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Software Quality Assurance of Learning Game Using Deutsch and Willis Method

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Abstract

Computer-based learning is an instructional program that is used in the learning process by using software that contains the payload of learning. One software application that can be used is a learning game. Many examples of products that are used as learning practices, including the game can get the products sold in the market or through a virtual world that can be downloaded via the internet. Basically, there are many similarities in the products developed. But to note is the quality of the product. in this case must be assessed whether a product meets the needs of users and how easy to learn and use the product.

Keywords : *Learning games, Software quality assurance, Deutsch and Willis*

1 INTRODUCTION

Adult learning is still widely used method of expository felt inadequate. Of the various conditions and potentials, efforts can be made with regard to improving the quality of schools is to develop a learning-oriented learners (children center) and facilitate the learning needs of active, creative, effective and fun to develop and implement a computer-based learning.

One software application that can be used is the medium of learning. Learning media is a tool or form of stimulus that serves to convey a message of learning. Many examples of products that are used as learning practices, including the game can get the products sold in the market or through a virtual world that can be downloaded via the internet. Basically, there are many similarities in the products developed. But to note is the quality of the product, in this case should be assessed a product if it meets the needs of users in which there are the supporting component of the purpose or results consistent content including components related to each other. And how easy to learn and use the product.

1.1 Software Quality Assurance

According to Galin [1] Quality assurance software is a pattern of planned and systematic of all actions necessary to provide adequate confidence that a product or a product is established in accordance with the technical requirements and a set of activities designed to evaluate the process of how the products developed or manufactured. Contrast with quality control.

1.2 Learning Games

Game very significant role in improving the effectiveness of the learning process. According to Rusman [2] Instructional games or games is one of the methods in computer-based learning. Furthermore, according to Azhar [3] "instructional games are well-designed game can motivate students and improve their knowledge and skills. Instructional game that successfully combines action video games and skill use the keyboard on the computer".

1.3 Deutsch and Willis Method

According to Galin [1], method of Deutsch and Willis is the method used for the assessment of software quality assurance. This model is an alternative model that emerged after the model McCall, then Evans and Marciniak, see figure 1.

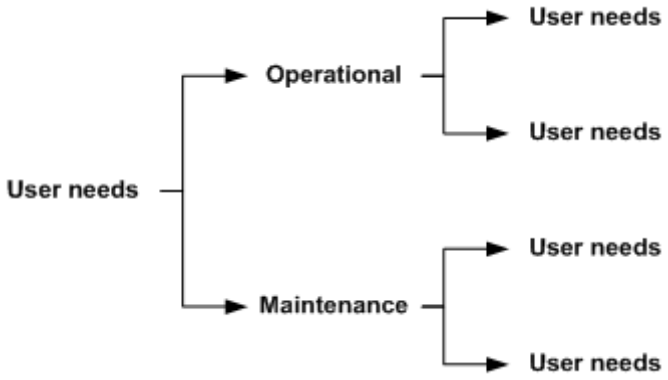

Figure 1: User need deutsch and willis

Table 1 stated comparison of the contents of factor models, it was found that two of the five additional factors, Expandability and Survivability, really-really resemble the factors that are included in the model factor McCall, although different names, Flexsibilitas and Reliability. In addition, testability factor is the ability of a software product that allows the modification of the software for validation, as well as the effort required separately test the program, ensuring the software performs the function expected. Testability factors considered as one element in the maintenance factors or treatments on the model of Deutsch and Willis. Testability McCall used in the model has sub-factor is user used in Usability Testing, testing maintenance failures included in Survavibility and Tracebility included in Verifibility in Deutsch models and Willis.

2 RESEARCH METHODOLOGY

The method used is qualitative research methods in preparation of the interview guide and questionnaire. The method used in this research is the method Duetsch and Willis with variables tested, namely functional and performance with aspects of the correctness, reliability, eficiency, integrity, usability. Subjects of this study is the application of mathematics classroom learning games two. respondents who used as many as 5 people engaged in the field

Table 1: Factors and Willis Deutsch

No	Software Quality Factor	McCalls classic model	Alternative factor models	
			Evans and Marciniak model	Deutsch and Willis method
1	Correctness	+	+	+
2	Reliability	+	+	+
3	Efficiency	+	+	+
4	Integrity	+	+	+
5	Usability	+	+	+
6	Maintainability	+	+	+
7	Flexibility	+	+	+
8	Testability	+		
9	Portability	+	+	+
10	Reusability	+	+	+
11	Interoperability	+	+	+
12	Verifiability		+	+
13	Expandability		+	+
14	Safety			+
15	Manageability			+
16	Survivability			+

of software engineering. This is done to assess or guarantee the level of quality of a software used will provide certainty and confidence that the quality can meet the targets adopted in learning. Step carried begins with data collection, data analysis using a Likert scale. The frame of this study, as shown in the figure below:

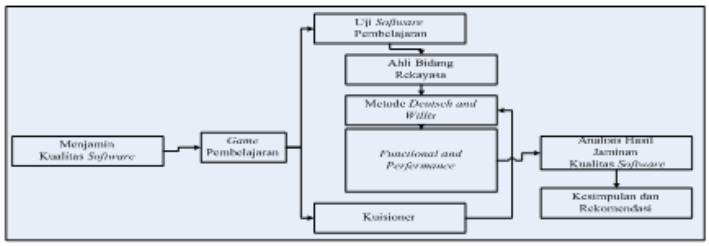

Figure 2: Wotldview Quality Assurance

3 RESULTS OF DATA ANALYSIS

Methods Deutsch and Willis on functional and performance of products in which there are 5 components (correctness, reliability, efficiency, integrity, and usability) that must be met by using software quality metrics and then select some indicators as needed. Here are presented the results of an evaluation of the 5 components of Duetsch and Willis on mathematics

learning games 2nd class.

3.1 Correctness

To get the final category, the calculation to obtain the total score, as shown below:

Table 2: Results of the total score on correctness

Respondents	**Aspect Correctness**							
	Accuracy			**Completeness**			**Up to Date**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
R1	4	4	5	4	4	5	4	4
R2	5	5	5	5	4	5	4	4
R3	5	4	4	4	4	4	4	3
R4	5	4	4	4	4	4	5	5
R5	4	5	4	4	4	4	5	5
Amount	23	22	22	21	20	22	22	21

Table 3: Continued score on the total results of correctness

Respondents	**Aspect Correctness**							**Score**
	Avalability		**Coding and documentation guidelines**		**Compliance/ Consistency**			
	9	**10**	**11**	**12**	**13**	**14**	**15**	
R1	5	4	4	5	4	5	4	65
R2	4	5	5	5	4	4	5	69
R3	4	4	4	4	5	4	4	61
R4	4	4	5	5	5	5	4	67
R5	3	4	4	4	5	4	4	63
Amount	20	21	22	23	23	22	21	325

After getting a total score then determines the maximum value of the two respondents as shown below: Max = Top Value x Much about the 5 x 15 = 75, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

3.2 Aspect Reliability

To get the final category, the calculation to obtain the total score, as shown in the table below:

After getting a total score then determines the maximum value of the two respondents as shown below: Max = Top Value x Much about the 5 x 7 = 35, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

Table 4: Percentage Feasibility Aspects Correctness

Respondent	Score	Max Value	Precentage	Category
R1	65	75	86,66	Very Worthy
R2	69	75	92	Very Worthy
R3	61	75	81,33	Very Worthy
R4	67	75	89,33	Very Worthy
R5	63	75	84	Very Worthy
Amount	325	375	86,66	Very Worthy

Table 5: Results Total Score On Realibility

Respondents	Aspect Reliability							Score
	System Reliability			Computational Failure				
	1	2	3	4	5	6	7	
R1	5	5	4	5	4	4	4	31
R2	5	4	4	4	4	5	5	31
R3	5	4	4	4	4	5	4	30
R4	4	4	5	4	5	4	5	31
R5	4	5	4	4	5	4	4	30
Amount	23	22	21	21	22	22	22	153

Table 6: Percentage Feasibility Aspects Reliability

Respondent	Score	Max Value	Precentage	Category
R1	31	35	88,57	Very Worthy
R2	31	35	88,57	Very Worthy
R3	30	35	85,71	Very Worthy
R4	31	35	88,57	Very Worthy
R5	30	35	85,71	Very Worthy
Amount	153	175	87,43	Very Worthy

3.3 Aspect Efficiency

To get the final category, the calculation to obtain the total score, as shown in the table below:

After getting a total score then determines the maximum value of the two respondents as shown below: Max = Top Value x Much about the 5 x 6 = 30, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

3.3.1 Aspect Integrity

To get the final category, the calculation to obtain the total score, as shown in the table below:

Table 7: Results Total Score On Efficiency

Respondents	**Aspect Efficiency**						**Score**
	Efficiency of Processing			**Efficiency of Communication**			
	1	**2**	**3**	**4**	**5**	**6**	
R1	4	3	4	4	4	3	22
R2	5	4	4	4	4	4	25
R3	4	4	5	5	4	4	26
R4	4	5	5	4	5	5	28
R5	3	4	5	4	3	4	23
Amount	20	20	23	21	20	20	124

Table 8: Percentage Feasibility Aspects Efficiency

Respondent	**Score**	**Max Value**	**Precentage**	**Category**
R1	22	30	73,3	Worthy
R2	25	30	83,3	Very Worthy
R3	26	30	86,7	Very Worthy
R4	28	30	93,3	Very Worthy
R5	23	30	76,7	Worthy
Amount	124	150	82,7	Very Worthy

Table 9: Results Total Score On Integrity

Respondents	**Aspect Intigrity**					**Score**
	Access Control			**Access Audit**		
	1	**2**	**3**	**4**	**5**	
R1	5	5	5	5	4	24
R2	4	4	5	4	4	21
R3	4	3	4	3	3	17
R4	4	5	5	4	4	22
R5	5	4	4	1	4	18
Amount	22	21	23	17	19	102

After getting a total score then determines the maximum value of the two respondents as shown below: Max = Top Value x Much about the 5 x 6 = 30, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

3.4 Aspect Usability

To get the final category, the calculation to obtain the total score, as shown in the table below:

After getting a total score then determines the maximum value of the five respondents as

Table 10: Percentage Feasibility Aspects Integrity

Respondent	Score	Max Value	Precentage	Category
R1	24	25	96	Very Worthy
R2	21	25	84	Very Worthy
R3	17	25	68	Worthy
R4	22	25	88	Very Worthy
R5	18	25	72	Worthy
Amount	102	125	81,6	Very Worthy

Table 11: Results Total Score On Usabilityh

Respondents	Aspect Usability					Score
	1	2	3	4	5	
R1	4	5	5	5	4	23
R2	5	4	4	4	4	21
R3	4	4	4	4	4	20
R4	5	5	5	5	5	25
R5	3	4	4	3	4	18
Amount	21	22	22	21	21	107

Table 12: Percentage Feasibility Aspects Usability

Respondent	Score	Max Value	Precentage	Category
R1	23	25	92	Very Worthy
R2	21	25	84	Very Worthy
R3	20	25	80	Worthy
R4	25	25	100	Very Worthy
R5	18	25	72	Worthy
Amount	107	125	85,6	Very Worthy

Table 13: Percentage of the Feasibility All Aspects of Software Engineering Inspection

Respondent	Score	Max Value	Precentage	Category
R1	165	190	86,84	Very Worthy
R2	167	190	87,89	Very Worthy
R3	154	190	81,05	Very Worthy
R4	173	190	91,05	Very Worthy
R5	152	190	80	Worthy
Amount	811	950	85,36	Very Worthy

shown below: Max = Top Value x Much about the 5 x 5 = 25, then calculated the percentage of feasibility that percentage = number of scores obtained / maximum total score x 100.

Based on data from the above table it on the fifth inspection categorized software engineering is very decent. So it can be concluded that the majority of software engineering experts stated this learning game is very decent.

4 CONCLUSIONS

Evaluation conducted by the researchers of the Mathematics learning games for children using the method of Deutsch and Willis then it can be concluded that:

1. From the results of research involving the respondent, the didapatlah assessment of mathematics learning games on the correctness with 86.66 value, for reliability with a value of 87, for the efficiency with 82.67 value, for integrity with a value of 81.6 as well as for usability with value 85.6. The fifth aspect of the results was obtained value of 85 and this can be inferred already meet very feasible to be used.

2. The results of this study also concluded that the presence of these learning games can help the school or the community generally older people to improve the teaching and learning process better.

References

[1] D. Galin, *Software quality assurance: from theory to implementation*: Pearson education, 2004.

[2] Rusman, *Learning and Computer-Based Learning.* Bandung: Alfamedia, 2013.

[3] A. Arsyad, *Media pembelajaran*, ed: Jakarta: PT Raja Grafindo Persada, 2011.

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