Developing Business Simulator Media Application-Based to Improve Analytical Capability and Independent Business Decision Making for Business Management Students

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Abstract: Objective of this research to designing, building, and testing business simulator applications which have purpose as an effective learning media in term of training and increasing constructive and transformative capability of students to do business analysis and decision making for business management students. So, students able to understand what will be happened in industry and able to take a right business decision. This research designed have 4 research stages, which are preliminary research and collecting data stage, planning and creating business simulator media stage, preliminary testing and its revisions stage, and main field testing and its revisions stage. Based on testing result, it shows that this business simulator application is effective improving student's ability to analysing business cases and make decision which profitable for their business. Researcher hope, this business simulator able to be a reference of constructive learning media application-based where students able to proactive in business problem solving.

1 INTRODUCTION

Development of working industry right now demands university to adapt and improve their graduate's ability (Sadiman, Arief S, 2006). University graduates not only have to have cognitive skill but also had business decision making skills (Bovee, 1997). University graduates, who don't able to fulfil qualification by working industry, then will increase number of unemployed in society. Based on data from Badan Pusat Statistik, number of graduates who unemployed is 360 thousand person in February 2013, or 5, 04% of total unemployed, which is reaching 7,17 million person (www.bps.go.id). Those data shows that hiring level of university graduate in Indonesia still in low category. Based on those phenomena, then needs learning that able to form and create graduates who had business situation analysis and decision making ability which profitable for their businesses.

Analysing competence in business and management learning will make student able to understand what happened in an industry and will affect their perception of planning which they made (Assauri, 1990). Otherwise, decision making competence will made students able to make and

make a right business decisions based on analysis which they had earlier. So, those two competences have to have by university graduates, especially business management graduates. For understanding those two competences, it will need learning media that able accommodate those two competences, so students able to apply theory that they had learned in some application which made to replicate business condition in real-life (Pimmel, Karr and Todd, 2002).

Simulators are needed because simulator can simulate a condition based on real-life condition. That real-life condition can be a training case for students, so they know newest and actual case to train their competence. If they used to solve an actual newest problem, they will solve a problem in their business life easier. In using simulator, competence that will students have is an analytical capability and business decision making. Analytical capability are trained while students understand the condition of the case that given by system. Business decision makes are trained while students choosing the best solution for specific case.

Media, in term of learning perspective, is a strategic instruments that determining successfulness of learning process. With limitation which they have, students sometimes don't able to understand and

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respond abstract conditions or conditions which they didn't ever experience. Learning media able to support learning successfulness because it has advantages. Learning media's advantages, based on (Buchari, 2007), are able to give deeper understanding toward learning material that discussing, because able to explain easier concept, able to explain concrete learning material, help teacher to provide learning media become easier and faster, so students easier to understand, more interested and creating attention, passion, motivation, activity, and student's creativity (Kotler, 1997).

Based on problems about learning differences which describe above, learning media is a solution which able to help student to increase their analysis ability for making a right business decision (Abdullah and Tantri, 2012). It hope that business simulator applications become a learning media reference for business management students in Indonesia, because there isn't a constructive learning media in business simulator applications form, where student able to

contribute for business problem solving using application approach (Rohani, 1997).

2 METHOD

As research objective that mention earlier, this research using research and development approach by (Borg and Gall, 1986) contain systematic steps which done by researcher so product that designed fulfil proficiency standard. In this research, product which developed is business simulator application-based learning media.

2.1 Research Procedure

These are research stage which will applied in this research, Based on figure 1, there is several research stages which will do for building business simulator application-based.
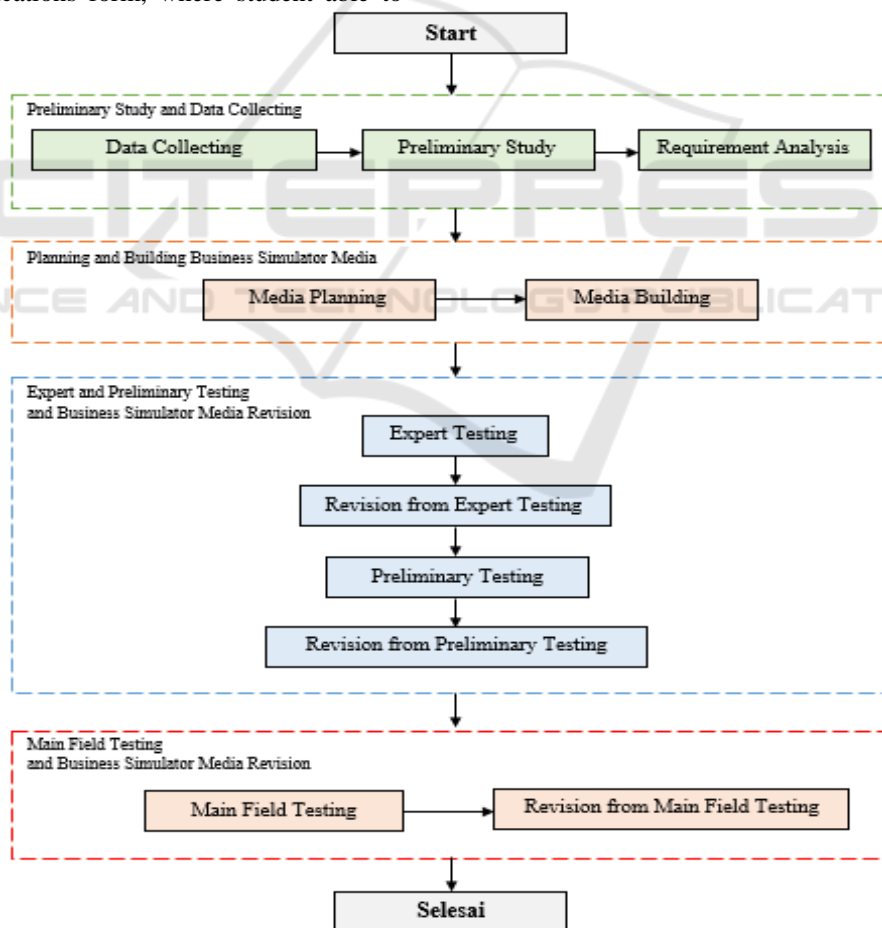

Figure 1: Research procedure.

2.2 Preliminary Study and Data Collecting Stage

In this stage, researcher collecting information and do preliminary research from previous research or related disciplines. Then researcher does requirement analysis to determine which data need to input into media that will be made.

2.3 Planning and Business Simulator Media Building Stage

In this stage, researcher start to planning program framework for business simulator application, then build business simulator application-based media as preliminary product. Learning strategy that applied in this simulation is problem based learning. That learning strategy chosen because in simulation will be included case that will be a problem that need to solve by students.

2.4 Expert and Preliminary Testing and Business Simulator Media Revision Stage

In this stage, researcher do expert field testing done by expert for validating study material, media, and application. Then, researcher revise application based on suggestion that gave by expert. After that, continue by preliminary testing which will be consideration for further revision. Result will be showed by several variables that evaluate of this learning media.

2.5 Main Field Testing and Business Simulator Media Revision Stage

In this stage, research test business simulator which validated and revised by expert and preliminary field. Current testing used for measuring performance of business simulator which have been made then do final revision for final product of this research is business simulator media.

2.6 Data Analysis Method

Data analysis which used in this research is descriptive and inference analysis. Descriptive analysis used for analysing data which get from material and media expert validations and student's questionnaires. Inference analysis used for analysing data that measure effectiveness of this media. There are several data analysis techniques that will be used in this research

2.7 Validity Test

Validity test done for make sure how valid of some instruments that used for measuring specific object. Construct validity used in this research, and equation that will be used is product moment equation,

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{\{N \sum X^2 - (\sum X)^2\}\{N \sum Y^2 - (\sum Y)^2\}}}$$

Annotation:
rxy= Correlation Coefficient Values
X = Question Score
Y = Total Score
N = Number of Respondents
$\sum$X = Sum of X value square
$\sum$Y = Sum of Y value square

If Corrected Item-Total Correlation values is positive and higher than r-table, then those variable are valid. Otherwise, if a Corrected Item-Total Correlation value is negative and lower than t-table, then those variables are invalid. Then result from rxy compare to critical value for product moment, if result from equation above is higher than r-table, then those instruments are valid.

2.8 Reliability Test

Reliability test used for determine that result of some measurement is stable and give same result (Sukmadinata, 2009). Reliability test done by using cronbach alpha equation,

$$r_1 = \left[\frac{k}{(k-1)} \right] \left[1 - \frac{\sum \sigma_b^2}{\sigma_t^2} \right]$$

r = Instrument Reliability Coefficient k = Number of Question
σb2 = Total Answer
σt 2 = Total Answer

Table 1: Relationship between number of question and instrument reliability.

No	Number of Question	Reliability
1	5	0,20
2	10	0,33
3	20	0,50
4	40	0,67
5	80	0,80

For testing reliability of instrument done by calculating reliability number of each question from questionnaire using alpha equation. After get (α) value, then comparing those value with critical reliability value from α-table, and it will show how relationship between number of question and instrument reliability, those value are represented in Table 1,

2.9 Inference Statistic Analysis

Inference statistical analysis used for knowing effectively of this learning media in term of improving student's learning result (Hubbard, 1983). This learning media effectively determine based on inference statistical analysis using t-test with IBM SPSS 21. But beforehand, data needs to analyse using normality test.

2.10 Normality Test

Normality test did to know those samples which will use in this research are from normally distributed population or not (Pummawan, 2007). Normality test using Kolomogorov smirov test with α = 0,050. H0 state that sample is taken from normal distributed population. If sig value from normality test bigger than α, then H0 rejected.

Kolmogorov-smirov normality test equations are:

$$z = \frac{x_1 - \bar{x}}{s}$$

Annotation:
z = normality value of the data x = data
s = standard deviation

2.11 Hypothesis test (t-test)

Correlated t-test equations used for effectively test for this learning media (Sezer, Karaoglan Yilmaz and Yilmaz, 2013), are:

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} - 2r\left(\frac{s_1}{\sqrt{n_1}}\right)\left(\frac{s_2}{\sqrt{n_2}}\right)}}$$

Annotation:
x1 = sample average data 1 x2 = sample average data 2
s1 = sample standard deviation 1 s2 = sample standard deviation 2

n1 = sample variance 1 n2 = sample variance 2
t = correlations between two data groups

3 RESULT AND DISCUSSION

This research held in 4 stages which described as below:

3.1 Preliminary Study

In preliminary study stage, we did literature study and field research. The literature study did by searching reference about business theory. Field research did by observing in real life to identify several business cases that happened in some business.

The result of this stage is that business frequently facing several problems, such as changes in market demand, changes in material price, changes in wages regulation, and other case. That real case will be case in simulation that we make. Also, variable that takes effect of decision making are distribution of products, total production, number of worker, and loan from bank. Those variables will insert in the decision making system.

3.2 Learning Media Creations

Learning media are made to make learning process easier and more effective. Learning media also help execute right learning process. Learning process that applied in this learning media are initial perception, material explanation, simulation, and evaluation. Initial perception using for make students understand what material will study in class. Then material explanation is a process to give student basic knowledge of material that studied in class. After material explanation, students will apply materials that have been studied in simulation. It will make students more understand into material that have been learned. After applied material in simulation, system will give students the result and the result will be evaluated. Those evaluations based on simulation result become suggestion for make students more understand of what they have done and better solutions.

Data which got from field survey also based on basics theory found from literature study used to create business simulator model by researcher. There are explanations about simulation applications which created in this research.

Based on the image shown in Figure 2, the business simulation application begins with the initial page containing the title of the SIMBIZ application

and 3 main buttons that will lead to another page, Mulai SIMBIZ button to enter business case page (case screen), Petunjuk Aplikasi button to go to the tutorial for application (tutorial
 screen), and Tentang Aplikasi button to go to the description page of the app and the research team involved in this research (about app).

We can see in Figure 3 (login screen), to be able to enter into the case, we must enter the NIM that we have and the code of the case that has been given by the instructor. After that, the view will be directed to the case selection page (case screen). On that page, we can choose an open case based on a pre-entered case code. After selecting the case, the view will be directed towards the description of the case to be faced (case description). After understanding the case that has been described, then it will go to the case problem display (case problem) which will then be completed on the decision-making view.

Figure 2: Home screen – case screen – tutorial screen – about app.

Figure 3: Login screen – case screen – case description – case problem.

Figure 4: Decision screen – validation screen – report – chart screen.

If we have understood the case and its problem, as shown in Figure 4, it will lead to the decision screen. On that page the user will enter the number of distributions corresponding to the case. After the user determines his decision, then it will enter in the validation screen (validation screen). This will bring up all the decisions we make, and the program asks the user to make sure that the decisions included are in accordance with what is intended. When you are confident with the decision made, then will go to the view report (report). On this page will show the results of financial statements of decisions that users make before, so can know the performance of the decision. On the other hand, the report can also be viewed in graphic form on the chart report page to find out the company's performance on all cases that have been undertaken.

3.3 Model Testing

Test models include test validity and reliability questionnaire, expert team validation, Test acceptance level of business simulation applications

3.4 Questionnaire Validity and Reliability Test

Validity indicates the extent to which the measuring instrument to measure what the valid measurement of an instrument item can be known by comparing the Product Moment Pearson correlation index with a significance level of 5% with the critical value. Validity and reliability test are divided into two, which is the validity and reliability test for experts and students. Based on the result of expert validity test, it is known that all questionnaire items for

experts and students have a probability value (sig) less than 0.05 so it can be said that all question items in questionnaire for expert have valid.

Reliability test used in this research using Alpha Cronbach. The results of the reliability test show that the variables in the questionnaire have the value of Alpha Cronbach coefficient greater than 0.6 so it can be said that the question instrument used in student and expert questionnaires are reliable.

3.5 Expert Validation (Expert Judgment)

The validity of the assessment in this study refers to the opinion of (Husnan, 2000) states that a valid instrument means the measuring instrument used to obtain the data (measure) is valid. Valid means the instrument can be used to measure what should be measured.

Assessment of business simulator learning media conducted by experts or practitioners through assessment instruments based on existing theories then used as indicators in the assessment by experts.

Based on Table 2 it can be seen that the acceptance score is above 60% so it is stated that based on the three elements of assessment that is the aspect of programming, content, and appearance of business applications made judged good as learning media and can improve the ability in business decision making.

Thus the experts in this study agreed to accept business simulation applications that have been made functional as a medium of learning.

Table 2: Result of learning media assessment by expert.

Variable	Acceptance Score	Meaning
Programming	75,0%	Good
Content	68,9%	Good
Appearance	74,3%	Good

Table 3: Application acceptance test result by students.

Variable	Acceptance Score	Meaning
Appearance	87,7%	Reliable
Material	81,2%	Reliable
Benefit	83,5%	Reliable

3.6 Acceptance Test of Business Simulation Application by Students

Acceptance test of business simulation applications by students is done to find out whether students feel satisfied and helped in business learning conducted with the help of business simulation applications. The result of student acceptance for business application as learning media is described in the Table 3.

Table 3 shows that the score of acceptance of business simulation applications as learning media is more than 80% which means that based on the aspect of display, material, and also the benefit of business simulation application made very good by the students and can attract student interest to use the business simulation application.

3.7 Normality Test

Normality test was performed using Kolmogorov-smirnov Test by comparing the probability value (p-value) obtained with the specified significance level of 0.05. If the probability value (p-value) of each independent variable is greater than 0.05 then the data is normally distributed, but if the probability (p-value) of each independent variable is less than 0.05 then the data is not normally distributed (Thorn, 1995). Normality test results can be seen in Table 4.

The table above shows that the probability value (p-value) of each variable has a value greater than 0.05 So that all data in this study is normally distributed.

Table 4: Data normality test result.

N		Pre-test	Post-test
		25	25
Normal Parameters	Mean	13.0921	40.0372
	Std. Deviation	1.132111	1.802481
Most Extreme Differences	Absolute	.169	.151
	Positive	.169	.151
	Negative	-.128	-.093
Kolmogorov-Smirnov Z		1.110	.991
Asymp. Sig. (2-tailed)		.170	.280

Test distribution is Normal

Table 5: Student pre-test score t-test result.

Class	Avg. Pre-Test Score	T-Calculated	Probability	Meaning
Control	71,84	-0,413	0,681	HO Rejected
Experiment	72,56			

3.8 Preliminary Test of Business Simulation Application toward Analytical Capability and Independent Decision Making for Management Major Students

Business simulation applications that have been approved by experts and accepted by the students in their application as learning media and then tested limited to know the effectiveness of business simulation applications in improving the ability of analysis and business decision-making independently on students majoring in management. The acceptance criteria of H1 on T-Test if the calculated T-calculated value at T test> T-table value at 5% error level (α = 0.05), or probability value <α = 0.05. The test results of students' initial ability at the time of pre-test obtained as follows:

Table 5 shows that the average score of the pre-test of students in the class of control class is 71.84 while the average pre-test grade of the experimental class is 72.56. The value of t-calculated is obtained at - 0.413 while the value of t-table at degrees of freedom 24 (n-1) and 5% error rate is 2.06. The value of t-count is -0.413 <t-table value, as well as seeing a probability value greater than 0.05 so it is stated that H0 in this study is accepted that there is no difference in initial ability of control and experimental class

students in the analysis and business decision making. Thus based on T test results on pre-test data it can be seen that the control class and experimental class have the same initial capability so that the application of business simulation stage can be done.

Post-test is done after the application of business simulation applications on learning in the experimental class. The score of post-test will be compared to know the effectiveness of learning using business simulation application in order to improve student ability in analysis and business decision making independently. The hypothesis used in t-test of post-test score. The result of T-test on student post-test score is as shown in Table 6.

Table 6 shows that the mean post-test score of the students in the class of control class is 78.32 while the mean post-test grade of the experimental class is 82, 96. The value of t-calculated is obtained at -2.926 while the value of t-table on degrees of freedom 24 (n-1) and 5% error rate is 2.06. Value t-calculated equal to 2,926> t-table value, likewise by looking at probability value less than 0.05 so it is stated that H0 in this study is rejected which means that there is difference of students ability of control class and experiment in business analysis and decision making. Thus, based on the result of T-test on the post-test data, it can be seen that the control class and the experimental class have the initial capability of different business analysis and decision making after the application of learning using the business simulation application, knows that the post-test score of the experimental class is higher than the control class student means that students who get learning using business simulation applications have the ability to analyse and make business decisions independently better than students who do not get learning using business simulation applications. Thus it can be stated that business simulation applications are effective in improving students' analytical and business decision making skills.

Table 6: Student post-test score t-test result.

Class	Avg. Pre-Test Score	T-Calculated	Probability	Meaning
Control	78,32	-2,926	0,005	HO Rejected
Experiment	82,96			

4 CONCLUSION

Objectives of this research to create business simulator media application and testing validity and effectively, based on research result, then can be concluded as:

- Based on the three elements of the assessment of aspects of programming, content, and the appearance of business applications made result both as a learning media and can improve the ability to analyse cases and business decision making.
- Based on the aspects of the display, the material, and also the benefits of business simulation applications that are made very good by the students and can attract students to use the business simulation applications.
- Based on the result of difference test, it is concluded that business simulation application is effective in improving student's analysis and business decision making.

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