(IJID) International Journal on Informatics for Development,
Vol. 5, No.2, 2016

Analysis Of Usability In FIFA 15 and Pro Evolution Soccer (PES) 15 Using Mc Call's Quality Factors

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***Abstract*—FIFA 15 and Pro Evolution Soccer (PES) 15 are soccer games that are popular in Indonesia. Usability testing needs to be done to assess user interest and satisfaction with both and provide an overview of the comparison of them. The framework used for testing is McCall'S. The test combines operability matrix and training matrix to determine software quality. McCall'S was chosen because it has a reliable and comprehensive quality factor indicator. The results of the tests carried out were data on the operability level of PES15 games of 76.81% ± 15.76% and FIFA15 games of 70.65% ± 20.73%. Testing of training matrices produced 15.96 ± 21.74 seconds for PES15 and 78.29 ± 25.73 seconds for FIFA15 game training matrix. The data shows that reusability of PES15 is better than FIFA15.**

Keywords-FIFA 15; Mc Call's; Operability; PES 15; Training

I. INTRODUCTION

Game software in Indonesia is still not growing rapidly. One reason is the usability factor of the software that has not met the market demands. An understanding of good game quality among game developers is still relatively underdeveloped compared to games from abroad.

One game that has become a trend in 2014 is the Flappy Bird. The way to play is quite simple, just by tapping the screen to keep the bird object on the track. The simplicity is able to invite many users to play.

Another example is Pro Evolution Soccer (PES). This soccer game first appeared in 1994 with its version name "Perfect Eleven" a.k.a. International Superstar Soccer (ISS). The development continues to be carried out, such as by adding audio effects, improving graphics quality, and game rules that are made as they really are. Transforming into Winning Eleven and PES, the Konami manufacturer's game is increasingly popular. PES 15 is the latest version that has significant improvements in terms of graphics, gameplay, shooting, dribbling, and other details.

Meanwhile, there is a FIFA game from EA Sport which is a rival for Konami products. The first version was FIFA International Soccer FIFA 94 which was released in mid-1993. Just like PES, FIFA games were transformed into several versions up to FIFA15 which was released in 2014, with updates in terms of graphics, gameplay, and additional emotional intelligence.

The study intends to compare the level of usability of the FIFA 15 and PES 15 based on McCall's Quality Factors. The aim is to find out the interests and level of ease of the user in using the game that can provide an overview of the reliability of the two software products.

II. LITERATURE REVIEW

A. FIFA 15

FIFA 15 is a soccer game with video-audio simulation developed by EA Electronic Arts (EA) Canada. The game was released on September 23, 2014, in North America for the Play Station 3, Play Station 4, Play Station Vita, Nintendo 3DS, Wii, Xbox One, Xbox 360, Microsoft Windows, iOS, Android and Windows Phone. On PC, FIFA 15 runs on Ignite EA machines with the same features as the PS4 and Xbox One editions. This game has Lionel Messi on its cover (Figure 1) with different players in various parts of the world.

Figure 1. Cover of FIFA 15

This game cannot be played on all types of machines because it can only run on 64 bits.

B. Pro Evolution Soccer (PES) 15

PES 15 (see Figure 2) is a soccer simulation game developed by Konami for Play Station 4, Play Station 3, Xbox One, Xbox 360, and Microsoft Windows. The game developed in Tokyo, Japan was released in 1996. Originally the Winning Eleven game, without the World Soccer prefix, was released only in Japan for the Play Station in 1995 and featured only teams played in Japan Division. PES 15 version released in November 2014.

Figure 2. The welcoming interface of PES 15

C. Mc Call's Quality Factors

Mc Call's is one of the tools for evaluating the usability of software. The criteria that Mc Call's concern relates to three things,[1] namely:

1) Product Operations: related to the operational characteristic of the software which includes: technical analysis, design, and construction. There are a number of quality factors used in these criteria: correctness, reliability, efficiency, integrity, and usability.

2) Product Revision: related to the ability of software to undergo changes and how far the software can be repaired. The quality factors used in these criteria are maintainability, flexibility, and testability.

3) Product Transition: related to relating to the adaptability or adjustment of software to the new environment. Quality factors used are portability, reusability, and interoperability.

All three aspects above are described in Figure 3.

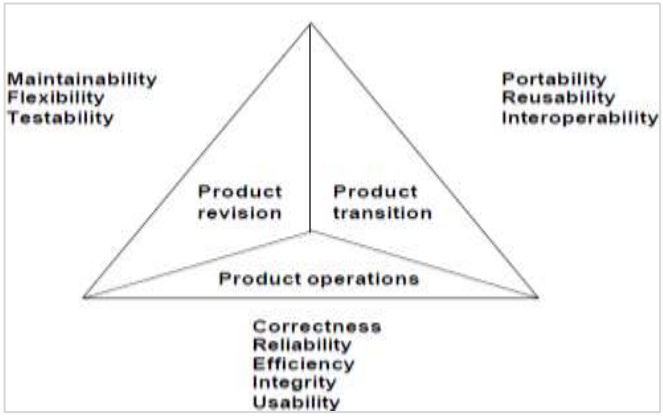

Figure 3. McCall'sSoftware Quality Factors [2]

There are 20 quality criteria matrices used in the measurement scheme above. all of them are connected to with quality factors through the scheme as shown in Figure 4:

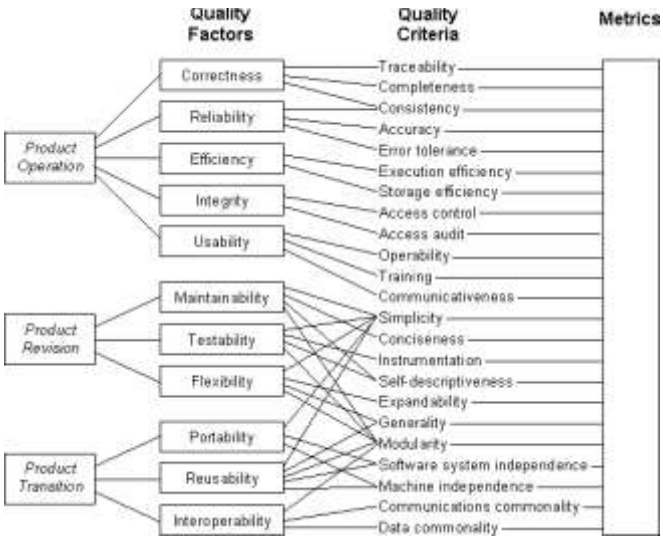

Figure 4. *McCall's Software Quality* [3]

Based on the measurement techniques of McCall's, a formula is proposed to measure software quality factors:

$$Fq = c1 * m1 + c2 * m2 + c3 * m3 + \ldots + cn * mn \qquad (1)$$

Where:

Fq = *software quality factors*
c1 = Weight that depends on the product and interests
m1= Metric that affects software quality factors [1]

III. METHODS

The study uses evaluative research (assessment) using the McCall's quality factor framework. While the object under study is the usability and operability of the FIFA 15 and PES 15. Data collection techniques are based on quantitative descriptive. SPSS software is used to evaluate evaluations and calculations that produce values which are then followed by the calculation of two McCall's Quality Factors matrices, namely operability (to test the ease of operation) and training (to test the ease of use of software for new users).

A. Sampling

The sample of this study were visitors in Forza Game held in UIN Sunan Kalijaga Yogyakarta. Determination of the sample from the population uses purposive sampling, with the aim of the research is the general public and students who play both of games. To determine the minimum number of samples, researchers used the Lemeshow formula.[4] The calculation of Lemeshow formula [5] results that the minimum number of respondents is 67.

B. Design of Research

This study uses the Mc Calls scheme to test the usability of the two software. Operability identifies the suitability of system or software operations by the user. Assessment of the quality of operability can be determined by calculating a questionnaire containing statements that can help the user by using the following calculations:

$$Operability = \frac{Score\ Total}{\sum score * \sum number\ of\ questions * \sum respondents} * 100\% \qquad (2)$$

The proposed questionnaire is evaluated in 1-5 scales of the score by the following list:

- Easy to play the game
- Menu display in the game is easy to understand
- The game has complete features
- The game has a good display design
- The game is better from other soccer games.
- The game has its features more complete compared to similar games
- Games are more similar to the conditions of football in the Real world
- Players feel satisfied when playing games
- There are no significant obstacles in terms of bugs or errors in the game when played
- The game is on the console gaming platform which is quite a lot like the Smart Phone, Gadget, PC, PS, and Xbox so it's easy to get.
- Games have fast operation
- Overall the operation of the game is very easy to remember
- The game has an attractive display design
- The game has a pleasant display design

The training identifies the application in helping the user to implement a new feature in the game properly. The training matrix can be calculated using the following methods:

$$Training = \frac{Total\ of\ explained\ functions}{Total\ of\ available\ functions} * 100\% \quad (3)$$

As for the design of the training matrix questionnaire are evaluated by the time as the following lists:

- Start the game
- Selection of teams to be used
- Form a team
- Start gameplay

IV. RESULTS

A. Operability of FIFA 15

Operability is a test of the ease of use or operation of the program. The statements given to program users use a questionnaire. The results for the FIFA15 game operability can be seen in Table I.

TABLE I. THE RESULT OF FIFA 15 CALCULATION

	Valid N	Missing	Mean	Median	Mode	Std Deviation
P1	70	0	3.47	4.00	4.00	1.03169
P2	70	0	3.37	4.00	4.00	0.99523
P3	70	0	3.78	3.50	4.00	0.96147
P4	70	0	3.85	4.00	4.00	0.96738
P5	70	0	3.17	4.00	3.00	1.11604
P6	70	0	3.58	3.00	3.00	1.04247
P7	70	0	3.80	4.00	4.00	1.02999
P8	70	0	3.32	3.00	4.00	1.17611
P9	70	0	3.12	3.50	3.00	0.99158
P10	70	0	3.25	3.00	3.00	0.94310
P11	70	0	3.44	3.00	3.00	1.03049
P12	70	0	3.32	4.00	4.00	1.21251
P13	70	0	4.02	4.00	4.00	0.97760
P14	70	0	3.90	4.00	5.00	1.03770
Total	70	0	49.48	49.00	48.00	6.71736

Total average = 3.53265
Modus average = 3.785714286
Std. Deviation average = 1.036668571
Median Average = 3.607142857

Determining the operability level of the FIFAv15 is done to get the operability value using the formula:

$$Operability = \left(\frac{Total\ average}{number\ of\ indicator\ variables} * 100\%\right) \pm \left(\frac{std.deviation\ average}{number\ of\ indocator\ variables} * 100\%\right) \quad (4)$$

The result is

$$= \left(\frac{3.53265}{5} * 100\%\right) \pm \left(\frac{1.036668571}{5} * 100\%\right)$$
$$= 70.65\% \pm 20.73\%$$

The total calculation of operability obtaining a percentage of the feasibility of operability is 70.65% ± 20.73%.

B. Operability of PES 15

The results for the FIFA15 game operability can be seen in Table II.

TABLE II. THE RESULT OF THE PES 15 CALCULATION

	Valid N	Missing	Mean	Median	Mode	Std Deviation
P1	70	0	4.00	4.00	4.00	0.83406
P2	70	0	3.97	4.00	4.00	0.81599
P3	70	0	4.08	4.00	4.00	0.65370
P4	70	0	4.22	4.00	4.00	0.72570
P5	70	0	3.62	4.00	3.00	0.98056
P6	70	0	3.68	4.00	4.00	0.86045
P7	70	0	3.84	4.00	4.00	0.81000
P8	70	0	3.74	4.00	4.00	0.79282
P9	70	0	3.50	3.50	3.00	0.77553
P10	70	0	3.44	3.00	3.00	0.84503
P11	70	0	3.65	4.00	4.00	0.69960
P12	70	0	3.77	4.00	4.00	0.74545
P13	70	0	4.10	4.00	4.00	0.72532
P14	70	0	4.11	4.00	4.00	0.77165
Total	70	0	53.77	53.00	51.00	5.90547

Total average = 3.840821429
Modus average= 3.785714286
Std. Deviation average = 0.788279286
Median Average= 3.892857143

The operability level of the PES 15 is done to get the operability value using the formula (4) at the FIFA operability. The result is

$$= \left(\frac{3.840821429}{5} * 100\%\right) \pm \left(\frac{0.788279286}{5} * 100\%\right)$$
$$= 76.81\% \pm 15.76\%$$

The total of overall operability calculations obtaining a percentage value of operability is 76.81% ± 15.76%.

The test results of the operability metric which more than 70% show that the games had good usability.

C. Matric Training of FIFA 15 and PES 15

Training metrics aim to measure how well software helps users (especially new users) to practice independently using the software. The results of the training matrix measurements of FIFA 15 are presented in Table III.

TABLE III. MATRICES TRAINING OF FIFA 15

Respondents	Total (second)	Average	Std. Deviation	Std. Deviation Average
Time 1	1695.8	24.22571429	3.710255498	25.73465678
Time 2	6988.49	99.83557143	45.41940681	
Time 3	11143.8	159.1971429	48.01851989	
Time 4	2094.9	29.92714286	5.790444939	

Determining McCall's training metric values using the formula:

$$\frac{(\sum W \div \sum R)^2 + (\sum W \div \sum R)^2 + \ldots + (\sum W \div \sum R)^n}{\sum statements} \quad (5)$$

The result is:

$$= \frac{(1695.8 \div 70) + (6988.49 \div 70) + (11143.8 \div 70) + (2094.9 \div 70)}{4}$$
$$= \frac{313.18}{4}$$
$$= 78.29 \pm 25.73\ seconds$$

The results of the training matrix measurements of PES 15 are presented in Table IV.

TABLE IV. MATRICES TRAINING OF PES 15

Respondents	Total (seconds)	Average	Std. Deviation	Std. Deviation Average
Time 1	1334.8	19.06857143	4.068776224	21.74567198
Time 2	6100.6	87.15142857	36.67057717	
Time 3	9154.3	130.7757143	43.6593813	
Time 4	1293.75	18.4821428	2.583953208	

Using the formula (5), the result of training matrices is

$$= \frac{(1334.8 \div 70) + (6100.6 \div 70) + (9154.3 \div 70) + (1293.75 \div 70)}{4}$$
$$= \frac{247.68}{4}$$
$$= 15.96 \pm 21.74\ seconds$$

Testing of training metrics obtained results which were 78.29 ± 25.73 seconds for FIFA 15 and 15.96 ± 21.74 seconds for PES 15.

V. CONCLUSION

Based on the results of software quality testing for the usability factors of FIFA 15 and PES 15, the PES15 game operability factor is better than FIFA15. As for the PES15 game training factor, it is also better than FIFA15 games, this is can be observed from the shorter time of the user in learn and operate the software, it shows that the software is easy and can help new users to operate the software.

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