our body-safe, through cover it in an appropriate way. This is in line with the ayat in Quran that said about aurat.



42. Puberty Adventure

There is an explanation on the box about female and male puberty. There is a button “guide” about guide “matching” game (slide 43). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” (slide 9). There is a button “female” (slide 42) to go to female’s function (game matching), and also for males go to (Slide 43)

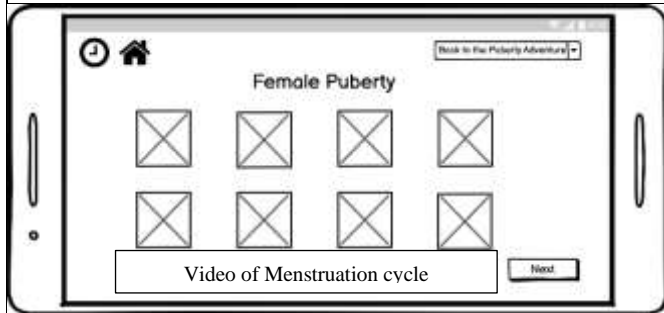
Puberty is a phase of physical and mental changes in boys and girls caused by changes in hormones. Puberty is a time transition from child to adult. Time puberty in boys and girls is not the same. Some have experienced it first and some are slower. Usually, girls experience puberty around the age of 8-13 years, while boys at the age of 10-15 years.



43. Guide Matching

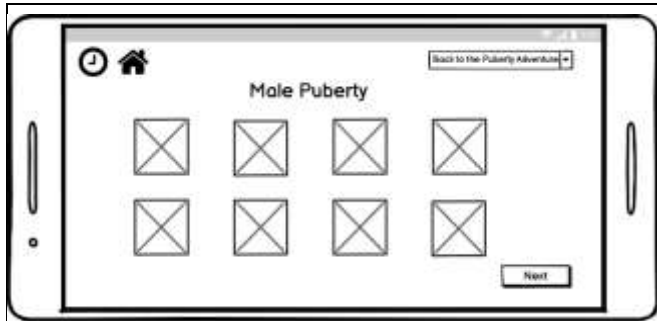
There is an explanation on the box about the Matching game. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42).

In this game, you can open and close the card, then find each match. Please click "check" to check the correct answer.



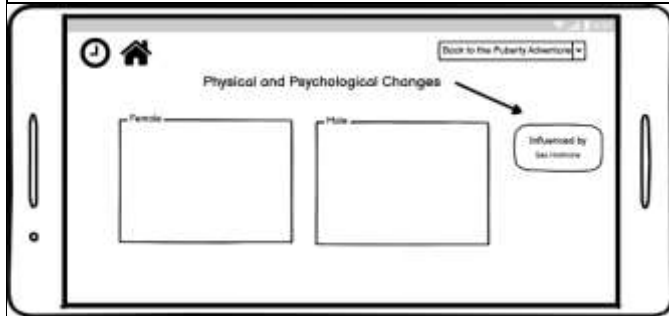
44. Female puberty *(Matching game)

On this page, there is matching. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42). There is also a “video of menstruation cycle”



45. Male puberty *(Matching game)

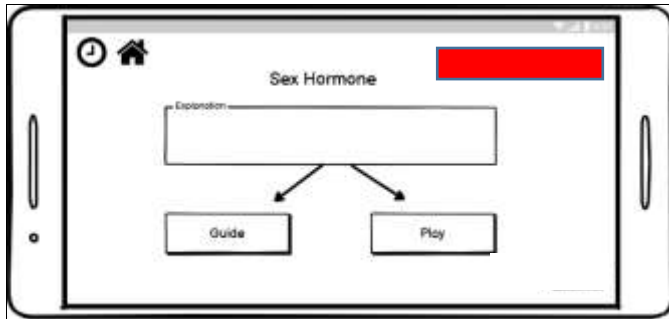
On this page, there is matching. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42). There is also a “Next” button (slide 46) to go to the next slide.



46. Physical and Psychological Changes

There is an explanation on the box about physical and psychological changes. There are two explanations female, and male. There is a button “Influenced by sex hormone” that leads into (slide 447). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “back to puberty adventure” (slide 42).

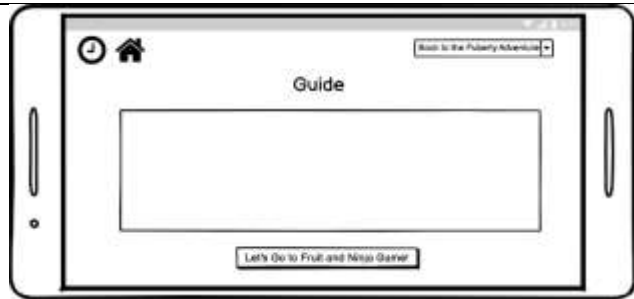
At puberty, the male body and women are changing. There are two types of changes that occur. During puberty, there are primary and secondary changes. Primary changes are also called the main changes that occur in the body. This change allows a male and a female at puberty to produce babies. Primary changes are accompanied by secondary changes. Secondary changes are called physical changes or changes whose characteristics appear in the bodies of males and females.



47. Sex Hormone

There is an explanation on the box about sex hormones. There is a button “guide” about guide “matching” game (slide 48). There is also a “Home” button to go back into “home” (Slide 4). There is also a “Play” button that goes to (slide 49); On the right corner, there is Redbox “back to puberty adventure” (slide 42).

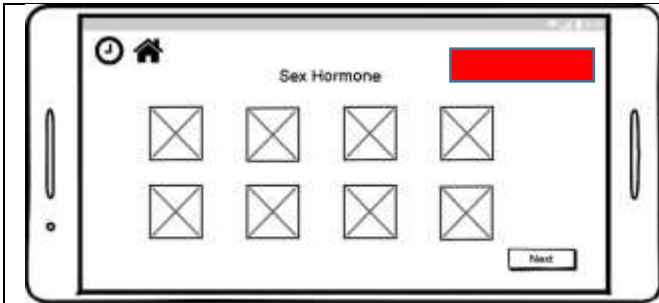
Sex hormones instruct reproductive organs to develop or mature in preparation for one day being able to have children. Puberty begins when an area of the brain called the hypothalamus starts to release gonadotropin-releasing hormone (GnRH). Some hormones influence the reproductive system.



48. Guide

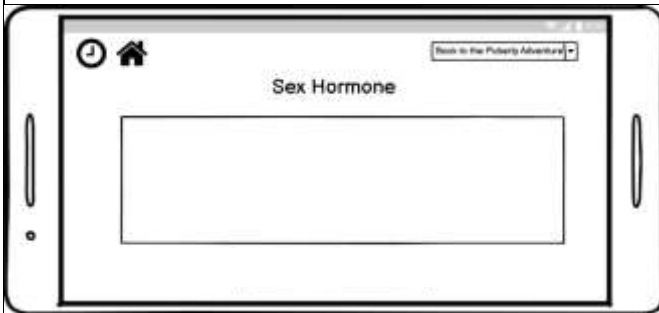
There is an explanation on the box about Fruit and Ninja game. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42).

In this game, you can choose which are the hormone related to sexual function. Be careful of bombs, and others hormones which not belong to sex hormones. Please click "check" to check the correct answer.



49. Sex hormone *(fruit ninja game)

On this page, there is a fruit ninja game, to choose which are the sex hormone. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “puberty adventure” (slide 42). There is also a “Next” button (slide 50) to go to the next slide.

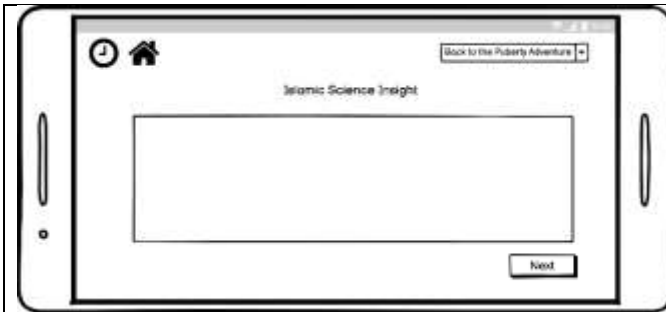


50. Sex hormone *(Explanation)

On this page, there is a fruit ninja game, to choose which are the sex hormone. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “puberty adventure” (slide 42). There is a “Next” button that goes to the (slide 51)

The ovaries and testes produce hormones as well as gametes (sperms and ova). One of the hormones from the ovary, estrogen, prepares the uterus for the implantation of the embryo, by making its lining thicker and increasing its blood supply. The hormones testosterone (from the testes) and estrogen (from the ovaries) play a part in the development of secondary sexual characteristics. This gland is attached to the base of the brain. It produces many hormones. For example, the pituitary releases into the blood follicle-stimulating

		<p>hormone (FSH) which, when it reaches the ovaries, makes one of the follicles start to mature and produce estrogen. Luteinizing hormone (LH), also known as lutropin, is also produced from the pituitary and, together with FSH, induces ovulation. Estrogen and testosterone also cause the development of secondary sex characteristics, which lead to male-female differences, such as women's breasts and rounded hips, and men's facial hair and muscle development. The maturing ovaries and testicles make increasing amounts of sex hormones, further promoting the process of puberty.</p>
--	--	--

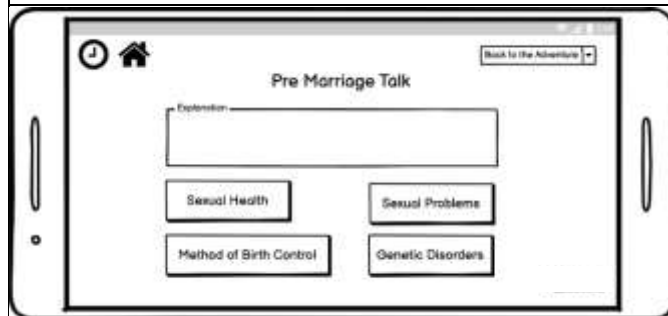


51. Islamic Science Insight

There is an explanation on the box about Islamic science insight from puberty adventure. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the puberty adventure” slide (slide 42).

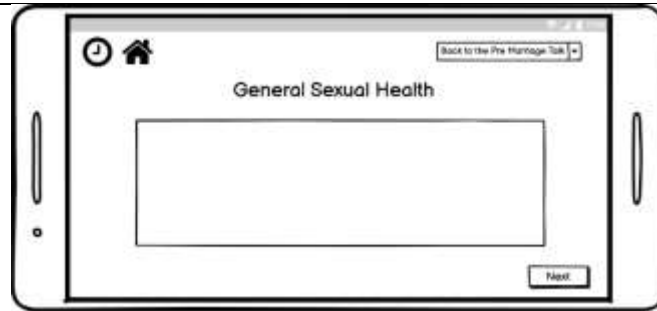
1. Menstruation Cycle (Q.S Al-Baqarah: 222)

Menstruation in Alquran stated on surah Al Baqarah ayat 222. Here it is about the menstruation cycle.



52. Pre Marriage Talk

On this page, there is Pre Marriage Talk. There are four menus, such as “sexual health” (53), “sexual problem” (slide 52), method of birth control (slide 57), sexual problems (52), genetic disorders (59). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “Adventure” (slide 9).



53. General Sexual Health

On this page, there is an explanation about female sexual health. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the pre-marriage talk” (slide 52). Button “Next” goes to the next (slide 54).

1. Interaction etiquette

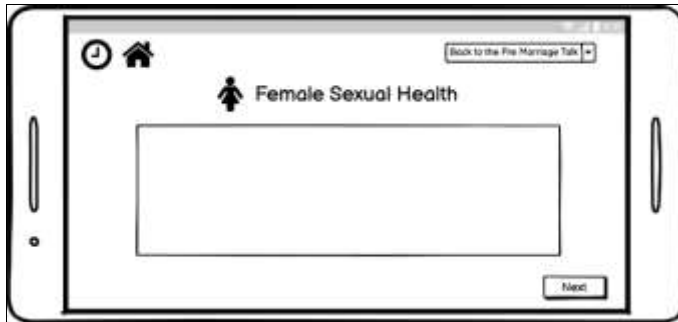
Due to are an Islamic law and social norm concerning unlawful sexual relations between males and females who are not married to one another through a married. There is some way to prevent it, we have to obey the interaction etiquette between females and males, such as lower our gaze, do not do khalwat, etc.

2. Pornography

Pornographic content can harm children. Exposure to pornography at a young age may lead to poor mental health, sexism and objectification, sexual violence, and other negative outcomes. Among other risks, when children view pornography that portrays abusive and misogynistic acts,

		<p>they may come to view such behavior as normal and acceptable.</p> <p>3. Prevent Free sex</p> <p>Free sex is a sexual relationship conducted with people based on likes, ranging from kissing (kiss the forehead, cheeks, and lips) to stimulate the holding of the genitals and sexual intercourse. Teenagers have free sex because of internal and external factors. The various reasons and factors of teenagers to have free sex are teenagers have a wrong view of the meaning of love, easy to get emotion and persuasion couples or peers based on the mistaken love, so it is easy to have free sex.</p> <p>5. Prevent body odor</p> <p>Body odor is one of the earliest signs of puberty. Due to hormonal changes,</p>
--	--	---

		<p>children begin to sweat profusely as their sweat glands start pumping out more moisture. But sweat alone does not a smelly child make—indeed, sweat itself is odorless salty water. There are some ways to prevent body odor :</p> <ol style="list-style-type: none">1. Wash your armpits, groin, and feet at least twice a day with soap and dry thoroughly.2. Shave your armpits regularly.3. Use antiperspirants and deodorants.4. change and wash your clothes regularly.5. Wear natural fabrics like cotton, wool, and silk.6. Wear antibacterial socks.
--	--	---



54. Female Sexual Health

On this page, there is an explanation about female sexual health. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the pre-marriage talk” (slide 52). Button “Next” goes to the next (slide 55).

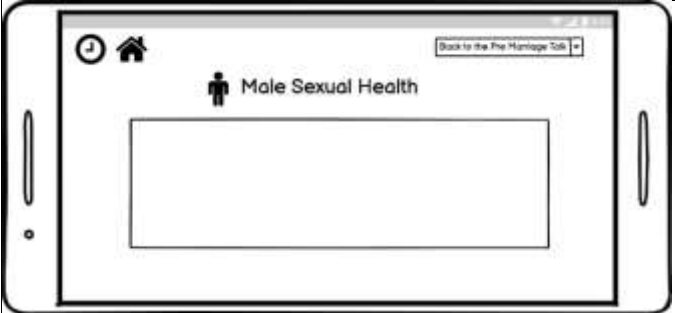
1. The obligation after puberty (What to do when having menstruation)

a. If you are menstruating, change pads as often as possible. When there is a lot of blood flow, you can replace it at least every 5-6 hours. Blood that is accommodated in the pads can be a medium for the growth of germs that cause infection.

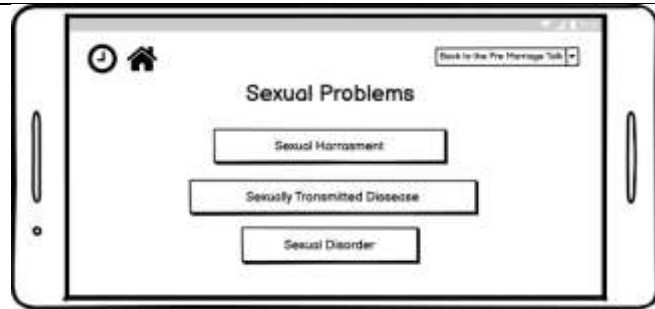
b. Avoid using feminine area cleaning soap and pantyliner continuously. The use of feminine hygiene soap will change the pH of the vagina which will then trigger the growth of yeast.

c. For Muslimah, there is an obligation after you finished menstruation, you have to do ghusl. Here is the way :

How this ghusl is done, as in all other cases prescribed by the shari'ah, is to start by washing the parts of the body that are washed in wudu, then pour three handfuls

		<p>of water over the head, then wash the right side then the left, then pour water over the whole of the body. Thus janaabah is removed but menstruation remains.</p> <p>2. Prevent Breast cancer</p> <p>For female, must eat healthy food, doing physical activity that can prevent breast cancer. There is to know breast cancer symptoms early by doing this :</p>
	<p>55. Male Sexual Health</p> <p>On this page, there is an explanation about male sexual health. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the pre-marriage talk” (slide 52).</p>	<p>1. The obligation after puberty (What to do when having a nocturnal orgasm)</p> <p>The ghusl is a purificatory shower that can be obligatory (fard) or sunna to perform. Taking a ghusl is obligatory to exit a state of major ritual impurity. Thus, the situations that necessitate taking the ghusl are, after engaging in marital relations, even if ejaculation did not occur, after</p>

ejaculating or climaxing through foreplay, wet dreams. The obligatory actions of the ghusl must be performed for the ghusl to be ruled as valid. Simply put, the obligatory actions are to rinse the nose, mouth, and entire body with water at least once. Water must reach every part of the outer body that is possible to rinse without undue hardship.



56. Sexual Problems

On this page, there are Sexual Problems. There are three menus, such as “sexual harassment” (57), “sexually transmitted disease” (slide 58), and “sexual disorder” (slide 59). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “Pre-marriage talk” (slide 52).

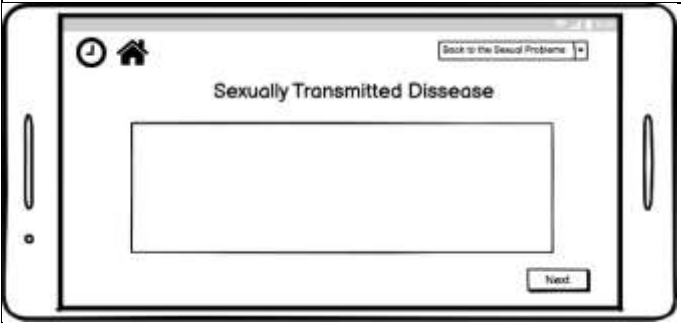


57. Sexual Harassment

On this page, there is an explanation about sexual harassment. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the sexual problems” (slide 56). Button “Next” goes to the next (slide 58).

Sexual harassment is unwelcome conduct of a sexual nature, which makes a person feel offended, humiliated, and/or intimidated. Sexual harassment can take various forms. It can involve conduct such as:

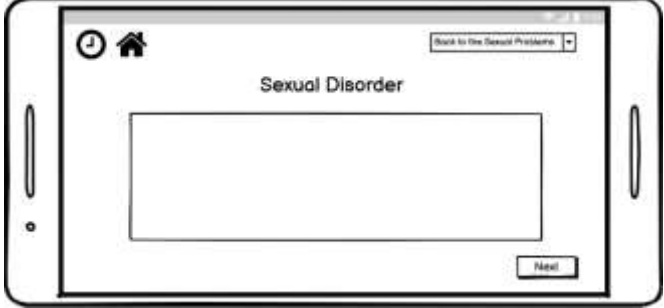
- a. Unwelcome touching, hugging, or kissing
- b. Staring or leering
- c. Suggestive comments or jokes
- d. Unwanted invitations for sex or persistent request to go out on dates
- e. Intrusive questions about another person’s private life or body
- f. Unnecessary familiarity, such as deliberately brushing up against someone
- g. Insults or taunts of a sexual nature sexually explicit pictures, posters, screen savers, emails, twitters, SMS, or instant messages

		<ul style="list-style-type: none"> h. Accessing sexually explicit internet sites i. Inappropriate advances on social networking sites j. Behavior that would also be an offense under the criminal law, such as physical assault indecent exposure sexual assault, stalking, or obscene communications
	<p>58. Sexual Transmitted Disease</p> <p>On this page, there is an explanation about the sexually transmitted disease. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to the sexual problems” (slide 56).</p>	<p>The reproductive system is very vulnerable to abnormalities and disease. Abnormalities and diseases of the reproductive system can be caused by bacteria, fungi, and viruses. These disorders and diseases can be transmitted from parents (infected) to their children, due to infected blood transfusions, transmitted due to unhealthy lifestyles such as free sex, and using a syringe for illegal drugs or drugs. The following will discuss some of the abnormalities and diseases that can occur in the</p>

human reproductive system. There are sexually transmitted diseases, such as AIDS, Gonorrhoe (GO), Sifilis, Herpes Simplex Genitalis, Leucorrhoea, Epididymitis.

HIV/AIDS

The initials of AIDS stand for acquired immune deficiency syndrome. (A ‘syndrome’ is a pattern of symptoms associated with a particular disease.) The virus that causes AIDS is the human immunodeficiency virus (HIV). After a person has been infected, years may pass before symptoms develop. So people may carry the virus yet not show any symptoms. They can still infect other people, however. It is not known for certain what proportion of HIV carriers will eventually develop AIDS: perhaps 30–50%, or more. HIV is transmitted by direct infection of the blood. Drug users who share needles contaminated with infected

		<p>blood run a high risk of the disease. It can also be transmitted sexually, both between men and women and, especially, between homosexual men who practice anal intercourse.</p>
	<p>59. Sexual Disorder</p> <p>On this page, there is an explanation about the sexually transmitted disease. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to the sexual problems” (slide 56). Button “Method of birth control” go to the next (slide 60).</p>	<p>LGBT (Lesbian, Gay, Bisexual, Transgender)</p> <ol style="list-style-type: none"> 1. Lesbian and Gay <p>A Lesbian is a homosexual woman. The word lesbian is also used for women about their sexual identity or sexual behavior, regardless of sexual orientation, or as an adjective to characterize or associate nouns with female homosexuality or same-sex attraction. Meanwhile, Gay is a homosexual man.</p> 2. Bisexual <p>Bisexuality is romantic attraction, sexual attraction, or sexual behavior toward both males and females, or to more than one gender. It may also be defined as romantic</p>

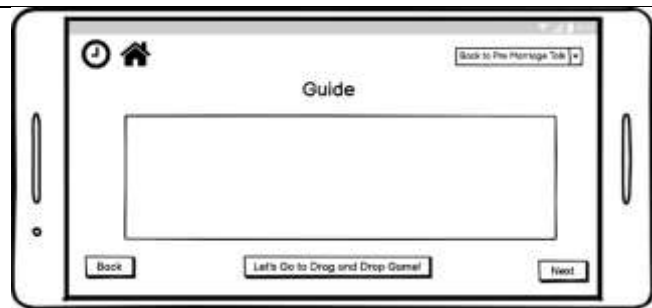
		<p>or sexual attraction to people of any sex or gender identity, which is also known as pansexuality.</p> <p>3. Transgender</p> <p>Transgender people have a gender identity or gender expression that differs from the sex that they were assigned at birth. Some transgender people who desire medical assistance to transition from one sex to another identify as transsexual.</p> <p>LGBT is categorized as unhealthy sexual behavior Because they do unsafe sexual intercourse, and change sex partners most of the time.</p>
--	--	---



60. Method of birth control

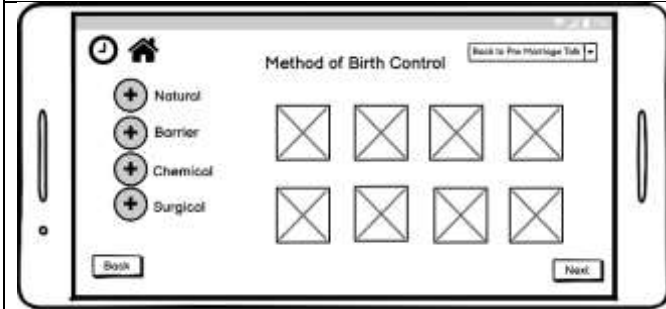
On this page, there is an explanation about the method of birth control. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to pre-marriage talk” (slide 52). Button “next” goes to the guide (slide 61).

As little as 4 weeks after giving birth, it is possible, though unlikely, that a woman may conceive again. Frequent breastfeeding may reduce the chances of conception. Nevertheless, it would be possible to have children at about 1-year intervals. Most people do not want, or cannot afford, to have as many children like this. All human communities, therefore, practice some form of birth control to space out births and limit the size of the family.



61. Guide drag and drop

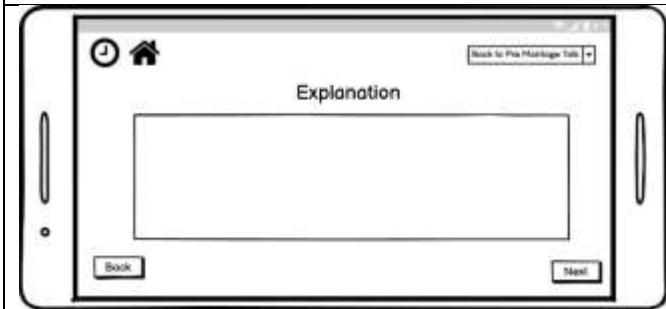
There is an explanation on the box about the drag and drop game. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to pre-marriage talk” (slide 52). Button “back” to go back to (slide 60). Button “Let’s go to drag and drop game” to go to the next slide (slide 62).



62. Method of birth control *(drag and drop game)

On this page, there is a drag and drop a game, to choose from which are the natural, artificial, chemical, and surgical methods. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “pre-marriage talk” (slide 52). There is also a “Next” button (slide 63) to go to the next slide, and “back” to go to the previous slide (slide 61).


In this game, you can move the object “natural”, “barrier”, “chemical”, and “surgical” through their pair answer, you can move it up and down, then match them according to their pair, after everything is matched, please click "check" to check the correct answer.

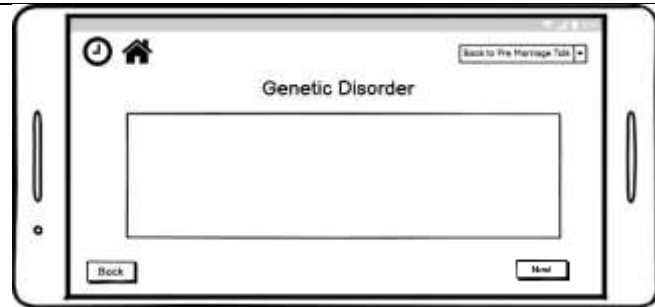


63. Method of birth control *(Explanation)

On this page, there is an explanation about the method of birth control. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to pre-marriage talk” (slide 52). There is also a “Next” button (slide 64) to go to the next slide.

There is some method of birth control, such as natural, and artificial method. Artificial methods, consist of barrier methods, chemical methods also surgical methods. The natural method is Abstinence This is the most obvious way of preventing a pregnancy. This involves a couple avoiding sexual intercourse. In this

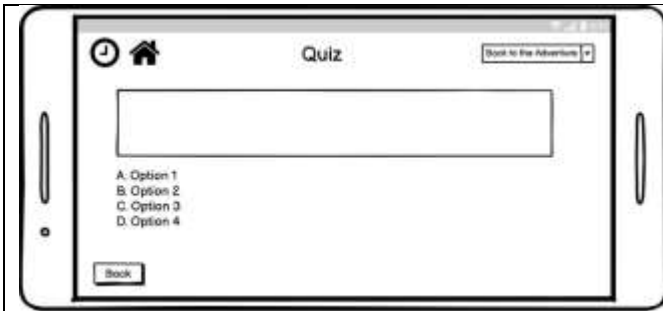
		<p>way, sperm cannot come into contact with an egg and fertilization cannot happen.</p>
	<p>64. Islamic Science Insight</p> <p>There is an explanation on the box about Islamic science insight from the pre-marriage talk. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the pre-marriage talk” slide (slide 52).</p>	<p>1. Surah about do not near into Zina (Q.S Al-Isra:32 and Q.S An-Nur: 2)</p> <p>Due to the sexually transmitted disease, and any kind of various implications and negative impacts of free sex. Allah gives warning on surah Al Isra Ayat 32 and An-Nur ayat 2.</p> <p>2. Surah about marriage (QS Ar-Rum 21)</p> <p>Allah created mates for humans from our souls that we may find rest in them. Marriage is one of the ways to prevent free sex. But, if we haven't ready enough, or are still underage, we can do fasting to decrease our sexual desire.</p>



65. Genetic Disorder *(Explanation)

On this page, there is an explanation about the method of a genetic disorder. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to pre-marriage talk” (slide 5 2). There is also a “Next” button (slide 66) to go to the next slide. There is also a “Back” button (slide 64) to go to the next slide.

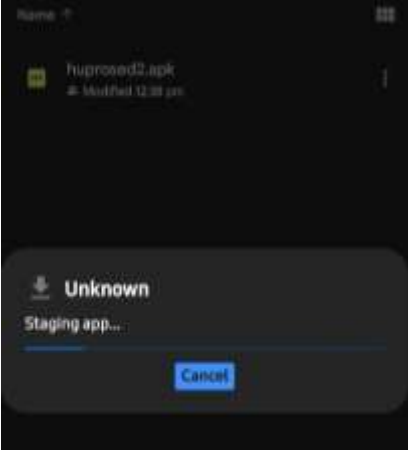
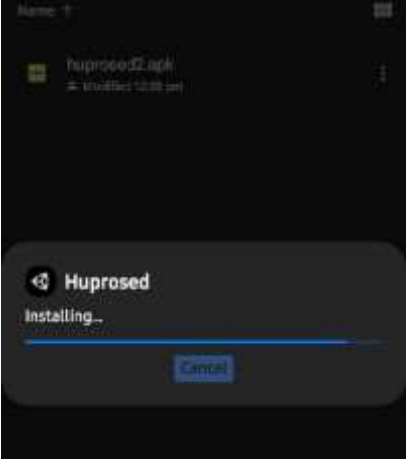
Researchers have identified more than 4,000 diseases that are caused by mutations. But having a genetic mutation that may cause a disease or condition doesn't always mean that a person will develop that disease or condition. On average, people probably carry from 5 to 10 genes with mutations in each of their cells. Problems happen when the particular gene is dominant or when a mutation is present in both copies of a recessive gene pair. Problems can also happen when several variant genes interact with each other — or with the environment — to increase susceptibility to diseases. There is Achondroplasia, dwarfism, Marfan syndrome (a connective tissue disorder), and Huntington disease (a degenerative disease of the nervous system), down syndrome, and many more.



66. Quiz (5 Questions)

At the end of the game, there is a quiz that refers to students' critical thinking skills based on Facione aspects, after the student clicks on the answer, the right or wrong answer will immediately appear. There are five question multiple choices

Figure 2 Installation procedure

Step	Explanation
	1. There is a link to google drive for downloading the file. Then, please click the file, and it will be installed.
	2. The application is being downloaded.

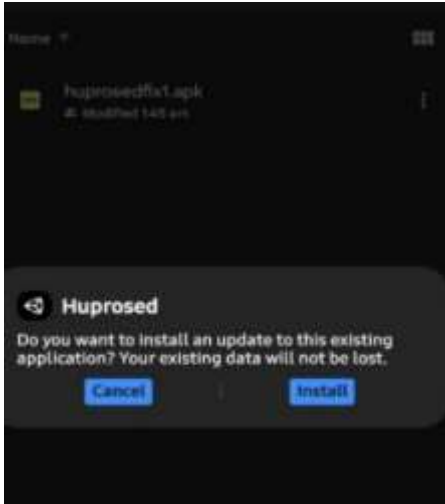
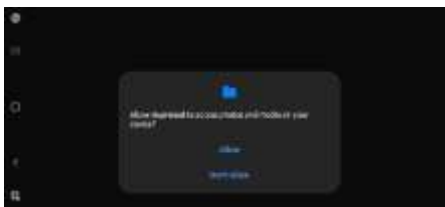
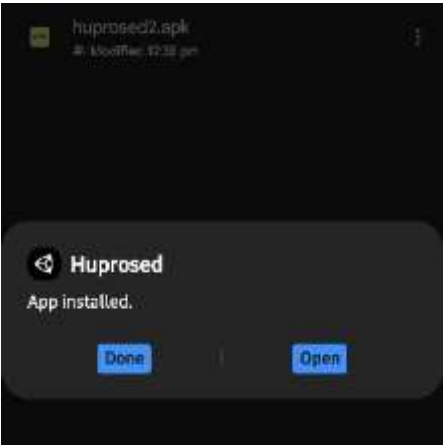
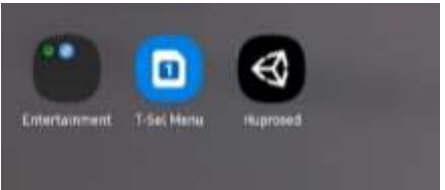





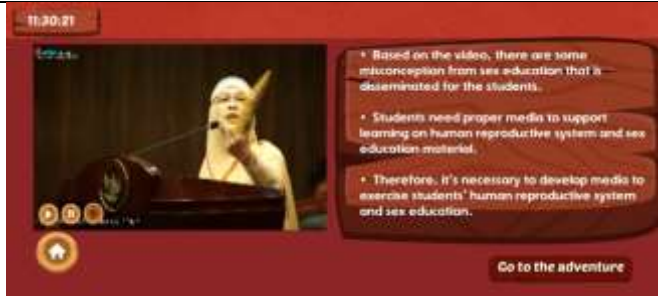





Step	Explanation
 	<p>3. Some phone protection will detect HUPROSED as an unknown application.</p> <p>4. Please click yes.</p>
 	<p>5. HUPROSED has already installed, and ready to use.</p>




Figure 3 Application result



Scene	Explanation
 	<p>1. Loading bar</p> <p>Loading bar as the first page of games. On this page, there are three buttons contain (exit and next). Below the title, there is a percentage button, it will direct to the main page after being 100 percent.</p>


Scene	Explanation
	<p>2. Main Page (Identity)</p> <p>There is a form of identity that is linked with email's developer game. Below this page, there are three buttons contain (exit and next). On this page, linked into Gmail.</p>
	<p>3. Introducing HUPROSED</p> <p>Introduce HUPROSED as the icon of this game. Below this page, there are three buttons contain (exit and next).</p>
	<p>4. Home</p> <p>On this page, there are four main menus in this game, namely about the game, game developer, credit, and references. Below this page, there are three buttons contain (exit and go to the adventure). "Exit" is quit from the game, and "Go to the adventure" is going to "HUPROSED's adventure (Slide 9).</p>

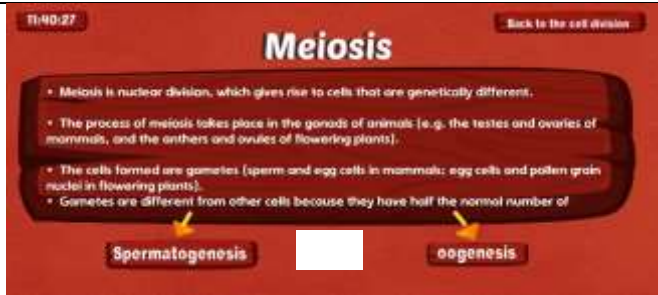

Scene	Explanation
	<p>5. About game</p> <p>On this page, there is a video, and an explanation about this game, and why this game is developed. There is also a “Home” button to go back into “home” (Slide 4).</p>
	<p>6. Game developer</p> <p>On this page, there are three photos of the game developer, and there is an explanation about them. There is also a “Home” button to go back into “home” (Slide 4).</p>
	<p>7. References</p> <p>On this page, there is a reference to the game’s materials. There is also a “Home” button to go back into “home” (Slide 4).</p>




Scene	Explanation
	<p>8. Credit</p> <p>On this page, there is credit, sources of pictures, soundtrack, video, and concept of the game. There is also a “Home” button to go back into “home” (Slide 4). On the right bottom, there is the button “Go to the adventure” which means go to the next slide (slide 9).</p>
	<p>9. HUPROSED’s Adventure</p> <p>This page, contain material about the human reproductive system and sex education. There is button “Reproductive system” (Slide 10), button “Cell division” (Slide 11), button “Prenatal Journey” (slide 21), button “Gender Reveal” (Slide 28), button “Human reproductive system” (Slide 33), button “Puberty adventure” (Slide 40), button “Pre-marriage talk”(Slide 49).</p>
	<p>10. Reproductive System</p> <p>There is the picture, then an explanation. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).</p>

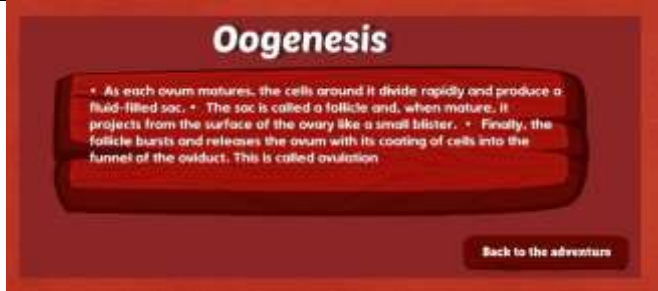

Scene	Explanation
	<p>11. Cell Division</p> <p>There is an explanation on the box about cell division, Cell division is divided into two, there are mitosis and meiosis. There is a button “guide” about the guide Drag and drop game (slide 12).</p> <p>There is a button “Mitosis” that leads into game drag and drop (slide 13). There is a button “Meiosis” that leads into game drag and drop (slide 15).</p>
	<p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).</p>
	<p>12. Guide Domino game</p> <p>There is an explanation on the box about the drag and drop game. There is a button “Let’s go to the game” to guide the Domino game (slide 13).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).</p>




Scene	Explanation
	<p>13. Mitosis *(Game Domino)</p> <p>On this page, there is a game drag and drop to arrange the phase of mitosis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” (slide 11). There is a button “Next”, that leads into mitosis explanation (slide 14).</p>
	<p>14. Mitosis (Explanation)</p> <p>There is an explanation on the box about Mitosis. There is a button “Let’s go to the meiosis” about the guide domino game (slide 15).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” (slide 11).</p>

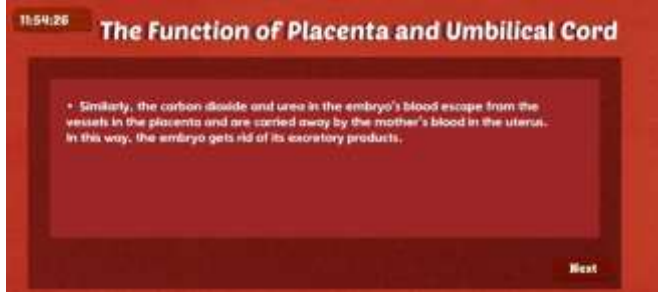
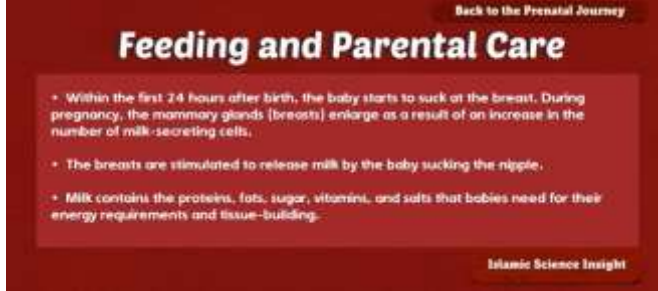

Scene	Explanation
 <p>The top screenshot shows a green interface titled "Meiosis" with the instruction "Please arrange the phases of meiosis". It features six cards, each with a diagram of a cell in a different stage of meiosis. Buttons for "Back to the cell division" and "Next" are visible. The bottom screenshot shows a red-bordered game board with six numbered slots (1-6) where the cards are being placed in order. A play button is in the top right corner.</p>	<p>15. Meiosis *(Game Domino)</p> <p>On this page, there is a game drag and drop to arrange the phase of meiosis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” (slide 11). There is a button “Next”, that leads into meiosis explanation (slide 16).</p>

Scene	Explanation
 <p>The screenshot shows a slide titled "Meiosis" with a red background. At the top left is a timer "11:40:27" and at the top right is a button "Back to the cell division". The main text area contains three bullet points: <ul style="list-style-type: none"> • Meiosis is nuclear division, which gives rise to cells that are genetically different. • The process of meiosis takes place in the gonads of animals (e.g. the testes and ovaries of mammals, and the anthers and ovules of flowering plants). • The cells formed are gametes (sperm and egg cells in mammals; egg cells and pollen grain nuclei in flowering plants). • Gametes are different from other cells because they have half the normal number of Below the text are two buttons: "Spermatogenesis" on the left and "oogenesis" on the right. A white rectangular box is positioned between these two buttons. </p>	<p>16. Meiosis</p> <p>There is an explanation on the box about meiosis. Meiosis is divided into two, there are spermatogenesis and oogenesis.</p> <p>There is a button “Spermatogenesis” that leads into game drag and drop (slide 17). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the cell division” which means go to the whole cell division(slide 11)</p>
 <p>The screenshot shows a slide titled "Spermatogenesis" with a green background. At the top left is a timer "11:40:32" and at the top right is a button "Back to the Meiosis". The main area contains a game interface with five cards representing different stages of spermatogenesis. The cards are: <ul style="list-style-type: none"> Card 1: Two pairs of chromosomes (one blue, one red). Card 2: Two single chromosomes (one blue, one red). Card 3: A single blue chromosome labeled "2n". Card 4: A single red chromosome labeled "2n". Card 5: Four sperm cells, each with a tail. A "Next" button is located at the bottom right of the slide. </p>	<p>17. Spermatogenesis *(Game Domino)</p> <p>On this page, there is a game drag and drop to arrange the phase of spermatogenesis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the Meiosis” (slide 16). There is a button “Next”, that leads into spermatogenesis explanation (slide 18).</p>

Scene	Explanation
	
	<p>18. Spermatogenesis (Explanation)</p> <p>There is an explanation on the box about spermatogenesis. There is a button “Let’s go to the oogenesis” about guide domino (slide 19).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the meiosis” slide (slide 16).</p>
	<p>19. Oogenesis *(Game Domino)</p> <p>On this page, there is a game drag and drop to arrange the phase of spermatogenesis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the Meiosis” (slide 16). There is a button “Next”, that leads into spermatogenesis explanation (slide 18).</p>




Scene	Explanation
 <p>Oogenesis</p> <ul style="list-style-type: none"> • As each ovum matures, the cells around it divide rapidly and produce a fluid-filled sac. • The sac is called a follicle and, when mature, it projects from the surface of the ovary like a small blister. • Finally, the follicle bursts and releases the ovum with its coating of cells into the funnel of the oviduct. This is called ovulation. <p>Back to the adventure</p>	<p>20. Oogenesis (Explanation)</p> <p>There is an explanation in the box about oogenesis. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” slide (slide 9).</p>
 <p>Prenatal</p> <ul style="list-style-type: none"> Mating and Fertilization Pregnancy and Development Feeding and Parental Care Function of Placenta and umbilical cord <p>Back Go to the adventure</p>	<p>21. Prenatal Journey</p> <p>This page, contain material about prenatal. There are buttons “Mating and fertilization” (Slide 23), button “Pregnancy and development” (Slide 24), button “Feeding and parental care” (Slide 25), button “Function of the placenta and umbilical cord” (Slide 26).</p>



Scene	Explanation
	<p>22. Guide 3D Games</p> <p>There is an explanation on the box about the 3D game. There is a button “Let’s go to the game” about the guide Drag and drop game (slide 23).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” (slide 21).</p>
	<p>23. 3D Games Mating and Fertilization Journey</p> <p>There is an explanation about the mating and fertilization journey by 3Dimension.</p>
	<p>24. Pregnancy and Development</p> <p>There is an explanation on the box about pregnancy and development, and a video about it. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21). There is a “Next” button, which goes to the next slide (25).</p>




Scene	Explanation
 <p>11:54:26 The Function of Placenta and Umbilical Cord</p> <ul style="list-style-type: none"> • Similarly, the carbon dioxide and urea in the embryo's blood escape from the vessels in the placenta and are carried away by the mother's blood in the uterus. In this way, the embryo gets rid of its excretory products. <p>Next</p>	<p>25. The function of the placenta and umbilical cord</p> <p>There is an explanation on the box about the function of the placenta and umbilical cord. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21). There is a “Next” button, which goes to the next slide (26).</p>
 <p>Back to the Prenatal Journey</p> <p>Feeding and Parental Care</p> <ul style="list-style-type: none"> • Within the first 24 hours after birth, the baby starts to suck at the breast. During pregnancy, the mammary glands (breasts) enlarge as a result of an increase in the number of milk-secreting cells. • The breasts are stimulated to release milk by the baby sucking the nipple. • Milk contains the proteins, fats, sugar, vitamins, and salts that babies need for their energy requirements and tissue-building. <p>Islamic Science Insight</p>	<p>26. Feeding and Parental Care</p> <p>There is an explanation on the box about feeding and parental care. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21). There is an “Islamic science insight” button, which goes to the next slide (27).</p>
 <p>Back to the Prenatal Journey</p> <p>Islamic Science Insight</p> <p>A birth-related process of human creation (Q.E. Al-Mulkun: 12-14)</p> <p>Next</p> <p>There is an ayat in Quran which explains human creation and development. Here it is:</p> <p>وَاللَّهُ عَلِيمٌ الْغَلِيْبُ</p> <p>He comprehends fully that which you do not see.</p>	<p>27. Islamic science insight</p> <p>There is an explanation on the box about Islamic science insight from feeding and parental care. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the prenatal journey” slide (slide 21).</p>


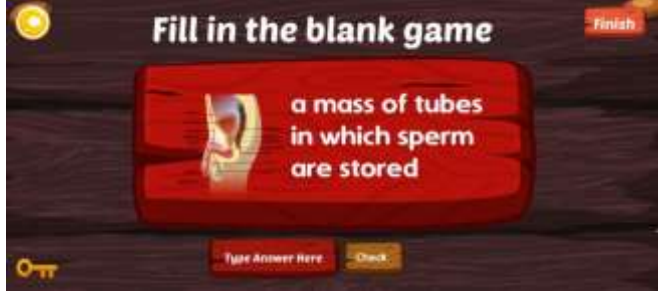
Scene	Explanation
	<p>28. Gender Reveal</p> <p>There is an explanation on the box about gender. Gender is divided into two, there are female and male. There is a button “guide” about the guide Drag and drop game (slide 30).</p> <p>There is a button “Islamic science insight” about gender (slide 29). There is a button “Sex Education” that leads into (slide 32).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” which means go to the next slide (slide 9).</p>



Scene	Explanation
	<p>29. Islamic science insight</p> <p>There is an explanation on the box about Islamic science insight from gender. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the gender reveal” slide (slide 28).</p>



Scene	Explanation
	<p>30. Guide drag and drop</p> <p>There is an explanation on the box about drag and drop. There is a button “Let’s go to the game” about the guide Drag and drop game (slide 31).</p> <p>There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the gender reveal” (slide 28).</p>
	<p>31. Gender (Game Drag and drop)</p> <p>On this page, there is a game drag and drop to choose the stuff that belongs to. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the gender reveal” (slide 28).</p>
	<p>32. Body Authority (Sex Edu)</p> <p>There is an explanation on the box about sex education, body authority. There is also a “Home” button to go back into “home” (Slide 4). there is a button “Back to the gender reveal” (slide 28).</p>



Scene	Explanation
	
	<p>33. Human reproductive system</p> <p>There is an explanation on the box about the human reproductive system. There are female and male reproductive systems. There is a button “guide” about the guide Drag and drop game (slide 34). There is a button “Sex Education” that leads into (slide 32). There is also a “Home” button to go back</p>




Scene	Explanation
	<p>into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” (slide 9).</p>
	<p>34. Guide Drag and drop</p> <p>There is an explanation on the box about drag and drop. There is a button “Let’s go to the game” about the guide Drag and drop game (slide 35). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “human reproductive system” (slide 33).</p>
	<p>35. Human reproductive organ (drag and drop)</p> <p>On this page, there is a game drag and drop to choose the organ to belong to. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the human reproductive system” (slide 33).</p>
	<p>36. The function of the human reproductive system</p> <p>There is an explanation on the box about the function of the human reproductive system. There are female and male reproductive systems. There is a button “guide” about guide “fill in the blank” game (slide 37). There is a button “Sex Education” that leads into (slide 39). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button</p>



Scene	Explanation
	<p>“Back to the adventure” (slide 9). There is a button “female” (slide 37) to go to female’s function (game fill in the blank), and also for male go to (Slide 38)</p>
	<p>37. Guide Fill in the blank</p> <p>There is an explanation on the box about Fill in the blank. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “function of human reproductive system” (slide 36). Button “Let’s go to drag and drop game” (slide 38)</p>
	<p>38. Male Reproductive System (Fill in the blank)</p> <p>There is some function statement on the “explanation” box, then the user fills the name of the organ on the “fill in the blank” box. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “function of human reproductive system” (slide 36).</p>




Scene	Explanation
	
	<p>39. Female Reproductive System (Fill in the blank)</p> <p>There is some function statement on the “explanation” box, then the user fills the name of the organ on the “fill in the blank” box. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “function of human reproductive system” (slide 36).</p>



Scene	Explanation
	
	<p>40. Aurat (Sex Edu)</p> <p>There is an explanation on the box about sex education. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “function of human reproductive system” (slide 36).</p>




Scene	Explanation
	
	<p>41. Islamic Science Insight</p> <p>There is an explanation on the box about Islamic science insight from the human reproductive system. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the human reproductive system” slide (slide 33)</p>



Scene	Explanation
	<p>42. Puberty Adventure</p> <p>There is an explanation on the box about female and male puberty. There is a button “guide” about guide “matching” game (slide 43). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the adventure” (slide 9). There is a button “female” (slide 42) to go to female’s function (game matching), and also for males go to (Slide 43)</p>
	<p>43. Guide Matching</p> <p>There is an explanation on the box about the Matching game. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42).</p>
	<p>44. Female puberty *(Matching game)</p> <p>On this page, there is matching. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42). There is also a “video of menstruation cycle”</p>




Scene	Explanation
	
	<p>45. Male puberty *(Matching game)</p> <p>On this page, there is matching. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42). There is also a “Next” button (slide 46) to go to the next slide.</p>




Scene	Explanation
 <p>The screenshot shows a slide with a red background. At the top right is a button labeled "Back to the Puberty Adventure". The main title is "Physical and Psychological Changes". On the left, there are illustrations of a boy and a girl. On the right, there is a text box containing the following text: "Primary changes are also called the main changes that occur in the body. This change allows a male and a female at puberty to produce babies. Primary changes are accompanied by secondary changes. Secondary changes are called physical changes or changes whose characteristics appear in the bodies of males and females." At the bottom right, there is a "Next" button.</p>	<p>46. Physical and Psychological Changes</p> <p>There is an explanation on the box about physical and psychological changes. There are two explanations female, and male. There is a button “Influenced by sex hormone” that leads into (slide 447). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red box, this is a button to go to “back to puberty adventure” (slide 42).</p>
 <p>The screenshot shows a slide with a red background. At the top left, there is a timer showing "11:57:23". The main title is "Sex Hormone". On the left, there are various icons representing hormones and reproductive organs. On the right, there is a text box containing the following text: "Sex hormones instruct reproductive organs to develop or mature in preparation for one day being able to have children. Puberty begins when an area of the brain called the hypothalamus starts to release gonadotropin-releasing hormone (GnRH). Some hormones influence the reproductive system." At the bottom, there are two buttons labeled "Guide" and "Play".</p>	<p>47. Sex Hormone</p> <p>There is an explanation on the box about sex hormones. There is a button “guide” about guide “matching” game (slide 48). There is also a “Home” button to go back into “home” (Slide 4). There is also a “Play” button that goes to (slide 49); On the right corner, there is Redbox “back to puberty adventure” (slide 42).</p>
 <p>The screenshot shows a slide with a red background. At the top right is a button labeled "Back to the Puberty Adventure". The main title is "Fruit Ninja Game". On the left, there is a text box containing the following text: "In this game, you can choose which are the hormone related to sexual function. Be careful of bombs, and others hormones which not belong to sex hormones. Please click 'check' to check the correct answer." At the bottom right, there is a "Next" button.</p>	<p>48. Guide</p> <p>There is an explanation on the box about Fruit and Ninja game. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is the button “puberty adventure” (slide 42).</p>




Scene	Explanation
	<p>49. Sex hormone *(fruit ninja game)</p> <p>On this page, there is a fruit ninja game, to choose which are the sex hormone. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “puberty adventure” (slide 42). There is also a “Next” button (slide 50) to go to the next slide.</p>
	<p>50. Sex hormone *(Explanation)</p> <p>On this page, there is a fruit ninja game, to choose which are the sex hormone. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “puberty adventure” (slide 42). There is a “Next” button that goes to the (slide 51)</p>




Scene	Explanation
	
	<p>51. Islamic Science Insight</p> <p>There is an explanation on the box about Islamic science insight from puberty adventure. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a button “Back to the puberty adventure” slide (slide 42).</p>
	<p>52. Pre Marriage Talk</p> <p>On this page, there is Pre Marriage Talk. There are four menus, such as “sexual health” (53), “sexual problem” (slide 52), method of birth control (slide 57), sexual problems (52), genetic disorders (59). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “Adventure” (slide 9).</p>

Scene	Explanation
 <p>General Sexual Health</p> <p>1. Interaction etiquette</p> <ul style="list-style-type: none"> • Due to one on Islamic law and social norm concerning unlawful sexual relations between males and females who are not married to one another through a marriage. • There is some way to prevent it, we have to obey the interaction etiquette between females and males, such as lower our gaze, do not do khelwat, etc. 	<p>53. General Sexual Health</p> <p>On this page, there is an explanation about female sexual health. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the pre-marriage talk” (slide 52). Button “Next” goes to the next (slide 54).</p>
 <p>Female Sexual Health</p> <p>1. The obligation after puberty (What to do when having menstruation)</p> <p>a. If you are menstruating, change pads as often as possible. When there is a lot of blood flow, you can replace it at least every 3-6 hours. Blood that is accommodated in the pads can be a medium for the growth of germs. The obligation after puberty (What to do when having menstruation)</p> <p>b. Change pads as often as possible :</p> <ul style="list-style-type: none"> • If you are menstruating, change pads as often as possible. When there is a lot of blood flow, you can replace it at least every 3-6 hours. • Blood that is accommodated in the pads can be a medium for the growth of germs that cause infection. 	<p>54. Female Sexual Health</p> <p>On this page, there is an explanation about female sexual health. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the pre-marriage talk” (slide 52). Button “Next” goes to the next (slide 55).</p>

Scene	Explanation
	
	<p>55. Male Sexual Health</p> <p>On this page, there is an explanation about male sexual health. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the pre-marriage talk” (slide 52).</p>
	<p>56. Sexual Problems</p> <p>On this page, there are Sexual Problems. There are three menus, such as “sexual harassment” (57), “sexually transmitted disease” (slide 58), and “sexual disorder” (slide 59). There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “Pre-marriage talk” (slide 52).</p>

Scene	Explanation
 <p>Back to the Pre Marriage Talk</p> <h3>Sexual Harassment</h3> <p>Sexual harassment is unwelcome conduct of a sexual nature, which makes a person feel offended, humiliated, and/or intimidated. Sexual harassment can take various forms. It can involve conduct such as:</p> <ul style="list-style-type: none"> a. Unwelcome touching, hugging, or kissing b. Staring or leering c. Suggestive comments or jokes d. Unwanted invitations for sex or persistent request to go out on dates e. Intrusive questions about another person's private life or body f. Unnecessary familiarity, such as deliberately brushing up against someone g. Insults or taunts of a sexual nature sexually explicit pictures, posters, screen savers. <p>Next</p>	<p>57. Sexual Harassment</p> <p>On this page, there is an explanation about sexual harassment. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to the sexual problems” (slide 56). Button “Next” goes to the next (slide 58).</p>
 <p>Back to the Sexual Problems</p> <h3>Sexual Transmitted Disease</h3> <p>The reproductive system is very vulnerable to abnormalities and disease. Abnormalities and diseases of the reproductive system can be caused by bacteria, fungi, and viruses. These disorders and diseases can be transmitted from parents (infected) to their children, due to infected blood transfusions, transmitted due to unhealthy lifestyles such as free sex, and using a syringe for illegal drugs or drugs. The following will discuss some of the abnormalities and diseases that can occur in the human reproductive system. There are sexually transmitted diseases, such as AIDS, Gonorrhea (GD), Syphilis, Herpes Simplex Genitalis, Lymphogranuloma Venereum, and Chlamydia.</p> <p>Next</p>	<p>58. Sexual Transmitted Disease</p> <p>On this page, there is an explanation about the sexually transmitted disease. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to the sexual problems” (slide 56).</p>
 <p>Back to the Sexual Problems</p> <h3>Sexual Disorder</h3> <p>LGBT (Lesbian, Gay, Bisexual, Transgender)</p> <p>1. Lesbian and Gay A Lesbian is a homosexual woman. The word lesbian is also used for women about their sexual identity or sexual behavior, regardless of sexual orientation, or as an adjective to characterize or associate nouns with female homosexuality or same-sex attraction. Meanwhile, Gay is a homosexual man.</p> <p>2. Bisexual Bisexuality is romantic attraction, sexual attraction, or sexual behavior toward both males and females, or to more than one gender. It may also be defined as romantic or sexual attraction to people of any sex or gender identity, which is also known as pansexuality.</p> <p>Next</p>	<p>59. Sexual Disorder</p> <p>On this page, there is an explanation about the sexually transmitted disease. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to the sexual problems” (slide 56). Button “Method of birth control” go to the next (slide 60).</p>

Scene	Explanation
	<p>60. Method of birth control</p> <p>On this page, there is an explanation about the method of birth control. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to pre-marriage talk” (slide 52). Button “next” goes to the guide (slide 61).</p>
	<p>61. Guide drag and drop</p> <p>There is an explanation on the box about the drag and drop game. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to pre-marriage talk” (slide 52). Button “back” to go back to (slide 60). Button “Let’s go to drag and drop game” to go to the next slide (slide 62).</p>
	<p>62. Method of birth control *(drag and drop game)</p> <p>On this page, there is a drag and drop a game, to choose from which are the natural, artificial, chemical, and surgical methods. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red</p>

Scene	Explanation
	button “pre-marriage talk” (slide 52). There is also a “Next” button (slide 63) to go to the next slide, and “back” to go to the previous slide (slide 61).
	<p>63. Method of birth control *(Explanation)</p> <p>On this page, there is an explanation about the method of birth control. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is a red button “back to pre-marriage talk” (slide 52). There is also a “Next” button (slide 64) to go to the next slide.</p>
	<p>64. Genetic Disorder *(Explanation)</p> <p>On this page, there is an explanation about the method of a genetic disorder. There is also a “Home” button to go back into “home” (Slide 4). On the right corner, there is “back to pre-marriage talk” (slide 52). There is also a “Next” button (slide 66) to go to the next slide. There is also a “Back” button (slide 64) to go to the next slide.</p>
	<p>65. Quiz (5 Questions)</p> <p>At the end of the game, there is a quiz that refers to students' critical thinking skills based on Facione aspects, after the student clicks on the answer, the right or wrong answer will immediately appear. There are five question multiple choices</p>

Scene	Explanation
	