

The Effects of Use of Video Techniques on Division III Collegiate Athletes

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Abstract

The purpose of this study was to determine if the reviewing of game film had a significant effect on the results of the Goucher Men's Soccer team throughout the 2014 season. The researcher used measurements in the effort to see if there were significant differences on results on weeks when video analysis was utilized and weeks when video analysis was not utilized. The measurement tools that were used were box score statistics: wins, goals scored, goals against, shots, shots on goal, assists, corner kicks, and saves. A series of t -tests were run to examine any differences in game statistics based on whether game film was watched. The results indicated there were no significant differences in statistics and results based on whether video analysis was conducted. It would be valuable to continue research on video analysis and its importance in sports especially at higher levels where more resources are available.

CHAPTER I

INTRODUCTION

Athletics at the intercollegiate level have become more demanding on both the coaches and players as technology has improved. The time that coaches put into devising practice and game plans would be endless if not for the rules of the National Collegiate Athletic Association (NCAA). In this day and age, collegiate coaches are doing whatever is necessary to maintain that competitive edge over the opposition. As technology has become a larger part of the general society, it has also become a valuable coaching tool that is widely utilized throughout the country. Brolinson, Manoogian, McNeely, Goforth, Greenwald, and Duma (2006) express that with the development of high speed digital cameras, the use of a collegiate team's video-taping their games and then reviewing or watching the tape is a coaching technique that is increasing with popularity, and it is also present in other work fields.

Duma, Manoogian, and Bussone (2005) explain that improvements in video analysis programs and video cameras has allowed video analysis to play a larger role in teaching athletes and doctors how to improve performance in their respective fields. However video analysis is being used much more by collegiate coaches, it is still in question whether it had an effect on winning and losing. Coaches spend countless hours breaking down game films in an effort to display each player's or the teams' strengths and weaknesses, but the ability to utilize this information is very dependent on the collegiate athletes. Lai, Chen, Kao, and Chien (2011), in their study about reviewing tennis highlights, explain that the purpose of using film in sports is that it gives the players a clear visual at a slower speed to illustrate their actions on the field.

As video analysis continues to become more widely utilized, the issue of its value in regards to improving on-field results is something that will continue to be discussed This study is

conducted in an effort to decipher whether the use of video analysis is beneficial to collegiate athletic teams. The win/loss record for a soccer team throughout a season could be a product of many differing reasons such as the overall ability level of the team members, the environment of the college campus, and the demeanor of the coaching staff. This study attempts to uncover whether video analysis was a valid reason for a team's success or rather a waste of energy and time on the coach's behalf.

Statement of the Problem

The purpose of this study is to determine if the reviewing of game films has a significant effect on the results of collegiate athletic teams.

Hypothesis

The null hypothesis for this study is that there is no significant difference on the performance for a collegiate team who is instructed through reviewing game film and a collegiate team who is instructed without reviewing game film.

Operational Definitions

In this study, the term team will be defined as the Goucher College Men's Soccer team. The team consists of thirty individuals who range from ages 18 to 23, but who work together for the common goal of having a successful season. The team will be categorized as the subjects for this study. The independent variable in this study will be the method that the Goucher Soccer team uses to review and evaluate player performance. For the purpose of this study the reviewing of game film will be the specific independent variable that will be utilized, which can be operationally defined as follows. The coaches taped each game with a video camera and

transferred each into the computer system. From there coaches are able to break down the game tape into segments. Ultimately, the reviewing of game films occurs and is defined when the team sits with the coach and watches what it did right and wrong in the previous game.

The dependent variable will be the team's overall performance. The team's overall performance will be characterized as several different categories: wins, goals scored, goals against, assists, shots, shots on goal, corner kicks, and saves. Wins are defined as scoring more goals than the other team in a respective game. Goals scored are defined as the Goucher Soccer team putting the ball in the opponents net. Goals against are defined as the opponent putting the ball in the net that the Goucher goalie is defending. Assists are defined as passing the ball to a teammate who then scores. Shots on goal are defined as kicking the ball on the opponent's goal without it going in. Corner kicks are defined as the ball going over the opponent's end line. Saves are defined as Goucher's goalkeeper stopping the shots from the opponent. Each one of these categories is the strongest representation in soccer of how a respective team is performing.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review examines the effects of differing coaching techniques that are utilized to improve and evaluate team performance in collegiate sports. The role of coaches in terms of giving feedback to their players is a significant aspect of creating better team performance (Carpentier & Mageau, 2013). Section one clarifies the overall importance of coaches in team sports. Section two provides an overview of the varying coaching techniques utilized for evaluation and teaching in collegiate sports. Section three displays how athletes comprehend and understand the coaching they receive.

The Importance of Coaching in Sports

In order to discuss the relationship between coaching techniques and team performance, the significance and role of coaches in sports needs to be stressed. The relationship between coaches and athletes has been noted as one of the greatest influences on athletes. Coaches play an essential role in the athletes' performances and accomplishments (Lorimer & Jowett, 2010). Carpentier and Mageau (2013) explain the importance of coaches, "Not only do they (coaches) represent important authority figures; they also act as models, confidants, and motivators" (p. 423). Coaches and athletes, especially in higher levels such as college, work with each other on a daily basis during the four months that their sport occurs. Therefore, there must a high degree of interdependence between coaches and athletes because of the coaches' need to guide athletes, and the athletes' need to obtain as much skill and knowledge as possible (Antonini & Seiler, 2006). The strong relationships between coaches and athletes illustrate the value of a coach to the players on his team.

Along with the one-on-one relationships between athletes and coaches, there are other valuable characteristics coaches possess. The coaches' ability to create structure and leadership for their teams allow for significant growth in team performance. Coaches are the ones who decide which athletes play in games and the strategy that these players should execute. Tavana, Azizi, and Behzadian (2013) believe that the success and failure of sports teams are based on the skills and abilities of the athletes on that team. Tavana and colleagues feel, however, it is very difficult for the coaches to weigh the different attributes of their players and decide which players will achieve the best performance together (Tavana et al., 2013). It is apparent that the role of coaches in higher level sports is influential to team performance whether it is through creating team structure or coaches' relationships with their players.

Varying Coaching Techniques in Collegiate Sports

A coach, as defined in the Merriam-Webster dictionary, is a person who teaches and trains the members of a sports team and makes decisions about how the team plays during games (Merriam Webster Dictionary, 2014). This definition is very broad in terms of how a coach teaches and trains members of a sports team, so it would be evident that there are varying coaching techniques for improving team performance. In order to explore the relationship between coaching methods and team performance, it is necessary to discuss the several differing coaching techniques.

The two most basic types of coaching styles revolve around negative versus positive feedback to athletes. Negative feedback can be argued as a good or bad way to create better team performance. Carpentier and Mageau feel that negative feedback can motivate athletes and guide them toward performance improvement (Carpentier & Mageau, 2013). At the same time it can

have negative effects; it can lead to an athlete's decrease in self-esteem and the quality of the relationship between the coach and athlete. Gillet, Vallerand, Amoura, and Baldes (2010) state that positive support for athletes promotes self-determined motivation and better sport performance.

In using both positive and negative feedback, coaches are able to establish their more intricate coaching techniques on their players. One example of a coaching technique that is used to promote better performance is done through physical practice. Many coaches feel it is best to put their players in game like situations on the field or court and to get them as many repetitions as possible. For example, Navarro, Miyamoto, van der Kamp, Morya, Savelsbergh, and Ranvaud (2013) conducted research on the practice of penalty kicks in soccer and the amount of pressure that goes along with taking them. Their research concluded that the group that practiced the penalty kicks more suffered from less pressure than the group that had limited practice (Navarro et al., 2013). Overall, the coaching technique of practice makes perfect, is one that is still widely regarded as successful.

Another technique that has become more prevalent in sports is the use of mental imagery. Imagery is a popular technique utilized by higher level athletes to enhance performance, skills, and regulation of emotions for game activities (Williams & Cumming, 2012). Mental imagery is the process of envisioning the performance of a skill, with no physical action completed (Jones & Stuth, 1997). In 1997, Jones and Stuth (1997) explained that about 94% of coaches are using mental imagery. It has also proven to be an acceptable replacement for physical practice. The purpose of mental imagery is for athletes to imagine what they should be doing on the field, making it easier for them to do it when they are put in competitive physical circumstances.

Coaches give their players opportunities to envision, such as scoring the winning goal or hitting the home run, which in turn promotes self-determination.

The use of technology has played an increasingly important role in sports as time has gone on. One interesting coaching technique to improve performance that has been on the rise is the use of reviewing game films. In today's society, it is almost mandatory for a college team to videotape their game so they have a visual representation. Furthermore, teams take the video and put it into the computer so they can edit it in any fashion they want. From there they will split the game into different parts that they feel need to be addressed so the team can see what they did wrong or right. There are many different systems that coaches or professionals can use; some include game breaker or right play. These systems give coaches the ability to do whatever they would like with the film to benefit their players as greatly as possible. This makes it easier for the coach and players to evaluate their performance, rather than just thinking about the game that occurred the prior day. For instance, Lai and colleagues (2011) looked at the creation of Tennis 2.0, which was a viewing program that allowed for the viewer to break down the match however they pleased (Lai et al., 2011). It allows for better viewing experience and allows for the viewer to study the match and decipher what could be changed to improve performance. The use of filming is an important aspect in sports and also the workplace.

Athletes Comprehension of Coaching

Coaching techniques may be intricately detailed and vary greatly, but much of the teaching is dependent on the pupil. Some athletes may find one method more useful and others may find another more helpful. The relationship between an athlete's psychological state and his performance has been a significant analysis over the history of sports conduct (Bar-Eli &

Tractinsky, 2000). The job of the coach is to present his teaching method in the easiest and most efficient way possible for his athlete to understand and ultimately perform better.

Throughout the history of sports the question of whether coaches should be positive or negative in feedback is still debated. Positive feedback, or promotion based feedback, aims at confirming athletes are doing the right things; while negative, or change oriented feedback, illustrates that performance is not good enough and needs to be altered to improve (Carpentier & Mageau, 2013). Change oriented feedback is most definitely harder to give to athletes from a coaching standpoint, but it may be necessary. The first purpose of change oriented feedback is to motivate athletes to by explaining that their performance is inadequate. The second purpose is to focus and guide them to display what changes need to be made so their performance improves. Carpentier and Mageau also feel that change oriented feedback can have negative effects, such as loss of self-esteem, in turn causing worse performance. The researchers' results exemplified that for both promotion and change oriented feedback, the way coaches deliver either feedback better predicts the athletes' outcomes rather than which type of feedback they choose to employ. The use of either style of feedback is apparent while using the varying specific coaching techniques.

The use of physical practice to teach and improve learning is a significant learning tool for high level athletes. Hancock, Rymal, and Ste-Marie (2011) look at the concept of observational learning in sports and assesses its value to athletes' performance. "Observational learning is a term that refers to situations in which individuals copy and then learn new cognitive skills, motor skills, or patterns of this behavior following the observation of others" (p. 236). This is essentially what occurs during practice; the coach will illustrate how to do a specific trick or play, and then the athletes will perform this concept. Cumming, Clark, Ste-Marie, McCullagh, and Hall (2005) determined that observational learning in sport is used for learning three

functions: skill, strategy, and performance. Respectively, the skill function illustrates how athletes get better at a specific sport-related trait while observing. The strategy function displays how adequately athletes can gain an understanding of their team's plan and goals. Lastly, the performance function exemplified how athletes learn to reach optimal mental states (Cumming et al., 2005). In Cumming and colleagues' survey on how observational learning affected athletes, the results supported that observational learning is used mostly for skill learning. This study implies that physical practice and observational learning are important coaching techniques when it comes to teaching players the physical actions and skills of the game, but may lack significance in the strategy and mental preparation of the game.

Coaches encouraging athletes to use visual and mental imagery is an aspect of sports that is continuing to grow. The goal of utilizing mental imagery is no different than other coaching techniques, which is to improve athletes' performance. The use of mental imagery has been seen as an individual tactic, but over time it has expanded to a team concept. For example, professional golfers use mental imagery to focus on the trajectory of their shots before physically taking them (Bernier & Fournier, 2010). Professional golfers feel this technique is helpful because it brings specific information about the mechanics of their swing and their projected ball flight which will increase performance. Jones and Stuth (1997) found that mental imagery was used more to perfect a skill, rather than to develop a game plan. This is similar to observational learning as it was also a more effective tool in skill acquirement when compared to understanding game strategy. This is an easy coaching technique to promote for athletes because it can be done at the individual's leisure and all it takes is an imagination. Jones and Stuth also believed that the use of mental imagery is more efficient in section of respective games that are based on routine. Examples that which illustrate this technique include basketball foul shots,

soccer penalty kicks, and football field kicks. If athletes utilize mental imagery in these areas their performance will be enhanced athletically.

The reviewing of game films in sports is a coaching technique that gives athletes the opportunity to witness how to improve skill, strategy, and performance. Seeing oneself outside of the game allows athletes to become more conscience of their actions on the field. New technology allows for short, pertinent game highlights to be viewed rather than having to watch entire games (D’Orazio & Leo, 2010). These systems are able to more accurately demonstrate how well players performed because the evidence is right in front of them. Overall, Scherer, Chang, Meredith, and Battistella (2003) concludes that videotape review is seen as a more effective learning tool than verbal feedback because it is more likely to create behavioral changes (Scherer et al., 2003).

The use of video-based post-game analysis has also been seen with doctors evaluating their patient surgeries. Hu, Peyre, Arriaga, Osteen, Corso, and Weiser (2012) conducted a study in which four surgeons were videotaped as they performed surgery. After each surgery, the surgeon sat down with a coach in a peer-to-peer interaction to evaluate the surgery (Hu et al., 2012). Reviewing the video proved valuable for the surgeons as they were able to witness episodes of failure to progress and eventually decide how they can fix those issues. The two were able to decide how to fix those issues and come up with a more efficient strategy for the next time the surgeon did a similar surgery. All in all, the surgeons concluded that reviewing videos was a significant tool increasing successful performance in their workplace.

Summary

Coaching is an important aspect of not only sports, but in other facets of society such as education and the workplace. This review of literature illustrates that there are varying coaching techniques that can inhibit performance or promote performance. Furthermore, the literature suggests that coaching is very dependent on the individuals with whom one works. Researchers believe that the relationship between the coach and the player is the underlying factor in the athletes' success (Lorimer & Jowett, 2010). The use of video to review game films shows great promise as a potential technique because of its ability to touch on both skill and strategy. In coaching techniques not accompanied by video, one aspect appears to be stronger than the two factors of skill and strategy. Coaching techniques in general will continue to change and develop as individuals continue to evolve to be more efficient at their respective game.

CHAPTER III

DESIGN

The study that was conducted used a single-subject experimental design to look at the effect of reviewing game films on the performance and results for the Goucher Men's Soccer team. The independent variable for the purpose of the study was the utilization of reviewing game films. For the sixteen games that were played during the 2014 Goucher Men's Soccer season, half of the games were preceded by reviewing game films in an attempt to improve performance. There were 8 games where video analysis was conducted and eight games where video analysis was not conducted. In the weeks that watching game films is not utilized all other soccer related activities will be similar. The dependent variable was the performance in the game they played each weekend, which was measured by wins and losses, goals scored, goals against, assists, shots, shots on goal, corner kicks, and saves. These statistics illustrate if there were differences in the group's performance based on whether watching game films during the week was utilized or not. The process of making the team meet as a group and review game films was conducted after every other game in order to compare the results with and without the treatment during the sixteen game season.

Participants

The participants in this study were categorized as "one" because they consisted of one group, the Goucher College Men's Soccer team for the fall season of 2014. The participants consisted of thirty male college students who ranged from freshman to seniors at the College. Of these student athletes, twenty-four were Caucasian, three were Hispanic, one was African American, and two were Asian. In regards to class, eight were freshman, thirteen were sophomores, five were juniors, and fourteen were seniors. Most of the student athletes came

from middle to upper class backgrounds; three came from lower class background. In regards to position, the team was broken into four goalkeepers, nine defensemen, eleven midfielders, and six forwards; only eleven players can be on the field at a time for each team. These student athletes participated at the Division three level of collegiate athletics, which is the lowest level recognized by the National Collegiate Athletic Association.

Instruments

The instruments that were utilized weekly to test performance created the most significant statistics in the soccer games. These statistics included games won, goals scored, goals against, assists, shots, shots on goal, corner kicks, and saves. Each one of these statistics was found in the box score on the Goucher College athletic site immediately at the completion of the game. The statistics were available for each of the sixteen games that were evaluated.

Procedure

The researcher began this study on August 29, 2014 with the completion of the Goucher Men's Soccer team's first game on the first weekend of the season. After each weekend the instrumental statistics were taken down and placed into a chart. On Wednesday, September 3, 2014 the team met and reviewed films for one hour. Twice monthly until October 29, 2014 a film session with thirty team members and the assistant coach took place in effort to improve these most important statistics.

Each film session was very similar; during the course of the day the assistant coach took the complete game and broke it into two sections, attacking and defending. The attacking portion of the session included video clips from the previous weeks on how the team needed to improve while attempting to score goals on the opposing team. The defending portion of the session

included video clips from the weeks previous on how the team needed to improve while attempting to stop the opposing team from scoring goals. The purpose of reviewing films was to increase the team's readiness for future games. There were sixteen games in the season; the team conducted a video review session for half of the games. All other soccer activity was the same from week to week with the exception of the utilization of a films session. At the end of the season, the statistics for games where films sessions were utilized and games where films sessions were not utilized were compared as a whole.

CHAPTER IV

RESULTS

The purpose of this study was to determine if the reviewing of game films had a significant effect on the results of collegiate athletic teams. The null hypothesis for this study is that there is no significant difference on the performance of a collegiate team when the team is instructed through reviewing game films compared to when a collegiate team is instructed without reviewing game films. This study had participants that were members of the Goucher Men's Soccer teams and all the teams they played throughout the 2014 regular season. In order to examine the above thesis, several statistics were utilized: goals scored, goals against, shots, shots on goal, saves, assists, corner kicks, and wins.

Table 1 Means and Standard Deviations of the Outcomes By Filmed Status

Statistic	Filmed Mean (SD)	NotFilmed Mean (SD)
Goal Scored	2.00 (1.309)	1.13 (1.356)
Goals Against	1.25 (1.165)	1.25 (1.035)
Shots	11.75 (4.234)	12.74 (4.097)
Shots On Goal	6.00 (1.690)	5.25 (2.252)
Saves	3.88 (3.182)	3.50 (2.070)
Assists	1.13 (.835)	.63 (.744)
Corner Kicks	5.88 (3.091)	5.00 (2.673)
Wins	.63 (.518)	.38 (.518)

Table 1 shows the means and standard deviations of the outcome statistics per game based on whether the team watched game films or did not watch game films. A series of t-tests were run to examine any differences in game statistics based on whether game films were watched. Results showed no significant difference in goals scored [$t(14) = 1.313, p > .05$], goals against [$t(14) = .000, p > .05$], shots [$t(14) = -.480, p > .05$], shots on goal [$t(14) = .753, p > .05$], saves [$t(14) =$

.279, $p > .05$], assists [$t(14) = 1.265, p > .05$], corner kicks [$t(14) = .606, p > .05$], or wins [$t(14) = .966, p > .05$].

The null hypothesis was supported. These results and their implications will be discussed in Chapter Five.

CHAPTER V

DISCUSSION

The results supported the original null hypothesis that there would be no significant difference on the performance of a collegiate team when the team is instructed through reviewing game films compared to when the team is instructed without reviewing game films.

Implication of the Results

The overall and most important implication from the results is that winning and the statistics recorded during games are not significantly affected by reviewing game films in the days prior to each game. However, the statistics of games were not statistically different in either situation. It is possible that there were unmeasurable improvements such as confidence and improved mental strength. Previous studies, such as the one conducted by Cummings and others show that observational learning - a teaching method in which athletes attempt to copy skills they have observed – may be significant in the skill and strategy improvements for athletes (Cumming et al., 2005). This action research study utilized a t-test; hence, the use of both methods may result in different findings.

Theoretical Consequences

The theoretical consequences implied by this study suggest that more research is needed in the utilization of game films with athletes. The results of a questionnaire, such as the one above may imply that video analysis is valuable to improving an athlete's performance; however, the results of other studies using various research methods may show very different results. It is important for more research to be conducted on this topic.

Threats to Validity

There are many factors that affect the result of a soccer game. The threats to internal validity that are evident in this study are the statistics that were utilized that are not found in the box score. Some of these threats include passing completion percentage, free kicks taken in dangerous areas, turnovers, team formation, fitness levels for each player, and chemistry between team members. Most of these statistics would be found in professional soccer, but to obtain the personnel to record those factors at the Division Three level is nearly impossible. Also, the statistics of each game are very dependent on the caliber of the opponent; video may have been beneficial, but the opponent may have been so strong that reviewing films had no effect.

By utilizing a convenience sample in this study, external validity may have been threatened as the participants were not very diverse because the sample was a convenience sample, rather than a random sample. The limited diversity of the sample causes external validity to occur because the results could not be generalized for the other teams in Division Three soccer.

Connections to Previous Studies and Existing Literature

The major connections between this study and previous ones involve differing coaching techniques; however, no studies using game films as a coaching technique were found. While Cumming and his colleagues found that observational learning may improve cognitive skill functions, mental imagery appears to be most useful for motivational purposes. This present study attempted to show that observational learning - i.e. game films - has a positive effect on the performance of athletes. The results were not significant.

Although substantial literature linking game film viewing to improved performance appears to be nonexistent, a comparable technique is seen in the medical field. Hu et al. (2012) filmed surgeons in the operating room; films were used following surgery to evaluate improvements. After reviewing the films, all surgeons in the study agreed that filming was a powerful, beneficial tool. There are some similarities to the present study; however, results were not as conclusive. Players may feel that reviewing films is helpful, but the on-field performance, as seen by statistics, does not illustrate a similar outcome.

Implications for Future Research

The results of this study with the proving of the null hypothesis implies that more research needs to be done with athletes and film viewing. Many Division One schools are utilizing films as are professional levels. A comparable study at these levels should prove interesting, especially if more detailed statistics were used to gain more accurate findings.

Conclusion

The importance of film utilization as a coaching technique is expanding in the world of sports today. The present study demonstrates that even though teams are using video analysis in an attempt to improve results, the outcomes may not be affected by reviewing films. Ultimately coaches may need to look at the reviewing of game films and how it qualitatively affects one's team, rather than the quantitative results that are seen in the box score.

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