IJST EXPLORE International Journal of Science and Technology
CENTRE OF PROFESSIONAL RESEARCH PUBLICATIONS
ISSN 2049-7318

International Journal of Science and Technology Volume 4 No. 7, July, 2015

Comparative Analysis on the User-Friendliness between Computer and Tablet Application in the Performance Analysis of Soccer

Mohammad Razali Abdullah[1], Rabiu Mu'azu Musa[1], Ahmad Bisyri Husin Musawi B. Maliki[1], Pathmanathan K. Suppiah[2], Mohd Nurakram B.Noraini Bahrin[1] ,Tomny Wong Kee Kiet[1], Engku Mohd Mubin B. Che Ku Zainal[1]

[1]University Sultan Zainal Abidin Faculty of Applied Social Sciences.
[2]University Malaysia Sabah Faculty of Educational Studies.

ABSTRACT

Variety of applications have been developed over the years to serve as the device for performance analysis in soccer. Computer applications have been utilized to analyze player's performance long before the discovery of tablet applications. However, for the performance analysis to be more accurate and free from human error, the device used for the analysis need to be user-friendly. The aim of this study is to compare the user-friendliness between computer and tablet application in the performance analysis of soccer. Computer and tablet applications were provided to twenty-five performance analysts. They were asked to analyze the performance of players during a soccer match using the two applications differently. Their opinions were collected using a questionnaire for which application was more user–friendly. Chi-square test for goodness of fit was conducted based on the hypothesis that there was no significance difference in their opinion at a confidence level of $p \leq .05$. The results shows the analyst differed in their views, ($\chi^2 = (1, N = 25) = 9.00$, $p < .05$). The null hypothesis was therefore rejected, and tablet application was found to be user-friendly in the performance analysis of soccer. Tablet application should be more explored in performance analysis of soccer.

Keywords: *Performance Analysis; Tablet Application; Computer Application; User-Friendly; Soccer.*

1. INTRODUCTION

Soccer is among the most popular team sports in the world because of the relative simplicity of the rules and the small amount of equipment required (D'Orazio and Leo, 2010).Soccer is an inversion game in which the continuous struggle to defend and attack is based on the whole team's effort not only on an individual player, hence the performance of the team is complemented by each other (Hughes & Franks, 2004). The game of soccer is played on a rectangular field of 110-120 yards (100-110m) long and 70-80 yards (64-73m) wide. The objective of the game is to score by putting the ball into the opposing team goal. The team consists maximum of eleven players excluding (substitutes) one of which must be the goalkeeper although, some competition rules may state a minimum number of players required to constitute a team that is usually seven. A number of players may be replaced by substitutes during the course of the game. The maximum number of substitutes permitted in a match is three unless during friendly matches in which there are no specified number of substitutes. Goalkeepers are the only players allowed to play the ball with their hands or arms provided that they do so within the penalty area in front of their goal area. The rest of the players (defenders, midfielders and strikers) are permitted to use any part of the body with the exception of hands or arms to kick the ball into position, occasionally using their torso or head to intercept a ball in midair

Performance analysis is an area of sports and exercise science that deals with the actual performance of an athlete rather than opinion or self-report by the athlete, coach or an observer (Peter, 2010). Carling, Relly & Williams, (2005) defined performance analysis in soccer as the assessment of the team or player's performance in which relevant variables are designed to collect data from a competitive situation using either hand, video camera, software applications or computer to determine action of player, his position, time and outcome either success or fail. Performance analysis is commonly used in many sports to enable coaches obtain an objective information that can be utilized to provide feedback on performance.

Multiple of software applications and devices have been developed over the years to serve as the instruments for performance analysis. In a soccer game, the earliest performance analysis system was developed by Reep Benjamin in 1968 when he notated a game of soccer using paper and pencil (Hughes & Franks, 1995). To date; several methods of performance analysis are being used to assess the performance of a player However, over the last twenty years, a considerable amount of research has been conducted in soccer using computers (Hughes, Robertson & Nicholson 1998; Yamanaka et al., 1993).The first development in soccer performance analysis were put forward by Franks, (1983) when he analyzed the 1982 World Cup. Also, Franks and Miller (1986) used an alternative computer notation system using a concept keyboard through which six Liverpool's matches were analyzed during the 1985-1986 season. Conclusions were made on patterns of play such as a greater number of passes were attempted when losing than winning (Hughes & Franks, 1997). Currently, a multitude of tablet applications soft wares are now made available for performance analysis in soccer.

System Analysis of Player (S.A.P) is a computer application that is compatible with window seven. It is designed to code the performances of two players or athletes at the same time. It has twenty available cells for the performance indicators that can be selected according to the demand for the game. The analysis is starting after setting the performance indicators in

the cells by tapping the cell to record the actions based on the performance indicators already selected. There is a scoreboard on the screen of the computer that indicates the scores for each team or the player. At the end of the match of at the half time interval of each match, a screenshot can be taken to transmit the information collected to the player or the coach.

Statwatch, is a tablet application for performance analysis, is an application that is compatible with tablet or smartphones. It has the ability to code the performances of two players at the same time each with 20 available cells to key in the performance indicators for each player in a way that their performances can be analyzed at the same time. After selecting and key in the performance indicators, the performance indicators of both the two players will appear on the screen of the tablet. The start button can then be pressed, and the time will start reading. All the required actions needed to be coded are already on the screen, so all that is required is to tap on the action, and it will be automatically recorded. The information recorded can be transmitted to the coach at the required interval of the match that means that the information can be transmitted as fast as possible to the coach as the game progresses. The application has two ways of transmitting information or data to the coach. The information can be transmitted via Bluetooth or Email. At the end of the match, analysis and summary are provided by the application. The number of actions performed by each player, the time the actions are performed as well as the number of success or fail can be seen. However, bar charts are drawn to illustrate the performance of each player based on the performance indicators the players are assessed on. Similarly, the information can further be transferred to Microsoft Excel for more in-depth analysis. The picture of both S.A. P and Statwatch can be seen as below:

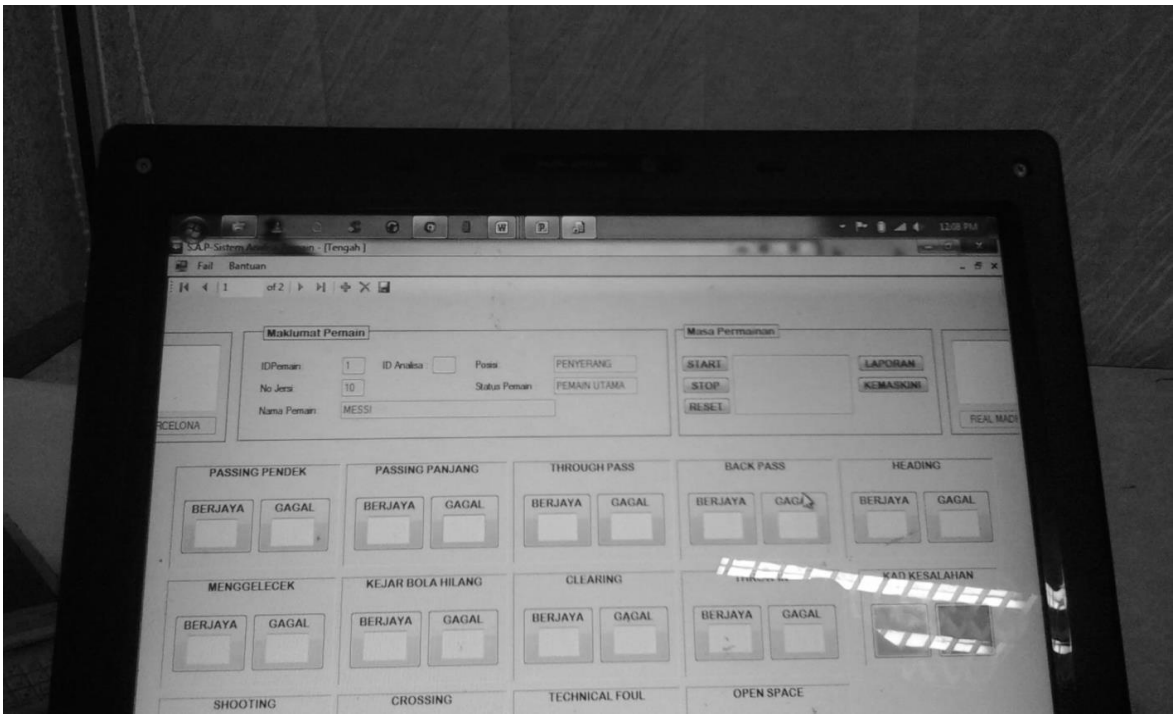

Figure 1: System Analysis of Player (S.A.P) installed on a computer.

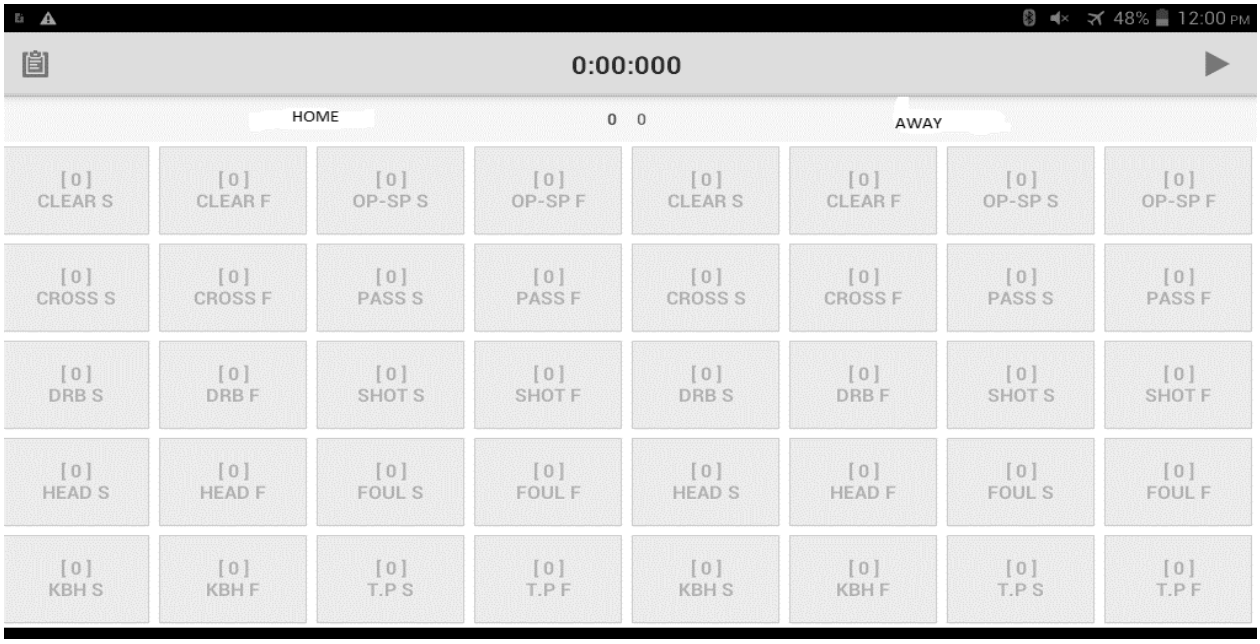

Figure 2: Statwatch application installed on a tablet.

The availability of various performance analysis in soccer made it possible for performance analysts to analyze the players or team performance on any parameters required. However, the analysis could be more effective, accurate and free from human error when the device used for the analysis is user-friendly. The purpose of this study is to compare the user-friendliness between computer and tablet application in the performance analysis of soccer.

2. MATERIALS AND METHOD

Twenty-five performance analysts were recruited to participate in this study.The analysts were provided with twenty-five computers installed with System analysis of player (S.A.P) and twenty-five tablet phones installed with Statwatch applications. A video match was shown to the analysts on an LCD screen they were asked to analyze the performances of the players' base on the performance indicators relevant to the demand for the game by using both applications differently. They were first asked to analyze the performance of the players using S. A. P when the match ended they were asked again to analyze the performance of the players using the same match with Statwatch application. After the analysis, a questionnaire was administered to the performance analysts to find out their opinion on which application is more user-friendly as a device for performance analysis in soccer.The opinion of each analyst was collected and analyzed using chi-square test for goodness of fit. All data were analyzed using SPSS version 20 for windows.

3. RESULT

To investigate which application is more user-friendly as a device for performance analysis in soccer, the opinion of the twenty-five analysts were sampled after analyzing players performances using the two different applications (Statwatch and S.A.P), 20 analysts opined that Statwatch was user friendly while 5 indicated that S.A.P was more user-friendly. The chi-square test for goodness of fit was conducted based on the hypothesis that there is no significant difference of the opinions of the performance analysts, the results shows that the analyst differed in their opinions, (χ^2 = (1, N=25) = 9.00, p < .05.), which revealed that Statwatch application is more user-friendly in the performance analysis of soccer.

Table 1: Descriptive Statistics of Chi-Square Test for Goodness of Fit conducted among the performance Analysts.

Response	Observed N	Expected N	Residual
Agree	20	12.5	7.5
Disagree	5	12.5	-7.5
Total	25		

Table 2: Inferential Statistics of the Chi-Square test for User-friendliness between S.A.P and Statwatch application as a Device for Performance Analysis of Soccer.

	df	t	Sig.
Chi-Square	1	9	.003*

*Significant at $p \leq .05$

4. DISCUSSION

The aim of this study is to compare the user-friendliness between computer and tablet application in the performance analysis of soccer. To achieve the aim of this study, twenty-five performance analysts opinion were sampled after analyzing players performances using the two different applications separately (Statwatch and S.A.P). A total number of 20 performance analysts opined that Statwatch was user-friendly while 5 indicated that S.A.P was more user-friendly. Chi-square test for goodness of fit was conducted based on the hypothesis that there is no significant difference on the opinions of the performance analysts.

The results of this study shows that the analyst differed in their opinions, ($\chi^2 = (1, N=25) = 9.00$, $p < .05$) which indicated that Statwatch application is more user-friendly in the performance analysis of soccer. According to Engels (2009), to determine the degree to which the opinion of people from a sample of population is tilted on a particular variable, Chi-square test of goodness of fit should be employed and the result of the analysis could be used to make conclusion about the sample population provided that all the assumptions are met. Based on the result of this analysis, therefore, it is tempting to conclude that Statwatch application is user-friendly in the performance analysis of soccer.

Athletes and coaches require effective way to support and guide the training process through the provision of objective information on performance via a reliable and user-friendly device (Baca et.al; 2010). Lemmink, Morgan, & Sampaio (2013) reported that for any instrument or device to be used for performance analysis in sport, there is need for it to be user-friendly both in the process of setting the parameters and transmitting the information to the athletes or coaches.

Furthermore, Hughes and Bartlett (2002) pointed out that the fundamental reason for performance analysis in soccer is to provide the coach and the players with objective feedback upon which to base augmentative performance that is directed towards helping the athletes and the coaches to improve their performances. However, this could be achieved efficiently when the device used for the collection of performance data is user-friendly. Therefore, feedback on performance could be collected effectively and transmitted via the use of a device that is user-friendly.

5. CONCLUSION

This study revealed that tablet application is more user-friendly as a device for performance analysis in soccer compared to computer applications. Table applications should be explored more in the performance analysis of soccer due to their user-friendliness.

REFERENCES

Baca, A., Kornfeind, P., Preuschl, E., Bichler, S., Tampier, M., & Novatchkov, H. (2010). A server-based mobile coaching system. Sensors, 10(12), 10640-10662

Carling, C., Williams, A. M., & Reilly, T. (2005). Handbook of soccer match analysis: A systematic approach to improving performance. Psychology Press

D'Orazio, T., & Leo, M. (2010). A review of vision-based systems for soccer video analysis. Pattern recognition, 43(8), 2911-2926.Engels, W.R. (2009). Exact tests for Hardy Weinberg proportions. Genetics, 183(4), 1431-1441.

Franks, I. Miller, G. (1986). Eyewitness Testimony in Sport. Journal of Sport Behavior. 9(1) 38-45

Franks, I.M. (1983). Analysis of Association Football Soccer Journal of sports Science September/October.35-43.

Hughes, M. D. & Bartlett, R.M. (2002). The Use of Performance Indicators in Performance Analysis. Journal of Sport Science. 3(10) 739-754.

Hughes, M.D. & Franks I.M. (1995). Notational Analysis of Sports. London. E& F Spon.

Hughes, M.D. & Franks, I.M. (2004). Notational analysis of sports: Better system For Improving Coaching and Performance. London. E& F Spon. (2)303.

Hughes, M.D. Robertson, K. & Nicholson, A. (1998).An Analysis of the World Cup of 1984 of association football. In Rell, T. Lees, A. David, K. & Murphy, W. (Eds) (1988).Science and Football: Paper Consideration. Centre for Notational Analysis, UWIC Cyncoed

Lemmings, K. A., Morgan, S., Sampaio, J., & Saupe, D. (2013). Computer Science in High Performance Sport-Applications and Implications for Professional Coaching (Dagstuhl Seminar 13272). Dagstuhl Reports, 3(7), 29-53.

Peter O'Donoghue (2010). Research Method for Sports Performance Analysis. London. Routledge

Yamanaka, K; Hughes, M. & Lott, M. (1993). An Analysis of Playing patterns in The 1990 World Cup for association football. In Relly, T. Clays J. & Stibbe, A. Science, and Football ii London: E & FN Spon. 206-214.