

DESIGNING ENGLISH AND SCIENCE GAME IN ANDROID AS TEACHING MATERIAL TO SUPPORT CLIL APPROACH

Paksi Jati Mulyono, Ikhsanudin, Urai Salam

English Education Study Program of Teacher Training and Education Faculty, Untan

Email: stand2fly@gmail.com

Abstract : This research is to design a game as material to support Content Language Integrated Learning Approach (CLIL) which is applied on Science subject on 5th grade students of Cerdas Istimewa class on SD Muhammadiyah 2 Pontianak. The method of this research is development research that uses ADDIE instructional development procedure (*Analysis, Design, Development, Implement, dan Evaluation*). The result of this research is a game that helps students to learn the specific science term or basic vocabulary in lifecycle topic of science subject. The game has been already evaluated by expert in media and learning. As the result, the media expert evaluation is 4.65 that is classified as feasible to be used as instructional media. The result of the subject matter evaluation is 4.29 that mean feasible to be used as supplementary material to support the CLIL approach for Science subject.

Keyword: Designing Material, Game, CLIL approach.

Abstrak: Penelitian ini bertujuan untuk mendesain sebuah game android yang berguna sebagai material untuk membantu pendekatan *Content Language Integrated Learning (CLIL)* yang diterapkan pada pelajaran IPA pada siswa Cerdas Istimewa kelas 5 di SD Muhammadiyah 2 Pontianak. Adapun metode penelitian yang digunakan adalah penelitian pengembangan dengan tahapan *ADDIE (Analysis, Design, Development, Implement, dan Evaluation)*. Hasil dari penelitian ini adalah sebuah game yang berperan sebagai material pembantu (*scaffolding*) yang dapat membantu siswa untuk belajar kata-kata dasar dalam topik pelajaran siklus kehidupan di pelajaran sains. Game tersebut telah di evaluasi oleh expert di bidang pembelajaran dan media. Alhasil, game ini dikatakan layak dengan skor 4.29 pada tinjauan media dan 4.65 pada tinjauan pembelajaran.

Kata Kunci: Mendesain Materi, Game, Pendekatan CLIL.

The content language integrated learning approach is implemented in the Indonesia curriculum. This approach is used in one of the governor program in serving equal education for students who have special talent and intelligence. Based on UU RI No. 20/2003, in section 5; article 4 of National Education System Act of 2003 is stated that any citizen who has special talent and intelligence should get special education. This regulation is applied in one of the school in Pontianak, the

name of the school is SD Muhammadiyah 2 Pontianak. The name of program is Cerdas Istimewa. The model of CI class in SD Muhammadiyah 2 Pontianak is CI class with acceleration program in 3rd – 5th grade by the enrichment of English for Math and science. English is used as the language escort for math and science class. This kind of learning is what educator usually called it as CLIL approach. CLIL approach is dual focus learning system that oriented not only on the content but also the language at the same time. Pupils are also directed to learn language and use it authentically in real context.

Researcher conducted a preliminary research in the 5th grade of CI class of SD Muhammadiyah 2 Pontianak to investigate the condition of the implementation of the program. As the result, researcher gathered several facts about the deficiencies of the implementation. The limitation of the materials, the lack of variety of teaching activities in teaching and students' basic vocabularies, the limited duration of learning process become the biggest issue from teacher and also student.

Firstly, the problem is the limitation of the material. The basis curriculum for conducting the program demands students not only to master the content of the topic but also the specific language of the topic. The target is clearly similar with the CLIL approach. The problem is the material that is used in the learning cannot cover the need of the language. The learning only relies with a book which is originated from Singaporean curriculum. The book provides a good quality of the content, but it is not about the language. There are some aspects that are not contextual with students at SD Muhammadiyah 2 Pontianak, such as the visual examples are not familiar, and also the language is too complex for them. This is because the target-user of this book is student in Singapore. As we know that in Singapore, English become their official language. So, there is a gap between language level in book and student's level of language.

Secondly, based on the field study data, the learning process in this program is monotonous. Almost every subject using a similar instructional activity to learn that demand students to listen to the teacher explanation and do exercise in the book. The monotonous learning leads student to ineffective learning. In addition, the exposure of learning also burdens the student. According to their age, the students in that group of age are classified as middle and late childhood. Based on Mustafa in his research about the essential requirement to teach young learners in Indonesia, he explained deeply about the characteristics of young learner in Indonesia, (Mustafa, 2010). He elaborates the points into children learn from direct experience, children learn from hand-on physical activities, children thinking is embedded in here-and-now context of situation, children learn holistically from whole to parts using script, and children have a short attention span. Based on the expert, children at this period of time have natural curiosity to learn something new. The desire to know anything and try something new makes them very active to seek information. Besides that, they also have short attention span that means they are easily distracted with something attractive. So, the variation of activity is imperative in order to annihilate their boredom and burden in learning.

Thirdly, students don't have enough basic vocabulary in learning the subject which makes them become passive. This problem came out because several factors, such as the limitation of the material and the time of learning. The students don't

have prior knowledge about the specific terms of the language which are used in the topic. One of the factors is because the materials cannot cover the language aspect. Besides that, the teacher doesn't have enough time and chance to build student basic vocabularies that are consisted of content-obligatory and content-compatible language because the time that is available in the formal learning process only 3x 35 minutes per week.

Based on the learning problem, researcher provides an alternative solution to solve the described problems. Researcher uses powerful function of technology nowadays to support the learning and annihilate the problems. The trend of using technology to support the learning is already common. The use of computer as pedagogical tools to support language learning is well known as computer assisted language learning (CALL). This trend is growing as long as the widespread of the computer user. Nowadays, as advanced mobile phone has become widespread in society, the trend is changing into mobile assisted language learning (MALL). Based on Miangah and Nezarat, there are two main characteristics of mobile devices are portability and connectivity. As for connectivity, designing the mobile system must have capability of being connected and communicated with the learning website using the wireless network of the device to access learning material ubiquitously including short message service (SMS) and mobile e-mail. Portability enables learners to move mobile devices and bring learning materials, (Miangah & Amin, 2012). Besides that, the nowadays mobile phone technology allows the developer to develop their own application freely.

Based on the expert and also the fact, researcher conducted this research to develop a game as scaffolding to help students to learn the basic vocabulary to learn the science subject. The use of mobile phone enhances independent learning and unlimited-time of learning. Then, the use of game accommodates the learning characteristics of the students, alienate their boredom, and keep their motivation in learning. Last, the use of Scaffolding helps student to obtain the basic vocabulary of the topic. Based on Alibali (2006), the variety of scaffolds can accommodate students' different levels of knowledge. More complex content might require a number of scaffolds given at different times to help students master the content.

METHOD OF THE RESEARCH

The method of this research is the Development Research in which the researcher designed appropriate android material sample based on content language integrated learning approach for natural science class on 5th grade students of Cerdas Istimewa class in SD Muhammadiyah 2 Pontianak. Based on (Richey & Klein, 2005), there are structured phases in developmental study. The study may have an analysis phase, design phase, and try-out and evaluation phase. Dick & Carey also explained about ADDIE model which consist of analysis, designing, developing, implementing, and evaluating.

RESULTS AND DISCUSSION

Result of the Research

The goal of this research is to design android application materials based on mobile assisted language learning to support content language integrated learning approach for natural science class on fifth grade students in SD Muhammadiyah 2 Pontianak. In order to reach the goal, researcher needs to find the detail of the needs, make the design and construction, and conduct implementation and also evaluation. The descriptions of each process are discussed below.

Analysis Phase

Researcher analyzed: (1) the analysis of the effect of implementation of The CI program for the students; (2) the analysis of the learning process; (3) the analysis of the textbook; (4) the analysis of the students regarding Mobile Learning; (5) the analysis of the school regarding Mobile Learning; (6) the analysis of teacher regarding Mobile Learning.

The Analysis of the Effect of Implementation of The CI Program for the Students

Based on the observation and interview, CI as special program tends burdening the student. The basis curriculum for conducting the program demands students not only to master the content of the topic but also the specific language of the topic. The core of the problem is that the learning is not contextual with the student condition that impressed to force the student to reach the target without considering the nature and characteristic of the learner. One of the examples is the monotonous of the learning activities. Almost every subject using a similar instructional activity to learn that demand students to listen to the teacher explanation and do exercise in the book. The monotonous learning leads student to ineffective learning.

The Analysis of the Learning Process

Based on the interview from the teacher, several problems were gathered about the learning process. In the learning, students meet difficulties in using target language to interact with their friends and also follow the explanation from teacher. The discussion about the material between them is dominated by the use of L1. Besides that, the lack of feedback from student about the learning is become the learning problem. As the result, the learning achievement is low, that only 30% can pass the standard score from 20 students. The core of that problem is the lack of students' basic vocabulary which is explained by Cambridge as content-obligatory and content-compatible language. In addition, Teacher meets difficulties in teaching the material to the student. Teacher confessed that it is very a hard to teach subject trough a foreign language as the medium because of the limited time and material. The duration of the learning is very limited which is 3x 35 minutes per week.

The Analysis of the Textbook

The learning only relies with a book which is originated from Singaporean curriculum. The book provides a good quality of the content, but it is not about the language. There are some aspects that are not contextual with students at SD Muhammadiyah 2 Pontianak, such as the visual examples are not familiar, and also the language is too complex for them. This is because the target-user of this book is student in Singapore. As we know that in Singapore, English become their official

language unlike in Indonesia that uses English as foreign language. So, there is a gap between language level in book and student's level of language.

The Analysis of the Students Regarding Mobile Learning

The meaning of Mobile learning is specified into the use of Android-Plat formed as learning media. The use of android-platform is because students have already familiar with this gadget. Based on the interview with the teacher, almost 90 % of total student in the subject of the research already have their own android-phone. They tend to use it because the multi-tasking facility in the phone, such as camera, video-recording, game, music-player, and internet. A recent report shows that, their phone becomes a tool to unwind amid the routine boredom.

The Analysis of the Teacher Regarding Mobile Learning

Teacher realized about the benefits of the use of technology in class. This can be seen in the use of LCD projector and Laptop. That technology becomes regular tools in running the activities. Teacher provides explanation that triggers their visual and audio sense in comprehending the lesson. Based on the further investigation and interview, researcher had several discussions about the concept of this research. Basically, the teacher supported the implementation of this research. Researcher got a good response from the teacher that the teachers was willing to provide baseline data for the research, such as the condition of the class, student data of android users, syllabus and guidebook. Teacher is basically already very familiar with android phone. Refers to the things mentioned above, it is undeniably that mobile learning can be accomplished with the good support from the teacher.

The Analysis of the School's Policy Regarding Mobile Learning.

Regarding to the mobile learning, there is a regulation issued by the school about this. Students were not allowed to bring mobile phones to school. This regulation was issued on some basis. The first reason is about the security in schools, because children are not old enough to use the goods that are quite expensive. This could lead to criminal acts related to the theft. The second reason, mobile phone could divert the concentration of students in learning. The mobile phone may interfere with the learning process.

Design Phase

In this phase, researcher determined several aspect of the game according to the analysis phase. Based on (Richard & Rodgers, 2001), design is level of method analysis in which we consider (a) what the objective of the method are; (b) how language content is selected and organized within the method, that is, the syllabus model the method incorporates; (c) the types of learning tasks and teaching activities the method advocates; (d) the role of the learners; (e) the role of the teachers; (f) the role of instructional material.

The Objective

The objectives of the game are to build student's basic vocabulary to learn specific science topic and improve student's motivation and interest in learning the topic. The basic vocabulary that is provided in the game is listed below.

Syllabus

The subject of the research is 5th grade student of CI Class of SD Muhammadiyah 2 Pontianak. Based on the curriculum in the school, Researcher takes “life cycles” topic as a sample topic that is learned by the students. The objective of the content are: (1) understand that living things reproduce to ensure survival of their own kind; (2) understand that all living things go through a life cycle and different living things go through different life cycles; (3) recognize that some animal hatch from eggs and some are born as young animals; (4) describe the life cycle of human being; (5) describe the life cycle of some animals; (6) describe life cycles of some flowering plant. (Taken from the school). Besides the content, the syllabus also demands the student to comprehend several basic vocabularies, as listed below.

Table 1
List of the Basic Vocabularies

Content-Obligatory Language	Content-Compatible Language
Tadpole	Classify
Chrysalis	Emerge
Pupa	Identify
Wiggler	Feed
Hydrophyte	Hatch
Frog let	Grow
Nectalis	Contain
Cocoon	Hatch
Larva	Reproduce
Seedling	
Shooter	

Types of Learning and Teaching Activities

The type of the learning is Mobile learning which is classified as informal learning in this research.. With the ubiquitous concept of mobile phone, learning can be accessed from everywhere, every time without any restriction, and the learning material can be accessed easily than any other devices. Game is chosen as cognitive tools, to encourage learner’s interest in learning. Effort is required and games help and encourage many learners to sustain their interest and work. In addition, the game is formed as scaffolding in supporting the CLIL approach. The scaffoldings are concept, mind maps, cue card, visual scaffolding, and example.

Learner Role

The roles of the learner regarding to the game are: (1) learner uses a self-directed and discipline-based process to analyze, collect, and interpret the knowledge or information; (2) learner uses the game based on the instruction in every section of the game; (3) learner constructs their vocabulary in order to finish the game.

Teacher Role

The roles of the teacher regarding to the game are: (1) teacher as facilitator in the learning; (2) teacher distributes the material; (3) teacher supports students for the using of the game by giving some examples and cues; (4) teacher answers or

addresses a few major issues or concept as an expert; (5) teacher motivates and controls the use of the game.

The Role of Instructional Material.

The roles of the instructional material are: (1) learning and teaching support – supplementary material that assist as scaffolding in the coordination of learners and resources for learning activities; (2) a reference source for learner on basic vocabularies to learn the whole topic; (3) a tool for learner to practice their vocabulary in fun way, keep their motivation in comprehending the material, and also enhance independent learning.

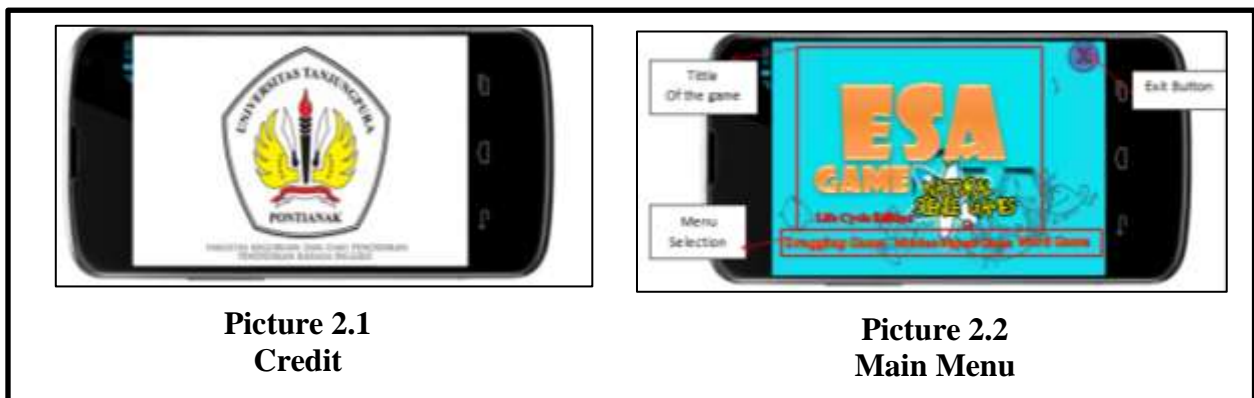
Development Phase

In this phase, researcher developed the model of the game. The model of the game is made by a collaborative work with teacher. Researcher ensured the content and syllabus of the game by having discussion with the teacher. The adjustment of student’s need and characteristic also became consideration in developing the game. Based on (Pribilova, 2006), young learner-age group 7-11 love to learn interesting things especially play, challenge but bot too challenging, and also to be praised for what they have done and learnt to keep their motivation. Those factors are become concern in composing the element of the game. In making the visual design of the game, researcher uses Adobe Photoshop as designing program because this software is really a reliable and famous program in visual editing. Besides that, the adjustment of user-friendliness factor is also the concern in designing the game so that student can easily use the game. User-friendliness, adjustment of student need’s and characteristics, and the design packaging become the researcher main concern in composing this game. In this phase, researcher developed the structure of the game and the model of the game.

The Model of the Game

The model of the game consists from 3 types of game activities, namely dragging game, hidden game object, and word game. These are the display of each section in the game:

Credit and Main Menu

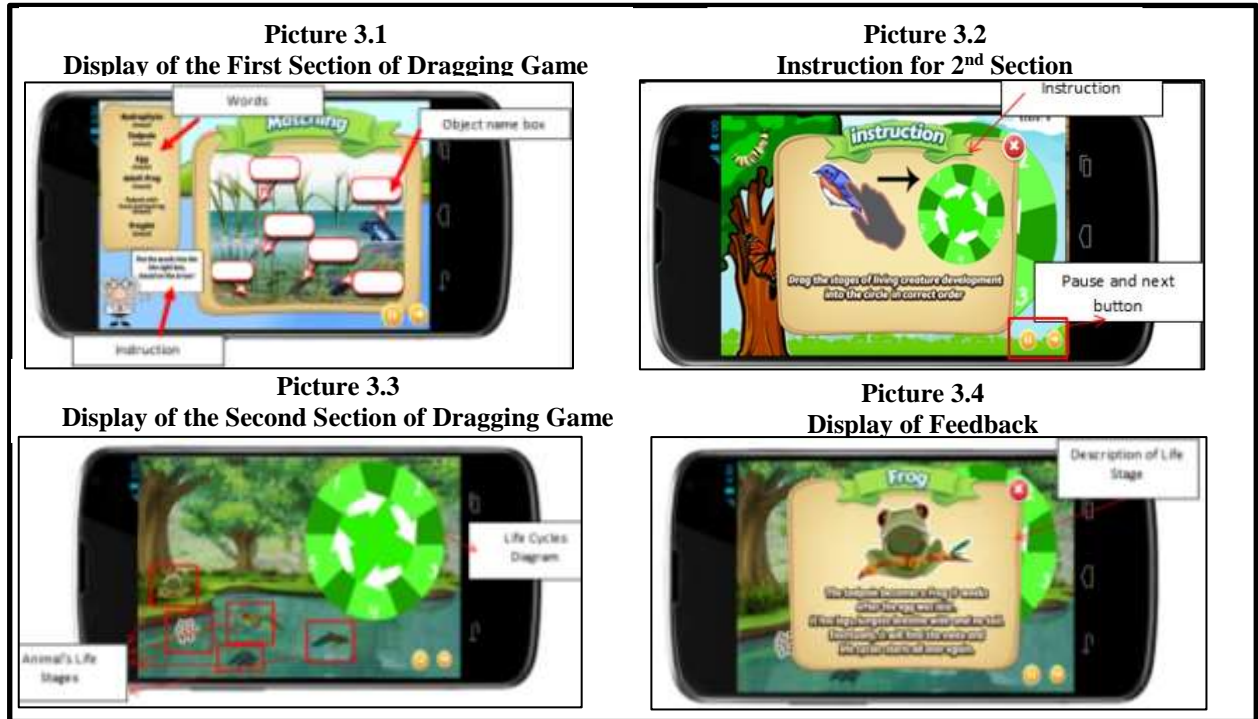


Picture 2

Display of the Credit and Main Menu

Dragging Game

The dragging game is divided into 2 sections. The first section is made to introduce about the basic vocabulary of the content, and the second section is used to give explanation about the content of the topic which is about life cycles.



Picture 3
Display of the Dragging Game

Hidden Object Game

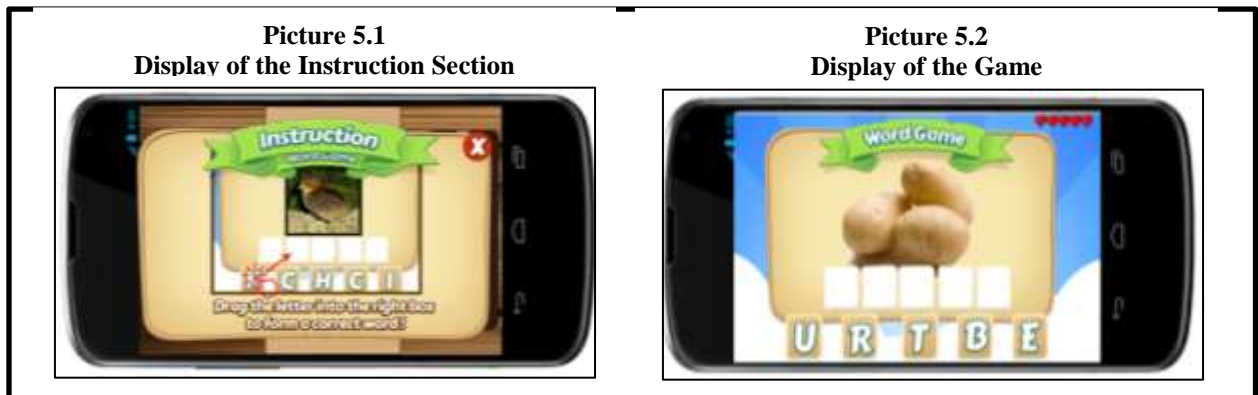
This section is a game which demands student to find hidden objects in the pictures based on the list of the object. This game enhances student's motivation and curiosity in comprehending the vocabularies. The use of several elements like time, score and lives emerge challenge in learning with this section. The goal of this game is to strengthen student's vocabulary, that the variety of exercise and activity will ease student to comprehend the vocabularies and keep their motivation.



Picture 4
Display of the Hidden Object Game

Word Game

This section, students have to arrange the letters into the right word. Students have to comprehend the vocab in order to be able to finish this game. This will also train student to remember about the spelling of the word. They have to drag the random letter into the right box. There are only 5 chances to make mistake.



Picture 5
Display of the Word Game

Implementation Phase

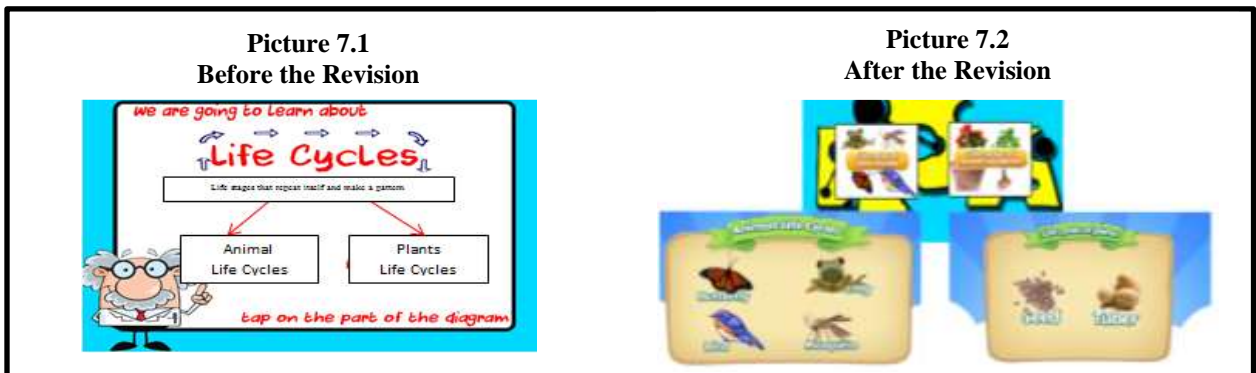
Implementation 1

This implementation was held with the help of researcher's peers. This stage involves 3 respondents. The background of those respondents is 7th and 9th semester students of English language study program. This stage uses an interview guide to seek the feedback on what should be added, removed, or replaced from games that they try. The feedbacks are: (1) there should be an introduction about the overall of the game and instructions for use at the beginning of the game when the game starts; (2) there should be given some interesting back sound; (3) there are some errors in typing; (4) in dragging the game, the sound that indicates the error should be made louder or should be given information that if they made a mistake; (5) the life cycle diagram should be made clearer or omitted that goes directly to the animal's choosing section.

Based on the interview and discussion with the respondent, the use of introduction is actually needed to inform about the goal of the game and general instruction in using the game. The introduction panel can be seen in picture 6. Besides the introduction section, the life cycles diagram also became the concern. This is because the navigation in this section was confusing, and the design was not interesting. Based on that feedback, researcher considered to change this part into simpler section and more attractive, as be seen in picture 7.



Picture 6
Addition of Introduction Section

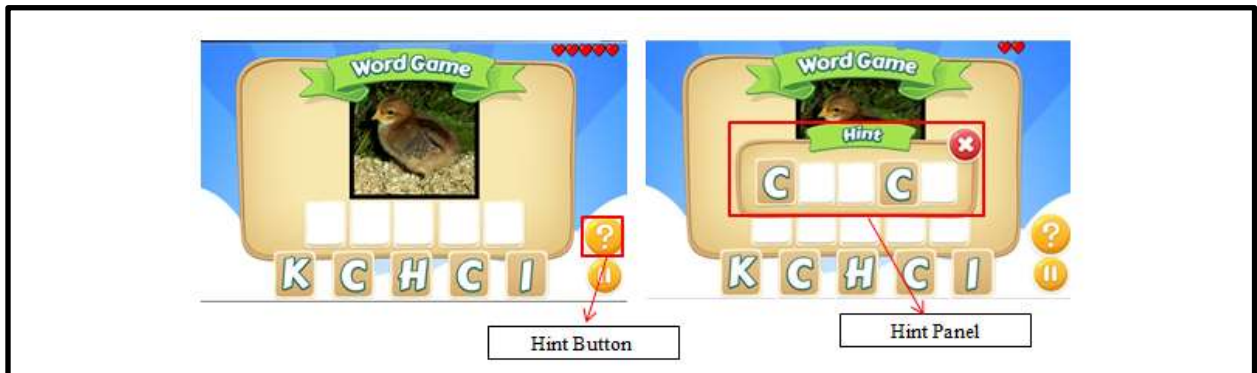


Picture 7
Revision of Diagram Section

Implementation 2

This implementation was held by directly testing the game to respondents, 5th grade elementary school students Muhammadiyah 2 Pontianak. This stage used an observation sheet to describe the feedback on what should be added, removed, or replaced from games that they try. Besides that, researcher also observed the condition of the implementation. Based on the observation sheet, the researcher pointed out several problems. The problems are: (1) the navigation at the end of the game is confusing; (2) the room is error at the hidden object game; (3) hint is needed to help student who do not know.

The navigation and the room error are categorized as technical error in the development process. While using the application, students got caught in several parts of the game. These problems are essential to be fixed. Researcher found out that several student cannot continue the game because of the lack of vocabularies. Based on that condition, researcher believed that hint is needed in order to help student and also build their basic vocabularies. The revision is available in picture 8.



Picture 8
The Addition of Hint

Besides gathered the weaknesses of the product, researcher also observed the condition of the implementation. The results are: (1) students are motivated to play the game; (2) students can generally operate all parts of the game and follow the instructions; (3) students are more interested in learning science. The observation showed that the game was able to enhance student's motivation in learning the material. Besides that, students also are able to use the game in proper way.

Evaluation Phase

Media Expert Evaluation

The expert evaluation was done by expert lecturer in media. The focus study of the evaluation is related to media in learning and the language. The instrument in this evaluation is evaluation sheet that consist of the evaluation rubric and suggestion. At this stage there are some shortcomings that need to be revised and some suggestion from the expert as follow: (1) the navigation is not precise and confusing, e.g. pause panel, back button at introduction, restart button, and at the end of the game; (2) sound effect when accomplish the game should be changed, because it collides; (3) there are some grammatical errors in instruction at the beginning of the game; (4) feedback is needed to strengthen student's understanding.

The errors in navigation, sound effect, and grammatical were categorized as technical error that is essential to be revised. Based on the expert's point of view, feedback is important to clarify the content and building student understanding about the content. Researcher was agreed with the ideas that feedback is one of the essentials elements in developing student's understanding and vocabularies. The addition of feedback panel can be seen in picture 9.



Picture 9
The Addition of Feedback

Table 2
Result of the Media Expert Evaluation

No.	Aspect	Score	Item	Average Score (Score/ Items)	Max Score	Category
1.	Software	18	4	4.5	5	Feasible
2.	Navigation	14	3	4.6	5	Feasible
3.	Simplicity	22	5	4.4	5	Feasible
4.	Writing	10	2	5	5	Feasible
5.	Appearance	19	4	4.75	5	Feasible
	Total	83	18	4.65	5	Feasible

Subject Matter Expert Evaluation

The subject matter expert evaluation was done by science teachers at the SD Muhammadiyah 2 Pontianak. The focus study of the evaluation is related to learning and the material. Based on the suggestion sheet at evaluation, the user guide should be printed for guideline in installation process for students.

Table 3
Result of Subject Matter Expert Evaluation

No.	Aspect	Score	Item	Average Score (Score/ Items)	Category
1.	Games	37	8	4.6	Feasible
2.	Learning	71	16	4.4	Feasible
3.	Material	33	8	4.1	Feasible
	Total	141	32	4.36	Feasible

Research Discussion

The Construct of the Material

The result of the analysis phase is the analysis of the learning problem as the basis to design a solution of the learning. Some of learning problems were gathered in analysis phase. The problems on the learning process are the lack of variety of learning activities that triggers boredom, the lack of scaffolding, the lack of student's basic vocabulary to learn the subject, and the limited time of learning. As the result,

researcher provided a solution for that problem that is the use of android game as scaffolding to support the learning.

In the design phase, researcher determined the elements of the material in the learning. Based on the analysis of the effect of implementation of CI program for students, researcher found that students are demanded to be able to sharpen their special potential by having more exposure in the learning. The lack of variation of the learning activities occur the lack of motivation in the learning. Susan and Mustafa explained that children at this period of time have natural curiosity to learn something new, (Mustafa, 2010), (Susan & Michelle, 2007). The desire to know anything and try something new makes them very active to seek information. Besides that, they also have short attention span that means they are easily distracted with something attractive. If they do some habitual activity that is bored for them, they will tend to do something that more interesting for them. Moreover, the CI program has more exposure in some of the subject. Based on that elaboration, the objectives of the game are to build student's basic vocabulary to learn specific science topic and improve student's motivation and interest in learning the topic.

The type of the learning is Mobile learning which is classified as informal learning in this research. Jones explained that as the changing trend of the CALL into MALL, it demands educator to be able to adjust the need of trend, (Jones, 2011). Kukulska-Hulme also explained that the intensive uses of mobile device enhance greater level of engagement with learning, (Hulme, Agnes, & Lesley, 2008). Researcher classified the learning as the informal learning because of some considerations. The first is the availability of facility. Android plat-formed becomes trend in student's life. This phenomenon is in line with Kukulsa-Hulme's explanation that the intensive use of mobile device will enhance greater engagement. The second consideration is the mobile learning can solve the limited-time problem and improve student's motivation. Student can learn independently without time limitation outside the formal class. The game-formed material and the interesting design of the game are become the aspect in motivating the student to learning the topic. The third is the school policy which does not allow student to bring their mobile phone to the class regarding to the security.

The roles of the learner regarding to the game are learner uses a self-directed and discipline-based process to analyze, collect, interpret the knowledge or information, and learner constructs their vocabulary in order to finish the game. The roles of the teacher are facilitator in the learning. Teacher distributes the material, supports students for the using of the game by giving some examples and cues, answers or addresses a few major issues or concept as an expert, motivates and monitors the use of the game.

The roles of the instructional material are a learning and teaching support – supplementary material that assist as scaffolding in the coordination of learners and resources for learning activities, a reference source for learner on basic vocabularies to learn the whole topic, a tool for learner to practice their vocabulary in fun way, keep their motivation in comprehending the material, and also enhance independent learning. Svecova and Do Coyle explained that language is essential before students going further to the content in CLIL approach. The use of scaffolding is important to help pupils to access previously acquired learning, to study in deep context and with

the help of new information, it is useful for creating new relational links. Such as, brainstorming a topic to determine the existing level of knowledge, providing language immediately, as it is needed placing notes in the margin of handouts, shortening sentences, using pictures and realia breaking material into chunks, highlighting the most important text in a passage, giving clues and asking follow-up questions, helping pupils to better understand and manage the learning process, (Coyle, 2006), (Svecova, 2011). According to the real condition in the class room, teacher does not have scaffolding that is appropriate with the content and student's condition. The teacher only relies with a book that is derived from different curriculum which has many deficiencies regarding to the student's differentiation in language comprehension.

In development phase, researcher developed the model of the game. Game Maker Studio was the application that is used to make the game. According to Mustafa in his research, children have a short attention span, that teachers of English should use various teaching techniques for shorter periods of time to avoid boredom on the part of students, while—at the same time—pay close attention to teaching items being targeted for each fraction of the sessions. (Mustafa, 2010). As Mustafa points out, an attractive material also can be able to become a solution in maintaining the student's short attention. If they use an interesting material in learning, the learning will become interesting and not boring. This statement is also in line with Wahono's explanation that includes communication visual aspect as one of the aspect in assessing learning media,(Wahono, 2006). Based on those experts, it is certainly true that a good learning media is not only communicating the information but also catch and maintain the receiver attention. In developing the game, this idea was also become the main consideration. As the result, researcher used Adobe Photoshop software as tool in developing the visual design of the game. Researcher believes that the use of this software is very useful in developing an interesting game.

Basically, the model of the game consists from 3 types of game activities, namely dragging game, hidden game object, and word game. The dragging game activates the student's prior knowledge about the vocabularies in used and also gives students explanations about the concept of the material that is about life cycles. This game is the combination of several scaffolding that is concept, cue card, visual scaffolding, explanation and also example. The hidden object games demands students to be able to know the basic vocabularies in order to find the object in the picture. This game is used to train students for mastering the basic vocabularies. This game is the result of modification and combination of visual scaffolding and cue card. The word game is used to train students about the spelling of the words. All of the games are combination of scaffolding to learn the vocabularies.

In implementation phase, researcher held several tests and simulations in order to gain feedback from users' point of view. Several major aspects reviewed are the introduction of the game, typo-error, technical problem in dragging game and the unclerness function of the lifecycles diagram. Based on the interview and discussion with the user, the use of introduction is actually needed to inform about the goal of the game and general instruction in using the game. Besides the introduction section, the life cycles diagram also became the concern. This is because the navigation in this section is confusing, and the design is not interesting. Based on that feedback,

researcher considered to change this part into simpler section and more attractive. All of the feedbacks on the implementation 1 are considered can improve the performance of the game.

In the implementation 2, the respondents are 5th grade students of CI class at SD Muhammadiyah 2 Pontianak. In this implementation, researcher used observation sheet in collecting the data. The specific goal of this implementation is to test the user-friendliness whether the application is usable or not by the students. As the result, there are three major points that are needed to be revised, such as, the obscurity of navigation, technical error, and also the coverage of student's different level of comprehension.

Besides that, researcher also observed the effect of the implementation of the product to the student. The results were students are motivated to play the game, students can generally operate all parts of the game and follow the instructions, and students are more motivated in learning science. According to the explanation in Chapter 2 about the instructional media, instructional media is media that carry messages or information that aims to facilitate learning process and distribute information from the teacher to students, so as to stimulate the mind, feelings, concerns, and motivation. In conclusion, the suitability of result of implementation 2 with the existing theory that the media can make a passionate learning condition and enhance students' motivation in learning means that the developed media can play its role as a good instructional media.

The Feasibility of the Product

Media Expert Evaluation

In software aspect, it is consisted from maintainable, usability, compatibility, and reusable. The average score for software aspect is 4.5 which mean that this aspect is feasible. According to this result, researcher recommends the use of Game Maker Studio in making a learning media especially for android plat formed.

In navigation aspect, the average score is 4.6 that means feasible. This aspect was used to assess the accuracy of the navigation and the benefit of the navigation. Based on the result, the navigation is accurate which according with the panel. This point is included in order to prevent errors in linking the navigation. Besides that, the benefit means that whether the navigation is useful or not in navigating the user. According to the assessment, the benefit was scored by 4.5 which mean the navigation is helpful in playing the game.

The simplicity aspect was scored by 4.4 that means feasible. This aspect covers the easiness in using the game, that are the media can be operated easily, language easily understandable, the linkage of the picture with the material to help student in playing, and the ease of choosing the answer. This aspect was assessed in order to see whether the student able to use the game independently or not. According to the chapter2, one of the benefits of the mobile learning is the independent learning. If the application is complicated for students, the independent learning condition will not happen. Based on the result, the game is simple which allow students to use it independently without any expert guidance.

The last scope is the visual communication scope which is elaborated into 2 aspects that are writing and appearance. The focus of this aspect is the message delivery and game packaging. Mustafa is clearly stated that students in that age of

group have short attention span which means that not only the variation of the activities but also an interesting material is essential in teaching the students, (Mustafa, 2010). Based on the expert assessment, the writing aspect was scored by 5 and appearance was scored by 4.7. The scores indicate that the visual communication aspect is qualified and appropriate for the students. Besides that, the observation in implementation 2 also shows that the students are interested in using the application.

In summary, the media expert assessment which based on the criterion from the frame of theory shows that the game is feasible to be used by target students. The software, navigation, simplicity, design of the game is feasible. The overall score for media assessment is 4.65.

Subject Matter Evaluation

The subject matter expert evaluation was done by science teachers at the SD Muhammadiyah 2 Pontianak. The focus study of the evaluation is related to learning and the material which is consisted from games, learning, and material aspects. As the result, the average score for game aspect is 4.6 which categorized as feasible. The average score for learning aspect is 4.4 that categorized as feasible. The material aspect was scored by 4.1 which means feasible. The overall score for subject matter expert assessment about the game is feasible by average score is 4.36.

The elements in games aspects are motivation, repetition, and meaningful learning. These points are elaborated from expert statement in chapter 2. This aspect was scored by 4.6. The motivation element is scored by 5. This score is also based on the implementation 2 that students are highly motivated in using the game and also learning the material. The repetition is also scored by 5 which means very good. This is because of the variety of activities and example in the game. Besides that the meaningful learning was scored by 4. The meaningful learning means the material is close and meaningful with their daily life. Besides that the new things can become also meaningful and memorable for students. According to the assessor, the games aspect is appropriate with the expert point of view.

In learning aspect, this aspect is elaborated into the curriculum connection, clarity of instruction, variety of example, variety of exercise, student's differentiation, flexible learning, authenticity, and scaffolding. The curriculum connection was scored by 5, which means that the goal of the game is appropriate with the curriculum. Based on the Svecova and Cambridge, the language exposure is needed, especially specific term in learning the content should be mastered by students in order to learn the subject, (Svecova, 2011), (Cambridge English, 2011). Moreover, the teacher problem is the limited-time in language exposure. That is why the material is significant in supporting the curriculum. Clarity of instruction is included to adjust the language in instruction with the student's level of language. As the result, the language in instruction is already appropriate with the student level of language which was scored by 4. Both the variety of example and exercise are scored by 5. The varieties of activities are needed in order to cover the student's short attention span. The differentiation aspect is covered by the available of hint in the games. This hint is used to help student whose does not have prior knowledge about vocabularies. This is scored by 3.5 because the hint is not available in dragging game. Researcher doesn't equip the dragging because researcher used that section as drilling section. The flexible learning was scored by 4.5 and authenticity was scored

by 4. Last, the scaffolding aspect was scored by 5, because the game is able to help students in building their basic vocabularies in learning science. The overall score for learning aspect is 4.4 which means that the media is feasible to support the learning.

The last is the material aspect that is consisted from correctness and up-to-date of material, feedback, language appropriateness, and the understandable of material for student. Based on the assessor, the material is correct and up-to-date that is scored by 4.5. Then the feedback was scored by 4.5. Feedback in the game is formed as glossary of the word with the Indonesian meaning and recording of the pronunciation. This feedback is used to review the finished activity so that the student can memorize the right meaning of the vocabularies. This kind feedback is categorized as good by the assessor because it is appropriate with the goal of the game itself that build the basic vocabularies. Then, the language appropriateness is quite similar with the clarity of instruction, but the assessment is addressed to all of the language in the game. The scored is 4 that mean good and appropriate with student's level of language. Then, the understandable of the material is good that scored by 4. This means that the material is simple and easy to follow by student without any guidance from the teacher. The overall score for material aspect is 4.1 which means feasible to be used by student as material to support the science subject.

In summary, the subject matter assessment which based on the criterion from the frame of theory showed that the game is feasible to be used by target students. The overall score for media assessment is 4.36 that means that the game is usable as supplementary material to support the learning.

CONCLUSION AND SUGGESTION

Conclusion

Based on the result of the research, the model of the game are consisted from 3 types of game activities, namely dragging game, hidden game object, and word game. All of the games are combination of scaffolding to learn the vocabularies. Then, the objectives of the game are to build student's basic vocabulary to learn specific science topic and improve student's motivation and interest in learning the topic. The game is used in informal learning in outside of the classroom by student as supplementary material to support the Science subject. The role of the material is as supplementary material that assists as scaffolding in helping the learners for learning activities. The game is feasible as the instructional material to support the CLIL approach at Science Class on CI Program; the result of the media expert evaluation is 4.65 that is classified as feasible to be used as instructional media. The result of the subject matter evaluation is 4.29 that mean feasible to be used as supplementary material to support the CLIL approach for Science subject.

Suggestion

Based on the result of the research, researcher suggests: (1) if the researcher tends to use Game Maker Studio in developing the game, researcher should utilize the Game Maker Studio Community in the Web in order to help the development process; (2). researcher should develop more interesting model of the game; (3) researcher should provide the user's guide in downloading, installing and using the application to allow user for having independent learning.

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