

# Pass Appearance Time and pass attempts by teams qualifying for the second stage of FIFA World Cup 2010 in South Africa

—All 48 group stage matches—

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The key concepts in modern football are thought to be *passing game* and *ball possession*. Does passing win championships? The performance of Spain and FC Barcelona suggests that passing does indeed bring success. What, then, are the passing tendencies in actual games? Teams that select a passing strategy are thought to employ a variety of passes. The majority of successful passes appear on the inside of plays. This study was carried out to clarify the role of passing in all teams that did and did not qualify for the 2nd stage of the FIFA World Cup 2010 in South Africa.

In this study, Pass Appearance Time was calculated by dividing Net Playtime by number of pass attempts.

The results were as follows:

- 1) Teams that qualified for the 2nd stage had a higher number of pass attempts and greater Net Playtime.
- 2) Pass attempts and Net Playtime were correlated.
- 3) Low Pass Appearance Time and high pass attempts were correlated.

Results suggested a tendency for teams that had both low Pass Appearance Time and high pass attempts to qualify for the 2nd stage.

**Keywords:** Passing game, Pass Appearance Time, Pass attempts, Net Playtime, Group stage matches,

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## 1. Background

Key concepts of the modern football are thought to be *passing game* and *ball possession*, which are often seen in the performance of the Spain national team and FC Barcelona. As shown in **Table 1**, they have won a number of games in major international play such as the world cup and champion league.

The 2010 FIFA Technical Report (FIFA, 2010) reported that “*The teams that were particularly successful were those with excellent technique and passing* (p.86)” at FIFA World Cup 2010 in South Africa (2010 World Cup). *Ball possession* rate is often used for statistics shown during live games, and published in magazines and newspapers. How, then, do passing and ball possession influence the outcome of games? Muramatsu (2010) argued that ball possession was used to create or lead misses

on the opponent side, such as gaps in covering or spacing, and to shoot goals, and that the increase of ball possession rate is not a goal of play. Increasing ball possession time could be accomplished easily enough through the use of back and square passing if that were the goal. However, the 2010 FIFA Technical

**Table 1** The results of Spain and FC Barcelona in International Competition in recent years.

Spain National Team	
2008	UEFA EURO Champion
2010	FIFA World cup Champion
2012	UEFA EURO Champion
FC Barcelona	
2006	UEFA Champions League Champion
2009	UEFA Champions League Champion
2011	UEFA Champions League Champion
2011	FIFA Club World cup Champion

Report (FIFA, 2010) reported that “*Successful teams try to move the ball forward and not sideways or backward whenever the opportunity presents itself, and the teams that played this way included Spain, Germany, Brazil and the Netherlands (p.77).*”

In order to quickly slip through a fast pressing and compact defense (FIFA, 2010) in modern football and shoot a goal, it is essential to move the ball forward. Winning requires goals, and goals require shots on goal. Kawamura (2006) showed that moving the ball behind the DF had a low success rate, but high shot appearance rate; therefore, it is important to move the ball behind the DF, which means first moving the ball forward.

In addition to passing, other skills are exhibited in games, skills such as ball control, dribbling, shooting, heading, and tackling. The recent success of teams such as Spain and Barcelona, which focus on ball passing, suggests the importance of passing skills in modern football. Teams that employ ball passing as a strategy tend to emphasize passing over other skills throughout the game and are thought to pass the ball at a faster tempo.

A number of studies on ball passing have highlighted isolated passing by examining the number of pass attempts made before shooting as well as pass area (Kawamura, 2006), and the frequency of passes among players. Ito, et al. (1999) calculated number, distance, speed, and angle of pass attempts in the 1998 France World Cup games utilizing an image analyzing system. They clarified that for the 4 best teams, the greater the number of pass attempts until a shot on goal or score increase, the more significant the gap between the percentage of passes leading to a shot on goal or score becomes in comparison with the Japan team. Watanabe (2010) examined ball possession time, frequency of continuous passing, and frequency of passes among players utilizing a real-time analysis system.

Because it is not possible to call a timeout in football, it is impossible to stop movement during a game except when the ball is out of play or during free kicks. In addition to the analysis of isolated passes, therefore, we considered it necessary to analyze passing within the context of the entire game to clarify passing tendencies in modern football, in which passing is more prioritized. This study was carried out to clarify Pass Appearance Time, Pass Appearance Time tendencies and number of pass attempts for teams that prioritize quick passes

utilizing quantified data of Pass Appearance Time, and Pass Appearance Time tendencies and number of pass attempts in games for all teams that did and did not qualify for the 2<sup>nd</sup> stage of World Cup 2010. We processed data from all 48 Group Stage matches of the World Cup 2010.

## 2. Methods

### 2.1. Data

Teams in group stage matches of the World Cup are classified into groups, called Pots<sup>1</sup> consisting of four groups (1<sup>st</sup>– 4<sup>th</sup> Pots), each of which has eight teams. Therefore, we considered it possible to clarify the passing tendencies of all teams utilizing the average of ball passes and possessions as tactics throughout three group stage matches with opponents from diverse regions and at various levels. In this study, we used ball possession time and number of pass attempts reported every five minutes in all 48 games in the 2010 World Cup group stage matches provided by Data Stadium Inc. to calculate Net Playtime, number of pass attempts, and Pass Appearance Time.

### 2.2. Measurement Method of Net Playtime

Net Playtime was calculated by summing ball possession time reported every five minutes for 90 minutes. Loose balls were counted as ball possession time of the team which held the ball immediately before it became a loose ball, until the ball was completely brought under the possession of the opposing team, or the ball traveled out of play. In this study, Net<sup>2</sup> Playtime was considered the time a team is in possession of the ball during play because “possession time” may be misunderstood as possession rate.

### 2.3. Measurement Method of Number of Pass Attempts

Number of pass attempts was calculated by summing ball possession time reported every five minutes for 90 minutes. Whether successful or unsuccessful, intentional pass attempts were counted. Unintended passes such as clear balls were not counted.

## 2.4. Pass Appearance Time

Pass Appearance Time during the Net Playtime for each game and team in World Cup 2010 group stage matches was calculated by dividing the Net Playtime by the number of pass attempts based on the Net Playtime and number of pass attempts defined in this study, and designated it as Pass Appearance Time (PAT).

## 2.5. Analytical Method

We calculated the mean values of PAT, number of pass attempts, and Net Playtime for each team in three group stage matches utilizing the collected data. Following this, we conducted t-test to examine the differences between mean values of all teams that did and did not qualify for the 2<sup>nd</sup> stage of World Cup 2010, and conducted correlation analysis to examine the relationship between the average means of each measurement item.

## 3. Results and Conclusion

**Table 2** shows the mean values of Net Playtime, pass attempts, and PAT for each team in the 48 games that did and did not qualify for the 2<sup>nd</sup> stage of World Cup 2010. Mean values of Net Playtime and number of pass attempts were higher, and average means of PAT were lower for teams that qualified for the 2<sup>nd</sup> stage. We also carried out t-test to examine the differences.

According to t-test (Table 2), mean values of Net Playtime ( $t(30)=2.30, p<.05$ ) and number of pass attempts ( $t(30)=2.23, p<.05$ ) for all teams that did and did not qualify for the 2<sup>nd</sup> stage showed significant differences. However, mean values of PAT ( $t(30)=1.23, n.s.$ ) did not show any significant

differences.

**Figure 1** and **2** show that Net Playtime and number of pass attempts were strongly correlated (teams that did qualify for the 2<sup>nd</sup> stage:  $r=0.983$ , teams that did not qualify for the 2<sup>nd</sup> stage:  $r=0.883$ ), and teams that had higher numbers of pass attempts showed longer Net Playtime regardless of whether or not they qualified for the 2<sup>nd</sup> stage. However, teams that did qualify for the 2<sup>nd</sup> stage showed higher mean values for Net Playtime and number of pass attempts as well as stronger correlations.

The significantly higher mean values of Net Playtime and number of pass attempts for the teams qualifying for the 2<sup>nd</sup> stage compared with the teams that did not qualify, and the strong correlation between the Net Playtime and number of pass attempts suggest that increasing the number of pass attempts and Net Playtime was one of the winning tactics in group stage games.

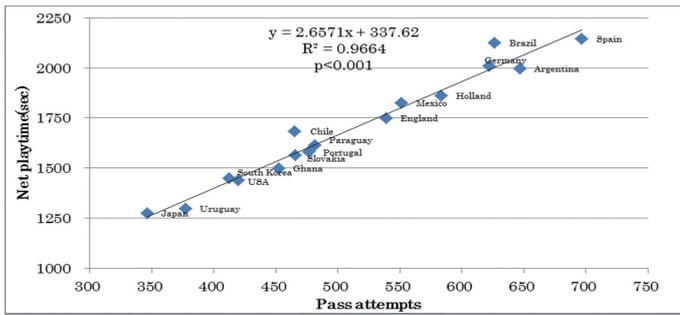
As Muramatsu (2010) argues, however, if ball possession produces a gap in covering or spacing, or if ball possession is to lead to such a situation or a way to score, it is doubtful whether simply increasing Net Playtime and the number of pass attempts is effective or that it explains why teams did and did not qualify for the 2<sup>nd</sup> stage because of the ease of increasing Net Playtime and number of pass attempts by moving the ball sideways and backward frequently, returning the ball to the back line, and passing. However, this would also allow the opponent to assemble a perfect formation and makes it difficult to get through a fast pressing and compact defense.

In order to quickly slip through a fast pressing and compact defense (FIFA, 2010) in modern football and shoot a goal, it is essential to move the ball forward. Successful teams such as Spain, Germany, Brazil, and the Netherlands always attempted to move the ball forward using every chance (FIFA, 2010). It is

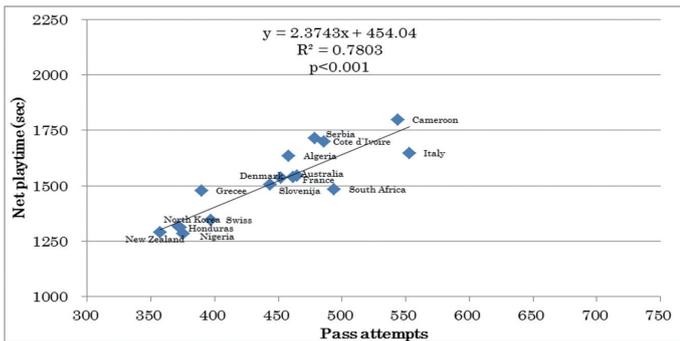
**Table 2** World Cup 2010 group stage results for Net playtime, pass attempts and Pass Appearance Time.  
(Source: Data obtained from Data Stadium Inc. / Processed by the author)

Items	All teams (n=32)	not qualified teams (n=16)	qualified teams (n=16)	t(df)
Net playtime(sec)	1601 ± 244	1508 ± 164	1694 ± 278	2.30(30)*
Pass attempts	477 ± 90	444 ± 61	510 ± 103	2.23(30)*
Pass Appearance Time	3.40 ± 0.21	3.44 ± 0.23	3.36 ± 0.17	1.23(30)

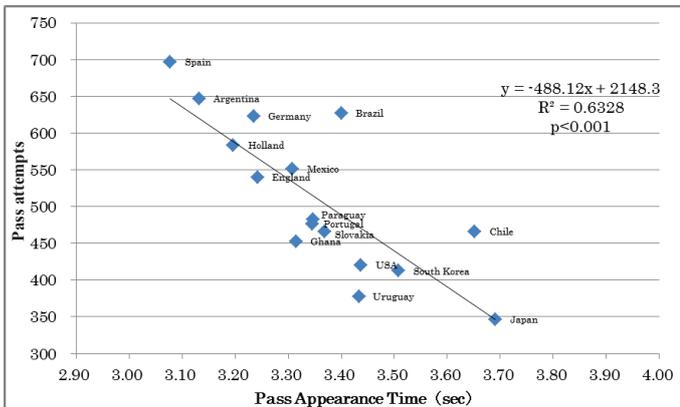
Note.\*= $P<0.05$



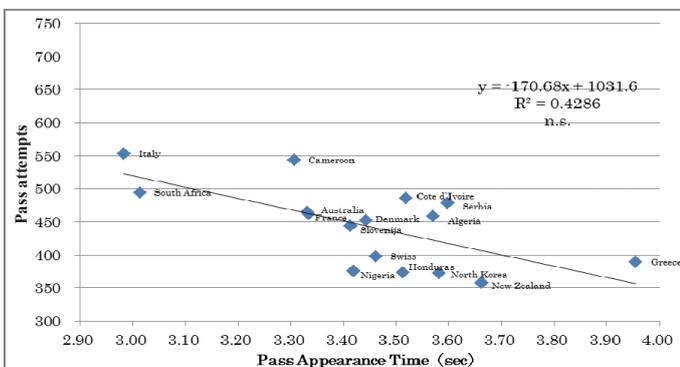
**Figure 1** The correlation of Net playtime and pass attempts of teams qualifying for the 2nd stage in group stage matches of World Cup 2010.



**Figure 2** The correlation of Net playtime and pass attempts of teams not qualifying for the 2nd stage in group stage matches of World Cup 2010.



**Figure 3** The correlation of pass attempts and Pass Appearance Time of teams qualifying for the 2nd stage in group stage matches of World Cup 2010.



**Figure 4** The correlation of pass attempts and Pass Appearance Time of teams not qualifying for the 2nd stage in group stage matches of World Cup 2010.

assumed that such teams do not pass backward or sideways as much, and do not attempt to increase ball possession. This study, therefore, focused on PAT. **Figures 3 and 4** show the correlation between PAT and number of pass attempts in teams that did and did not qualify for the 2<sup>nd</sup> stage games. Figures 3 and 4 also reveal that teams with shorter PAT and more pass attempts concentrated at the left top in the distribution chart. According to the comparison of Figures 3 and 4, teams that did qualify for the 2<sup>nd</sup> stage showed a stronger correlation between PAT and number of pass attempts ( $r=0.795, p<0.05$ ) than teams that did not qualify for the 2<sup>nd</sup> stage ( $r=0.655, n.s.$ ).

According to the t-test, number of pass attempts showed a significant difference; however, PAT did not show any significant difference. In terms of teams that did qualify for the 2<sup>nd</sup> stage, there was a strong correlation between shorter PAT and more pass attempts ( $r=0.795$ ).

There was a significant difference in the number of pass attempts between the teams that did and did not qualify for the 2<sup>nd</sup> stage, and there was also a strong correlation between the shorter PAT and more pass attempts, which revealed that teams capable of passing quickly have a tendency toward shorter PAT and more pass attempts. In addition, teams capable of passing the ball more than the average of 32 teams showed shorter PAT, which indicated the necessity of having shorter PAT to increase the number of pass attempts.

Table 2 and Figure 3 show that the number of pass attempts for 11 out of 16 teams that did qualify for the 2<sup>nd</sup> stage was greater than the average of 32 teams, and PAT was shorter than the average. Teams from five countries did not fall into the category: Uruguay, America, Chile, Korea, and Japan. Of the five countries, however, some showed shorter PAT and others showed fewer pass attempts. Such teams showed longer times during which they did not possess the ball, indicating that they were more offensive, utilizing simple and direct play styles such as counterattack.

To increase the number of pass attempts and Net Playtime only, it is simply necessary to increase the number of sideways and back passes. However, to possess the ball to pass forward, produce a gap in covering, and make a shot on goal, quick play with quick passes are considered the most effective.

With all these factors, many teams that did qualify for the 2<sup>nd</sup> stage of 2010 World Cup showed a

tendency toward more pass attempts and shorter PAT.

#### 4. Conclusion

As a result, number of pass attempts and Net Playtime for the teams that qualified for the 2<sup>nd</sup> stage were greater than those of the teams that did not qualify, and there were significant differences in both between the two groups. In addition, shorter PAT resulted in increased pass attempts, and the number of pass attempts and Net Playtime of teams that did qualify for the 2<sup>nd</sup> stage showed a strong correlation.

This study indicated that many teams qualifying for the 2<sup>nd</sup> stage showed shorter PAT and more pass attempts, which means that teams tended to pass quickly and continue passing longer, in World Cup 2010 group matches.

It is also necessary to examine the relationship among the number and frequency of forward passes, PAT, and possession to clarify what made it possible for players to pass forward, whether there is a relationship between number of pass attempts and PAT for each team, and the passing tactics. We will also study the changes in PAT and number of pass attempts in World Cup 2014.

Note 1: A classification based on the FIFA ranking in the previous year's World Cup. Teams in each region other than Europe are arranged to be in different groups.

Note 2: "Net," used as in net price, etc.

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