

## Developing Interactive Learning Multimedia Based on Simulation Model

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### ABSTRACT

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The purpose of this research is to develop an interactive multimedia namely Smile English that can be used as the media for learning reading especially for self-preparation on the Test of English for International Communication (TOEIC) material. This reading interactive media used a simulation model. This idea exploded after observing and collecting the data in the internal environment of Politeknik Negeri Batam Based on placement test, it was found that about 540 (49,23%) of Polibatam students test were categorized into intermediate level and the rest were elementary and novice level. It means that the students need to improve their preparation before taking the test to an accomplished better score. Smile English was developed by using R and D research. In this case, the researcher followed the step of the *Luther-Sutopo* method which was started from concept, design, material collecting, assembly, testing, and distribution. It was designed using Adobe Flash software which in this software combined text, sound, and animation. The research result showed that the implementation of Smile English was successful to help the students in preparing themselves for TOEIC test. Therefore, 60 students from Politeknik Negeri Batam had a good result in joining the TOEIC test, especially for the reading section.

**Keywords:** English smile; interactive multimedia; reading section; simulation model.

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## INTRODUCTION

The main communication tool in the world is the language. Language is a symbolic system of sound, is arbitrary, used by people to speak, cooperate, communicate, and identify themselves. This statement represents the meaning that English is used by various nations to communicate with nations around the world. Therefore, English is one of the International languages as well as a global language. English learning and understanding become an unavoidable requirement. According to (E. Putra, 2020), the urgency of learning English in today's times cannot be underestimated or ignored seeing English as the language spoken all over the world. English does not only play as a tool for communication only but also to the environment and word for today's time and future. Therefore, in Indonesia that still considers English as a foreign language, all colleges for all departments or universities design English as a general course without exception to equip the students for accomplishing this competency.

Based on government's policy namely from Directorate General of Learning and Student Affairs of the Ministry of Research, Technology and Higher Education Republic of Indonesia (RISTEKDIKTI, 2015) , it is clearly stated that higher education graduates must have a supplementary diploma. State Polytechnic of Batam as the only State Polytechnic in Batam implements this government regulation. One of the

supplementary diploma is English certification. All of the students who graduate from this campus must take an English proficiency test namely the Test of English for International Communication (TOEIC). There are two courses designed to help the students with English preparation, the two courses are English I and English II. Before these two courses are composed, a mapping test was conducted to investigate students' initial scores and it was found that the students' scores are still low. The most important purpose of English language evaluation is to monitor and improve students' competency (Fauzi, 2016) (Crystal & Ammon, 2008). It is important to provide the strategy to make the average score higher. This mapping test was conducted in 2015, there were 522 students from 8 study programs. It was found that for general professional (score 905-990) was 0% (0 students), level advance working (785-900) was 0,96 % (5 students), level basic working (605-780) was 17,62% (92 students), was level intermediate (405-600) was 49,23 % (257 students), elementary (255-400) was 28,35 % (148 students) and for level novice (10-250) is 3,83% (20 students). So, based on this data, it was found that most of the students included at an intermediate level. Many students need assistance to improve English proficiency score. Besides, (Siahaan et al., 2020) published her study that surveyed the users of internships of Politeknik Negeri Batam in the industry. It was found that about 78% agreed that the ability to

speak actively in English was the demand of the industry. Some users asked to attach a certificate of English proficiency but in the interview session, the interviewer conducted the session in English to ascertain which one the most capable worker to fulfil the positions is offered by the company. On the contrary, the industry still needs the certificate to prove the candidates' ability in English proficiency. In Politeknik Negeri Batam, the English proficiency test given to the students is reading and listening TOEIC. (Asyhar, 2011) stated that learning is anything that can bring information and knowledge in the interaction that takes place between educators and learners. Anything that can convey or distribute messages from a source in a planned manner, resulting in a conducive learning environment where recipients can perform the learning process efficiently and effectively.

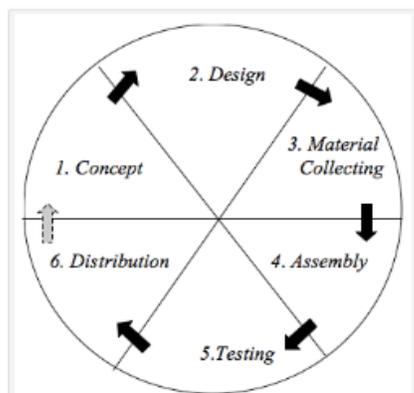
In this study, the researcher create an interactive learning for reading based on simulation model. Simulation is a model of decision-making by imitating or using the actual image of a real-world life system without having to experience it in real circumstances. By duplicating the actual circumstances it allows decision-makers to perform an experimental system of behavioral systems and predictions and the results are based on inputs of various parameters and rules. (Gusmida & Islami, 2017), (Chang et al., 2020), (Angelini & García-Carbonell, 2019), (Szanajda & Ou, 2018), and (P. S. Putra et al., 2020)

researched that developing media through simulation-based instruction in some different fields of research. According to (Angelini & García-Carbonell, 2019), a simulation can be described as the activity in which participants are assigned duties and provide more information about the problem to perform the responsibility without play-acting or creating key facts and it is applied in several disciplines in many fields such as medicine, nursing, engineering and language. One of the benefits of simulation is engaging the audiences in active learning where participants can learn each other not just only step by step (Caniglia, 2019; Williams & Meitiri Group, 2009). So, based on all of the problem and background that already stated previously, the objective of this study is to develop an interactive multimedia namely Smile English that can be used as the media for learning reading especially for self-preparation on the Test of English for International Communication (TOEIC) material.

## **METHOD**

In this study, Research and Development (R and D) was conducted to develop the multimedia interactive. It was chosen as the research method since it meets the objective of the research. The researcher used Luther Sutopo method; the steps are started from concept, design, material collecting, assembly, testing and distribution. All of the stages are conducted to create the product. The stages of multimedia development on the

Luther-Sutopo method are presented in Picture 1.



**Picture 1. Multimedia Development Methodology**

The concept stage of this study is determined by the selection of the audience in which the students use the product. Interactive multimedia applications with the presence of advantages are expected to meet the needs of students. The purpose of this simulation model application is that students can prepare for the actual TOEIC test after having simulation by using this application. The next step is the design phase. In this stage, the design starts from the interface and the layout of the application is designed in the storyboard and how users interact with applications, buttons and so forth. In material collecting, the collection of materials is conducted from various sources such as books, journals and articles from certain websites. At the assembly stage, the process of making the application is done on Adobe Flash CS6 software. Adobe Flash version can accommodate ActionScript 3.0 and can

run well on the hardware owned by the author. For testing, there was checking phase to make sure the application is still the occurrence of interference or not on the buttons on the application. The respondents involved 60 students from Politeknik Negeri Batam. Lastly, for distribution, it was conducted by uploading apps on file-sharing services like Google Drive and Mediafire.com. Expected with such publications, users get unlimited access to applications the author designs.

Likert scale was used to arrange the questionnaire in testing phase. This scale is a type of psychometric scale that uses a questionnaire and uses a broader scale in survey research. This trial group should have characteristics that are as close as possible to the characteristics of the individual to be expressed by the scale being prepared. 60 students were involved in this phase. Usually, the Likert scale is divided into five categories consisting of "Strongly Agree (5)", "Agree (4)", "Less Agree (3)", "Disagree (2)", and "Strongly Disagree (1)". The Likert scale is a scale that shows how strongly a level agrees or disagrees with a statement (Joshi et al., 2015). This testing purposed to make sure that this application can be used appropriately by all of the users in to support TOEIC Reading Test preparation based on its usage, learning and display aspects.

## RESULTS AND DISCUSSION

The purpose of the product was intended to be used by the students to prepare them to take the TOEIC test. Interactive multimedia applications with the presence of advantages are expected to meet the needs of students. Application of interactive multimedia-based learning media presents TOEIC reading material and questions on the TOEIC test itself, as new learning, is expected to be interesting by using multimedia elements. At the design stage of interactive multimedia-based learning media using this simulation model the researchers use elements such as text, images, sounds, animations, etc. The things that support to create this application is the design of the system, storyboard, script writing, and navigation structure. Products made by this researcher presents a material in the form of text, animation and images. Create a navigation structure that provides an overview of links from one page to another. For example, if you go to the material menu display we want to return to the home menu then just press the home button we can directly return to the home menu before. Storyboard was created to illustrate the look of each product. Scriptwriting to explain the functions of interactive multimedia. The needs of materials and questions of interactive multimedia-based learning media are made appropriate selection so that the needs of this product can be utilized. The next important thing, in the design of interactive learning media applications

based on learning system using simulation model. First, the researcher created a main view where in the main view will be made an enter key. Then go to the menu view, once entered into the menu view, there are several menu options such as the display menu instructions, menu display, menu display material and display test menu TOEIC reading.

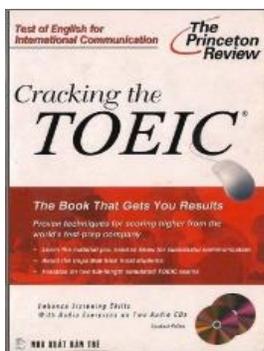
The steps in making learning media based on interactive multimedia learning using this simulation model are making the object tracing on the material using Adobe Flash application, coloring on objects that have been created using Adobe Flash applications, animating on objects that have been in tracing and coloring using Adobe Flash applications, creating a Primary View using Adobe Flash application, then making the buttons used using the Adobe Flash application, entering the script into the buttons used on the product. Lastly, incorporating the sound of narration and key sound into interactive multimedia.

In making the learning media applications, the data needed in the process of designing interactive learning media-based interactive learning such as questions, audio, and character applications. The reference for the manufacture of content of this application is the *Cracking the TOEIC* and *Barron's* book used as materials to make the material in the learning media. This book contains the materials of Incomplete Sentence, Text Completion and Reading Comprehension which are references in

applications such as Cracking the TOEIC and Barron's TOEIC test that is presented in Picture 2 and 3. It is only used as reference material but the contents of this application are self-developed researcher and were validated by an English lecturer in Batam State Polytechnic.



Picture 4 Main Character (Smiley)



Picture 2 Reference Book Cracking the TOEIC



Picture 3 Barron's Reference Book

For the audio of interactive multimedia-based, learning media is used on buttons that match the circumstances and the format used is .wav included in the interactive multimedia application. Audio used is a button when in click, audio music\_bg, audio when wrong and correct. Picture 4 presented the main character namely smiley.

In this interactive multimedia-based learning media, there are 100 questions provided to be answered by the users. The form of the problem presented is only a multiple-choice where the user can choose one of the correct answers. In some cases, it has several categories such as Incomplete Sentence (40 problems), Text Completion (20 questions) and Reading Comprehension (40 questions). On the other side of each material will be given 5 questions and its discussion. So as a total exercise material the required problems in this application as many as 115 questions. The researcher provided 200 questions stored in the question bank that collected from many sources. The 200 questions were consulted or validated by one of the lecturers at the Batam State Polytechnic. The result is 151 questions. To validate the question, ITEMAN was conducted in this research. ITEMAN is an empirical analysis of items by providing empirical evidence in the form of results of calculation of correlation between two series of scores obtained by the same group of participants from two different tests, namely validation tests and similar tests whose validity level

has been proven. As the correlation number, the highest number is 1.00 (one) indicating the highest or perfect correlation level. The correlation figures of such calculations are almost always less than 1.00 between 0, 99; 0.78; 0.12; 0.04 and so on. Furthermore, quantitative figures that can be labeled leather that shows a high level of correlation (Brown James Dean, 2005)

The next step is assembly phase. The process of making interactive multimedia-based learning by using simulation model has several stages of the whole character design, material, audio and animation. Picture 5 shows the main page of the application.



Picture 5 Main pages of the application

At the stage of character making use 1080 x 720 resolution which in coloring using an RGB color model. Characters in this application are obtained from the internet and then designed by the application of "Reading Media Based Interactive Multimedia Using Simulation Model". There are several steps you can take to create characters that correspond to interactive multimedia. The steps that can

be done are tracing, coloring and animating. Figure 6 shows the menu display in this application. The user can access home button, instruction button, material button and simulation button. The content of the material is the material for incomplete sentences, text completion and reading comprehension. For each part of the material, the researcher provided the exercises and its discussion. For simulation, the user can access the TOEIC reading section. Test taker can do simulation by clicking this button as feel as taking the test. Picture 6 shows the menu display of the application.



Picture 6 Menu Display of application

### *Data Analysis of Multimedia Interactive testing*

In the beginning after the product had finished, it is time to do testing. Firstly, functional testing was conducted to check all of the functions worked well. It consisted of 9 parts, testing was conducted on interactive multimedia applications as a medium of learning reading using this simulation model serves to get the desired

results by stage. Starting from main page, menu page, instruction page, material page, content of material, exercise, discussion, back to material. All of the function for interactive multimedia applications when executed one by one for input and output were working properly.

The application feasibility test was conducted to measure the success rate that has been made with 60 respondents of Batam State Polytechnic students aged from 19-24 years with all departments so that students can prepare for the actual TOEIC exam. Questionnaire was used to collect the data based on 3 aspects namely aspects of learning, display and its usage.

Firstly, based on the learning aspect, it was found for the value was 87%, 83% and 85 %. The average based on respondent feedback on questionnaire was 85 % which means that the material made this application is categorized very well. Table 1 shows the result of questionnaire based on aspect of learning.

**Table 1 Grouping by Aspects of Learning**

No	Aspects of Learning	Value
1	This learning media can help me in preparation for TOEIC test especially reading.	87 %
2	The material learned through the "Smile English" app is easy to understand.	83%
3	This plication can be an alternative medium for me to study independently in this case as a preparation for TOEIC test.	85 %

Secondly, for each statement of display aspects, it was found that the value was 85%, 84%, 85% and 84%. According to this finding, the clustering on the aspect of this app display gets an average of 84.53%, then overall the respondents have stated that the appearance of this made application has been categorized very well. The result was presented in Table 2.

**Table 2 Grouping by Display Aspect**

No	Display Aspect	Value
1	The presentation of the material in the application "Smile English" is presented interestingly.	84,6%
2	The composition between text, color and background on this app is obvious.	84%
3	The overall look of this "Smile English" app looks interesting.	85%
4	The "Smiley" character in this app looks interesting.	84 %

Thirdly, on the aspect of the use of this application earn an average percentage of 86.22% which is categorized very well and the use of buttons on this created application has been declared running according to its function. It was found 85%, 87,6% and 86% for each category of the statement. The result can be seen in Table 3.

**Table 3 Grouping by Aspects of Use**

No	Aspects of Use	Value
1	The use of sound in the "Smile English" app works fine.	85%
2	The use of the overall button in the "Smile English" app works fine.	87,6 %
3	Overall, interactive learning media based on interactive multimedia is easy to use.	86%

The stage of distribution is the last stage on the making of multimedia-based learning media using the model of simulation. The product was distributed by performing interactive multimedia storage that has been completed in the format. Exe. The format of the product can be run without having to use Flash Player software and the product was submitted to the lecturers who teach English in Politeknik Negeri Batam. This development was in line with other research that tried to develop interactive multimedia for other fields that was conducted (Fauyan, 2019) and (Ramadhani & Muhtadi, 2018). Fauyan's research involved the data of media experts to validate the product include integration, balance, font, color, language and interaction. It was found that the category was eligible. Besides, then came the response of the students regarding the quality of learning media, it was found that the category was very good. The researcher tried to investigate the quality of content and objectives, technical quality

and quality of learning process. Meanwhile for Ramadhani & Muhtadi investigation, it used Research and Development (R and D) which refers to the development model of Alessi and Trollip. Before the product was used by the students, there were assessment conducted regarding to the material and media. For the assessment of users, beta test was conducted include three aspects, namely, programming aspects, display aspects and learning aspects. All these three aspects were feasible. In line with this research that this product was research and development. To make sure the product worked well, the assessment consist of two steps namely functional testing and target users assessment namely display aspects, learning aspects and usage aspects. Feasibility was accomplished based on the testing stage.

## CONCLUSION

Based on the result and analysis above, it can be concluded that the smile English application has been successfully created by using Luther-Sutopo method where the steps were concept, design, material collecting, assembly, testing and distribution. It was built by using Adobe Flash CS6 software. The other conclusion is that this application can perform very good average results. Some aspects applied have a percentage of 85.11% for the learning aspect, meaning the material that has been made in this application is very good. The aspect of display that has been made in this application has a

percentage of 84.53%, which can be stated in the application has been categorized very well. In terms of use of this application earn a percentage of 86.22% which is categorized very well and the use of the button has been running by its function. So it can be said that this application as a whole aspect is very good to use as alternative media of preparation for following TOEIC test especially reading section. For the future of this application is more developed again such as mobile-based for easy to use anywhere and the problem is made randomly and continue to change if the application on the run. The same application can also be developed for other English Proficiency tests.

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