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PROCEEDING INTERNATIONAL SEMINAR



**REFORMULATING THE PARADIGM OF
TECHNICAL AND VOCATIONAL EDUCATION**

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Badan Penerbit UNM

Fakultas Teknik
Universitas Negeri Makassar



INTERNATIONAL SEMINAR

Reformulating the Paradigm of Technical and Vocational Education



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SIMULATION GAME AS LEARNING MEDIA FOR VOCATIONAL STUDENTS

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Abstract:

Nowadays, computers have been used by students to assist them in doing tasks and create reports. Besides that computers can also be used for learning something. This research aims to use computer simulations in a form of simulation game to learn the learning material in vocational education. These simulation games were designed and built by using Games Based Learning (GBL) method to create a form of learning based on the game. This study used two different learning materials and softwares to create the simulation game. The first was a simulation game that using learning materials Ketrampilan Komputer dan Pengelolaan Informasi (KKPI) with macroedia Flash software and the second was a simulation game that using learning materials Menginstalasi PC with RPG software. The results of this research showed that both of these simulation games have produced a different values feasibility percentage. For simulation game of KKPI produced an average percentage of student responses feasibility at 71.94% with criteria "good", while simulation game of Menginstalasi PC produced an average percentage of student responses feasibility at 86.61% with criteria "very good".

Background

The development of technology has grown rapidly lately, people are increasingly demanding efficiency and effectiveness in doing their job. The development of technology has also occurred in information and communication technology (ICT) with the widespread of the use of its applications such as the use of PC computers, laptops, mobile phones, tablets, and internet with nearly every month released its newest product. Similarly, features that support the ICT equipment also follow its development. Information and Communications Technology (ICT) by UNESCO is defined as all technologies related to the retrieval, collection (acquisition), processing, storage, dissemination and presentation of information. The model of the use of ICT include: radio, television, video, DVD, telephone, mobile phone, satellite systems, and hardware and computer software and networks, as well as device and services related to this technology such as videoconferencing, e-mail and blogs.

One of the use of ICT in education is the using of computers for learning. The using of computers for learning has several models such as: Computer Assisted Instruction (CAI), Computer Aided Instruction (CAI), Computer Assisted Learning (CAL), Computer Based Education (CBE), Computer Based Instruction (CBI), Computer Enriched Instruction (CEI), Computer Managed Instruction (CMI). These learning is usually in the form of computer simulations that used to learn the learning material. Sultan (2006) in his research has used CAI to learn the remote sensing for students to study the material about GIS (Geographic Information System). Research results showed that CAI can be used to facilitate the carrying out of learning.

Learning that use computers is growing from just a simulation, shift to simulation games where the elements of game also have been developed such as the development of scenario. Buditjahjanto (2011) have developed a simulation game that used to learn the decision-making. The problems to make the decision making can be changed by changing the scenario, so that players can learn while playing a simulation game. Kenneth (2003) asserts that an effective simulation game can help students to grasp concepts more quickly and remember the concepts better than from a direct provision of material such as lectures.

Simulation Game as Learning Media for Vocational Students

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2. Game Based Learning (GBL)

As described above, game can also be used for the simulation and used to explain a situation or a process. Therefore, it is an opportunity to develop a learning by using simulation game. Some education researchers say that learning by experience often more efficient than learning through learning (Maja Pivec, 2004). By playing games, players will have experience in dealing with problems by running the game. According Buditjahjanto (2008), generally, the use of games for the purpose of education offers a wide - range of knowledge and life skills.

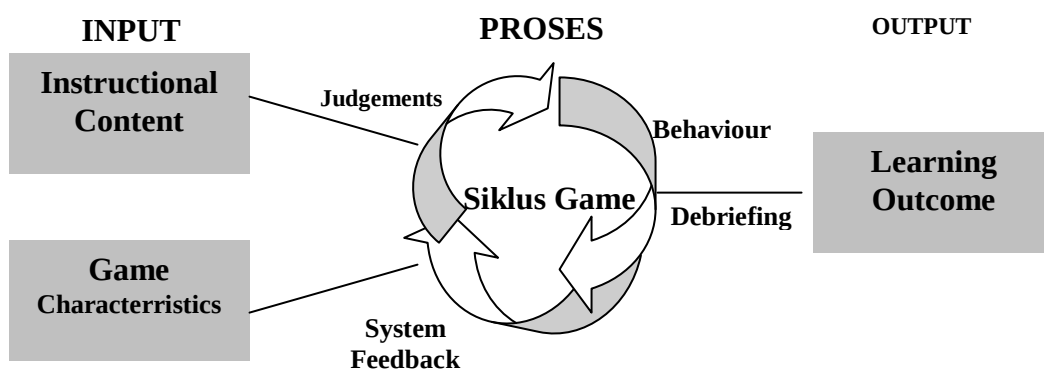


Figure 1. Game Based Learning method

One of the learning method that uses games for learning is Game Based Learning (GBL) (Anni Koubek, 2004). In Figure 1 shows a picture of the GBL method. This method consists of parts: Input, Process and Output. On the input, GBL consists of Instructional Content and Game Characteristics. On process, as a game cycle consists of System Feedback, Judgments, Behavior. Between process and output, there is a debriefing. Finally, on the output there is a Learning Outcome.

3. The design of educational games using GBL

GBL can be used as a basis for designing educational games. Figure 2 shows the design of educational games using GBL. The design consists of several parts: input, process and output. At the input stage of educational game consists of three parts, game design, validation by experts and revised game. In the game there are some elements of design to build an educational game such as material to be taught, the level of the game, scenarios and feedback from experts.

Learning material is an educational element included in the design of educational. Learning material is an educational element that can be incorporated into the design of educational games. Educational games can be designed with inserted the learning materials increase with an increasing level of learning difficulty. Difficulty level is used as the levels of educational games. Players should be able to master the game by understanding the learning material in order to pass to the next level. Mastery learning material can be either a collection of points if the player can answer a question in the running of a level of play of the game. Mastery of learning materials in this educational games, if the player can answer at least 7 out of 10 questions as given. If players can answer the questions, then the players will get points and if the players can not answer the questions then they do not get the points. Detail explanation can be seen in Figure 3 which is a flow diagram of the educational games. By following figure 3, students can play educational games.

Therefore, the player should be able to meet the requirements set for the game can ascend to a higher level. Another element that is not less important in designing educational game is the scenarios. If the educational game made no scenarios then the game will feel monotonous and boring. The scenarios are used to adapt the existing culture or stories that are made to give character education to players.

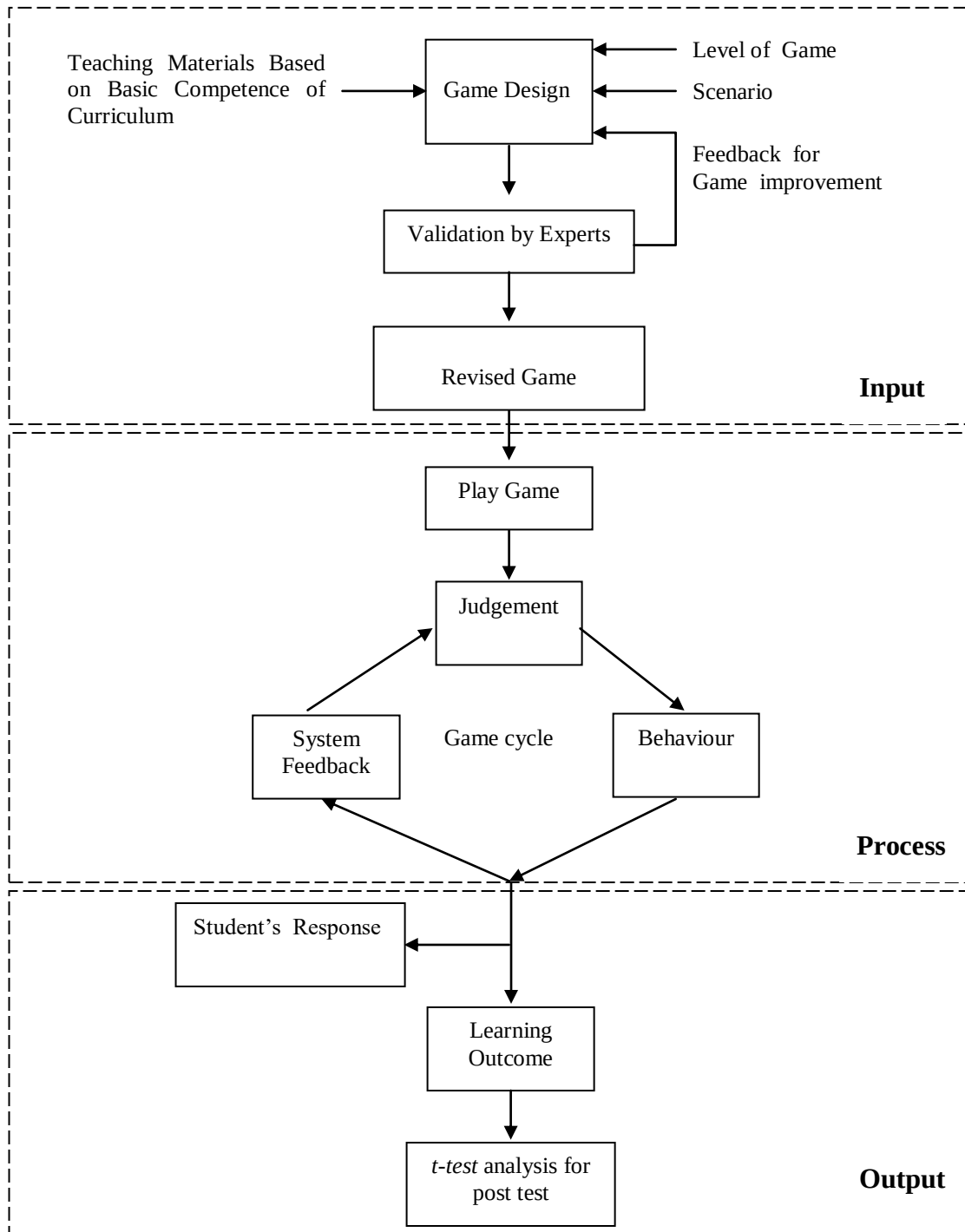


Figure 2. Block diagram of GBL

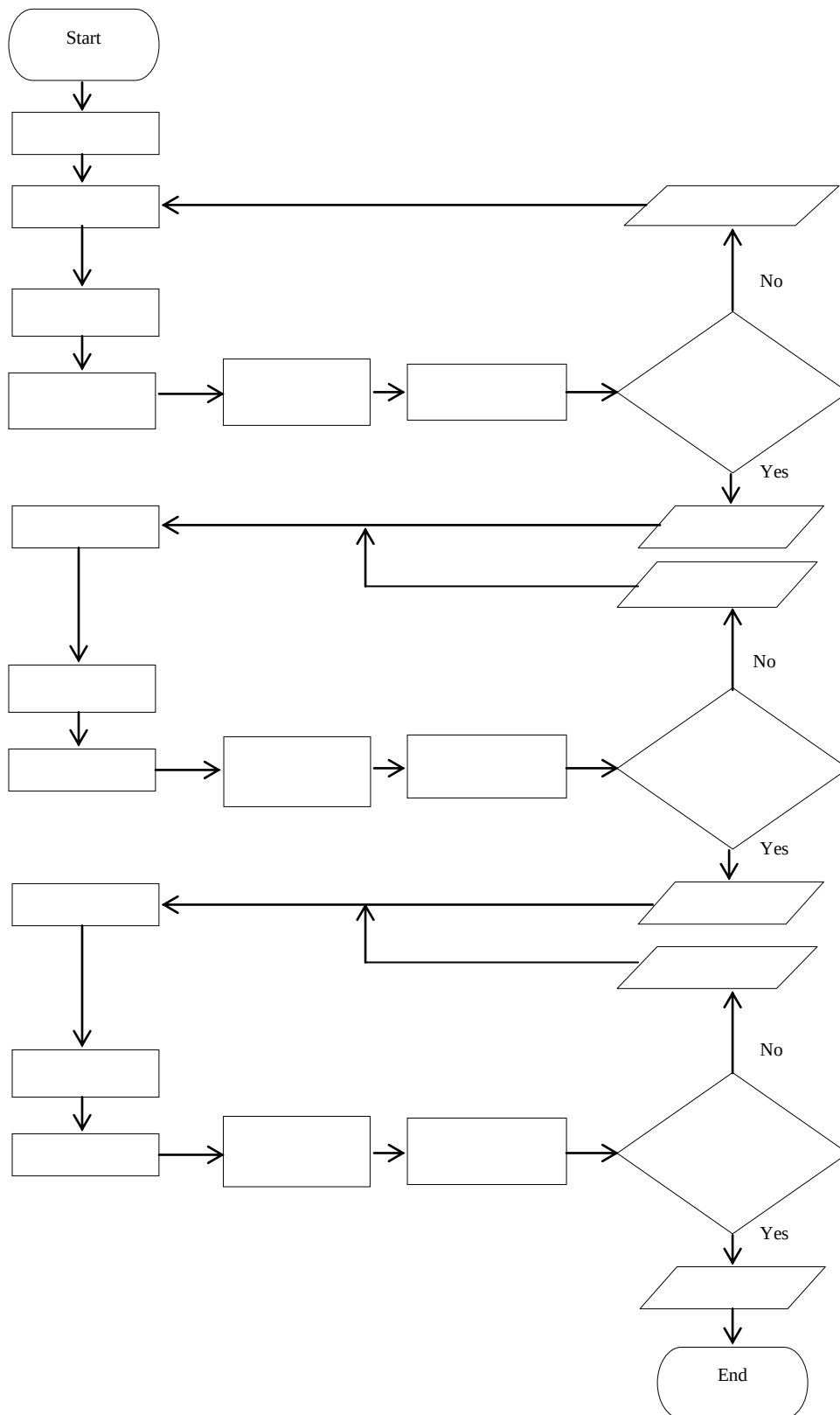


Figure 3. Flow Chart of Simulation Game

Validation of the experts required, if the educational game has been completed. It aims to provide feedback and improvement of educational games to students before employing these game. Suggestions from these experts to be the feedback for game design. Then, suggestions is done by improvements to the learning materials that inserted in the game, scenarios and so on. Therefore, the improvements of educational game can be used appropriately for the students. If revisions have been done then the educational game can be used.

The next stage is a process, where at this stage the player plays the game. While playing, player will experience a game cycle such as judgement, behavior and feedback system. In the judgment, the player can give an assessment of educational games such as understanding the given scenario, the atmosphere and conditions of the level being addressed and how the player can finish the game level. On behavior, the player must study the behavior and character of each agent or the opponent that must be overcome in order to win the game being played. In the feedback system, players will be able to give a feedback to the reaction given to the agent or the opponent. This game cycle will be repeated both at the level when players play the game or at the next levels.

The next stage is the output. Output here is the result of playing the game by a player that consists of student responses and learning outcomes. Student responses are measured after the students play the games in order to determine the response of the simulated game. To know how this game can help in studying the material or otherwise. While learning outcomes are measured by comparing with other students who do not use game simulation with the students that learning material with the use of simulation games.

4. The Results of Using Simulation Games in The Classroom

Research using simulation games for learning have been done using a two different of learning materials and software namely: Installing the Personal Computer learning materials using software RPG (Edy, 2011) and Computer Skills learning materials and management of information by using Macromedia Flash software (Athika, 2009). Both educational game is an adventure game, where the player cruise in the game area and then able to meet the enemy, or a box to get the learning materials.

Next, data retrieval is carried out through questionnaires given to students who have used this educational game. To analyze the results of the questionnaire responses of students used the formula as follow: (Riduwan, 2005)

$$\text{Percentage} = (\text{Total score obtained} / \text{criteria score}) \times 100\%$$

The highest criterion score = score x number of items per item x number of respondents. While the presentation of feasibility is formulated as follows: (Riduwan, 2005)

$$K = F / (N \times I \times R) \times 100\%$$

Description:

K = Percentage of feasibility

F = Number of respondents' answers

N = Highest scores in the questionnaire

I = Number of questions in the questionnaire

R = Number of respondents

Table 1 shows the percentage of student response criteria that used to assess this educational game. The percentage of criteria that must be reached in order to whether educational game is good, if the response of students is $\geq 61\%$.

Table 1. Percentage response criteria (Riduwan, 2005)

Prosentase	Kriteria
0%-20%	Very Less
20%-40%	Less
41%-60%	Fair
61%-80%	Good / feasible
81%-100%	Very good / very feasible

Assessment of student responses consist of multiple assessments include assessment of feasibility of the media format (The clarity of each part of the learning media, use of type and font size, layout systematics media, fascination of learning

media, level of ease of use of learning media), feasibility of contents (attachment content / media concepts to the curriculum, content / media concepts, Conformity evaluation by concept / media materials), feasibility of the language (the language of learning media in terms of grammar, level of language used for the students, the language used in accordance with the spelling of the refined), feasibility of the illustration (use animated illustrations to help understand the concept of material, level of presentation of animated illustration, layout design and color to the media). The results of student responses to the entire feasibility of the two researches can be seen in Table 2.

Table 2. The Results of Feasibility of Student Response from a two different Learning Materials

No	Type of feasibility of student responses	Learning Materials	
		KKPI (Macromedia Flash)	Menginstalasi PC (RPG)
1.	Feasibility of media format	69,66%	87,88 %
2.	Feasibility of contents	72,70%	85,00 %
3.	Feasibility of the language	72,41%	83,75 %
4.	Feasibility of illustrations	72,99 %	89,80 %
	average	71,94 %	86,61 %

Both of research has met feasibility with the percentage value $\geq 61\%$. Educational game with KKPI as learning materials has each of percentage of feasibility with "good" value of criteria and for Menginstalasi PC has as learning materials has each of percentage of feasibility with "very good" value of criteria.

5. Conclusion

The results of both educational game shows that students response has value "good" and "very good" for their assessment. Therefore, learning media such as educational game can be applied to assist students in studying learning materials on vocational education.

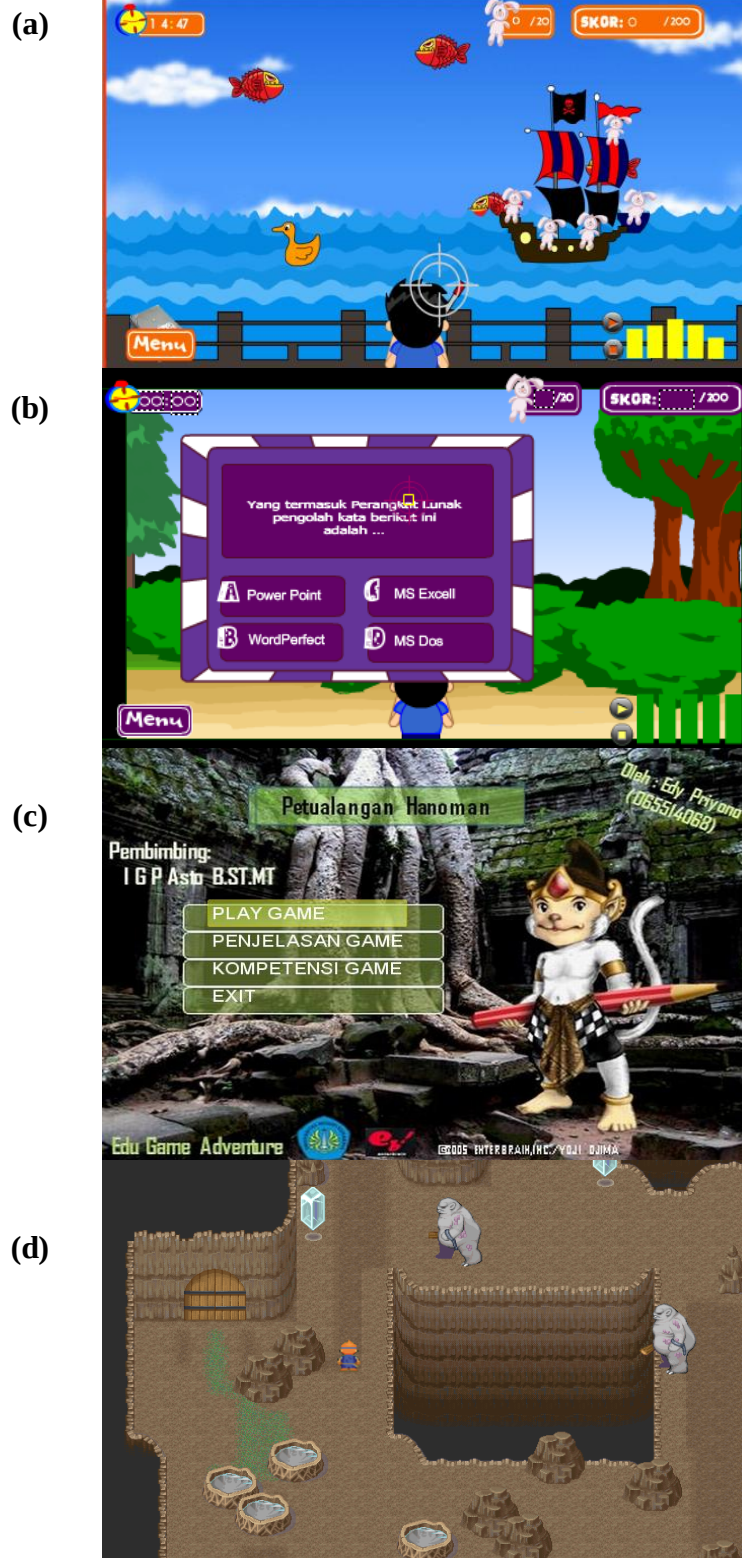


Figure 4. Images a and b for educational games with KPPI as learning materials, images c and d for educational games with Installing PC as learning materials

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