Designing the Interactive Multimedia Learning for Elementary Students Grade 1st-3rd

A Case of Plants (Natural Science Subject)

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Abstract— **Learning is human activities as the necessities of life that will add insight, knowledge, change behavior, and leads man to maturation. Therefore, humans known as *homo educandum* or educated man. The learning process requires media as a tool to understand the science that is being studied, for example in Natural Science subject, especially in the world of plants that teaches human to interact directly in identifying and testing (experimenting) in plants. The Natural Science subject provides the experience and practice so that students more quickly understand the teaching material. However, the lack of media as a teaching tool at school and the focus only on textbooks make education figures in Indonesia began to decline. However with proper media such as edutainment learning, students - especially for kids who psychologically need to play for cognitive and motoric development - can learn in fun and interactive way, but still informative. In this study, the authors designed an interactive learning media i.e. the game, which is fun but still informative, with material about plants for grades 1st to 3rd of elementary school. Media is packaged in the form of interactive Compact Disc (CD) and can be accessed via computer or laptop. It also can be used as a teaching tool for teachers in teaching activities. Furthermore the creation of character that is creative, clever, diligent, and always wanted to know is expected to encourage kids to be critical and not afraid to ask.**

Keywords— *Interactive Media, Edutainment, Natural Science, Plants, Kids*

I. INTRODUCTION

Learning is an activity for someone to look for information that is not known and as a tool in meeting their needs. Someone changes - whether its behavior, insight, skills and maturation - after they learn something. Therefore a man is an educated creature or Homo Educandumi [1]. However, based on the article [1], it stated that education in Indonesia began to decline, mainly due to the lack of teaching aids at school, especially for public elementary schools. However, the lack of teaching aids make students only learn from text books and rarely interact with their environment, especially with plants. Though learning can be done in a way that is fun yet informative (named Edutainment).

In addition, as playing creatures (*Homo Ludens*), all humans need to play as entertainment especially for kids who need to support the development of cognitive, motoric, and sensory. Therefore, edutainment can be used as an alternative for kids to learn. It can be a game, video or animation. Thus, making of interactive games i.e. interactive Compact Disc (CD) into a teaching aid or learning tool that hopefully can help provide information, especially about plants.

Based on phenomenon above, the problem that can be identified is "the lack of media as a learning tool, especially in natural science subject of plants". So that the problem formulation is "how to deliver information about plants in natural science subject to students in grade $1^{st} - 3^{rd}$ with the right media?" The purpose of this study is to provide information on the plant for students in grade $1^{st} - 3^{rd}$ through the interesting and educational medium of learning, i.e. interactive CD game.

II. THEORITICAL REVIEWS

A. Learning Media

Term media comes from Latin, the "*medius*" which literally means "middle", "intermediate", or "introduction". In Arabic, the media interpreted as an intermediary or an introductory message from the sender to the recipient of the message. The media is an integral part of the learning process to achieve the goal of education and learning in schools [2]. Reference [3] argues the media as a useful tool in teaching and learning activities and to represent what cannot be a teacher deliver through words. According to Levie and Lants in ref [2], there are four functions of media, especially visual media, as follow:

1. Attention function

   It's a core function, which is drawing and directing the attention of students to concentrate on the material that

is displayed with fun; with audio-visual media, images and sound.

2. Affective function

By reading the pictorial text, it can be seen the conditions or enjoyment level of students when learning. The image can arise emotions and attitudes of students.

3. Cognitive function

The addition of picture and sound can facilitate the achievement of the goal to understand, remember the information and messages contained in the image.

4. Compensatory function

From previous study, the visual media can provide context so that students can understand the text and help students who are weak in reading to analyze information in the text and recall it.

B. Edutainment

Edutainment is combination words of education and entertainment; and has the ability to grow and develop creativity and imagination, as well as train the motor nerves that are supported by multimedia devices [4]. Edutainment is usually used by teachers as a fun learning tool for all students, so that they become active in class and not feel bored with the existing learning methods, such as lecturing or writing on the board. The function or benefit for kids according to reference [4], as follow:

1. Means for preparing of adult life later in accordance with the roles acted.
2. Means of learning in forming social relations as well as facing and solving the problems that will arise.
3. Means for deriving pleasure and satisfaction from the activities carried out by their own efforts.
4. Means for improving language development through new information from a playmate, so that expanding their horizons.

C. Interactive Media

There is interaction between one object to another object, either among man or between man and object. It aims to deliver the topic or information from the media as the users desired and can respond directly and quickly by the media. Interactive media has some important elements that must be considered in the manufacturing process [5], which are:

1. Text; a collection of some of the letters which aims to provide information to users.

2. Voice or audio; sound placement, either back sound, sound effects, voice over or music.

3. Figure; messages or information conveyed in a visual form, i.e. images or photos.

4. Animation; is how to create an object which is stationary or not moving into a moving object and given the visual effects such as fade in, fade out, zoom, and others.

5. Video; present information in various ways, such as using text and graphics as well as adding animation and other audio.

D. Interactive CD

Media as a learning tool is growing with the change of technology, from the conventional media (books and traditional teaching aids) up to modern media (cassette tape, Video Compact Disc/ VCD, computers, and other modern teaching aids) [2]. Therefore, with the development of diverse media, interactive CD can be used as an alternative media in addressing the needs of learning. Excellence interactive CD as a medium of learning is it can help sharpening the messages or material submitted with the advantages that attract the senses and interest to learn, such as sound, image and movement [6]. In addition, the display on the monitor screen as a medium for communication between the user and the tool is not much different from magazines or books [6], so to design interactive CD, it needs the rules and regulations on design science.

III. METHODS

In designing media, the research method used is literature study by citing some theories that will be used as a guide in the design concept and analysis as well as observing by playing or testing of similar projects. Visiting a public elementary school in Bandung, interviewing teachers and multimedia designers and distributing questionnaires to parents, including housewives were conducted to collect data. The matrix analysis in similar project aligns with the case study was conducted too.

IV. FINDING

From the data obtained, the authors conclude that there are some important points in this study on designing interactive media for kids, as follow:

1. It takes a couple of books on the topic of plant of Natural Science in accordance with class lessons grade $1^{st} - 3^{rd}$ elementary school accordance with the existing curriculum.
2. The materials collected, then summarized clearly and simply, so that students can understand it when learning while playing.
3. The creation of interactive media assets from background, characters, objects, mission, and story must be adapted to the material, experience, and environmental conditions of students.
4. The colors used have to be a vivid color or recognized by the students.
5. The illustrations, both the character and the background, have to be known by the students.

6. The drawing style should be simple and resembles the existing object, e.g. cartoon.
7. Typography used must be readable and fonts should be familiar to students, such as san serif family font with a large size as well as clearly and concisely writing.
8. Display figures of characters who are intelligent, curious, and willing to learn, so that kids will follow the nature of the characters. The character figures have to support the story according to the kids' everyday life.
9. The design of the media can be used as teaching aids, both by teachers and parents, so that kids can be guided into play and learn.
10. This project is made in the form of applications for computer or laptop

VI. RESULTS AND DISCUSSION

A. Communication Concept

Communication concept designed by the authors were aimed to:
1. Introduce forms of vegetation to students. The communication strategy is carried out by describing the shape around the existing plants such as flowers, trees, parts of plants, fruits, and others.
2. Inform about plant material such as plant anatomy, growth in plants, green plants, and others. The strategy will be undertaken by following Natural Science text book information from grade 1 to grade 3 and distill them clearly and concisely and describe it visually.
3. Introduce a fun way of learning for kids, parents and teachers. The strategy is done by making media such as interactive educational games that can deliver the material in accordance with the applicable curriculum.
4. Persuade and invite the community to play educational games that can be used for learning. The strategy is done by presenting the material in the game which is simple but can be understood by the players, as well as creating good characters so that kids learn, and creating a story from daily life so that kids and parents feel comfortable with the media. In addition, the character figure would influence kids to always want to know and find out, dared to ask, and think more critically.

B. Creative Concept

Creating interactive game i.e. interactive CD are fun but still educational, bringing Natural Science subject about plants. Media made using bright colors and flashy, style simple schematic drawing (cartoon), and typography are simple and easy readability. Object picture is taken from the environment around the kids and the depiction of the characters as well as the story as a teaching aid in the media.

C. Visual Concept

Visual concept based on the design of creative concepts, i.e. sketches from some reference and analytical results.

1) Illustration Style

Illustration style is a cartoon drawing style, because it is aligned with the image of kids who like a simple thing. In addition, based on interviews, the drawing style that is suitable for education is a simple schematic drawings or cartoons style. Objects taken are plants, such as mango, hibiscus flower, lotus flowers, and supporting objects, such as pots, watering and fertilizer.

Figure 1. Dora's magical garden (www.nickjr.com)

2) Character

Character created as a support so that kids want to learn about the plant. Characters created are two twin brothers with different gender and attitudes. The characters are taken from several references, such as Upin & Ipin, and Gravity Falls.

Figure 2 Character design sketching of Anto & Ana (source: trilito.wordpress.com, www.kelabupindanipin.com, quotesgram.com)

3) Colour

Colors which are applied to the medium is pastels as well as bright colors, and easily recognizable by kids.

4) Typography

Font used comes from san serif family, the typeface looks have been a simple, easy to read, and resemble to the kids' hand writing, i.e. Chinacat and Caviar Dreams.
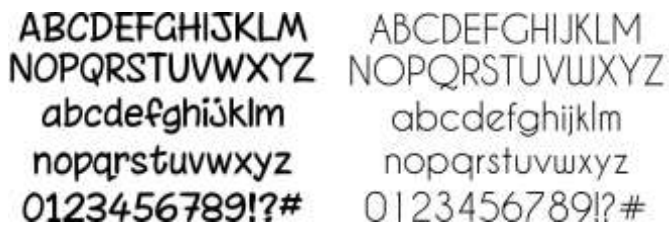

Figure 3 Chinacat font (left) and Caviar Dreams font (right)

5) Audio

Interactive media cannot be separated from voice or music, so that the media becomes more alive. Back sound applied to media using cheerful music so that kids can be encouraged to learn the material on the media. Sound effects which are applied to the media is the voice of button, the sound of the object collided, the sound of water, and so on, using voice interaction that arises between the media and the players.

D. Design Result

1) Illustration

The image objects are adapted to plants which are discussed on the material on the game, such as tomato tree, soybean tree, potato tree, mango tree, lotus flowers, and others.

Figure 4 Object and background illustration

2) Character

Characters are created to support the game. The visual concept designed characters were twins, which Anto is more active and curious, while Ana is calmer, love reading and plants enthusiast.

Figure 5 Design character Anto and Ana

3) Designing Media

The end result of this project is interactive CD as a learning media.

Figure 6 CD and CD cover

VII. Conclusion

Based on the results of study conducted by the authors, it's concluded that:

1. Media edutainment is an alternative tool to help kids understand the material being taught in a fun way yet informative.

2. Teaching tool at schools is still lack, but with the technological development, teachers can be helped in the learning process, such as the use of interactive media, animation and games.

3. Interactive multimedia learning must use images with a simple scheme (cartoon), familiar and vivid colors and simple and readable fonts, with additional characters and stories as a support medium in order to be more interesting and not boring, especially in the learning process.

4. The information submitted must be valid and aligned with the current curriculum. In addition, the material is summarized in a clear and attractive to be easily understood.

5. This study is generating media i.e. interactive multimedia/ CD for students in grade $1^{st} - 3^{rd}$ elementary school.

Finally, the suggestion that can be used as a concern for further research is to create a survey to get the response from the users (parents). Afterwards, it is better to analyze whether there is a significant impact to the learning outcome of the students or not.

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