Pointer Animation Implementation at Development of Multimedia Learning of Java Programming

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Abstract

This research represents the development research using the references of previous research results related to the development of interactive multimedia learning (learner controlled), specially about the effectiveness and efficiency of multimedia learning of a content that developed by pointer animation implementation showing the content in harmony with relevant voice narration (having the character of affirming/equiping/explaining). Content to be learnt is to have a dynamic type (principle), that is Java Programming). Java Programming is selected considering the content complexity level which is high enough. The development method follow the method of development of multimedia learning with the instructional strategy according to Merrill in Component Dislay Theory (CDT), animation principle in multimedia format from Mayer, and accomodating the learning style (visual/verbal) of the learner. The result of development in the form of modules of interactive multimedia learning (learner controlled) of Java Programming with the pointer animation. With those modules, the learner expected to earn more motivated to learn self-supportingly, circumstantial and recuring, so that learner ability in comprehending concepts of Java Programming and applying it in solving problem can be reached.

Keywords: Multimedia Learning, Pointer Animation, Java Programming

1. Introduction

Multimedia, as one of study component base on the electronic (e-learning), representing delivery media of message or instruction. Nowadays, technology of multimedia continued to expand and also its use (Ganesan, 2009) . With its growth, from hardware aspect and also software , techniques or practices teach good in conventional class or face-to-face instruction perhaps have opportunity implementation in study through multimedia or multimedia learning (computer based) . Research result of Mbarika et al. (2010), indicating that multimedia learning has significant role in improving (enhancing) learning experience of learner, higher understanding in solving problem and or its attitude to teaching items. .

A multimedia learning is said to be effective when succeeding to integrate the four main elements, they are: existence of knowledge achievement, content type, instructional method and delivery media (Clark, 2008). Beside that, the effectiveness of multimedia learning will increase if in designing and producing it pay to to the followings: learning style of the learner (Clark & Mayer, 2008); the available of learner controlled facility (stop and play button) or multimedia interactivity that utilize to accomodate the cognitive load of learner during learning processes (Tabbers & de Koeijer, 2010); content type (static/dinamic) to be presented (Passerini, 2007); and content visualizing type (static/animation) (Line & Dwyer, 2010).

Related to the content visualisation, research result conducted by Rusli et al. (2014), concluding that the animation visualisation presentation of interactive multimedia learning (computer based) by dynamic content type (procedure) is more effective than the static visualisation presentation to learning result. The animation visualisation type used at the multimedia learning is content appear step by step in screen in harmony with the voice narration. Hereinafter Rusli (2015), in its research comparing the effectiveness of two type animation visualisation, content appear step by step in harmony with the voice narration versus of pointer animation showing the content (static visualisation, appear at once) in harmony with the voice narration, concluding that its effectiveness is equivalent to learning result (content type of procedure). With the equivalence, considering from practical aspect in its making multimedia lerning, pointer animation showing the content (static visualisation) in harmony with voice narration, perhaps can be more efficient. The condition perhaps similar to face-to-face instruction with the power-point media, what the instructor showing the studied content (for example with the pointer laser or pointer) in harmony with its voice narration.

This research represent the development research using the references of previous research results related to the

development of interactive multimedia learning (learner controlled), specially about the the effectiveness and efficiency of multimedia learning of a content that developed by pointer animation implementation showing the content in harmony with relevant voice narration (having the character of affirming/equiping/explaining). Content to be learnt is to have a dynamic type (principle), that is Java Programming. Java Programming is selected considering the content complexity level which is high enough. The development method follow the development method of multimedia learning with the instructional strategy according to Merrill in Component Dislay Theory (CDT) (Berkove & Moore [2001] & Clark [2008]), and animation principle in multimedia format from Mayer (multimedia and modality principle) (Clark & Mayer [2008]). Result of its development in the form of modules of interactive multimedia learning of Java Programming with the pointer animation. With those modules, the learner is expected to earn more motivated to learn self-supportingly, circumstantial and recuring, so that learner ability in comprehending concepts of Java Programming and apply it in solving problem is reachable.

2. Research Methods

This research is a the development research. Which is a development of multimedia learning of Java Programming. The design of multimedia learning development including arranging items outline, creating flowchart, designing interface, and arranging storyboard (Ivers & Barron, 2010). The instructional strategy including: the determination of learning objective, content presentation, practicing, and testing (Berkove & Moore [2001]; Clark [2008]). While the animation follow the principle of animation in multimedia format from Clark & Mayer (2008), specially about multimedia principle (learner learn better from animation and voice narration [audio] rather than only with narration [text]) and modality principle (learner learn better from animation and voice narration rather than animation and text in screen [visual]). Based on the reference, the research/development method consist of:

2.1 Determining the Learning Objective

Learning objective is represented in performance (ability in understanding/applying/finding)-content (concept/procedure/principle) matrix.

2.2 Arranging the Content Outline

Based on (2.1) arranged content outline to be learnt.

2.3 Arranging the content and its instructional strategy

Based on (2.1) and (2.2) describes the content which is essential and relevant with its instructional strategy.

2.4 Arranging the Flowchart

Based on (2.3) arranged the application program menu.

2.5 Arranging the Screen Lay-out

Based on (2.3) and (2.4), designed the screen lay-out or computer interface.

2.6 Arranging the Storyboard

Based on (2.3) and (2.5), designed the storyboard for each screen which describe the multimedia elements (text, image, animation, voice narration) which will be loaded.

2.7 Developing the Multimedia Learning

Based on (2.6), developing/producing the modules of multimedia learning created by Adobe-Flash.

3. Research Result and Discussion

3.1 Research Result

Research result described as follows:

3.1.1 Program Menu

Program menu (Figure 1) representing flowchart or flow of application program (to some of path or ramification). It depicts the bearing one screen by other screen, start from main menu screen (application program context/*Home*, Figure 3), sub-menu (content context, Figure 4), sub-sub menu (a topic of content, Figure 5), up to screen presenting the description of a topic (Figure 6a/b). The arrow guide at Figure 1 showing relevant direction of one screen to other (it can have two direction). If one screen emerges, so other screen does

not emerge. Meanwhile, special for screen of the example/target program (*Contoh/Target Program*) with run program (*Run Program*) (or by program description [*Penjelasan Program*]) can emerge in one monitor screen (by dragging near one another, Figure 8a/b/c).
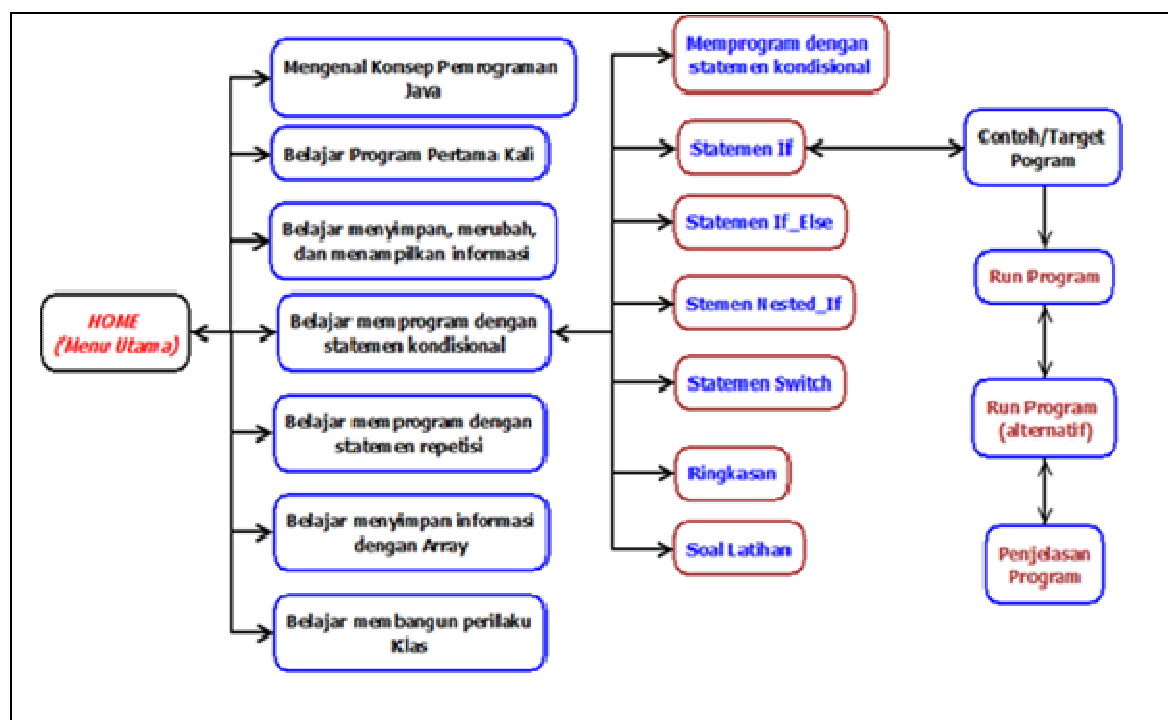

Figure 1. Program Menu

3.1.2 Content Structure

Content structure (Figure 2) representing sequence of learning items start from the lowest items up to the highest items. The lower items representing prerequisite for the higher items which will be learnt. For that reason, to master Java Programming, learner has to master the lower or previous learning items.
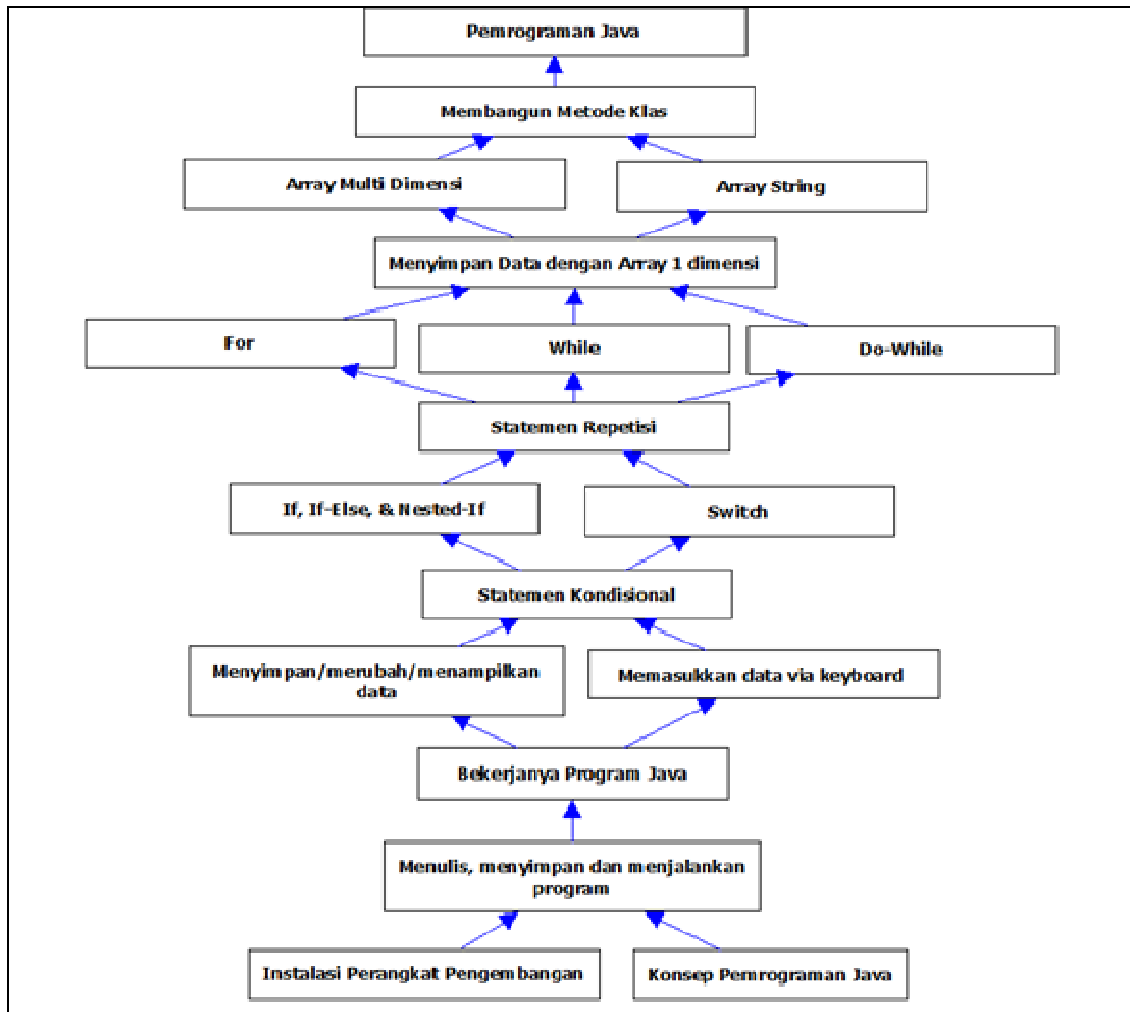
Figure 2. Content Structure of Java Programming

3.1.3 Screen-shot of Application

a) Main menu

The main menu (Home, Figure 3) representing screen-shot of application context including: learning objective, content, information of lecturer, and references.

b) Content menu

The content menu (Figure 4) representing screen-shot of content context will be learnt.

c) Content sub-menu

The content sub-menu (Figure 5) representing screen-shot of one topic of content will be learnt.

Figure 3. Main Menu

Figure 4. Content Menu   Figure 5. Content Sub-Menu

d) Content topic description

Figure 6a representing screen-shot of content topic description that will be learnt (for example: if statement). Here, the pointer animation (tweening animation in the form of red colored block) showing some of learning items displayed in a screen in harmony with voice narration (having the character of   affirming/ equiping/explaining). With that condition, learner expected seeing more focus at learning items displayed and almost at the same time listening the voice narration (as according to multimedia and modality principle in Clark

& Mayer [2008]). Pointer animation will disappear slowly if voice narration have ended.

Meanwhile, Figure 6b representing of screen-shot of pointer animation showing next learning items accompanied also voice narration momentary after pointer animation of Figure 6a ending.
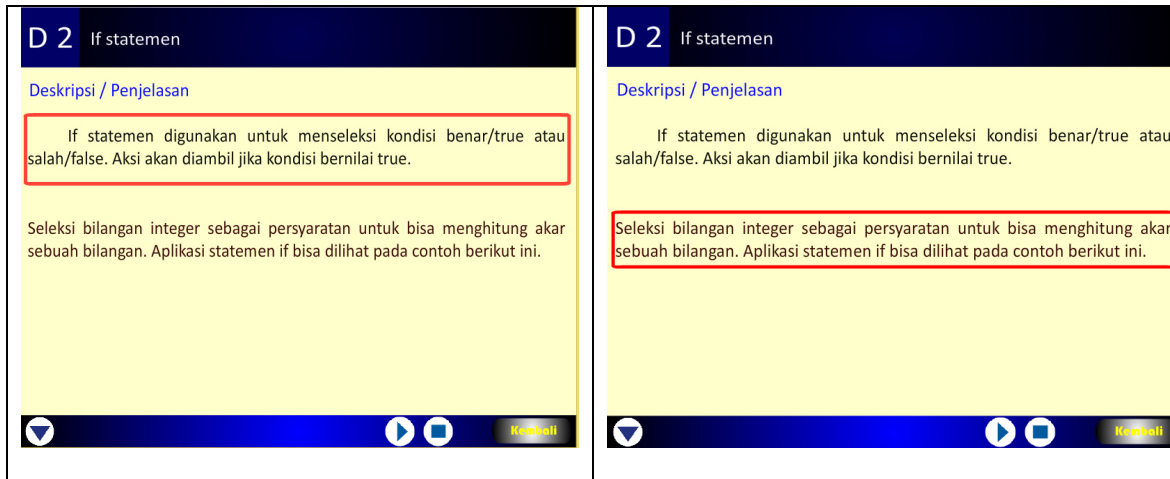

Figure 6a. If Description (Animation-1)   Figure 6b. If Description (Animation-2)

e) Program Example

Figure 7a representing screen-shot of source example of Java Programming will be learnt (created by NetBeans editor) related to the topic described (if statement). Here, the pointer animation (tweening animation in the form of red colored block) showing some of learning items displayed in a screen (lines number 4-7) in harmony with voice narration (having the character of affirming/ equiping/explaining). With that condition, learner expected seeing more focus at learning items displayed and almost at the same time listening the voice narration (as according to multimedia and modality principle in Clark & Mayer [2008]). Pointer animation will disappear slowly if voice narration have ended.

Meanwhile, Figure 7b representing of screen-shot of pointer animation showing next learning items (lines number 8-9) accompanied also voice narration momentary after pointer animation of Figure 7a ending.

f) Running Program

With pushing the RUN button at Figure 8b, the new screen will emerge as a second screen loaded the result of running program. In that screen will be also displayed the pointer animation which showing some of learning items in harmony with voice narration. The first and second screen, which emerged in one monitor screen, can be dragged near one and another as Figures 8a and 8b. The condition needed to facilitate the learner in comparing/evaluating the source of program with the output of program.

Meanwhile, Figure 8c representing the screen-shot of 2 screens as the result of pushing the description (deskripsi) button at second screen from Figure 8a or Figure 8b.
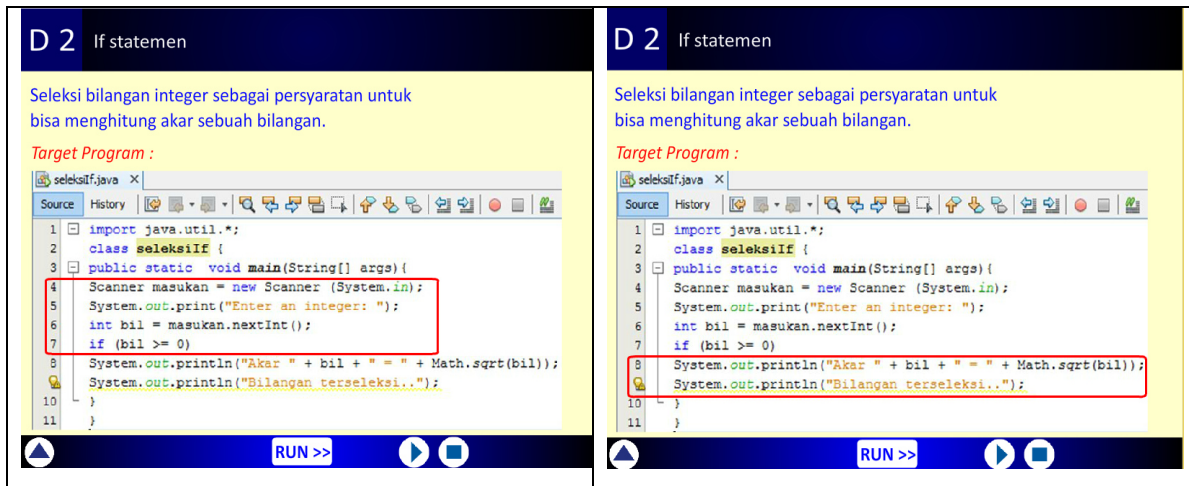
Figure 7a. If Program Source (Animation-1)   Figure 7b. If Program Source (Animation-2)
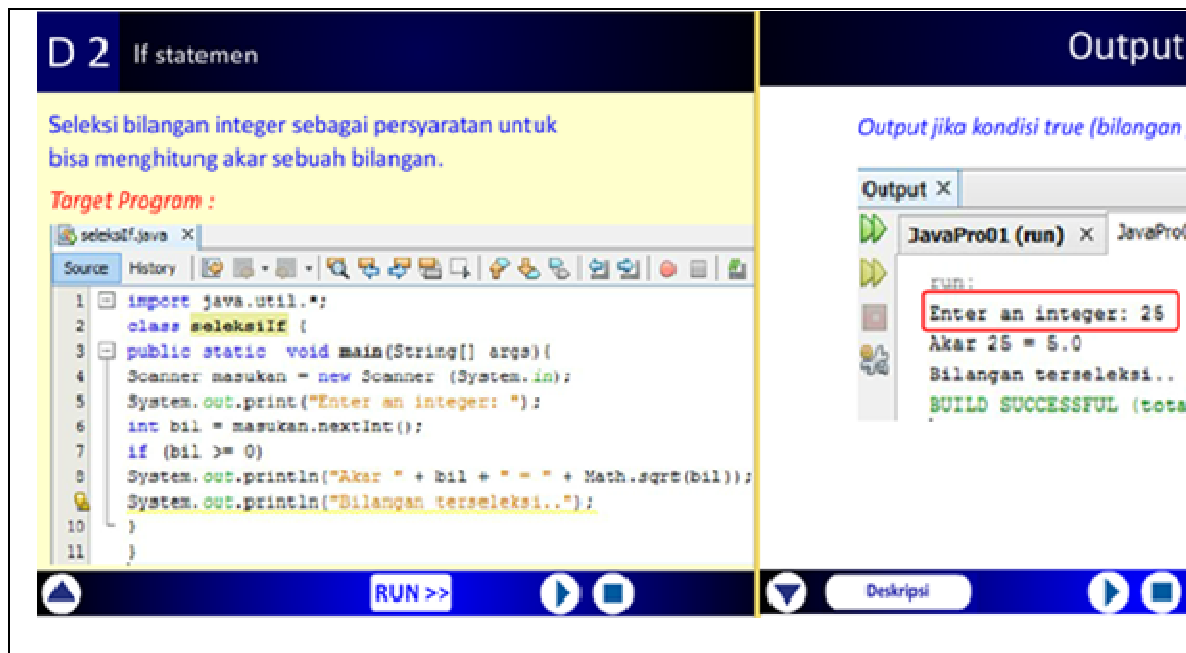

Figure 8a. If Program Source with Result of Running Program (Animation-1)

Figure 8b. If Program Source with Result of Running Program (Animation-2)

Figure 8c. If Program Source with Program Description

3.2 Discussion

In developing multimedia learning, according to Clark & Mayer (2008), it is suggested fulfill the characteristic including: (1) content learnt relevant with the learning objective, (2) using instructional method like examples and practices to assist the learner learn, (3) using multimedia elements like words, image, figure, table, video, animation in submitting the content and learning method, (4) designed for learner to be able learn self-supportingly (asynchronous learning), and (5) building the knowledge and new skill which deal with the learning objective of learner.

The characteristic of (1)-(3), and (5) have been strived by its accomplishment in developing multimedia learning of Java Programming. While for the characteristic of (4), there are two main things that need to be noticed so that the learning process can run effectively: how the content/information is presented, and what the learner's

chosen way in accepting and processing the information into a meaningful knowledge. First it is related with the way to visualize the content (static/animation) and how people learn. The chosen way of how to visualize the content/information can influence the cognitive process of the learner and furthermore it can influence his/her learning result. This influence can occur because the limited capacity of sensoric memory (which is related with how the information enters visually and/or audio, through sighting/hearing) and the working memory of the learner in processing the information into a meaningful knowledge. The second one is related with the learning style of the learner (visual/verbal). The effectiveness of the learning by using multimedia depends on how far the learning style is accomodated in the learning strategy (Clark & Mayer [2008]; Rusli [2014]).

According to those, related to development of multimedia learning of Java Programming, for the first matter: content presented by implementation of pointer animation (Rusli [2015]), conducting the learner controlled (Stop and Continue button) (Tabbers & de Koeijer [2010]), and also the implementation of interdisplay relationships of content screen from Merrill in Component Display Theory (Berkove & Moore [2001]); for the second one: represented by accommodating the learning style of learner (visual/verbal) (Litzinger et al. [2007]) with harmonizing appearance text/image/figure/animation by voice narration (Clark & Mayer [2008]).

4. Conclusion and Suggestion

Interactive multimedia learning of Java Programming (learner controlled) which have been developed have fulfilled the minimum characteristic as effective multimedia learning, whether it is reviewed from the aspect of method of multimedia development, instructional strategy, animation principle, and learning style of learner (visual/verbal). However, empirically, its effectiveness to learning result is still required to be tested furthermore at the next research.

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