The Effect of Using Data as Motivation

for a High School Basketball Team

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Abstract

The purpose of this study was to examine the impact of recording and sharing defensive data with the players on a basketball team concerning defensive play during a basketball season. A quasi-experimental without randomization design was used. An instrument was developed by the researcher to record steals, deflections, and turnovers of the basketball team. The data did not show an increase in player defensive productivity each game. Additional studies are needed to validate whether data can motivate individuals in basketball.

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CHAPTER I

INTRODUCTION

Overview

All teams need a source of motivation, whether it be a team of business professionals, a medical team, or a youth basketball program. For a coach, it can be very challenging to keep players focused and encourage them to improve through the course of a season. However, effective motivation can have a dramatic effect on the team and translates not only into wins, but also into player improvement and player satisfaction.

Over the years, there has been a considerable amount of research into what makes a successful team and how to deal with differing personalities. Each team, and more specifically, each individual player, responds differently to motivational tactics. As such, there is no one-size-fits-all solution to motivating the players. Some players are excited by winning, others by personal improvement, while still others are encouraged by being part of the team. More recently coaches are implementing individual player sports metrics to quantify how well their team is playing and to provide targeted areas for improvement for their players.

It is particularly challenging to motivate a team defensively. It seems that the players are often more concerned with scoring in basketball than with stopping the other team. Defense is a major priority for successful basketball teams. As a basketball coach, the researcher is tasked with the challenge of finding effective ways to motivate a basketball team defensively.

Statement of Problem

This study examined the impact of recording and sharing defensive data with the players on a basketball team concerning defensive play during a basketball season.

Hypothesis

A null hypothesis was proposed for this study. An effort chart was displayed to the players after each game, and the goal was for players to demonstrate fewer turnovers per game as well as an increase in steals and deflections. However, there null suggests that there will be no significant difference in the defensive productivity when players' results are compared before the treatment (charting statistics) and after the treatment.

Operational Definitions

In order to quantify the variables, the team staff designed and implemented an *effort chart* for the players. The *effort chart* is used as the dependent variable in this study and served as a means of quantifying and tracking the players' defensive productivity by recording the number of deflections, steals, and turnovers they had in each game.

The independent variable for this study involved the following defensive basketball metrics: deflections, steals, and turnovers. A *deflection* is when the defensive player is able to touch the basketball while it is being passed to the person he is defending. This shows that the defender is keenly engaged and knows where the ball is or may be going. Deflections also reflect that the player has his hands in the passing lane. Often, deflections lead to steals. A *steal* is when the defensive player is able to recover the basketball from the other team. The team that steals a ball will subsequently change

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from being on defense to offense. Steals often translate into quick and easy points. *Turnovers* are essentially the opposite of steals. Protecting the basketball and preventing the other team from getting a steal is essentially good offense.

CHAPTER II

REVIEW OF THE LITERATURE

This review of the literature discusses athletic teams and motivation. The first section reviews the value in understanding and appreciating the different personalities that make up the team. The second section examines a collection of techniques that a coach can use to motivate a team. Finally, section three of this literature review discusses how using sports metrics can help provide specific and individual motivation for players.

Understanding and Accepting Different Personalities

The first step to motivating a team is understanding and appreciating the players and their different personalities and social situations. The diversity in behavioral styles on a team is a positive and should be treated as such (Hanson, 2014). Team performance is multidimensional, and, according to Driskell, Goodwin, Salas, and O'Shea (2006), "different personality facets may be predictive of different performance dimensions" (p. 250).

Coaches have to take into consideration what a team's needs are, including their home environment, academic and/or classroom challenges, and relationships. Grove and Stoll (1999) conducted a study in which athletes reported reasons for being in a slump while in season. Their study found that athletes go through a variety of trials and tribulations that the coach is not necessarily aware of, all of which can be detrimental to their production during the season.

Much of team research is focused in business literature as businesses also rely heavily on teams and team dynamics to accomplish goals. Individuals of any team,

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whether for athletics or for a business environment, need to be able to coexist with one another (Whiting & Maynes, 2016).

Research has shown that there are five major personality traits that are linked with successful individuals. Commonly, all of these traits cannot be found in a single person. Each team member possesses specific information or expertise to contribute to the team. The first trait is emotional stability, defined as the lack of anxiety and nervous tendencies and the ability to adjust and generally have good self-esteem. The second trait is extraversion, which reflects a person's assertiveness or dominance. Openness is defined as a person's flexibility. Agreeableness is the fourth trait found in successful individuals, and it is defined as kindness and selflessness. The fifth and final trait is conscientiousness; someone who is conscientious is hard working, prepared, and organized (Driskell et al., 2006).

Ambrose and Anderson-Butcher (2015) suggest that a coach should allow players independence in practice and games, thereby allowing each individual player's personality to flourish. It is the coach's responsibility to evaluate relationships between players and how those relationships motivate those players (Leo, Sanchez, Sanchez, Amado, & Calvo, 2009). Coaches must realize that the players on any team may only be acquaintances with no real commonality. Therefore, a coach must make sure to form a bond among the players. In addition, coaches must bond themselves with each student athlete individually (Leo et al., 2009).

<center>**Methods for Motivating Teams and Players**</center>

As alluded to above, one of the socially complicated things about teams and team sports is the diversity in personalities and emotions. This also comes into play when a coach is looking to motivate his/her team. Principles of motivation, if they are to be used successfully to increase motivation, must be applied to individuals and individual situations. Individuals are indeed motivated differently, and a discrepancy often exists between what motivates individuals (Mobaraki, 1996). Below is a summary of some of the techniques that have already been studied as ways to motivate players.

Positive Feedback

Positive feedback is encouragement of an individual by highlighting the positive actions of an individual with the goal of making him or her better. Self-determination and self-esteem are reinforced through positive feedback. According to Mouratidis, Vansteenkiste, Lens, and Sideridis (2008), a coach would highlight areas of needed improvement for a player and does so in a positive, complimentary way.

Criticism

It is a generally held belief in society that praise should be emphasized over criticism. Anecdotally, it is easier to get someone to do more of what he or she already does than to change altogether. Positive feedback does help build self-esteem, but Lenko (2014) suggests that it may also reinforce complacency. A study from the University of Exeter shows that people can recover from poor performance when rivals comment on their failures. Criticism from team members sends individuals down a performance spiral, but external criticism can be a trigger that boosts performances.

Lenko (2014) does warn against criticizing someone who already feels beaten down. It is important to gauge whether criticism will be encouraging and serve as a source of motivation, or, alternately, if it will cause the person to become more inert.

Team Social Identity

Another commonly used method for team motivation is the creation of a team "identity." Many athletes enjoy feeling like they are a part of something greater. Parish and Williams (2007) found that players may feel confident in defining their role on the team and develop a sense of self-worth over being needed in that role This is a tactic used at all levels of competition. The Great Britain cycling team manager worked to develop a team social identity by creating emotional attachment and a sense of belonging to motivate his team during the 2012 Olympics in London (Slater, Evans, & Barker, 2013).

Personal Enjoyment

Many players are motivated to play sports based solely on having fun and enjoying themselves (Parish & Williams, 2007). Though this phenomena is often truer in younger athletes and fades as competition becomes stiffer, it is always the role of the coach to ensure that the members of his team are having fun.

Fame and Fortune

It is also true that many athletes are motivated by power, worth, and recognition. Some players strive to be the best, to show off, or to win awards in order to garner attention from peers or society (Parish & Williams, 2007). This phenomenon occurs at all levels of competition, whether athletes are hoping to win a participation trophy, hoping to

be MVP of the league, hoping to play Division I intercollegiate athletics, or garnering the largest contract in the NBA.

Goal Setting

Another tactic for motivating teams is through setting goals. However, it is important that these goals are realistic. If the goals are too difficult, they are never achieved and convey to the athletes that they are not good enough. However, if goals are too easy, achievement becomes meaningless and rewards hollow. Setting goals should be a joint venture of the coach and the athletes. It is possible that different goals may be set at practices than at games. It is also important to include short-term goals. The goals should be written down and visible (Weinberg, 1982). It is also important to recognize the diversity of players and the likely diversity of their goals. The need for an understanding of the athletes and their reasons for participation is emphasized along with an approach for setting realistic goals for both individual and team sports (Howe, 1986).

Fear of Failure

Fear of failure energizes and directs achievement-related outcomes. Fear of failure has long been viewed as an important influence on achievement behavior. The five aversive consequences of failing repeatedly include experiencing shame and embarrassment, devaluing one's self-estimate, having an uncertain future, important others losing interest, and disappointing important others (Conroy & Elliott, 2004). Though this may not be a motivational tactic that is commonly used, coaches must recognize the fear that their players and team have of failure and work to use it for the best.

Using Sports Metrics as a Form of Motivation

Sports are forever changing, and more and more commonly coaches are turning to sports metrics as a way to quantify success and also as a way to provide solid feedback and motivate their players to perform at a higher level. Sports metrics, broadly defined, are a way to quantitatively describe actions throughout a game. For example, sports metrics allow a basketball coach to quantify players' preferences like where they usually shoot a three-pointer or at what part of the court they tend to catch the ball. It also allows the coach to quantify more simple things like field goal percentage, steals, and rebounds. The coach can then use this information to determine which skills the player and team need to work on. Additionally, presenting the team and player with individual statistics can motivate the player by showing him in black and white what he is and is not doing (Sampaio et al., 2015).

Coaches want to have numbers to assess and support the decisions that they make. In addition, objectifying the process can also allow players to know why the coach may not play them. These metrics can ultimately improve the individual's success, which, in turn, helps the entire team. In their study, the Bartholomew and Collier (2011) used DEA (data envelopment analysis) to compare of multiple players on the team to calculate their production while they are playing. These numbers then serve as hard facts, either supporting the cause of an individual to play more or less depending on whether the team is more or less productive when he or she is playing.

Sports metrics are also subject to a fair bit of scrutiny. While much of the information reflects real game behaviors such as number of turnover or number of missed free throws, other measures do not reflect well on real game behaviors or actions and may

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become confusing for the coach and the player (Andersen, McCullagh, & Wilson, 2007). So this data must be carefully selected to be useful.

Summary

The review of this literature has discussed how coaches need to be aware of and respect the differing personalities and factors that may motivate their players. Coaches can consider employing both positive and well-timed negative feedback to elevate their players to the next level. Additionally, sports metrics may be a helpful objective tool to motivate and give players feedback.

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CHAPTER III

METHODS

This study examined the impact of recording and sharing defensive data with the players on a basketball team concerning defensive play during a basketball season.

Design

This was a quasi-experimental study without randomization. There was no control group and no randomization. There were multiple measures on each player taken during the basketball season.

Participants

A total of 12 participants were enrolled in this investigation and were selected from a group of 40 high school-aged boys who tried out for the junior varsity basketball team in an independent school in the Greater Baltimore Area. The average age of the players selected is 15.4 years old. The team consisted of five African-American and seven white players. All members of the basketball team were multisport athletes and played on other sports teams throughout the school year. Seven of the 12 players identified basketball as his "main sport" and for that reason tended to be better players and received more in-game playing time than the other five players.

Procedures

This study began with the researcher's observation that team performance in terms of training was negatively influenced by individual players on their athletic skills. Those skills were evaluated daily within the confines of practice.

The researcher needed to identify a technique which would help to improve defense, as alluded to in the literature review in Chapter II. The researcher was already using both team and one-on-one meetings to express the importance of defense and how the team would be measured throughout the season. However, the researcher also newly implemented an effort chart for each player. The effort chart tracked three different measures of defensive efficiency that could be easily tracked and quantified throughout a game: steals, deflections, and turnovers. An assistant coach tracked this data for each individual player during each game.

After each game, the player was shown his own effort chart as a means of giving active and real-time feedback of his defensive effort. Effort charts for each player were kept over the course of the season to determine whether the players showed any improvement in their defensive performance.

RESULTS

This study investigated how effective using quantitative data is in improving the defensive performance. For the purposes of this study, a null hypothesis was proposed. Data were collected over 18 basketball games and included the following variables: deflections, turnovers, and steals. For each variable, an average was calculated for the players who played during a given game. The variables were charted for each of the 18 games. Players who did not play in a given game were not part of the average for that game. Graph 1 displays the deflection data, Graph 2 displays the turnover data, and Graph 3 displays the steals data.

At the beginning of the season, before implementation of the effort chart, the team was averaging between three and four deflections per game. The data in Graph 1 shows a spike in the number of deflections at game three where the average rose to over five deflections per game. However, after game three, there was a steady decline in deflections. Overall, as the season progressed, the number of deflections plateaued to fewer than one per game.

The data in Graph 2 shows that during the first game the team averaged 1.3 turnovers. There was a significant variation in the number of turnovers over the course of the season. By the last two games of the season, the turnover average had reached its lowest point, fewer than one per game.

The data in Graph 3 shows that the team's activity for steals was at its lowest all season in game one. This average reached its all-time high during game two at 1.8.

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During game three, the number fell to 1.1. Thereafter, the number of steals experienced a
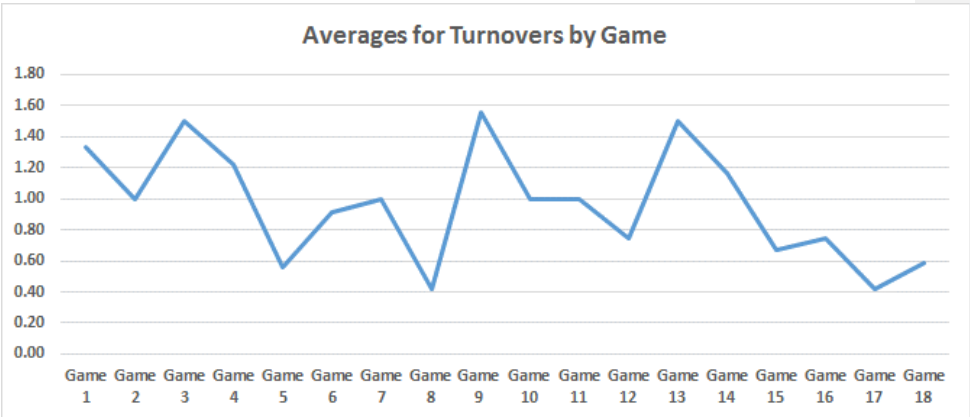
steady fluctuation between .4 and 1.
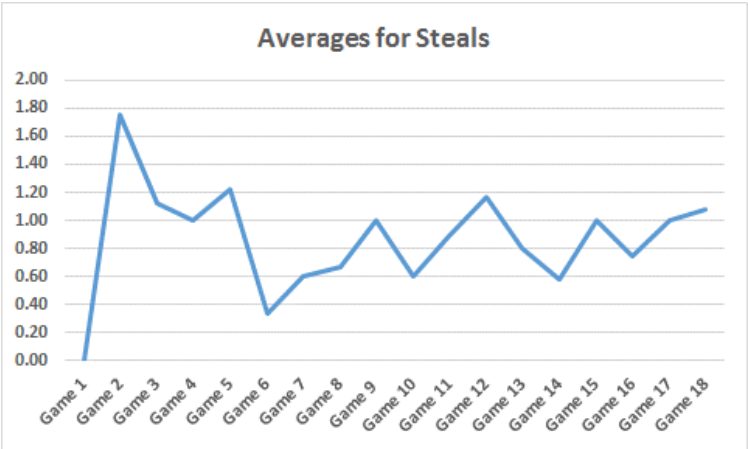
Graph 1

Average for Deflections by Game
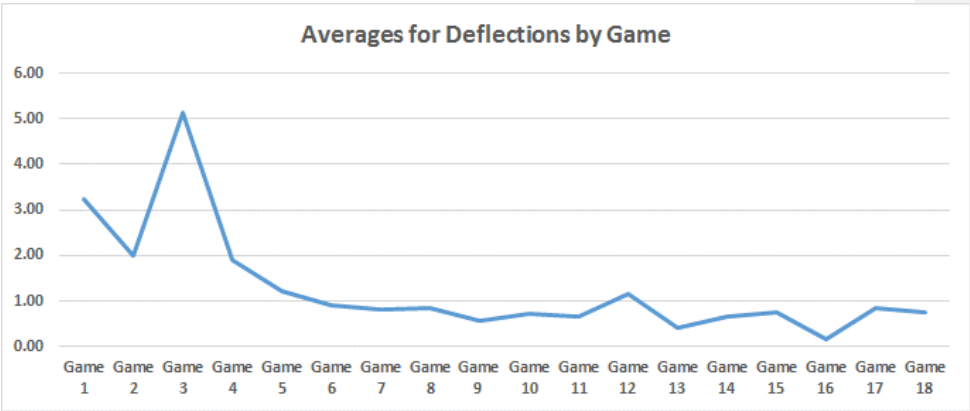
Graph 2

Average for Turnovers by Game

Graph 3

Steal Averages

Averages for Steals

<center>**CHAPTER V**</center>

<center>**DISCUSSION**</center>

The researcher hypothesized that implementation of effort charts as a quantitative form of defensive evaluation would have no effect on each player being more aware of his defensive activity and would not translate into an increased number of steals and deflections throughout the season with a decrease in the number of turnovers. The data supports this null hypothesis. In fact, it was discovered that, overall, the number of all three factors remained pretty consistent throughout the season.

<center>**Implications of Results**</center>

Though the data in its raw form does not show a consistent improvement in defense over the course of the season, the researcher suggests that using an effort chart still has value. There are many variables that affect how a team plays during a particular game. No two games are the same; even two games against the same opponent differ. Many factors combine to greatly influence a team's style of play: each player doesn't get the same amount of playing time, the starting lineups change, and the opposing team differs. Therefore, it is, perhaps, unrealistic to expect an increase in steals and deflections and a decrease in turnovers during the season. However, the effort and hustle put forth by any team are not so easily quantified.

In this study, as the season progressed, an increase in players' hustle was evident, and the team began to work harder and harder on the defensive end. The players were eager to know their numbers at the end of each game, and each used the information that the charts presented to help him hone in on what he needed to work harder on. Thus,

though the use of the effort charts did not lead to noticeable changes in the number of steals, deflections, and turnovers over the course of the season, the effort chart helped the team have a more defensive mindset and led to better and better defense through the season.

Threats to Validity

This study does have multiple threats to its internal and external validity. Internal validity is threatened particularly due to history and maturation. History, as it relates to internal validity, describes the unexpected events that may take place while testing which may affect the study outcome. In this study there were multiple other factors which could affect the data including the opponent, the location of the game, and the roster. The team's opponent changed each game. With that comes a different style of play and a resultant difference in how the study team played, as well. Additionally, the games were played at varied locations; some were home and some away, which may have also affected the team's performance. The roster was also different at each game. Though there was a core group of players who consistently played a majority of the game, different players have different skill sets which may have affected the data. There are also some social factors that may have affected a player's performance including his academic responsibilities, illness, or even personal or family conflicts.

Maturation refers to the natural growth that occurs over time in the participants of a study. This study evaluated a team over the course of an entire basketball season. It is inevitable that in this time the players matured and evolved over the course of the season, developing more and different skills that they learned to implement in the game. The

players had practice all season long which focused on different areas of improvement. The coach would design practices based on the team's performance in prior games.

Threats to external validity prevent a study from being applicable to other groups of participants. This study may be applicable to other basketball teams at the high school level. Teams at this level share many similarities: number of games, age of players, and academic responsibilities, to name a few. Also, high school teams have similar athletic abilities that a coach can endeavor to improve and expand. For the same reasons, this study may not apply to higher levels of play because college and professional teams are able to dedicate more time to enhancing pre-existing skills. Players at higher levels are more mature physically and, in some cases, are paid to play.

The reactive arrangements threat means that the participants' behavior was different than their normal behavior. In this study the participants were aware the number of deflections, steals, and turnovers were being recorded. This may have drawn their attention more to those categories as well as encouraged them to be more productive.

Another external threat to validity of this study was the experiment effect. The experimenter put such an emphasis on these categories during practice and games that certain participants did not respond as well as others.

Connections to Existing Literature

As stated in Chapter II, there are multiple ways to motivate players, and not all tactics work for each individual. This study used analytical sports metrics as an attempt to improve the team's defensive performance. Overall, the use of the effort chart did not

show a marked impact in defensive productivity. This may suggest that not all players respond to motivation in the form of sports metrics. Perhaps those players would have responded better to other forms of motivation such as criticism or positive feedback.

Sports metrics are also known to have their flaws. While they are able to produce objective evidence about what a player does on the court, metrics do not necessarily account for other factors that are more difficult to measure. The current study did not demonstrate that the team's defense improved with use of the effort chart, measured in steals, turnovers, or deflections. However, subjectively, the researcher did feel that defense was improved in other ways. The team played harder and was more aware of defensive play. This data may show that the team did not progress in specific areas (turnovers, steals, deflections), but it did not measure the growth and togetherness of the team.

Suggestions for Future Research

Future research should focus only on players who play more than half of a game. This will allow the data to be less skewed by those players who only play a small portion. Also, by focusing the data on the players who play a majority of each game, the researcher could direct more attention to ways of motivating those players rather than the entire team. A future study such as this could be performed at the collegiate level as well. There would be different expectations from the researcher, but to see the impact of statistical data on a team could be beneficial.

Conclusion

Motivating a team can be a daunting task. No player is the same, and it is the coaches' responsibility to figure out how to connect to each of those personalities. Sports metrics have become a leading method of motivating and encouraging players to be more productive. The live data gives the players a reference point into areas for improvement. This study sought to determine whether implementing an effort chart measuring three specific quantifiable areas of defense and sharing this data with the team would improve their defensive play. Overall, the data did not show that the effort chart led to more deflections or steals or fewer turnovers.

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