

**VARIABLES ASSOCIATED WITH RUN OUT OPPORTUNITIES IN CRICKET:  
COACHES' PERCEPTIONS VERSUS VIDEO ANALYSES OF THE INDIAN  
PREMIER LEAGUE 2018/2019 SEASONS**

**BY**

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## **ABSTRACT:**

### **Background**

The purpose of this investigation was to add a scientific element to the understanding of run out opportunities in T20 (twenty/twenty) formats, which would in turn, provide recommendations to players and coaches around the topic of run outs. Due to a lack of research in this field, the study was two-fold, as there is little research known on this topic. Firstly, surveying experienced coaches on what they would expect to take place during run out opportunities from different areas of the field in a T20 game. Secondly, the study looked at what happened during successful and unsuccessful run outs from different areas of the field in two Indian Premier League (IPL) seasons.

### **Aim**

The aim of the study was to determine what variables, within an area of fielding, led to a successful or non-successful run out from different zones in the field.

### **Methods**

Coaches were required to fill out a survey which asked them to give their expectations on run out opportunities during a T20 competition. The data from the questionnaire would be used to gain a greater understanding of the way coaches understand different characteristics of run outs and whether this matched the findings of the second part of this study. The second part of the study investigated run out opportunities in two consecutive IPL seasons, based on video footage, looking at how different variables impacted successful or marginally missed run out opportunities in different areas of the field and at different times of the game. The areas were put into four different zones. Zone 1 being close to the batter, zone 2 being in the inner ring, zone 3 being on the edge of the ring and zone 4 being boundary fielders.

### **Results**

Most of the coaches believed that in zone 1 of the field, the bowler would have the most opportunities, where in fact, based on the video footage, these fell to the wicket-keeper. In zone 2 there were a larger range of fielding positions (10) that run outs fell to when analysing video footage. The coaches supported this by often naming the same fielding positions. There was a divide in zone 3. Most run out opportunities from the video footage came to extra cover, where most coaches didn't believe that would be the case and rather mentioned mid-off and mid-on.

When analysing video footage in zone 4, it had two fielding positions (long on and deep mid-wicket) make up the majority of run out chances in this area and these two positions were quoted by most of the coaches as having the most run out opportunities fall to them. Throughout the findings, as concluded from the video footage, there were some results that matched the coaches' expectation and some results where findings from the video footage differed from the coaches' expectations. These findings are all useful. Firstly, it validates coaching practices. Secondly, it provides coaches with greater insight as to where they aren't getting it correct in their fielding training.

### **Conclusion**

In conclusion, this study found that although coaches perceptions, for the most part, matched what took place on the field, there were instances where we saw the opposite action take place. This has important practical implications for coaching and practice.

Keywords: *Cricket, Fielding, Throwing, Run Outs*

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# CHAPTER I

## INTRODUCTION

Cricket is undergoing a phase of rapid change in all formats (Noakes & Durandt, 2000). The duration and intensity of the formats vary (MacDonald, Cronin, Mills, McGuigan & Stretch, 2013; Petersen, Pyne, Dawson, Portus & Kellet, 2010). More recently, the shorter formats of the game have been introduced, which include T20 cricket, more notably and relevant to this study, the Indian Premier League (IPL). Recently “*The Hundred*” was introduced, which is 100 balls bowled per innings which started in England in 2021. The shorter formats of the game have made cricket increasingly popular, not only for viewers, but for players and stakeholders as it has become more lucrative with these leagues being played all around the world.

The IPL has, in recent times, become the most lucrative short format cricket tournament. The formation of the tournament has transformed the sport into an entertainment driven format, steering away from the ‘gentleman’s game’ (Majumdar, 2011). It came at a time when other formats of cricket had begun to plateau in viewership. It is evident that the IPL tournament was designed to bring about a unique blend of entertainment and sport, which has resulted in an abundance of traction, not only from spectators and sponsors, but from players (Majumdar, 2011).

With the large amount of money involved in the IPL, both in terms of buying players, as well as the lucrative endorsements received from sponsors, players and coaches will want to get any advantage over their opposition. India’s sport market is large (over a billion people), a market almost three times the size of America’s market and over twice as large as the European market (Gupta, 2009). It is estimated that in 2009 approximately 220 million people watched IPL games on television in India alone (Gupta, 2009). The highly hyped and lucrative auction for players is a highly anticipated moment, where players were auctioned for large amounts of money, such as South African, Chris Morris who went for approximately \$2 million in 2021, being the most expensive player in IPL history (Shah, 2021). With prize money for the winners reaching \$4 million, and a host of other monetary benefits for other aspects of the tournament, such as most runs scored or most wickets taken (Shah, 2021), players are increasingly attracted to this format of the game.

Cricket’s popularity is largely credited to the numerous one-on-one interactions between bat and ball (Jooste, Van Wyk, Steyn & Toriola, 2014). Therefore, players look to stand out by

becoming a specialist in either batting or bowling (Jooste et al., 2014). It is therefore obvious that batting and bowling skills are given higher priorities in research than fielding even though fielding is an integral part of the game (Wickramasinghe, 2020). As fielding is an under researched aspect of the game of cricket, and there is little empirical evidence on it, the focus of this study was on aspects of fielding in the T20 format (specifically the IPL).

Fielding in cricket is, for the most part, the “on-field” action of players, related to collecting the ball after the batter contacts it (MacDonald et al., 2013). Fielding has gained considerable importance in the game of cricket as saving runs is an important factor in winning matches, particularly in the shorter formats of the game (MacDonald et al., 2013). Quality fielding can apply pressure to batters, which contributes to batting errors. Fielding has different components of performance, which have been outlined by MacDonald and colleagues (2013). These are technical, mental, physiological and physical. However, for the purpose of this study, the focus is on the technical aspects of fielding, and more specifically run outs.

This study has no aspects of the technical side that can be compared to previous research, and it is for that reason we looked at the different variables that impact a successful or unsuccessful run out opportunity. Run outs by fielders are one way of dismissing batters which could come from a good or bad ball by the bowler, or a good or bad shot from the batter, and therefore, are crucial ways in which fielders can execute a skill to get a wicket. A run out is executed when a batter leaves his crease to gain a run and a player from the fielder side either throws the ball against the stumps or takes the ball to the stumps when the batter has not made it into the crease. However, there is limited research on this probably due to the complexity of measuring these. Although run outs do not happen that often, the game of T20 cricket is a game of small margins and if more is known about them, it could help create more run outs. For example, there were 720 wickets taken in the 2018 IPL season, where only 58 of them were run outs. There are no reports or scientific evidence of run outs and how all the variables associated with fielding added together, from different areas of the field, effect a run out opportunity highlighting the importance of this pre-experimental study.

Due to the traditionalist nature of cricket, coaches mostly rely on experience and anecdotal evidence when coaching (MacDonald, 2015). There has been an increase in research on the technical aspects of cricket, mainly in batting (Portus & Farrow, 2011; Connor, Renshaw, Farrow & Abernethy, 2016; Scanlan, Berkemans, Vickery & Kean, 2016; Khan, Nicholson & Plötz, 2017; Connor, Renshaw & Farrow, 2020) and bowling (Johnstone, Mitchell, Hughes,

Watson, Ford & Garrett, 2014; Phillips, Davids, Renshaw & Portus, 2014; Doljin & Fuss, 2015; Ahmun, Scott, Jones & Tallent, 2020), with little research being conducted on fielding, and none on investigating run outs more closely. This therefore shows a clear need for a study to investigate different aspects that may lead to more run out chances and in turn, greater success.

The purpose of the study was to look further into the technical and tactical of fielding, more specifically, the factors which contribute to a successful or unsuccessful run out opportunity, and to assist coaches determine what variables are associated with successful and unsuccessful run out chances to enhance the way they may coach. This was done in a two phased approach. Firstly, due to no comparative data, expert coaches were surveyed to get their assumptions of what they believe would take place during a run out opportunity to get a clearer understanding of coaches' perceptions. This gave key insights into the way that they may coach players, and what they have learnt on the job, as well as from their coaching qualifications, which has in turn been represented in the way the coaches' players' execute run out opportunities. Secondly, data from two IPL tournaments were collected using video footage to examine what variables take place, how they are executed, what periods of the game they occur in and from what area of the field do fielders execute a successful or unsuccessful run out opportunity.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

*“...the most enthusiastic supporters of One Day cricket could have never foreseen the revolution One Day cricket would trigger: the limited-overs game may have undermined batting techniques and made certain attacking bowling tactics extinct, but it has single-handedly transformed fielding from a sedate accessory to an athletic exciting and absolutely crucial pillar of the modern game.”* (Bob Woolmer et al., 2008, p. 322).

Cricket is a bat and ball game played between two teams of 11 players (MCC, 2019). It is played by both sexes from primary school age to a professional level. In the centre of the field there is a 20-meter pitch with a set of three wickets and two bails at each end and the field is an oval shape (MCC, 2019). The team batting contacts bat and ball to score runs, and the bowling and fielding side tries to prevent runs from being scored and/or dismissing the batter (MCC, 2019).

Matches are measured in overs (6 balls bowled constitutes an over) and an innings is a descriptor for the number of times the teams will contest each other (MCC, 2019). There are three main formats of the game:

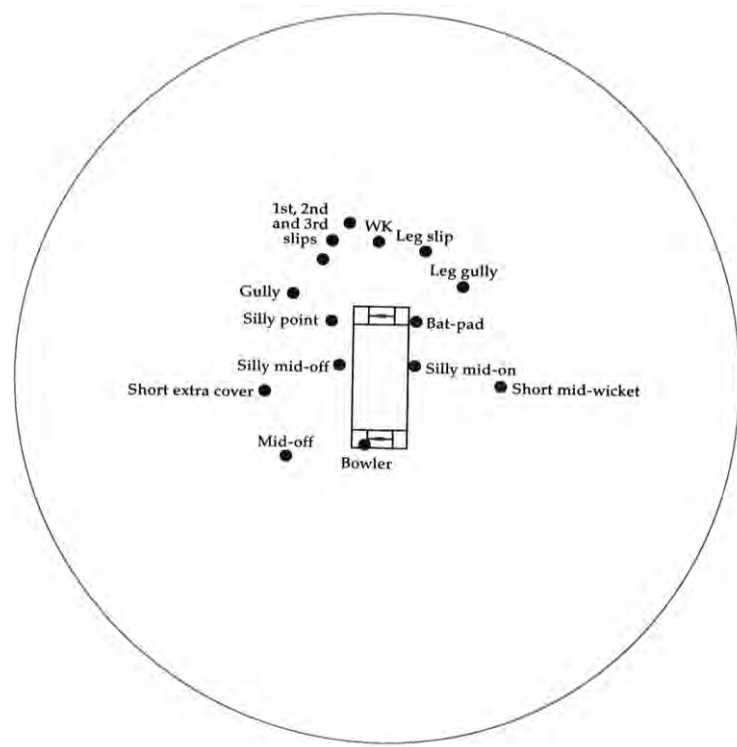
- Twenty20 (T20) matches, which involve one innings of 20 overs per side (maximum). A typical game lasts about three hours.
- Limited over (One-day/OD) games, which involve one innings of 50 overs per team (maximum). A typical game lasts 8 hours.
- Multi-day day games (e.g. test matches), which involve two innings per side with designated lunch and tea breaks.

During normal game play, there are 13 players on the field and two umpires. Two players are the batters, and the rest are the 11 players of the fielding team. The other nine players that make up the batting team are off the field either waiting to bat, or they have been dismissed (MCC, 2019).

Some players are skilled in both batting and bowling, which is termed an all-rounder. Another type of all-rounder is both skilled in batting and as a wicket-keeper. Bowlers are also classified according to their style; fast, medium pace, or spin, and will bowl either right or left-handed. Batters are considered right or left-handed. All players have a chance to bat, depending on

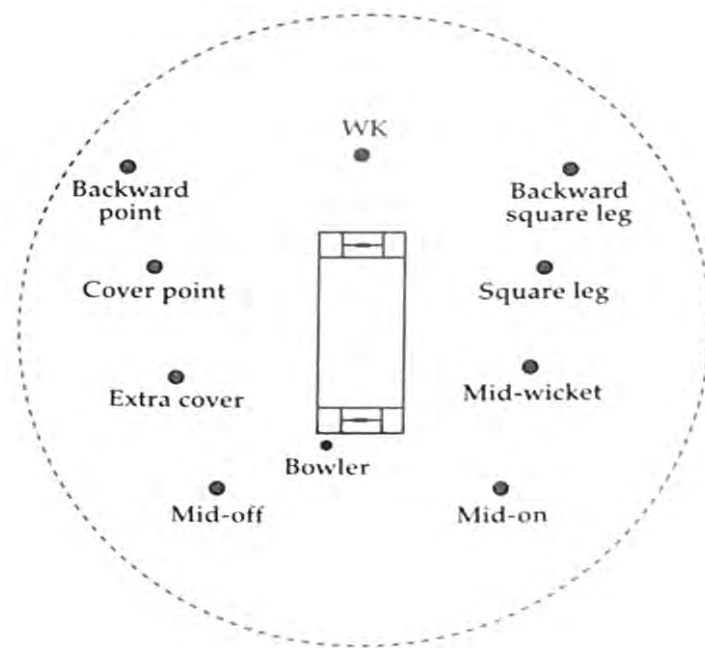
whether their teammates have been dismissed or not, and field (MacDonald, 2015). Only some players bowl and one person keeps wicket (MacDonald, 2015).

There are there are three main fielding ‘groups’, which are close catchers (close to the batter), the inner ring and the boundary fielders (Figures 1, 2 & 3). (Woolmer et al., 2008). Fielding is crucial to the game of cricket as it plays an integral role in taking wickets and restricting runs. In addition, and more importantly, fielding creates opportunities which could directly result in a win or a loss (CoachEd, 2020).



*Figure 1: Pitch map showing the different fielding positions in close catching area (adapted from Woolmer et al., 2008)*

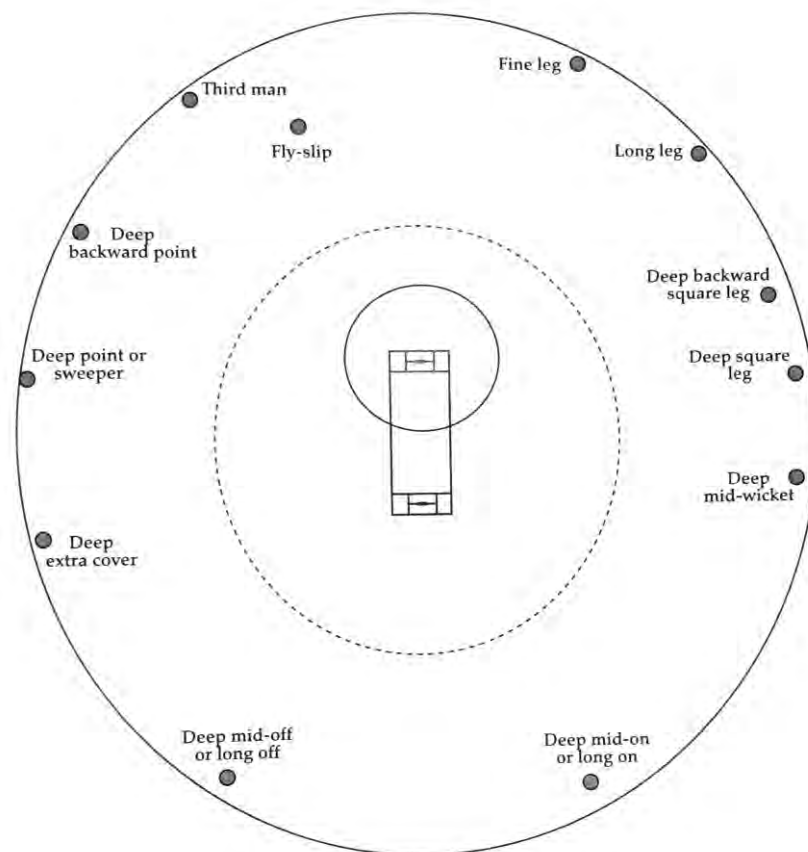
Figure 1 shows the close catching fielding options. These fielders are more ‘high-risk, high-reward’ and are more specialist fielding positions (Woolmer et al., 2008). These fielders rely on a considerable amount of repetitive training as well as some natural ability, with a lot of courage, speed and focus to pull off remarkable catches and saves (Woolmer et al., 2008). The slips mostly intercept fast moving balls that come off the edge of the bat which reaches them below chest height (Cook & Strike, 2000; MacDonald et al., 2013). However, none of the above mention the possibility of a run out opportunity that may arise in this area of the field.



*Figure 2: Pitch map showing the different fielding positions in the inner-ring (adapted from Woolmer et al., 2008)*

Figure 2 shows the ‘inner-ring’ fielding options. Key attributes here are staying low to the ground and stalking sideways, both of which are perfect stance positions (Woolmer et al., 2008). The essentials are speed off the mark, flexibility, safe hands for catching and a hard and accurate throw (Woolmer et al., 2008). Inner-ring fielders require good reactive ability to catch a ball falling from above their heads and strong-over-arm throwing ability to attempt run-outs (Bartlett, 2003; MacDonald et al., 2013). Woolmer et al (2008) highlights general guidelines to work on for fielders:

- lean to dive to cut off, or catch a ball;
- anticipate ball direction;
- practice hitting the stump from all angles;
- back up your fellow fielders all the time; and
- when throwing to the bowler’s end throw with a bounce.



*Figure 3: Pitch map showing the different fielding positions on the boundary (adapted from Woolmer et al., 2008)*

Figure 3 shows possible outfield fielding options. These fielders need speed across the ground, flexibility and the ability to judge a high ball while shutting out other possible distractions, such as boundary rope and crowd noise (MacDonald et al., 2013; Woolmer et al., 2008). However, one could argue that being aware of the boundary rope is now key with the modern game because more recently players are taking catches where they have momentum taking them over the boundary and need to be aware of where it is to avoid stepping over it. Players in these positions need good throwing arms (MacDonald et al., 2013; Woolmer et al., 2008). A player that can throw a flat throw from 40 to 50 meters is an asset, and one that will take wickets for your team (Woolmer et al., 2008). There are five guidelines set out by Woolmer et al (2008):

- a ball heading to the boundary must be chased by two fielders, where possible;
- call loudly and clearly, whether for a catch; or to call which stumps to throw at;
- look after your arm i.e. do not throw too much, warm up prior to throwing and do strength training;
- make sure that your body weight is directed at the target when throwing; and

- be balanced in your throw, avoid twisting and throwing.

A fielder should be the 'eyes and hands' of the captain and bowler (Woolmer et al., 2008). Great fielders manage themselves and always try to anticipate the plans set out and, in turn, understand when the ball is coming to them (Woolmer et al., 2008). The skills of fielding will vary considerably depending on where fielders are placed within the field (MacDonald et al., 2013). It is important to understand how different positions suit certain players and to learn what is required of these different positions (Woolmer et al., 2008). A fielder looks to either be defensive or attacking in the field. Defensive fielding is more important to save runs, or make sure the ball does not get past the fielder (Woolmer et al., 2008). Attacking fielding means that the fielder looks to 'pounce' on the ball and typically involves trying to perform a run out, or to cut out the batter from running (Woolmer et al., 2008).

The playing fields in cricket are not entirely fixed dimensions (MacDonald et al., 2013). The area must be a minimum of 137.2m from boundary-to-boundary square of the pitch, with the shortest boundary being no smaller than 64m (MacDonald et al., 2013). With this comes different field dimensions, as well as varying size and shaped fields, requiring different fielding requirements, which need to be considered.

When it comes to batting, the main purpose of a batter is to hit the ball to score runs, whilst at the same time ensuring that they do not go out. Not all shots are aimed at scoring runs, some shots are more defensive and are used to protect the batter from going out (Jooste, 2012). A batter gets to bat until they are out, or the overs are completed. If a batter hits the ball and it is caught without it bouncing the batter is out (Jooste, 2012). There are other modes of being dismissed as a batter, for example, being bowled out (where the wicket is struck by the bowler), run out (where the ball is struck against the stumps when the batter is out of their crease), stumped out (the batter steps out of the crease while trying to strike the ball and the wicket-keeper or fielder breaks the wicket with the ball), leg before wicket (LBW) (where the body obstructs the ball from hitting the wicket), and hitting the wicket (where the batter hits their own wickets with their bat) (Jooste, 2012).

Batting requires, but is not limited to, motor, cognitive and psychological skills to select the most accurate shot from a selection of shots against bowlers who bowl varied types of balls (seam, swing, spin, slow & fast) (Stretch, Bartlett & Davids, 2000). A batter's ability is generally measured by their average, which is calculated by adding all their runs scored divided by the number of times they have been dismissed (Lemmer, 2004). However, averages need to

be considered in the context of the game and cannot be isolated as game situations may differ, resulting in an individual's average being greater than their ability, or vice versa. With the growth of limited overs cricket, there is now a different emphasis on measuring batting performance in these types of games. Instead of praising batters on runs scored, runs scored per ball faced have become the essential measure of success in these shorter formats of game.

Batting practice takes years to master, however, only half the battle with batting is won due to technique and practice (Woolmer, Noakes & Moffett, 2008). Batting also relies on the batter accurately judging his/her shot selection. Other qualities, such as mental strength, focus, strategy, awareness of external conditions and so forth have become important factors for batting success (Woolmer et al., 2008).

Regarding bowling, the bowling action requires a ball to be delivered with a straight elbow throughout the movement, creating a wide circular motion with the arm (Jooste, 2012). Bowlers are only permitted to bowl overarm, which means that the arm is not allowed below horizontal (Jooste, 2012). Before bowling, fast bowlers normally have a run up before releasing the ball, whereas a spin bowler's run up consists of a few short strides (Jooste, 2012). When bowling, it is preferable to bounce the ball off the ground before it reaches the batter. The main aim of the bowler is to bowl the ball in such a way to try to hit the batter's stumps or cause the batter to play the ball directly into the hands of one of the fielders (Jooste, 2012). Six deliveries are bowled from one end of the pitch to the other, which comprises of an over. After each over, a different bowler starts another over, which is bowled from the opposite side of the pitch. When this is done, a different bowler or the bowler before the last, delivers six balls from the opposite side (Jooste, 2012).

A bowler can bowl a 'no ball' if there is a section of the ball delivered that is illegal. This can be in the case of the action, the height of the ball without a bounce or where the bowler's foot lands (Woolmer et al., 2008). A 'wide' can also be bowled where the ball goes wider than a certain point, normally where the batter cannot reach the ball. With any illegal ball (wide or no ball) that is bowled, the batting team is rewarded with a run and that illegal ball is not counted within the over (Jooste, 2012).

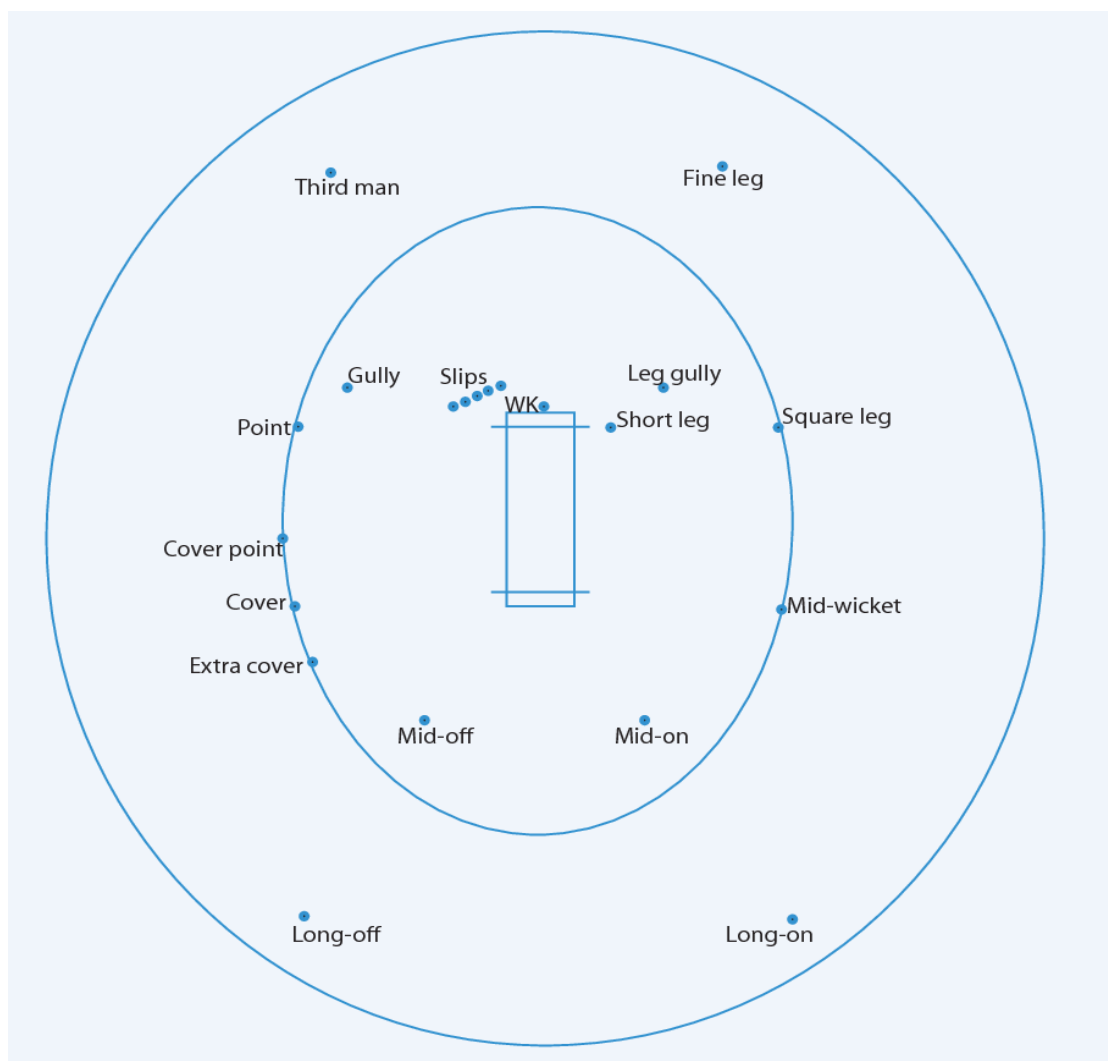
When determining bowling performance, similarly to batting, three criteria are considered. The first criteria being the bowling average, which is the runs conceded per wicket (Average = Runs/Wickets). Therefore, the lower the average the better in this case. The second being economy rate, which refers to the total number of runs conceded by a bowler divided by the

number of overs bowled ( $\text{Economy} = \text{Runs/Overs}$ ). Economy has nothing to do with the number of wickets taken, but rather, the number of runs scored off the bowler. The third criteria is the strike rate, which is the total number of balls bowled, divided by the number of wickets taken ( $\text{Strike Rate} = \text{Balls bowled/Wickets}$ ).

Although there are a lot of technical aspects of fielding covered in coaching manuals and coaching books, there is no research on the technical side of fielding. An example of using fielders tactfully, is placing your best fielders where your bowler is planning to bowl so that area can be protected the best. Another example as Woolmer and colleagues (2008) advise is that fielders in the ring throw the ball with a bounce to the bowler, however, this is information passed down from coaching and has never been looked at in scientific literature.

In a study done by MacDonald (2015) it was found that coaches suggest technical considerations, such as realigning their body towards the target, and establish a base to throw accurately. This is a clear indication that coaching strategies are ones that coaches are passing down through generations of coaching manuals, with no scientific evidence to support their rationale.

Shilbury (1990) defined the frequency of fielding skills for 25 defined positions, and patterns of individual players of an 'A-grade' cricket team playing first-class multi-day cricket. The data was divided into four skill classifications: fielded ball, fielded ball and throw, fielded ball and under arm return, and catches and attempted catches (Shilbury, 1990). However, not including any data on run outs or missed run out opportunities which is the basis of this study. The positions, excluding the wicket-keeper, which featured the most were cover (12%), mid-off (10%) and mid-on (9%) (Figure 4) (MacDonald et al, 2013).



*Figure 4: Pitch map showing the different fielding categories (adapted from MacDonald et al., 2013)*

Cover has always been traditionally considered a position that requires good attacking skills, such as: moving quickly forwards and to either side, field the ball, and ability to throw quickly (MacDonald et al., 2013; Shilbury, 1990). However, only 13% of cover contacts required attacking skills, most of the contacts were defensive and required very little diving or lateral movement (MacDonald et al., 2013; Shilbury, 1990). This finding is not matched with conventional beliefs (MacDonald et al., 2013). However, with this data, pertaining to Shilbury (1990), being more than 20 years old its relevance today could come into question. It also shows very little relevance to the current study as it is in the contrasting format, as this study

was multi-day format versus looking at T20 format. Given the developments of the game, it would be more useful to have an update on these findings to help develop and assess training protocols for different formats of the game (MacDonald et al., 2013). It is for this reason that the author of this thesis decided to explore a specific aspect of fielding in cricket.

Prior knowledge could be complemented by obtaining the considered opinions of coaches and players and by carrying out detailed video analysis (MacDonald, 2015). Greater knowledge and insight would be able to be attained regarding the different requirements for different positions (MacDonald, 2015). This could result in specific training for fielders in different positions (MacDonald, 2015). This shows that the opinion of the practitioners (coaches and players) is of the utmost importance when yielding results, and the coaching styles used by practitioners directly correlates to the team's performance and outcome.

### **COACHING STYLES IN CRICKET:**

The coaching process, within any sport, is an ongoing cycle of performance and practice (Lee, 2011). The coach's role is to observe, analyse the performance and then provide feedback (Lee, 2011). This cycle should inform planned practice which, in turn, should lead to enhanced performance (Lee, 2011). Although useful, it can only be successful as the accuracy of the presentation and how the data is analysed (Lee, 2011). No matter the sport or playing level, to be successful, some sort of practice needs to take place, usually over a long period (Vickery & Nichol, 2020). However, information surrounding the types of practices is limited (Vickery & Nichol, 2020). Most forms of practice have in the past come from anecdotal evidence, as opposed to more detailed and data driven evidence (Vickery & Nichol, 2020). However, this needs to be carefully weighed with the practicality of the information provided to coaches which remains a challenge.

Traditionalist coaching in cricket is based around developing perfect technique (Renshaw & Holder, 2010). Coaches develop players by separating building blocks of performance which, are worked on in isolation, before putting it back together (Renshaw & Holder, 2010). Examples of this would be when, during batting practice, a player would be required to hit off a cone, then progress until a coach is throwing to the player (Renshaw & Holder, 2010). The major issues that have been identified with this type of coaching is that it doesn't allow for

much decision-making from the player and is solely based on technique (Renshaw & Holder, 2010).

There is an increased effort, more recently, to provide players with a more random and variable practice, which simulates the constraints likely to be encountered in a match environment (Renshaw, Davids, Newcombe & Roberts, 2019; Vickery & Nichol, 2020). Rather than viewing learning as a linear process, where skills are learned in isolation and then applied, a constraint led approach would apply for learning through interactions within the environment (Vickery & Nichol, 2020). Although, for many coaches breaking it down into stages still needs to happen at junior levels, there is no one-size-fits-all approach and this reductionist method of coaching is often done at the higher levels of play, which has been criticized (Renshaw & Holder, 2010).

In a study by Vickery and Nichol (2020), most coaches reported using game awareness in their players based around decision making in different contexts (Vickery & Nichol, 2020). However, none reported on any evidence-based research on run outs. They did report on having different fielding settings, either defensive or attacking in their game plans (Vickery & Nichol, 2020) but this was rather based on the bowling plan and not discussed further in terms of fielding. However, they did report on using pressure to hit the target of the stumps in a fielding session (Vickery & Nichol, 2020). Unfortunately, and yet again, no details of positions in the field and what different variables may lead to successful run outs in certain positions, were discussed. The study by Vickery and Nichol (2020) shows that coaches are aware of the importance of fielding and run outs as they are practiced by most coaches, but there is currently a lack of evidence in research to help assist coaches in defining what different fielding positions can be expected to do and then practiced accordingly.

While constraints led coaching and drill specific coaching both have their place, it is always important to understand what the coach is trying to achieve. However, with the lack of evidence in run out research in coaching there is little understanding on how coaches are coaching this aspect of the game.

As a result of traditional coaching being based on the coach's experience and subjective interpretations, which at times can be unreliable and is not always suited for certain players (Lee, 2011), a more objective approach can be done by using, as an example, video analysis.

(Lee, 2011). The use of video technology can help collect data for post-match analysis, using replay and slowing down footage. This can lead to an unbiased and reliable analysis of performance (Lee, 2011). Footage is collected from different cameras and angles, with broadcast footage changing from camera to camera to be able to follow the ball (MacDonald, 2015). When using an approach like this, it can result in certain tasks and movements which were missed when a change in the camera happens, which coaches and players may want to review at a later stage. More recently, the technology of Hawk-eye and the Decision Review System (DRS) are being used to assist and correct umpire decisions using video play-back (MacDonald, 2015).

Cricket now has the benefit of different analytical systems that can assist in coaching. However, it is key that it is used properly (Woolmer et al., 2008). Analytical systems allow players to physically see their own game, instead of having to picture what the coach is trying to explain (Woolmer et al., 2008). Analysis that comes from this technology aims to advance the understanding of the game behaviour to improve future outcomes (MacDonald, 2015; McGarry 2009). Analysts can provide feedback throughout/pre- and post-match by capturing video footage as play takes place, using it after a game for feedback or before another game, using either the televised footage or collecting their own footage using purposely placed cameras (MacDonald, 2015). Each method comes with its own advantages and disadvantages. Placed cameras try to take a bigger view so that nothing is missed, however, players will look small and one can miss small details (MacDonald, 2015).

Using television cameras can result in missing actions when the camera angle is changed but will have far greater attention to detail (MacDonald, 2015). Coaches, however, cannot solely rely on technology as this is not always an option due to the cost and time. Gary Kirsten, World Cup winning coach with India in 2011, ex-South African cricket player and coach, was quoted as saying: *“In my opinion, video analysis has become one of the most crucial components of developing, correcting, or improving batting or bowling techniques. It allows both coach and player to go through the entire technique, from head to toe, frame by frame, and breaks down in a very visual way the specific components that must be identified and worked on.”* (Woolmer et al., 2008 p.494). It is worth noting that most video analysis look at ways of improving batters and bowlers, and not looking enough at ways to improve fielding.

Another option is on-screen comparisons. This can be done with a split screen showing reference of the correct technique, versus where the player is going wrong (Woolmer et al., 2008). The fact that the governing body of the game now use videos for making umpiring decisions in the form of DRS suggests that video footage, as a research method, is highly valuable, particularly when determining run out opportunities. (MacDonald, 2015).

## **RUN OUTS:**

Run out drills have moved to become more high speed and revolve around more athletic efforts. They are designed to help fielders identify what tactics are needed in those few seconds in which the batters are floundering in the middle of the pitch (Woolmer et al., 2008). This results in pressure on fielders to execute an exact skill and may not have a clear picture of what to do from each scenario in the field. The coach should be able to assist their players in decision-making from different areas of the field and doing this with evidence would benefit their players immensely.

Run outs usually occur between 10 and 35 meters from the wickets (Shilbury, 1990). However, this is, to the author's knowledge, the only published research data on run outs available. There are many examples of where run outs have been missed and a batter has gone on to score many runs. During the T20 Big Bash 2020/21 tournament which is played in Australia, there was a clear example in the final knockout game. A batter facing his first ball received this from text commentary: *"Xavier Bartlett to Livingstone, no run, direct hit and Livingstone was gone. He had walked out and moved across to knock the fullish delivery back to Bartlett, he throws and misses the stumps. Livingstone dived back in but he was well short as the ball past the stumps"* (Cricbuzz, 2021). Livingstone went on to win player of the match scoring 77 runs off 39 deliveries (Cricbuzz, 2021). This was an opportunity for the bowler to throw down the stumps from approximately 10 meters and having all three stumps to aim at. A run out here could have changed the game. Jonty Rhodes, who has been labelled one of the best fielders in the history of the game, rates the evolution of fielding as an art and science in the modern era (Wigmore, 2020). Rhodes said: *"If you had to count the number of balls a fielder had in practice every day as opposed to balls bowled or hit, there would be a massive disparity"* (Wigmore, 2020). He went on saying: *"We still throw badly, our throwing arms are terrible. Think of baseball, it's such an integral part of the game — they work really hard on their throwing techniques. I don't think we work hard enough. I look at big strong guys and they can hardly throw the ball."*

It is evident that the ideal throw is a baseball overarm throw, however, during a quick run, the fielder may not be afforded the time to get into the correct stance and may be required to throw off balance (MacDonald, 2015). This is understandable, however, to help decision making in this process, it would be ideal for the fielder to have an idea of what other tactical considerations he may have to make when throwing off balance to give them the greatest chance of a successful run out.

We know that throwing in cricket is important for the return of the ball from the field, after it has been hit by the batter to reduce the runs scored, and to dismiss the batter in the form of a run-out (Freeston & Rooney, 2014). When attempting a run out, accuracy and speed is required (Woolmer et al., 2008). This may be to get a direct hit at the stumps, or a hard flat trajectory throw to the wicket-keeper or fielder standing at the stumps (Woolmer et al., 2008). This is all made easier through a good throwing technique however, fielders aren't always afforded the time to get into an ideal position to execute a perfect throw (Woolmer et al., 2008).

Fielders are encouraged to throw the ball with a bounce back to a fielder or bowler, but without a bounce to the wicket-keeper as it makes it easier to collect for the player without gloves (Woolmer et al., 2008). This has been coaching advice for a long time, but it lacks researched evidence on whether this is still the case.

A fielder's ability to throw a ball over a considerable distance with speed and accuracy, if attempting a run out, requires excellent throwing technique (Elliot & Anderson, 1990; MacDonald et al., 2013). When looking at speed and accuracy, it is clear that throwing performance is crucial for overhead throwing sports such as cricket, baseball and others (Freeston & Rooney, 2014). It is made up of two factors, speed and accuracy (Freeston & Rooney, 2014). These two factors cannot be optimized simultaneously in certain contexts (Freeston & Rooney, 2014). This relationship is defined as the speed-accuracy trade off. Different theoretical ideologies have been used to explain the relation between speed and accuracy in human motor studies (García, Sabido, Barbado & Moreno, 2013). Fitt's law (1954) is regarded as one of the most successful human performance models, as it indicates that rapid movements are less accurate.

In the case of throwing, it is that the faster one throws the ball, the more difficult it is to release it at exactly the correct time (Venkadesan & Mahadevan, 2017). A speed-accuracy trade-off has been reported to exist during the execution of overarm throwing, such that an increase in

velocity results in an improved accuracy until critical velocity is reached, at which point, further increases in velocity result in decreases in throwing accuracy (Freeston, Ferdinands & Rooney, 2007). Optimization of accuracy has been found at 75% of maximal throwing speed, compared to 50% and 100% of maximal throwing speed (Freeston & Rooney, 2014). However, this is not universal as different studies on speed-accuracy trade-off have produced varied results. When researching speed and accuracy, the instruction can be key, as this may vary the outcome (García et al., 2013). A study that asked dart players to “throw normally” versus “throw as hard as you can” resulted in less accurate throwing with quicker speeds (Etnyre, 1998). However, there are many rapid-aimed movements where the efficacy criterion is a balance between speed and accuracy (García et al., 2013). This relationship is important for cricket, as a throw with high velocity is of little value if increases in velocity are produced at a detriment to accuracy (Freeston et al., 2007).

This is not limited to cricket as a sport and is the case for handball throws, which require both accuracy and speed (García et al., 2013; van den Tillaar & Ettema, 2006). Studies found that in handball, an instruction to decrease throwing speed did not translate to an increase in throwing accuracy in elite players (van den Tillaar and Ettema, 2003a). They found that the type of instruction given to experts influenced the speed of the throw, but not the accuracy. It was argued that the maintenance of accuracy shown by the experts was due to their experience (van den Tillaar and Ettema, 2003b). Regarding the throwing speed of elite versus non-elite, it is expected that more experienced players throw at a considerably higher speed than participants with little, or no experience (Bayios, Anastasopoulou, Sioudris & Boudolos, 2001; Gorostiaga, Granados, Ibanez & Izquierdo, 2005; Wagner, Buchecker, Von Duvillard & Müller, 2010).

Both cricket and baseball require execution of the overarm throw, with a similar sized and weighted ball, for successful performance (Freeston & Rooney, 2014). However, the number of throws differ per player. Baseball sees throwing as a primary mode of retiring a batter or runner and is used when pitching, as well as throwing to a base from the field (Freeston & Rooney, 2014). Whilst in cricket, the primary mode of getting a batter out is through bowling. Previous studies have investigated limited throwing speed conditions, where accuracy has been assessed at limited speeds or self-reported speeds (Freeston et al., 2007; Garcia et al., 2013). While these speeds have been beneficial in understanding the relationship between speed and accuracy, they lack contextual validity (Freeston & Rooney, 2014). This is due to a variety of

throws, particularly in cricket, being required to be performed across a range of speeds (Freeston & Rooney, 2014). Situational demands significantly affect the technique employed by baseball players as they throw across a range of different distances in several different game situations (Barrett & Burton, 2002; Freeston & Rooney, 2014). Determining the relationship between speed and accuracy across a range of throws would prove useful for in-game decision making (Freeston & Rooney, 2014). This would allow athletes to understand and enhance the speed-accuracy trade-off in given match scenarios.

Distinguishing different throwing techniques in cricket has led to the identification of important performance variables (Elliot & Anderson, 1990). The relationship between over-arm throwing speed and accuracy in elite and sub-elite cricketers, was investigated using a specific designed throwing test (Wickstrom, 1983). A trade off in speed and accuracy was found in more than one study (Freeston et al., 2007; Wickstrom, 1983). There was a speed-accuracy trade-off as participants improved their accuracy at speeds between 75-85% of maximal throwing velocity. Using the correct technique is crucial for success, however, with the lack of practical and experimental data in this area, it limits the development of optimal training programs (MacDonald et al., 2013). Coaching 'the throw' technique is not covered in major detail. The suggestion is that it should be smooth and repeatable; such that the correct technique is when the ball is drawn back over the shoulder so that it faces backwards, before the arm unwinds and throws it over the shoulder at the target (Woolmer *et al.*, 2008). However, the nature of game doesn't always allow for ideal technique, particularly during a run out opportunity.

Coaching manuals and coach's wisdom on several aspects of the game are often not supported by scientific literature. More recently, scientific literature has been too complicated and not easy to realistically put into practice. With a combination of difficult data to understand, and a lack of research in fielding, a study highlighting current trends for run outs, in the most lucrative cricket competition, is data that players and coaches will want to obtain and will be able to benefit from.

## AUTHOR'S NOTE:

While, this information below is sourced by the author, it is an attempt to allow the reader to gain further information on why run outs need to be looked at in more details and is not a review of published literature but rather anecdotal evidence.

As there is limited empirical evidence, data from the IPL was investigated by the author by tallying up and calculating the average amount of run outs between the years of 2008 to 2019.

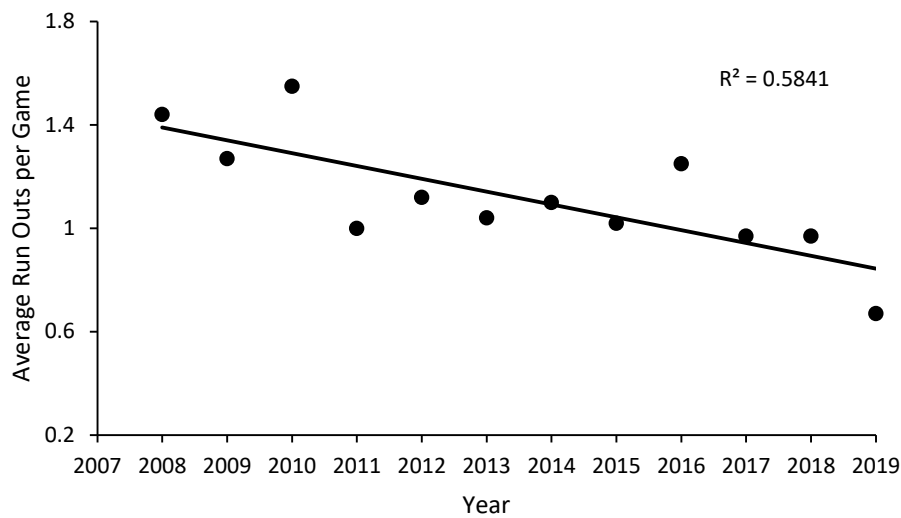


Figure 5: Average run outs at the IPL from 2008 to 2019.

The data revealed that the average number of run outs has decreased (Figure 5,  $R^2 = 0.5841$ ).

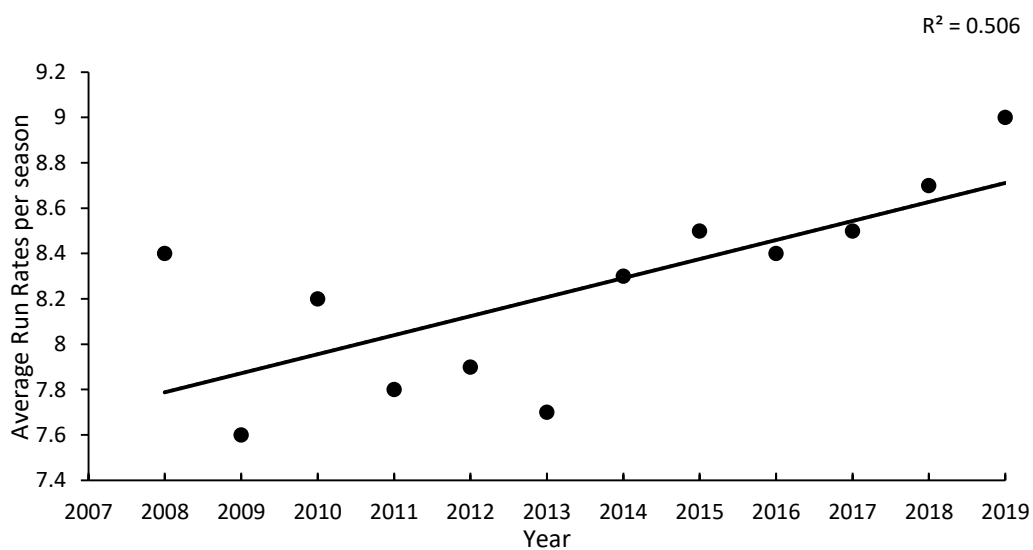


Figure 6: Average run rates at the IPL from 2008 to 2019.

The average run rates have increased during the same period (Figure 6). Most notably is the increase between years 2014 - 2019 ( $R^2 = 0.506$ ).

The greater outliers in both figures are in the early years of the tournament where players and coaches were not used to the format, as T20 cricket was still new, only having had its first World Cup in 2007. There are no published objective reasons for this, therefore, the author asked 10 professional cricket coaches (International level 3 minimum and currently working at a professional level) for reasons as to why the number of run outs have dropped and the run rate increased.

The most common answer was that there has been an increased focus on greater boundary hitting which, in turn, leads to less runs physically being run. The game has turned into a batter's game and a lot of focus has been put into batting and scoring boundaries. It was also suggested, that in focusing predominantly on batting, that practicing run outs has not been focused on as much. This is due to fielders now practicing catching the ball, spectacularly, over the boundary and throwing it back in to take the catch. Another suggestion was that newer bats have made it easier for batters to hit the ball hard, so the ball gets hit harder for a boundary, or it flies to a boundary fielder where they can only get the one run and the amount of twos' run, becomes less. Conditioning of players have also increased, making players generally faster, which can assist with running between wickets. As the format is still new in the grander scheme of the game, players have only learnt certain skills and ways to go about them more tactically than previously. They now know that there is no reason to take a risky run if the player now understands that they can hit a four or six.

## CHAPTER III

### METHODOLOGY

The methods chapter is divided into Methodology I and Methodology II. Methodology I focuses on expert coaches perspectives on what they anticipated would occur during a run out opportunity, based on the fielding variables set out in Table 1. Methodology II focuses on what took place during a run out opportunity, during two IPL seasons, based on videos analysed by the author.

### METHODOLOGY I

#### RESEARCH DESIGN

The study was a pre-experimental, descriptive study to determine expert coaches' perspectives on what they would expect to happen in a run out opportunity from different fielding areas during a T20 competition. It took the form of an electronic online questionnaire on Google Forms. The questionnaire, which is attached as Appendix A to this study, consisted of multiple-choice questions and one, one-word written answer that focused on the variables involved in run out opportunities.

#### VARIABLES

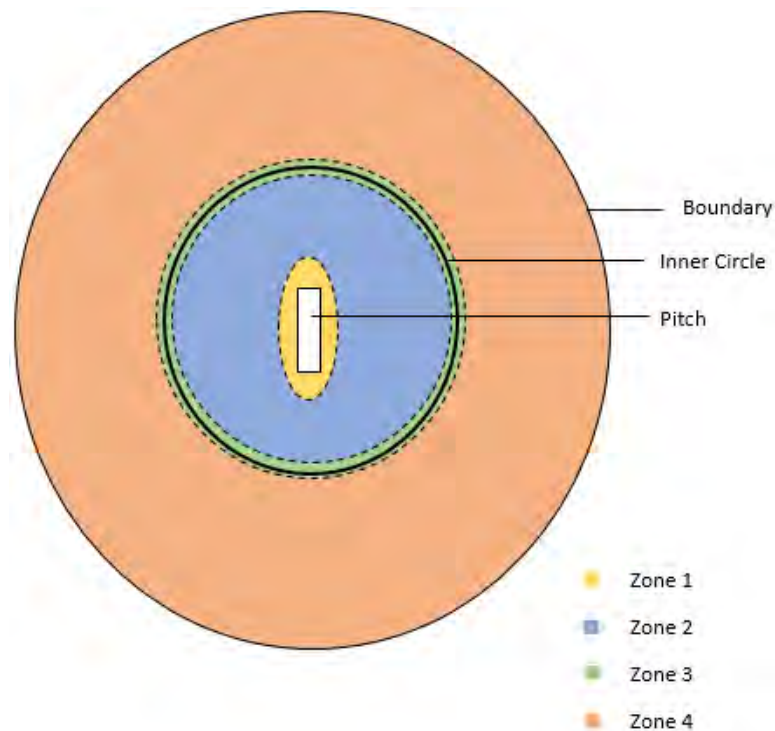
*Independent variables:* Fielding position (Figure one, two and three), period in the game (overs), where the ball was picked up (weak, strong side or straight), collection type (dive, slide, pick up), hand(s) used (1 or 2), throwing balance (on or off balance), throw type (overarm, side/hip throw or underarm), throw intention (speed & accuracy, speed or accuracy), throw end point (collected, missed or direct), number of bounces (1 bounce, more than one bounce or no bounce) and did it have to be direct to be out (yes or no) (Table 1).

Table 1: Fielding variable definitions:

VARIABLE	DEFINITION
<b>Positions</b>	Positions will be according to Figures one, two and three
<b>Overs</b>	
1-6	Overs in the powerplay where only two fielders are outside the inner ring.
7-14	Deemed 'middle' overs of the game, associated with medium risk
15-20	Deemed the 'death' overs of the game, associated with high risk

<b>Collection Side</b>	
Strong	Ball that comes to the players dominant hand
Weak	Ball that comes to the players non-dominant hand
Straight	Ball that comes towards the player straight on.
<b>Collection Type</b>	
Pick up	Where the player remains on both feet to gather the ball
Dive	Where a fielder dives to a direction (laterally or forward) to collect the ball (MacDonald et al., 2018).
Slide	When a player goes onto a knee with momentum to slide next to the ball (Woolmer et al., 2008).
<b>1 or 2 Hand(s) used</b>	
1 Hand	When the fielder retrieved the ball with one hand.
2 Hands	When the fielder retrieved the ball with two hands.
<b>Balanced or Off Balanced</b>	
Balanced	When the fielder threw from a balanced position.
Off Balanced	When the fielder threw from an off balanced position.
<b>Throw Type</b>	
Overarm	When the fielder draws the ball back over the shoulder, then the ball is thrown over the shoulder (Woolmer et al., 2008).
Side/hip throw	When the arm is approximately parallel to the floor (MacDonald et al., 2018).
Underarm	A throw when the ball is drawn back with hand pointing to the floor before release (MacDonald et al., 2018).
<b>Throw Intension</b>	
Speed & Accuracy	Fielder looked to have the intent of throwing for both speed and accuracy.
Accuracy	Fielder threw the ball slowly looking for accuracy.
Speed	Fielder looked to throw as hard as possible.
<b>Throw End Point</b>	
Missed	The ball ended up missing the wickets and collected away from the wickets after a throw.
Collected	The ball was collected at the wickets by another player after a throw.
Direct	The ball went directly onto the wickets after a throw.
<b>Number of Bounces</b>	
1 bounce	The ball bounced once after going past, or to the wickets.
No bounce	The ball went directly onto the stumps or was at that height when passing the stumps without a bounce.
More than 1 bounce	The ball bounced more than once after going past, or to the wickets.
<b>Had to be direct hit to be out</b>	
Yes	The throw had to hit the stumps directly or it would not have been out.
No	The throw did not require a direct hit to be out and a fielder could have collected it to dislodge the bails and it would have been out.

*Dependent variables:* The four fielding ‘Zones’ (Figure 7).



*Figure 7: Predetermined Zones on the field*

## **PARTICIPANTS**

The inclusion criteria were as follows:

- current holders of their respective country’s level three equivalent cricket coaching course.
- coaching cricket at first class level and above or played at first class level or above.

It was expected that this group of quality coaches would have the best understanding of this information.

A total of 10 coaches were included in the study. The coaches were recruited after an invitation was sent out to participate, and the link to the questionnaire was distributed to contacts in the cricket community. Their qualifications ranged from international accredited level 3 and CoachED Elite Accreditation (a new qualification run by World Cup winning coach Gary Kirsten), to an international level 4 coaching qualification. Out of the 10 coaches, one coach coached at school boy level and is a recently retired professional player. 50% of the coaches worked in U18/U19 provincial/domestic/county level and played first class cricket, two

coaches were involved in coaching domestic/franchise/county (professional) and two coaches coached at the highest level (international). This comes with numerous years of experience and vast knowledge within the field of the game.

The questions posed to the participants were based on the variables listed in Table 1. All participants answered all questions. The variables that are presented were put forward by an international fielding coach, who suggested that these aspects are important factors to investigate during run out opportunities.

## **QUESTIONNAIRE**

The questionnaire was designed to get the expectations of the coaches with respect to what they believe occurs in a run out opportunity during a T20 competition. This was to create a data set which could be compared to the second part of the study. Due to no previous published data on these variables, the data from the questionnaire would be used to gain a greater understanding of the way coaches see this aspect of the game and whether this matched the findings of the second part of this study (Methodology II). The same questions were asked for each zone. There was one, one-word answer required where they had to answer what fielding position (which was where the run out took place, and not where the fielder started) created the most run out opportunities, followed by 11 multiple choice questions, which were based on the variables in Table 1. For example, ZONE 1: Which fielder had the most run out opportunities in this area of the field? This question was then asked for each of the different zones before moving onto the next question. This was the same for the remaining 11 multiple choice questions (see Appendix A).

## **ETHICS**

All participants were informed in writing about the purpose, aims and expectations, as well as any risks or benefits associated with the study. Each participant had the option of giving voluntary consent within the questionnaire, prior to the completion of the survey. Upon completion of the study, each participant received an email outlining feedback from the results of the study, if they requested. Ethics was approved by the Rhodes University Ethical Standards Committee with application number “RU-HSD-16-11-001” (see Appendix B).

## **EXPERIMENTAL PROCEDURE**

The questionnaire was emailed to the respective coaches that met the inclusion criteria. The email consisted of the information about the study and the link to the questionnaire. They were made aware that they were under no obligation to complete the questionnaire and that they could decline to participate at the start, or during the questionnaire.

## **POST-EXPERIMENTAL PROCEDURE**

All data was collected and exported to Microsoft Excel. It was then calculated into averages for each zone to determine what expert coaches, who met the inclusion criteria, expected to happen in each zone, ranging from the most likely to the least likely to occur in a run out opportunity, from different areas of the field. All data are displayed as percentages.

## **ASSUMPTIONS**

It was assumed that the coaches who completed the questionnaire did it to the best of their knowledge and ability. The coaches were assumed to be honest in completing the questionnaire. It was assumed, due to the explanations provided in the questionnaire that they understood the questions asked.

## **LIMITATIONS**

The researcher had no control over whether the coaches would complete the questionnaire. Coaches were trusted to not search for any information on the topic and to answer the questionnaire to the best of their knowledge. Thus, there was no control over whether the form would be filled in accurately or not.

## **METHODOLOGY II**

### **RESEARCH DESIGN**

The study design was a cross-sectional, observational investigation. It used retrospective video footage of fielders' performing, or attempting to perform, a run out in two seasons of the Indian Premier League (IPL) (2018 and 2019).

## **VARIABLES**

Prior to determining the variables (Table 1), a descriptive pilot study was conducted, with an expert fielding coach and the author, to determine what points in a run out they considered to be important. This came about over a conversation about the effectiveness of his teams run outs, to which we both concluded it would be greatly beneficial to investigate what takes place during run out opportunities to ensure that he was coaching the players correctly for each situation. The coach watched videos of run outs and concluded that the variables in Table 1 would be useful to gain further insight to. Based on this, the independent and dependent variables were determined, as set out under Methodology I and II.

## **ETHICAL CLEARANCE**

Prior to the study, ethics was obtained by the Rhodes University Ethical Standards Committee (application number “RU-HSD-16-11-001” see Appendix B).

## **SAMPLE**

The sample was a sample of convenience and investigated run outs which took place in the 2018 and 2019 IPL seasons, where players either performed a successful run out (when a batter is attempting to run between the wickets, and the fielding team succeed in getting the ball to one wicket before the batter has made their ground at that end), or marginally missed a run out chance (where a run out chance was available, however, the fielding team made a mistake resulting in a missed chance). The total number of run outs and missed opportunities in all four zones was 207 in the two seasons. 81 of these were successful run outs, 126 were missed chances.

## **MEASUREMENT TECHNIQUE**

The videos were received from a professional video analyst in the IPL and then sorted into run outs and missed run out groups by the same professional video analyst. To avoid bias, the missed run outs were deemed as such by an expert international video analyst, from the IPL. There was no further validity required as the author felt that an expert analyst would provide accurate information. For the purposes of this study, for a run out to be deemed a missed run out, within the missed run out section, the full run out opportunity had to take place. For example, the throw had to come in, for all the variables to be noted, as opposed to the fielder

fumbling the ball before the throw could take place. The expert video analyst deemed a chance to be a missed run out if one of the variables (Table 1) was performed in a more optimal way, the batter would have been run out.

The author documented the run outs and the missed run outs separately. The videos were then viewed and sorted into the different zones (Figure 7), keeping the missed and successful run outs separate. The zones were used to determine, not where the fielder started, but what zone the fielder was in when the run out or missed run out occurred. They were allocated into separate files (zone 1, zone 2, zone, 3 and zone 4). Once the videos had been allocated into their respective zones, the zones were looked at individually. ‘Zone 1’ videos were looked at first, followed by the rest of the zones in numerical order.

The author would play the footage and note the fielding position. This was repeated throughout every video within each zone, starting with the successful run outs and then the non-successful run outs. Once this was completed the videos were watched again. The author would pause the video, when each variable was performed, to take a closer look at each action to determine what variable took place during the run out chance (successful or not). The variables were looked at in a particular order as this was the order of events that would take place in a successful or non-successful run out. It must be noted that the fielder could start in a different zone to where the run out took place. A limitation of this study is that a second observer was not used and that the analyses was subjective in nature.

## **POST-EXPERIMENTAL PROCEDURE**

Once the variables, from Table 1, for each video in zone 1 were noted, they were added to an excel spreadsheet. This was repeated for each video for run outs and non-successful run outs for zone 1. Once zone 1’s successful and non-successful run outs were completed, a separate excel tab was opened for zone 2, zone 3 and zone 4, for which the same process was repeated. Throughout this process, successful and non-successful run outs were considered separately to allow for comparison at the end.

## CHAPTER IV:

### RESULTS

The results chapter is divided into Results I and II. Results I focuses on the perceptions of coaches with regard to what they expected would occur in a run out opportunity, based on the fielding variables, during a T20 competition. Results II focuses on real life data of what occurred during a run out opportunity during two IPL seasons.

#### RESULTS I:

All coaches' perceptions were calculated within each zone and are shown in table's two to five.

Table 2: Zone 1 Elite Coach's Perceptions on variables that lead to run out opportunities (Successful or not).

<b>Run Out Chances</b>	<b>Percent (%)</b>
<b>Positions:</b>	
Bowler:	50
Short Leg:	20
Cover:	10
Slip:	10
Mid-Off:	10
<b>Overs:</b>	
1-6:	50
15-20:	50
7-14:	0
<b>Collection side:</b>	
Weak:	40
Strong:	30
Straight:	30
<b>Collection type:</b>	
Pick up:	50
Dive:	50
Slide:	0
<b>1 or 2 hand(s) used:</b>	
1 Hand:	100
2 Hands:	0
<b>Balanced or off balance:</b>	
Off Balanced:	70
Balanced:	30
<b>Throw type:</b>	
Underarm:	90
Overarm:	10
Side/Hip:	0
<b>Throw intention:</b>	

Speed & Accuracy:	40
Accuracy:	40
Speed:	20
<b>Throw end point:</b>	
Direct:	70
Missed:	20
Collected:	10
<b>No. of bounces:</b>	
No bounce:	80
1 Bounce:	10
More than 1 bounce:	10
<b>Had to be direct to be out:</b>	
Yes:	90
No:	10
<b>What % Chances thought to be successful:</b>	
51-60	30
0-10	20
11-20	20
21-30	10
31-40	10
41-50	10

Referring to Table 2, 50% of the coaches expected the most run out opportunities to fall to the bowler. Other positions that were noted were short leg (20%), cover (10%), slip (10%) and mid-off (10%). An equal divide in which run outs were expected to happen were between overs 1 - 6 (50%) and overs 15 - 20 (50%). An equal divide was anticipated by the coaches regarding the collection side, which saw a weak sided pick up being expected more often during all run out opportunities (40%), and an equal split between a strong and a straight pick up (30%). A pick up or dive were the popular opinions of the coaches when it came to what method of collection was used in run out opportunities (50%). A one-hand pick up was presumed to be used 100% of the time in this zone during a run out opportunity. The coaches projected a greater number of off balanced throws (70%) in comparison to balanced throws (30%). Underarm throws dominated the expectations of coaches in this area (90%) with a small percentage expecting an overarm throw (10%).

Opinions were divided once again when it came to throwing intention, which saw 40% of the coaches choosing speed and accuracy, 40% choosing accuracy alone and 20% choosing speed alone. Majority of the coaches anticipated that the throws would end up with a direct hit from this area (70%), with less thinking that they would be missed (20%) and even less thinking it would be collected by another player (10%). No bounces on the way to the target was the popular perception for a successful hit amongst the coaches (80%) with an equal divide (10%) predicting one bounce or more than one bounce into the target. 90% of the coaches believed

that a direct hit was necessary in this zone to affect a run out, with 10% believing that this didn't need to be the case.

Finally, the coaches had to give their thoughts on what percentage of the run out opportunities turned into successful run outs, of which 30% of the coaches thought that 51-60% of the opportunities created in this zone were then successful. This was the greatest opinion amongst the coaches, where other percentages were more evenly spread.

Table 3: Zone 2 Elite Coach's Perceptions on variables that lead to run out opportunities (Successful or not).

<b>Run Out Chances</b>	<b>Percent (%)</b>
<b>Positions:</b>	
Point:	40
Mid-wicket:	30
Mid-off:	20
Cover:	10
<b>Overs:</b>	
1-6:	50
7-14:	30
15-20:	20
<b>Collection side:</b>	
Strong:	50
Straight:	40
Weak:	10
<b>Collection type:</b>	
Dive:	50
Pick up:	40
Slide:	10
<b>1 or 2 hand(s) used:</b>	
1 Hand:	80
2 Hands:	20
<b>Balanced or off balance:</b>	
Off Balanced:	60
Balanced:	40
<b>Throw type:</b>	
Side/Hip:	80
Overarm:	10
Underarm:	10
<b>Throw intention:</b>	
Speed & Accuracy:	60
Speed:	30
Accuracy:	10
<b>Throw end point:</b>	
Direct:	60
Missed:	30
Collected:	10
<b>No. of bounces:</b>	

No bounce:	50
1 Bounce:	50
More than 1 bounce:	0
<b>Had to be direct to be out:</b>	
Yes:	90
No:	10
<b>What % Chances thought to be successful:</b>	
11-20	30
21-30	30
51-60	20
31-40	10
41-50	10

Coaches expected point to create the most (40%) run out opportunities in this zone, followed by mid-wicket (30%), mid-off (20%) and cover (10%) (Table 3). Run out chances were expected to happen most of the time in overs 1 - 6 (50%), followed by overs 7 - 14 (30%) and finally overs 15 - 20 (20%). Coaches presumed more often that a strong collection side is accredited to a run out opportunity (50%), with a similar expectation being seen with a straight collection (40%). A similar make up, in terms of numbers, was the case for the collection type. The majority of the coaches estimating that a dive collection was needed (50%) during all run out opportunities, followed by an ordinary pick up (40%) for the run out opportunities in this zone. Similarly to zone 1, the one-hand pick up dominated the assumption of coaches (80%) for a successful hit. Throwing off balance or balanced divided opinions, with 60% of the coaches feeling that throwing off balanced created a run out opportunity, compared to the 40% that felt throws from a balanced position would create a better run out opportunity. The side/hip throw dominated the beliefs of coaches in this zone (80%), with an equal divide between underarm (10%) and overarm (10%). The expectations around throwing intention were that 60% of the coaches thought speed and accuracy would be used to create the most run out opportunities for this zone. Followed by an intention of speed (30%). Direct hits were thought to be the expected end point of a throw by 60% of the coaches, with 30% expecting the ball to be missed and not collected at the stumps. The number of bounces into the target was equally divided between no bounce (50%) and 1 bounce (50%). Coaches assumed here that a direct hit was vital to a run out being successful, receiving 90% of the votes. Finally, the coaches had to give their thoughts on what percentage of the run out opportunities turned into successful run outs, of which 30% of the coaches thought that 11 - 20% and another 30% thought 21% - 30% of the opportunities created in this zone were then successful. This was the greatest opinion amongst the coaches, where other percentages were more evenly spread.

Table 4: Zone 3 Elite Coach's Perceptions on variables that lead to run out opportunities (Successful or not).

<b>Run Out Chances</b>	<b>Percent (%)</b>
<b>Positions:</b>	
Mid-Off:	20
Mid-On:	20
Point:	20
Cover:	10
Extra Cover:	10
Mid-Wicket:	10
Deep Mid-wicket:	10
<b>Overs:</b>	
15-20:	60
7-14:	40
1-6:	0
<b>Collection side:</b>	
Strong:	60
Straight:	40
Weak:	0
<b>Collection type:</b>	
Pick up:	70
Slide:	20
Dive:	10
<b>1 or 2 hand(s) used:</b>	
2 Hands:	70
1 Hand:	30
<b>Balanced or off balance:</b>	
Balanced:	90
Off Balanced:	10
<b>Throw type:</b>	
Overarm:	90
Side/Hip:	10
Underarm:	0
<b>Throw intention:</b>	
Speed & Accuracy:	100
Speed:	0
Accuracy:	0
<b>Throw end point:</b>	
Direct:	40
Collected:	40
Missed:	20
<b>No. of bounces:</b>	
1 Bounce:	70
No bounce:	30
More than 1 bounce:	0
<b>Had to be direct to be out:</b>	
No:	60
Yes:	40
<b>What % Chances thought to be successful:</b>	
11-20:	60
0-10:	10
31-40:	10
51-60:	10
61-70:	10

Mid-on (20%) and mid-off (20%) combined made a total of 40% of the coaches' expectations of creating a run out opportunity in this area of the field (Table 4). Point was another fielding position that coaches believed would have a good chance (20%) of creating run out opportunities. Just more than half the coaches expected run outs to occur in overs 15 - 20 (60%) in this zone, followed by overs 7 - 14 (40%). The ball being collected on the player's strong side was thought to occur more often by coaches (60%) in run out opportunities, followed by straight at the player (40%). The majority of the coaches estimated that a pick up collection was needed (70%), followed by a slide (20%) for the run out opportunities in this zone. There was a change in expectation around hand(s) used to collect the ball with two hands being expected by more coaches (70%) in this zone. A greater number of coaches (90%) anticipated throwing from balanced positions to create a greater chance of run out opportunities in this zone. Overarm throws were expected by most (90%) of the coaches to create run out opportunities in this area of the field. All of the coaches believed that throwing for speed and accuracy was used to create the run out opportunities. However, opinions were divided when it came to where the throw would end up. 40% believed that the throw would end up being direct, 40% believed the throw would be collected by another player and 20% believed the throw missed the target and was not collected at the stumps. The majority (70%) of the coaches thought that a throw would have one bounce before ending at its intended target with the remaining coaches assuming it wouldn't bounce into the target. 60% of the coaches believed the throw didn't need to be direct and 40% believing the throw had to be direct. Finally, the coaches had to give their thoughts on what percentage of the run out opportunities turned into successful run outs, of which 60% of the coaches thought that 11 - 20% of the opportunities created in this zone were then successful. This was the greatest opinion amongst the coaches, where other percentages were evenly spread.

Table 5: Zone 4 Elite Coach's Perceptions on variables that lead to run out opportunities (Successful or not).

<b>Run Out Chances</b>	<b>Percent (%)</b>
<b>Positions:</b>	
Deep Mid-Wicket:	50
Long-On:	20
Deep Cover:	20
Long-Off:	10
<b>Overs:</b>	
15-20:	90
1-6:	10

7-14:	0
<b>Collection side:</b>	
Strong:	60
Straight:	30
Weak:	10
<b>Collection type:</b>	
Pick up:	90
Slide:	10
Dive:	0
<b>1 or 2 hand(s) used:</b>	
2 Hands:	80
1 Hand:	20
<b>Balanced or off balance:</b>	
Balanced:	80
Off Balanced:	20
<b>Throw type:</b>	
Overarm:	90
Side/Hip:	10
Underarm:	0
<b>Throw intention:</b>	
Speed & Accuracy:	70
Accuracy:	20
Speed:	10
<b>Throw end point:</b>	
Collected:	90
Missed:	10
Direct:	0
<b>No. of bounces:</b>	
1 Bounce:	90
No bounce:	10
More than 1 bounce:	0
<b>Had to be direct to be out:</b>	
No:	90
Yes:	10
<b>What % Chances thought to be successful:</b>	
11-20:	20
41-50:	20
61-70:	20
0-10:	10
21-30:	10
31-40:	10
51-60:	10

Deep mid-wicket got half of the votes (50%) for the position that coaches deemed most likely to be involved in a run out chance (Table 5). This was followed equally by long-on (20%) and deep cover (20%), with long-off making up the balance (10%). 90% of the coaches believed these opportunities are most likely to occur in the latter part of the innings (overs 15 - 20). The ball being collected on the player's strong side was thought to be seen by more coaches (60%) in all run out opportunities, whether successful or unsuccessful, followed by straight at the player (30%). The majority of the coaches estimated a pick up collection was needed (90%), followed by a slide (10%) for the run out opportunities in this zone. More coaches (80%) predicted that the ball would be picked up with two hands for run out opportunities in this zone,

compared to those that thought one hand pick ups' would occur more (20%). More coaches (80%) anticipated throwing from balanced positions to create a greater chance of run out opportunities in this zone. Overarm throws were expected by most (90%) of the coaches to create the run out opportunities in this area of the field. 70% of the coaches felt that throwing for a mix of speed and accuracy would lead to the most opportunities for run outs, followed by 20% believing that accuracy would lead to run out opportunities. Almost all (90%) of coaches believe that the throw end point was collected by another player at the stumps. Again, almost all (90%) of the coaches thought that a throw would have one bounce before ending at its intended target with the remaining coaches assuming it wouldn't bounce into the target. 90% of the coaches felt that the throw did not need to be a direct hit from this area in the field. Finally, the coaches had to give their thoughts on what percentage of the run out opportunities turned into successful run outs, of which there was a three way finish between 11 - 20%, 41 - 50% and 61 - 70% all getting 20% of the total coaches vote. This was the greatest opinion amongst the coaches, where other percentages were evenly spread.

Based on the data generated from Results I, the author can deduce that the expectations of majority of the coaches, can be correlated to the way coaches have been coached. This could be based on actual experience in the game, or coaching manuals which have been passed down through the years. It is likely that if the coaches were presented with real time data, which the author seeks to provide through this study, it is probable that the overall expectations of the coaches would have differed, as they would be more aware of what fielding variables contribute to a successful or non-successful run out.

## **RESULTS II:**

Results II focuses on real life data of successful and non-successful run out opportunities, during two IPL seasons, based on videos which were analysed by the author. All variables were calculated within their zones and are show in table's six to nine.

Table 6: Zone 1 fielding action for successful and missed run outs.

NOT OUT	Percent (%)	OUT	Percent (%)
<b>Positions:</b>		<b>Positions:</b>	
Bowler:	41	Keeper:	54
Keeper:	38	Bowler:	17
Cover:	14	Cover:	13
Point:	3	Mid-Wicket:	13
Mid-Wicket:	3	Point:	4
<b>Overs:</b>		<b>Overs:</b>	
15-20:	48	15-20:	54
7-14:	31	7-14:	29
1-6:	21	1-6:	17
<b>Collection side:</b>		<b>Collection side:</b>	
Weak:	41	Strong:	67
Strong:	38	Weak:	17
Straight:	21	Straight:	17
<b>Collection type:</b>		<b>Collection type:</b>	
Pick up:	100	Pick up:	96
Slide:	0	Slide:	4
Dive:	0	Dive:	0
<b>1 or 2 hand(s) used:</b>		<b>1 or 2 hand(s) used:</b>	
1 Hand:	69	2 Hands:	63
2 Hands:	31	1 Hand:	38
<b>Balanced or off balance:</b>		<b>Balanced or off balance:</b>	
Off Balanced:	62	Balanced:	58
Balanced:	38	Off Balanced:	42
<b>Throw type:</b>		<b>Throw type:</b>	
Overarm:	52	Overarm:	63
Side/hip throw:	31	Underarm:	25
Underarm:	17	Side/hip throw:	13
<b>Throw intention:</b>		<b>Throw intention:</b>	
Speed & Accuracy:	45	Speed & Accuracy:	63
Speed:	41	Accuracy:	33
Accuracy:	14	Speed:	4
<b>Throw end point:</b>		<b>Throw end point:</b>	
Missed:	93	Direct:	63
Collected:	7	Collected:	38
Direct:	0	Missed:	0
<b>No. of bounces:</b>		<b>No. of bounces:</b>	
No bounce:	48	1 Bounce:	71
1 Bounce:	41	No bounce:	17
More than 1 bounce:	10	More than 1 bounce:	13
<b>Had to be direct to be out:</b>		<b>Had to be direct to be out:</b>	
Yes:	86	Yes:	54
No:	14	No:	46

The total number of run out opportunities (successful and non-successful) in zone 1 were 53, which are represented by “Out” and “Not Out” (Table 6). In zone 1, for opportunities, bowlers and keepers got most of the opportunities, equating to 75% of all chances in this zone, whether successful or not. Most of the opportunities came in the latter part of the game, in overs 15 - 20 (51%). The successful run outs came from the fielder’s stronger collection side (67%), where the missed chances came mainly from their weak side (41%). Overall, a pick up from the ground was used, as opposed to a dive, or a slide. Two hands were used mainly in the successful run outs (63%), where one hand was used in the missed chances (69%). Throwing from a balanced position was more frequent in the successful run outs (58%), where an off balanced throw was more frequent in the unsuccessful chances (62%); however this difference was marginal. Throwing with an overarm action was used the most throughout both successful and unsuccessful chances (58%). The combination of speed and accuracy in throwing intention dominated, making up 59% of the throwing intent from this zone, for both successful and unsuccessful chances. A direct throw, hitting the stumps, resulted in the greatest chance of a successful run out, which equated to 63% of the time. However, 93% of the time, the missed chance throw was not collected by someone at the stumps or hit the stumps directly. During a successful run out in this zone, 71% of the time, the ball was thrown with one bounce, whereas it was only thrown with one bounce 41% of the time in unsuccessful chances. Additionally, most of the run outs that were missed in this zone did require a direct hit for the batter to be out (86%). Whereas the successful run outs in this zone only needed 54% of them to be direct hits.

Table 7: Zone 2 fielding action for successful and missed run outs.

<b>NOT OUT</b>	<b>Percent (%)</b>	<b>OUT</b>	<b>Percent (%)</b>
<b>Positions:</b>		<b>Positions:</b>	
Extra Cover:	26	Cover:	29
Point:	23	Mid Off:	24
Cover:	13	Point:	24
Mid-Wicket:	13	Extra Cover:	6
Short 3rd man:	6	Mid On:	6
Mid On:	6	Short 3rd man:	6
Mid Off:	4	Short Fine Leg:	6
Square Leg:	4		
Short Fine Leg:	2		
Bowler:	2		
<b>Overs:</b>		<b>Overs:</b>	
7-14	43	15-20:	35

15-20	34	7-14:	35
1-6:	23	1-6:	29
<b>Collection side:</b>		<b>Collection side:</b>	
Strong:	45	Strong:	53
Straight:	30	Straight:	29
Weak:	26	Weak:	18
<b>Collection type:</b>		<b>Collection type:</b>	
Pick up:	96	Pick up:	94
Slide:	4	Dive:	6
Dive:	0	Slide:	0
<b>1 or 2 hand(s) used:</b>		<b>1 or 2 hand(s) used:</b>	
2 Hands:	87	2 Hands:	76
1 Hand:	13	1 Hand:	24
<b>Balanced or off balance:</b>		<b>Balanced or off balance:</b>	
Off Balanced:	53	Balanced:	59
Balanced:	47	Off Balanced:	41
<b>Throw type:</b>		<b>Throw type:</b>	
Overarm:	64	Overarm:	47
Side/hip throw:	36	Side/hip throw:	47
Underarm:	0	Underarm:	6
<b>Throw intention:</b>		<b>Throw intention:</b>	
Speed & Accuracy:	66	Speed & Accuracy:	65
Speed:	34	Speed:	29
Accuracy:	0	Accuracy:	6
<b>Throw end point:</b>		<b>Throw end point:</b>	
Missed:	98	Collected:	53
Collected:	2	Direct:	47
Direct:	0	Missed:	0
<b>No. of bounces:</b>		<b>No. of bounces:</b>	
1 Bounce:	51	1 Bounce:	71
No bounce:	49	No bounce:	29
More than 1 bounce:	0	More than 1 bounce:	0
<b>Had to be direct to be out:</b>		<b>Had to be direct to be out:</b>	
Yes:	91	No:	65
No:	9	Yes:	35

The total number of run out opportunities (successful and non-successful) in zone 2 were 64 (Table 7). The main fielding positions in this zone were on the off side for left and right handed batters. This was made up by point, cover, extra cover and mid-off. These made up 70% of the positions that had run out opportunities in this zone. The chances, successful or not, came at varying points of the game, with overs 7 - 14 making up an amount which was slightly more than the others (39%). The collection side was strong throughout this zone, irrespective of the

outcome (49%). The collection type was dominated in this zone by a pick up (95%). Two hands were mainly used through successful and non-successful opportunities (82%). Throwing from a balanced position (59%) occurred more than throwing off balanced (41%) when looking at the successful opportunities. Contrastingly, from the missed chances point of view, off balanced throws (53%) happened slightly more frequently than balanced throws (47%). Throwing with an overarm action was used the most throughout both successful and unsuccessful chances (56%). The combination of speed and accuracy in throwing intention dominated, making up 66% of the throwing intent from this zone. A throw that was collected by either another fielder or the wicket-keeper resulted in the greatest chance of a successful run out, which equated to 53% of the time, followed by 47% of the time it being a direct hit. However, 98% of the time, the missed chance throw was not collected by someone at the stumps or hit the stumps directly. During a successful run out in this zone, 71% of the time, the ball was thrown with 1 bounce, whereas it was only thrown with 1 bounce 51% of the time in unsuccessful chances. Additionally, most of the run outs that were missed in this zone required a direct hit for the batter to be out (91%). The successful run outs in this zone only needed 35% of them to be direct hits.

Table 8: Zone 3 fielding action for successful and missed run outs.

<b>NOT OUT</b>	<b>Percent (%)</b>	<b>OUT</b>	<b>Percent (%)</b>
<b>Positions:</b>		<b>Positions:</b>	
Extra Cover:	18	Extra Cover:	29
Point:	18	Short Fine Leg:	14
Short Fine Leg:	18	Deep Mid-Wicket:	14
Short 3rd man:	11	Long on:	7
Square Leg:	7	Deep Square Leg:	7
Long on:	7	Short 3rd man:	7
Mid Off:	4	Cover:	7
Mid On:	4	Point:	7
Deep Square Leg:	4	Mid Off:	7
Deep Mid-Wicket:	4		
Cover:	4		
Mid-Wicket:	4		
<b>Overs:</b>		<b>Overs:</b>	
15-20	57	15-20:	36
7-14	21	1-6	36
1-6:	21	7-14	29
<b>Collection side:</b>		<b>Collection side:</b>	

Straight:	46	Strong:	43
Strong:	29	Straight:	43
Weak:	25	Weak:	14
<b>Collection type:</b>		<b>Collection type:</b>	
Pick up:	100	Pick up:	100
Slide:	0	Dive:	0
Dive:	0	Slide:	0
<b>1 or 2 hand(s) used:</b>		<b>1 or 2 hand(s) used:</b>	
2 Hands:	93	2 Hands:	79
1 Hand:	7	1 Hand:	21
<b>Balanced or off balance:</b>		<b>Balanced or off balance:</b>	
Balanced:	82	Balanced:	71
Off Balanced:	18	Off Balanced:	29
<b>Throw type:</b>		<b>Throw type:</b>	
Overarm:	93	Overarm:	79
Side/hip throw:	7	Side/hip throw:	21
Underarm:	0	Underarm:	0
<b>Throw intention:</b>		<b>Throw intention:</b>	
Speed & Accuracy:	86	Speed & Accuracy:	86
Speed:	7	Speed:	14
Accuracy:	7	Accuracy:	0
<b>Throw end point:</b>		<b>Throw end point:</b>	
Missed:	79	Collected:	50
Collected:	6	Direct:	50
Direct:	0	Missed:	0
<b>No. of bounces:</b>		<b>No. of bounces:</b>	
1 Bounce:	57	1 Bounce:	93
No bounce:	39	No bounce:	7
More than 1 bounce:	4	More than 1 bounce:	0
<b>Had to be direct to be out:</b>		<b>Had to be direct to be out:</b>	
Yes:	71	No:	50
No:	29	Yes:	50

The total number of run out opportunities (successful and non-successful) in zone 3 were 42 (Table 8). There was one fielding position which dominated this zone, and it was extra cover; it made up 24% of the chances. Most chances created were during overs 15 - 20 (47%). The successful run outs came equally off the fielder's stronger side, and straight to them for the collection side (43%). The missed chances came mainly from the collection side as 'straight' (46%). Collection type was only done by a pick up (100%) in this zone. Two hands were used mainly through successful and non-successful efforts (86%). A balanced throw was used throughout this zone irrespective of the outcome (77%). Throwing with an overarm action was used the most throughout both successful and unsuccessful chances (86%). The combination

of speed and accuracy in throwing intention dominated, making up 86% of the throwing intent for this zone. A throw that was collected by either another fielder, or the wicket-keeper, resulted in the same chance of a successful run out as what a direct hit did (50%). However, 79% of the time, the missed chance throw was not collected by someone at the stumps or hit the stumps directly. During a successful run out in this zone, 91% of the time, the ball was thrown with 1 bounce, whereas it was only thrown with 1 bounce 57% of the time in unsuccessful chances. Additionally, the majority of the run outs that were missed in this zone did require a direct hit for the batter to be out (71%). The successful run outs in this zone only needed 50% of them to be direct hits.

Table 9: Zone 4 fielding action for successful and missed run outs.

<b>NOT OUT</b>	<b>Percent (%)</b>	<b>OUT</b>	<b>Percent (%)</b>
<b>Positions:</b>		<b>Positions:</b>	
Long On:	23	Long on:	27
Deep Mid-Wicket:	23	Deep Mid-Wicket:	23
Long Off:	23	Long Off:	19
Deep Square Leg:	18	Deep Cover:	12
Deep Cover:	9	Deep Square Leg:	8
3rd Man:	5	Deep Point:	8
		3rd Man:	4
<b>Overs:</b>		<b>Overs:</b>	
15-20	68	15-20:	73
7-14	27	7-14	23
1-6:	5	1-6	4
<b>Collection side:</b>		<b>Collection side:</b>	
Strong:	50	Strong:	50
Weak:	45	Weak	46
Straight:	5	Straight:	4
<b>Collection type:</b>		<b>Collection type:</b>	
Pick up:	95	Pick up:	85
Dive:	5	Dive:	12
Slide:	0	Slide:	4
<b>1 or 2 hand(s) used:</b>		<b>1 or 2 hand(s) used:</b>	
2 Hands:	86	2 Hands:	81
1 Hand:	14	1 Hand:	19
<b>Balanced or off balance:</b>		<b>Balanced or off balance:</b>	
Balanced:	82	Balanced:	77
Off Balanced:	18	Off Balanced:	23
<b>Throw type:</b>		<b>Throw type:</b>	
Overarm:	77	Overarm:	81

Side/hip throw:	23	Side/hip throw:	19
Underarm:	0	Underarm:	0
<b>Throw intention:</b>		<b>Throw intention:</b>	
Speed & Accuracy:	77	Speed & Accuracy:	85
Speed:	18	Speed:	12
Accuracy:	5	Accuracy:	4
<b>Throw end point:</b>		<b>Throw end point:</b>	
Missed:	68	Collected:	88
Collected:	32	Direct:	12
Direct:	0	Missed:	0
<b>No. of bounces:</b>		<b>No. of bounces:</b>	
1 Bounce:	77	1 Bounce:	81
No bounce:	14	No bounce:	15
More than 1 bounce:	9	More than 1 bounce:	4
<b>Had to be direct to be out:</b>		<b>Had to be direct to be out:</b>	
No:	50	No:	92
Yes:	50	Yes:	8

The total number of run out opportunities (successful and non-successful) in zone 4 were 48 (Table 9). The main fielding positions in this zone were the long-off, long-on and deep mid-wicket. These made up 69% of the positions that had run out opportunities in this zone, where long-on got most of the chances (25%). Most chances created were during overs 15 - 20 (71%). Collection sides were evenly distributed, with successful run outs having 50% of the run outs come from the fielders' strong side and 46% of the time coming from the weak side. Similar numbers were reported for the unsuccessful side having 50% of the opportunities come from the fielders' strong side and 45% of the time coming from the weak side. The collection type was dominated in this zone by a pick up (90%). Two hands were used mainly for successful and non-successful chances (84%). A balanced throw was used throughout this zone irrespective of the outcome (80%). Throwing with an overarm action was used the most throughout both successful and unsuccessful chances (79%). The combination of speed and accuracy in throwing intention dominated, making up 81% of the throwing intent for this zone. A throw that was collected by either another fielder, or the wicket-keeper, resulted in the greatest chance of a successful run out, which equated to 88%. However, 68% of the time, the missed chance throw was not collected by someone at the stumps or hit the stumps directly. During a successful run out in this zone, 81% of the time the ball was thrown with 1 bounce, which was like the unsuccessful chances (77%). Additionally, the run outs that were missed in this zone was a 50% split: half requiring to be direct hits and the other half not being the case. Whereas the successful run outs in this zone only needed 8% of them to be direct hits.

Table 10: Summary of most frequent occurring variables for all run out opportunities for each zone.

	<b>Zone 1:</b>	<b>Zone 2:</b>	<b>Zone 3:</b>	<b>Zone 4:</b>
<b>Positions:</b>	Keeper	Point	Extra Cover	Long on
<b>Overs:</b>	15-20	7-14	15-20	15-20
<b>Collection side:</b>	Strong	Strong	Straight	Strong
<b>Collection type:</b>	Pick up	Pick up	Pick up	Pick up
<b>1 or 2 hand(s) used:</b>	1 Hand	2 Hands	2 Hands	2 Hands
<b>Balanced or off balance:</b>	Off Balance	Balanced	Balanced	Balanced
<b>Throw type:</b>	Overarm	Overarm	Overarm	Overarm
<b>Throw intention:</b>	Speed & Accuracy	Speed & Accuracy	Speed & Accuracy	Speed & Accuracy
<b>Throw end point:</b>	Missed	Missed	Missed	Collected
<b>No. of bounces:</b>	1 bounce	1 bounce	1 bounce	1 bounce
<b>Had to be direct to be out:</b>	Yes	Yes	Yes	No

Table 11: Summary of most frequent occurring variables for all missed run out opportunities for each zone.

	<b>Zone 1:</b>	<b>Zone 2:</b>	<b>Zone 3:</b>	<b>Zone 4:</b>
<b>Positions:</b>	Bowler	Extra Cover	Extra Cover	Long on
<b>Overs:</b>	15-20	7-14	15-20	15-20
<b>Collection side:</b>	Weak	Strong	Straight	Strong
<b>Collection type:</b>	Pick up	Pick up	Pick up	Pick up
<b>1 or 2 hand(s) used:</b>	1 Hand	2 Hands	2 Hands	2 Hands
<b>Balanced or off balance:</b>	Off Balance	Off Balanced	Balanced	Balanced
<b>Throw type:</b>	Overarm	Overarm	Overarm	Overarm
<b>Throw intention:</b>	Speed & Accuracy	Speed & Accuracy	Speed & Accuracy	Speed & Accuracy
<b>Throw end point:</b>	Missed	Missed	Missed	Missed
<b>No. of bounces:</b>	No Bounce	1 bounce	1 bounce	1 bounce
<b>Had to be direct to be out:</b>	Yes	Yes	Yes	Yes/No

Table 12: Summary of most frequent occurring variables for all successful run outs for each zone.

	<b>Zone 1:</b>	<b>Zone 2:</b>	<b>Zone 3:</b>	<b>Zone 4:</b>
<b>Positions:</b>	Keeper	Cover	Extra Cover	Long on
<b>Overs:</b>	15-20	7-14 & 15-20	15-20	15-20
<b>Collection side:</b>	Strong	Strong	Strong	Strong
<b>Collection type:</b>	Pick up	Pick up	Pick up	Pick up
<b>1 or 2 hand(s) used:</b>	2 Hands	2 Hands	2 Hands	2 Hands
<b>Balanced or off balance:</b>	Balanced	Balanced	Balanced	Balanced
<b>Throw type:</b>	Overarm	Overarm/Side	Overarm	Overarm
<b>Throw intention:</b>	Speed & Accuracy	Speed & Accuracy	Speed & Accuracy	Speed & Accuracy
<b>Throw end point:</b>	Direct	Collected	Collected/Direct	Collected
<b>No. of bounces:</b>	1 bounce	1 bounce	1 bounce	1 bounce
<b>Had to be direct to be out:</b>	Yes	No	No/Yes	No

Based on the above data from Results II, the most noteworthy findings are the different actions that have taken place in different areas of the field. For example, it is useful for coaches, as well as players to know that during a stage of the game, a certain fielding position is more likely to be involved in a run out opportunity. These findings show some validation to the coaches' expectations. However, there are some notable and important findings that can be utilised by coaches in the future, which will allow them to take this information and put it into real game scenarios, enabling them to gain that smaller, but extra, advantage over their opposition.

## CHAPTER V

### DISCUSSION

The aim of the study was to determine what variables, within an area of fielding, led to a successful or a non-successful run out from different zones within the field. The purpose of the study was to show, and therefore provide practical insight for coaches. This was achieved by looking at how successful and unsuccessful run outs came about, by examining which areas in the field, during what period of the game and what other variables took place during both successful and unsuccessful run outs. Due to each zone presenting different requirements, this could not be looked at in isolation and each zone required individual attention.

#### ZONE 1

The video footage suggested two main findings in this area of the field. The first being that most run out opportunities fell to the bowler and the wicket-keeper. This is a logical explanation as these two players will spend most, if not all, of their time in this area after a ball has been delivered. The data shown from the coaches' perspective agrees, in part, with these findings. 50% of the coaches expected the bowler to be the player who was most involved in run out opportunities within this area of the field. However, these positions are rarely spoken about in terms of having to execute a throw straight after their primary task of bowling to take a wicket (Jooste, 2012), in the case of the bowler, and catching a bowled delivery, in the case of the wicket-keeper. In two widely used cricket coaching resources, neither highlight these two positions in terms of creating run out opportunities within these two sections of fielding, nor in their respective fields (CoachEd, 2020; Woolmer *et al.*, 2008). To the author's knowledge, there has not been any published data pertaining to bowlers and wicket-keepers in terms of creating, or making run out attempts. The second finding from the video footage saw that a direct hit was crucial to the success or not, of a run out happening within this area of the field. This was supported by the perception of the coaches where 90% of the coaches expected that the throw had to be direct for the batter to be out. In the missed run out chances, 86% of these chances needed to be a direct hit for the batter to have been out in the video footage. This can be expected as it means that the run out happens within a quicker time, as opposed to a player first collecting the ball and then the player taking the ball to the stumps. This indicates the small margins of accuracy needed when considering a successful run out chance.

Another key difference in the video footage between successful run outs and missed chances was that 71% of the successful chances took one bounce before hitting the stumps or being collected by the keeper or another fielder. Where, for the unsuccessful chances, no bounce was used more than the other two throws. This supports the data received by the coaches as 80% of the coaches expected no bounce in the throw from this area of the field. There has been no reported reason for this in previous cricket research. It has been recently reported in a coaching qualification course that players must aim to hit the stumps anywhere from the bottom of the stumps, to half way up (CoachEd, 2020). This could explain why more successful throws come in with a bounce, as the trajectory is easier to maintain with a shorter bounce throw. Although not conducted as scientific research, but in the closest published related article, a blog experiment was conducted that discussed the flight of the ball trajectory between no bounce to the target and with a bounce (Dominijanni, 2018). The author concluded that a bounce throw can be released at a lower and more direct angle, if the ball does not lose too much speed on the bounce, a shorter path would mean a more likely chance of shorter time for the ball to reach the intended target, or catcher (Dominijanni, 2018). From the data presented in this study, although it cannot directly conclude that this variable resulted in successful run outs, it does show that more run outs were caused with a bounce throw.

The majority (51%) of the time, all run out opportunities came in overs 15 to 20 in the two IPL seasons. This can be expected, as during this stage of the game, batters are looking to take a risk to gain as many runs as possible. This was supported by 50% of the coaches who expected that most of the run outs in this zone would fall at this point of the game. A greater number of coaches believed run out opportunities would fall to the fielder's weak side where, in fact, just over half of the opportunities fell to the player's strong side; although the findings were quite similar. More notably, during successful run outs, 67% of the time the ball was collected on the player's strong side. This enables the player to throw sooner as opposed to having to get the ball onto their strong side first. This can be compared to the unsuccessful chances where only 38% of the time, the ball fell to the player's strong side, resulting in the player needing to reposition themselves to be able to throw the ball. However, no research has previously investigated this. The varied opinions of the coaches show this is an area for further investigation. Collection type saw mixed results from the coaches' perspective with half believing that a standard pick up was used and half believing that a dive was used to collect the ball. On the contrary, the collection type seemed to be consistent throughout successful and missed chances in the video footage analysed. In 98% of the cases, the ball was picked up, as

opposed to the player having to dive or slide to retrieve the ball. The coaches that expected the dive stop may have thought players would require a dive to stop the ball, and that this led to the batter thinking they could take a run, which in turn had now been fielded, creating a run out chance. However, as shown by the other half of the coaches, as well as the data from the video footage, the pick up was used more regularly in run out chances. This could be because the player is in a strong position to throw the ball, as opposed to diving and sliding and then still having to get into a strong position to throw. This will allow the batter extra time to complete a run.

When picking the ball up, players have the choice of using one or two hands to collect the ball when fielding. During all run out opportunities analysed from the video footage, just over half (53%) of the time the ball was collected with one hand. Similarly, all the coaches expected the ball to be collected with a one hand pick up. A noticeable finding in the video footage was that when collecting the ball for successful run outs, two handed pick ups were in the majority. For missed chances, there was a majority of one handed pick ups'. This was unexpected. One would expect that using one hand would allow for a quicker time for ball release, this was supported by the coaches' expectations. The above is a finding that coaches can use to implement around their current practice or assist in developing new ideas. The reasons for this could be the fact that the run outs, where two hands were used, were easier opportunities and the choice of pick up had little to do with the overall run out chance. However, again, there is no previous research and/or explanation within coaching manuals to explain this.

Most of the coaches expected players in this area to throw from an off balanced position. During all run out opportunities seen in the video footage, just more than half (52%) of the time players threw from off balanced positions. However, there were more successful run outs that were executed with the fielder being in a balanced position (58%) than not, but marginally so (42%). A comparison comes from baseball where a shortstop must often move left and right to collect the ball and then must make a quick throw (Johnston, n.d.). They therefore do not have the time to set their feet and throw from a balanced position (Johnston, n.d.). This could be in line with the thoughts of most of the coaches that felt throwing from an off balance position would lead to more run out opportunities. This means players here must be expected to throw from off balanced positions, however, a balanced position when throwing is always preferable (CoachEd, 2020; Woolmer et al., 2008). Nevertheless, a traditional overarm throw, without set feet, would have less accuracy, and this is why a side/hip throw is often used when off balance as it assists with counter balance (Johnston, n.d.). Due to a lack of alignment in an

off balanced side/hip throw, they are not easy to perfect. However, this is something that needs to be practiced as players aren't always afforded the time to get into a balanced position and throw with an overarm throw. When looking at missed chances in this zone, based on the author's analyses of the IPL video footage, there was a higher number of throws being completed off balanced (62%) than balanced (38%). These results are expected as, in anecdotal evidence, cricketers are coached and advised to be balanced in their throw (Woolmer et al., 2008).

Almost all the coaches expected underarm throws in this area of the field. This is an expected perception as this is something that is covered in a world-renowned coaching course, which states that underarm is the main option in this area of the field (CoachEd, 2020). However, the video footage presented in this case showed that the most used throwing option in all run out chances was an overarm throw. There was a greater number of side/hip throws in the unsuccessful run outs than the successful run outs and vice versa in the opposite for underarm throws. This is in line with published data, as side/hip throws had a greater error left and right of the target compared to overarm throws (Irawan, 2015). This may be down to difficult chances for missed attempts causing the fielder to rush the throw and throwing from the hip instead of being able to get into a strong position to throw overarm. This has been found in baseball, where players that field closer to the bat have less time to complete their throw and choose the side/hip throw, as this has found to help quicken their release (Johnston, n.d.).

Traditional overarm throwing is a more reliable and accurate throwing motion, but when time is limited, the throw from the side/hip allows for the quicker ball release (Johnston, n.d.). Successful underarm throws may have been down to easier chances. Nevertheless, with most of the coaches using this method, it is not unsurprising that underarm throws are more successful from this area of the field, as coaching resources indicates that this is how coaches are taught, as well as, based on the coaches' perceptions. More recently with the shift in mentality towards fielding, this supports the common traits of today's athletes. Woolmer *et al* (2008) shared that fielders must do more than just expect the ball to come to them, they must hope that it does. This means that fielders will be on the tip of their toes and ready to run in to receive a ball in front of them which would see them run in to throw an underarm throw. However, there were a fair amount of run outs missed with underarm throws (17%) in the two IPL seasons.

Throw intention from this area resulted in a mixed opinion from the coach's views, with 40% expecting a mix of speed and accuracy and 40% with accuracy alone, whilst 20% thought speed alone would result in the most run out opportunities. However, the video footage showed that the intention of the throw was consistent for successful and unsuccessful run outs and it was the combination of speed and accuracy that was used more frequently. The major limitation with this is that it can be subjective and become more based on opinion, rather than the throw intention. However, the results from the video footage taken from the two IPL seasons should not be surprising as per Fitt's law (1954), where rapid movements are less accurate and where trying to be too accurate lowers accuracy, and therefore requires an optimum speed. When looking at the video footage in this study and, comparing the successful against the unsuccessful run outs, there was a noticeable difference. 63% of the time in successful run outs, the combination of speed and accuracy was used in a throw, as opposed to only 45% of the unsuccessful run outs. Once more, previous research does show that having a throwing speed of 75% of maximal speed allows for greater accuracy, where 50% and 100% throwing speed showed a drop in accuracy (Freeston & Rooney, 2014).

Once the ball had been thrown it had three different places it could have gone, either hitting the stumps directly, missing the stumps and not being collected at the stumps, or being collected by another player at the stumps. 70% of the expert coaches expected the ball to go on to hit the stumps from this area of the field. However, in the video footage, only 32% of the time this happened. This shows that accuracy in players needs to be worked on, particularly with coaches' perceptions versus the reality of the result. The video footage showed that during unsuccessful chances, 93% of the chances were missed. This is a high percentage of chances missed from an area not all that far from the target. During successful run outs, most of the time (63%), the ball went on to hit the stumps, which was expected. However, there was a greater percentage of run outs that were collected by another player (38%) compared to unsuccessful attempts (7%). This could either go down to good fielding, where a player is aware of the situation and runs to the stumps, or just easier run out opportunities due to poor running between the wickets by the batters. This has not been looked at in prior research and already shows a mismatch between the IPL footage presented, and the perceptions of expert coaches.

Finally, coaches were asked what percentage of run outs were successful from all run out opportunities in this area of the field. It yielded a mixed result in this case, however, the most

votes were towards between 51 - 60% of run out chances ended in success for the fielding side. This is not too far from the correct 45% from the video presented.

## **ZONE 2**

In the two IPL seasons, the off side of the field in this zone received the most run out opportunities (70%), including mid-off, extra cover, cover and point. 70% of the coaches expected that this would include point, cover and mid-off, with point leading the way with the coaches' expectations in all run out opportunities. This supports the evidence in previous research that illustrates cover and mid-off featuring the most when it came to all fielding activities (Shilbury, 1990). More than half of the coaches assumed that the ball would end up hitting the stumps in this zone from the throw point. However, as evidenced in the video footage, out of all the chances, only 24% of them went on to hit the stumps directly. The throw end point had a noticeable difference between successful run outs and missed chances. It was collected most of the time during a successful run out, however, missed most of the time during an unsuccessful run out. However, only 10% of the coaches assumed that the ball would be collected by another player. A connection to this could be seen when looking at the amount of missed run out opportunities in the video footage that required a direct hit (91%). This matched 90% of the coaches' expectations, as they believed it was difficult to be a direct throw to be out from this area. This means that a player standing at the stumps knew that he could not afford the time to catch the ball and then take it to the stumps to execute the run out, alternatively, there simply wasn't enough time for a player to even get to the stumps, as such it needed a direct hit to be out. This is indicative that if there was greater accuracy on the throw, there would have been more run outs.

In this zone, half of the coaches expected a one bounce throw, whereas the other half predicted no bounce. Overall, the data presented in the video footage showed that in the run out opportunities there were 61% of one bounce throws and 39% of no bounce throws. Similarly, to zone 1, we saw a greater amount of one bounce throws (71%) with less no bounces (29%) for successful run outs. With less one bounce throws (51%) and more no bounces (49%) in the unsuccessful opportunities. Reasons for this have been covered in zone 1 above as the data shows several similarities.

From the video footage, overs 1 - 6 in this zone saw the least run out chances in both successful and unsuccessful run outs, making up 26%. This contrasted with half of the coaches'

perceptions who perceived that most run out opportunities would occur in this zone within this point of the game. Nevertheless, this does not match with the period of the game when most fielders will be in zone 2, as it is also the time of the game associated with low risk as batting teams would try to avoid losing wickets at this stage of the game, as this will allow the bowling team to gain momentum for the remainder of the innings. (CoachEd, 2020). At this stage of the game there is less running, and more boundaries being hit, or dot balls as fielding restrictions mean 9 of the 11 players are in the inner ring (Woolmer *et al.*, 2008). Most successful run outs in the video footage came in overs 15 to 20 and only 20% of the coaches expected all run out opportunities to come at this stage of the game. This would be deemed as an important finding as there is a disparity in coaches' expectations, and the reality. Another interesting finding from the video footage, was that overs 7 to 14 provided the highest amount of run out opportunities, with 30% of the coaches expecting the same. However, during this period of the game, over half of the run out chances were missed, which again is something that coaches need to become more cognisant of. Different results were found here and that could be down to different teams batting blueprints, or tactical considerations. This means that some teams would use this as a more high risk time, whereas others would use it more moderately. This is evident with the varying expectations of coaches who may carry out different tactics during a game.

This area of the field saw a mix of which side of the fielder the ball was collected. This can be expected as the ball is generally hit hard and with the fielder being close, it goes either side of them, or straight at them. Based on the IPL video footage, most run out opportunities came to the fielder's strong side, which was also expected by most of the coaches. Similarly, to zone 1, there was a mismatch in the collection type used by majority of the coaches against the video footage. Most of the coaches expected a dive stop before attempting the run out. However, a normal pick up was used 95% of the time during all run out opportunities. As mentioned earlier, coaches that expected the dive stop may have thought players would require a dive to stop the ball, and that this led to the batter thinking that they could take a run, which in turn, had now been fielded, thereby creating a run out opportunity. However, the video footage showed that if players dived or slid in this area of the field, the batters must have had the time to take the run.

Almost all (80%) of the coaches predicted a one hand pick up, however, the data presented is in contrast to this where in fact 82% of the run out opportunities came after a two hand pick up. The notable difference was that for successful run out opportunities, one hand was used more frequently (24%) compared to unsuccessful run outs (13%). This is expected as this

would afford the fielder more time to release the ball, as opposed to getting the ball into their correct throwing hand, which corresponds to the perceptions of most of the coaches. Unlike in baseball, where a greater surface area is used when picking a ball up in one hand, due to the glove, cricketers adopt using both hands more often, as shown in the results, to create a greater surface area to collect the ball without a mistake. This leads to the fielder's position after the pickup, which will determine if the player is in a balanced or off balanced position. A one hand pick up could result in an off balanced position after retrieval as opposed to a two hand pickup. The same coaching course used for reference explains that the two-hand pick up is deemed more appropriate (CoachEd, 2020). This is often not spoken about in many coaching manuals and lacks scientific evidence in cricket research.

The video footage from this zone saw the most mixed results with balanced and off balanced throws, with nearly half of the coaches believing one was better than the other. As seen by the video footage, off balanced throws in this zone equated to 44% of the time, with balanced throws making up the balance with 56%. Balanced throws saw more (59%) successful run outs than off balanced (41%) throws. Where in the unsuccessful run out opportunities, there was a higher number (53%) of off balanced throws compared to (47%) of balanced throws. This is in line with coaching manuals that encourage players to throw from a balanced position (CoachEd, 2020). However, players are not always able to get into a balanced position and must release the ball as quickly as they can. This highlights the amount of off balanced throws made.

This area of the field saw a varying throw type. It was dominated by overarm throws in both successful and unsuccessful run outs (56%). However, 80% of the coaches expected a side/hip throw to be used in this zone. The noticeable finding from the video footage was that, although the overarm throw was used in most run out opportunities, when it came to successful run outs, it made up the same amount of successful side/hip throws, compared to unsuccessful throws which saw 66% of overarm throws used, compared to only 34% of the side/hip throw. This illustrates that most of the coaches' perceptions were aligned with this. However, coaching resources teach players to get into balanced and steady positions, and from a 'textbook' point of view, it anecdotally supports that the game does get unpredictable at times and to improve on situations to create opportunities, one needs to practice different skills, which may create run out chances (Woolmer *et al.*, 2008).

In the two IPL seasons, throw intensity was again dominated by speed and accuracy through successful and unsuccessful run out chances and supported by most of the coaches' perceptions based on overall game situations. This is not unexpected as this is also scientifically shown (Freeston & Rooney, 2014; García, Sabido, Barbado & Moreno, 2013; Freeston, Ferdinandes & Rooney, 2007). More noticeably, and which corresponds to the type of throw used, was that speed was important by 30% of the coaches and was used in the IPL 32% of the time in run out opportunities. This can be expected with the greater use of the side/hip throw, which is used more frequently when the fielder does not have time to get into a good position to throw (Johnston, n.d.).

Finally, coaches were asked what percentage of run outs were successful from all run out opportunities within this area of the field. Most of the coaches believed that between 11 - 20% and 21 - 31% of run out chances ended in success for the fielding side. This was an accurate expectation from the coaches as the IPL findings in this case was 27%.

### **ZONE 3**

This zone saw the greatest number of different fielding positions (12) from run out opportunities and from the coaches' expectations. 40% of the coaches expected that mid-on and mid-off would receive the most opportunities, where in fact, based on the video footage, extra cover received the highest number of opportunities. It is worth noting that extra cover got the most run opportunities for successful and unsuccessful run outs. When a fielder is fielding in zone 3 this is normally a defensive tactic (CoachEd, 2020). Either, it will be in the first six overs of fielding restrictions, when only two players are allowed out of the inner ring, and the captain will ask that they stay towards the edge of the circle. Alternatively, it will be towards the end of the game where the batters are trying to score boundaries and, therefore, due to fielding restrictions again, the captain can only have five players outside of the inner ring, at this point they may ask players to stand on the edge of the inner ring, allowing them to be more defensive. This corresponds to when the run out opportunities arose in this period of the game in the video analyses. Overs 15 to 20 had the most run out opportunities, of which most of the coaches predicted. When looking at the second most run out opportunities in the video footage, these fell in overs 1 to 6. However, this did not match coaches' expectations and this is something that needs to be investigated further.

In both the IPL seasons, a one bounce throw seemed to continue to be at the forefront of the option to use when throwing for a run out opportunity. It was used 75% of the time in all

opportunities in the IPL video analyses. This isn't surprising when looking at anecdotal evidence already covered, that indicates the trajectory is easier to maintain with a shorter bounce throw (Dominijanni, 2018). Most of the coaches also expected a one bounce throw within this area of the field. Noticeably, 93% of successful run outs in this zone came from a throw with one bounce; where 7% of successful run outs came from a throw with no bounce compared to 39% of unsuccessful chances with no bounce. Once more, the video footage suggests a throw with a bounce will add to the overall success of the run out opportunity.

Comparable with zone 2, this area of the field saw a variety in terms of which side of the fielder the ball was collected. Just over half of the coaches presumed that the ball would fall to the player's strong side, with just under half expecting that the ball would come straight at the player. The IPL video footage showed that (45%) of the run out chances came straight to the fielder during a run out opportunity. Unlike zone 1 and 2, there was a stronger perception from coaches about the collection type used when gathering the ball. In the video footage, each time a run out opportunity arose, it came from a pick up, as opposed to a slide or dive. This correlates to the coaches' expectations (70%). Due to the fielders being that extra distance back, it would have been easier for the batters to run if a dive or slide was used to retrieve the ball. It then comes as no surprise, particularly considering that when fielding within this zone the ball is coming at a rapid pace (CoachEd, 2020), that two hands were used more frequently in a run out chance, which was also anticipated by 70% of the coaches. However, when looking at successful against unsuccessful run out opportunities in the video footage, there was an increase in one hand pick up's for successful run outs (21%) compared to the lower cases of one hand pick up's in unsuccessful run outs (7%). This again may indicate a player being able to save time by using one hand to pick the ball up, however, this cannot be confirmed. When looking at the player's positions after collecting the ball within this zone, it yielded, overall, more (77%) opportunities to a fielder that was balanced when throwing the ball and 90% of the coaches expected the same result. However, similarly to the increase in one hand pick ups', the video footage showed that there was an increase in off balanced throws in the successful throws (29%) compared to the unsuccessful throws (18%). Yet again, this could be down to time related constraints as coaches encourage players to get themselves into positions of strength when throwing the ball, however, time doesn't always allow for this (CoachEd, 2020). Therefore, it shows that although being balanced is an ideal position to throw from, coaches should be encouraged to practice match scenarios where time constraints are accounted for, to allow players to practice being able to throw from an off balanced position.

Unsurprisingly, there was a high percentage (86%) of no underarm throws from this area of the field. This met the beliefs of 90% of the coaches. As previously mentioned, this would be in line with published data as traditional overarm throwing is a more reliable and accurate throwing motion than a side/hip throw (Johnston, n.d.). However, again, there was a higher chance of side/hip throws (21%) resulting in successful chances than those that were unsuccessful (7%) in the two IPL seasons. When time is limited, the throw from the hip/side allows for a quicker ball release (Johnston, n.d.), this in turn could lead to the difference between a successful, or unsuccessful run out. These sorts of scenarios evidently need to be practiced.

Throw intensity in the IPL video footage was again dominated by speed and accuracy through successful and unsuccessful run outs and all the coaches' perceptions supported this. Again, according to Fitt's Law (1954) accuracy is at its best when an optimal speed is met, which is one that has a mix between full speed and full attention to accuracy. The end point of the throw was similar across either missed (39%), collected by another player (36%) or a direct hit (25%). This resulted in a mixed opinion from the coaches which saw 40% expect that it would be a direct hit, 40% expected that it would be collected by another play, and 20% expecting that it would be mixed. Although this is well spread when we look further into the IPL video footage, we see that there were large differences between successful run outs and missed chances. It was seen in the video footage that throws ended up being split equally between being collected by another player and direct hits during successful chances. However, during unsuccessful chances, 79% of the chances were missed, with 21% of the chances being collected. This illustrates that a player either needed to be up at the stumps to collect the ball, albeit the player may not have been afforded the time, or a direct hit was needed. This again looks at the greater need for accuracy in unsuccessful chances and the video analyses suggests similar findings. 61% of all run out chances needed a direct hit, of which 25% of the time, there was a direct hit. However, in the missed chances, 29% of the time a run out didn't need to be a direct hit, which is the highest percentage so far out of all the zones. However, there was still a high percentage (71%) that required direct hits to be out. Again, showing a greater need for accurate throwing. Finally, coaches were asked what percentage of run outs were successful from all run out opportunities within this area of the field. Many coaches felt that between 11 - 20% of run out chances ended in success for the fielding side. This was a rather low expectation when compared to what happened during IPL games where 33% of the chances that were created, turned into a successful run out.

## **ZONE 4**

During the two IPL seasons, fielders within this area experienced run out opportunities in a variety of different fielding positions. However, almost 70% of the opportunities came from long on, long off and deep mid-wicket. 80% of the coaches expected the same results. Long on resulted in the most (27%) successful run out opportunities within this area of the field. Fielders within this zone should be particularly aware during overs 15 to 20 as these are overs where batters are normally taking high risks to gain as many runs as possible and where the batting side are looking to score boundaries (CoachEd, 2020). This is illustrated in the results taken from the video footage, as 71% of all run out opportunities in this zone came during this point of the game. This also met the expectations of 90% of the coaches, who assumed that most of the run out opportunities within this area would occur at this point of the game. It was found that 80% of the coaches expected a balanced throw from this area of the field, of which, from the actual video footage, 80% of the throws in run out opportunities were from balanced positions. Balanced positions were used an equal number of times during successful and unsuccessful chances. This is not only important for accurate throwing, but for the power behind the throw as it affords the fielder the opportunity to get into a strong position (CoachEd, 2020). Players in this area of the field are afforded slightly more time as the ball will take longer to get to them, thereby enabling them to move into better positions while the ball is on the way to them.

Unlike in the closer zones, the footage taken from the two IPL seasons saw a higher amount (60%) of throws that were collected in this area for all run out opportunities, which was expected by 90% of the coaches, as there is greater room for accuracy error. This was evident in the successful chances, as 88% of throws were collected by another player at the stumps during the IPL games. However, during the missed chances, 68% of the throws that came in were missed and not even collected. Of these throws that were missed, 50% did not require a direct hit. This indicates that either, more needs to be done by the player collecting the ball at the stumps, or it was simply a poor throw that wasn't near the target. However, we cannot conclude this in its entirety as both are aspects of fielding that coaches are taught to deliver clearly to players (CoachEd, 2020). 90% of the coaches expected that a direct hit wasn't needed, and, during the games, 71% of the time this was the case.

From the footage analysed in the two IPL seasons, and in a very rare (5%) instance, did the ball go out straight to the fielder within this zone during a run out opportunity. This can be expected

as the further away from the batter the fielder is, the greater the chance there is of the ball going either side of the fielder. The IPL game data showed that 50% of the time the ball was collected on the strong side of the fielder and 45% of the time it was collected on the fielder's weak side during all run out opportunities. Just over half of the coaches expected the ball to be collected on the player's strong side. During both successful and unsuccessful opportunities, very similar results were found which shows that this position wasn't a determining factor to run out chances in this zone.

The collection type that was expected by almost all the coaches was a pick up. This matched the results of the IPL game footage where 90% of the time during run out opportunities, a pick up was used. A dive and slide were used very rarely (10%), as this normally allowed for great time for the batter to gain the run. Coaching manuals suggest that players need to have a clean pick up from this zone almost every time to ensure an additional run isn't taken, or one can create a run out opportunity (CoachEd, 2020). Knowing this, it was no surprise that 84% of the time two hands were used to ensure that there was a clean pick up to create the run out opportunity. This was expected by 80% of the coaches. However, often a fielder needs to decide, based on time, whether they have to use a quicker option to pick the ball up with one hand, or not. This is encouraged within coaching manuals, particularly from this area in the field (CoachEd, 2020). One hand pick up's did contribute to 19% of the successful run out opportunities, and while using two hands creates a bigger surface area for a pick up, the skill of using one hand must continue to be practiced.

The throw type most used during the IPL game footage was the overarm throw, which comes as no surprise as this is the throw type is encouraged from this distance (CoachEd, 2020) and 90% of the coaches expected similar findings. Overarm throws are better for accuracy and enables a further distance to be covered (Johnson, n.d.). However, we did see 21% of side/hip throws used for run out chances within this zone indicating that the time for ball release was rushed. The IPL game footage showed that throwing for speed and accuracy was used most (81%) during run out opportunities and 70% of the coaches expected this to happen. The one change we did see in this zone, in terms of throwing intention, was that there was an increase in throwing purely for speed, compared to anywhere else on the field. This may be because players are further away from the target, therefore, they would attempt to get the ball in as quickly as possible.

All but one coach expected one bounce before reaching the target when the throw came in from this zone. The IPL game footage was similar in that 79% of the throws from this area bounced once before going towards the target. This match certainly doesn't come as a surprise because this is how players are coached. Coaching training methods indicate that from this area of the field, players must be able to throw with a bounce throw that lands anywhere between five to eight meters away from the stumps (CoachEd, 2020). This can help with a lower trajectory and lower release point which can create greater speed (Dominijanni, 2018). Players should also be able to throw without a bounce to the target if required (CoachEd, 2020), as 15% of the successful run outs were done by fielders who used no bounce in their throw.

Finally, coaches were asked what percentage of run outs were successful from all run out opportunities within this area of the field. It yielded a mainly mixed result in this case, with majority of the votes between 11 - 20%, 41 - 50% and 61 - 70% of run out chances ended in success for the fielding side. There was only one coach that gave a correct answer of 51 - 60%. The figure in this case was 54% of run out opportunities turned into success.

Throughout this study, it is important to look at each opportunity in isolation. Different fielding positions, at different times of the game have different skills required to give their team the greatest chance of a successful run out. This is supported by the IPL video footage and coaches' expectations, which showed that a higher amount of varying degree skill was used at different times and from different positions in the field.

## CHAPTER VI

### CONCLUSION

With little to no research on this topic in fielding in cricket, there are some important findings that coaches can use and take back to improve their overall chances of creating successful run outs. While some results yielded very little contribution to what is already covered in coaching manuals, this study provided a greater base for evidence on coaching ideologies. As we looked through each zone individually throughout this study, we will conclude in the same method.

#### ZONE 1

With no published research concluded on the amount of run outs created by players from this zone, using the comparison to what coaches expected, yielded an exciting result. Keepers were involved in the most run out opportunities from this zone, however, interestingly, there was not one coach who mentioned this. Creating just under half of all run outs in this study, this is an area coaches would need to work on. Keepers must therefore learn to throw with, as well as without their glove on, as the data has shown that opportunities do arise from the keeper.

Collecting a ball with one hand created more run out opportunities and was expected to be the case from most coaches. However, when looking at successful run outs, players used two hands more often. Although we cannot conclude that using two hands made the run out more effective, it would have given them a greater chance for a clean pick up. Therefore, players need to continue to work on creating opportunities with one hand picks, turning them into a success, but if time is afforded, it is more accurate and a safer option using two hands.

Coaches expected players to throw from off balanced positions in this area and we saw more off balanced throws from player's the majority of the time when creating a run out chance. However, the successful run out chances saw a higher number of balanced throws. This agrees with literature and coaching manuals that states that when a person throwing is in a balanced position, we see an increase in accuracy (CoachEd, 2020; Johnson, n.d.). Players must first look to be in a balanced position to throw if time allows them. However, seeing that off balanced throws created chances, this gives greater insight for coaches to incorporate into their training if not done already.

Due to the close nature of this zone, many coaches assumed that the underarm throw would have been used more frequently. This is not surprising as coaching manuals also added into the

fact that underarm throws from this area would need to be practiced (CoachEd, 2020). However, in all opportunities, which included successful opportunities, overarm throws were used regularly. This shows a disconnection between the results and coaching methods, and this is another opportunity for coaches to look at more closely and consider in training.

The throw end point had most coaches believe that the ball would go onto hit the stumps. However, in overall opportunities the stumps were missed mostly. Yet, in successful attempts, the end point would be a direct hit. This indicated that coaches expected a higher number of direct hits, whereas in stark contrast, there were less direct hits. This points toward players being less accurate than what coaches expect. This is something that needs to be focused on. If the throws during all run out opportunities in this area were more accurate, we would have seen far greater run outs.

Another conclusion that was made in this zone was the number of one bounce throws that were made. Most coaches didn't expect a bounce throw where in fact most opportunities came after a bounce throw and this was prominent in successful run outs too. This is a mismatch between coaching ideologies and what is taking place, which indicates that one should look to aim short of the target when throwing in this zone.

More than half (55%) of the run out chances from this zone are being missed and with the information provided within this study, the author is hopeful that coaches can use this to instrumentally increase more successful run outs when the opportunity arises. This mainly saw not enough time for players to get to the stumps and just poor accuracy in the throw.

## **ZONE 2**

Point was noted as receiving the highest amount of run out opportunities from the data, as well as from the coaches too. However, cover was involved in most successful run outs. These two fielding positions are next to each other highlighting the importance of this area in this zone.

The run out chances presented themselves within this zone during overs 7 to 14 majority of the time. This is a part of the game that batters play moderately, looking to run hard (CoachEd, 2020) and therefore this result matches the data. This information enables players within this area to know that is when a run out chance could come their way. Interestingly, during successful run outs we saw an equal balance between overs 7 to 14 and the last six overs. To the author's knowledge, he believes that this was the case as bigger risks are taken in this period of the game, resulting in an opportunity for easier run outs.

Once again, and as prevalent in zone 1, coaches expected one hand pick up's during run out opportunities. However, when looking at successful run outs, players used two hands more often, just like in zone 1. The only difference that can be noted is that more two hand pick ups were used in all run out opportunities. Where zone 1 had more one hand pick ups'. This could be because the ball was hit harder, therefore it was collected further away from the batter.

Most of the coaches that felt players would throw from an off balanced position, whereas in this case, we saw more balanced throws for successful, as well as through all run out opportunities. Again, this agrees with literature and coaching manuals that indicates that when a person is throwing from a balanced position, we see an increase in accuracy (CoachEd, 2020; Johnson, n.d.). We can conclude, in a similar way for this area of the field, which players must first look to be in a balanced position to throw, if time allows them, while not forgetting that chances may arise from off balanced throws and these need to be practiced more frequently.

Most coaches felt that they would see a side/hip throw used more commonly in a run out opportunity, which was partly accurate. We saw an equal amount of side/hip throws and overarm throws in successful run out chances, with overarm throws dominating the overall number of chances. This shows a consistent match with coaching methods, as well as the data. However, a side/hip throw is less accurate, as previously mentioned. This means players need to be able to throw with this style confidently, which in turn, indicates that these types of throws need to be more reliably practiced during a player's training.

Almost all the coaches believed that a direct hit was necessary from this area in the field for the run out to be successful, and in most cases, it was. However, there were cases where it didn't need to be a direct hit. Most cases that were unsuccessful were because of a direct hit, however, if there was more accurate throwing, we would have seen much more run outs. However, when it didn't require direct hits, we saw more run outs. This shows the importance of a player getting to the stumps to collect a ball in order to assist in making the run out possible.

The coaches' opinions were split when it came to whether the throw would come in with, or without a bounce. However, the results saw more opportunities prevail to those throws which had a bounce and thus, creating far more successful opportunities. Again, this links to zone 1 and shows that throws with a bounce have greater run out successes.

Only 27% of run out opportunities were taken in this zone, showing a high amount of missed chances. With the information provided within this study, hopefully coaches can use this

information to positively increase successful run outs when the opportunity arises within this zone.

### **ZONE 3**

Extra cover received the most run out opportunities within this area of the field and was involved in the most successful run outs in this zone. This position received up to 24% of all run out opportunities in this zone. However, the most votes came for mid-on and mid-off from the coaches, where mid-off and mid-on were only involved in 7% of run outs in this zone.

As rightly predicted by most the coaches, overs 15 to 20 received the most run out chances for this zone. This period of the game, as well as overs 1 to 6, saw the most successful run outs during the games analyzed. Overs 1 to 6 are points of the game that need to be looked at in finer detail by coaches as not one coach assumed this to be the case.

Unsurprising, two hands were used the most for collecting the ball within this area of the field during a run out chance. However, again we saw a slight increase in one hand pick ups' in successful run outs. Again, coaches should look to continually allow players to experiment and get used to picking the ball up with one hand, where possible.

This time most of the coaches felt that players would throw from a balanced position and this was the case for most run out opportunities in this zone. Again, this agrees with literature and coaching manuals that indicates that when a person throwing is in a balanced position, we see an increase in accuracy (CoachEd, 2020; Johnson, n.d.). We can conclude in a similar way for this area of the field that players must first look to be in a balanced position to throw if time allows them. However, we saw yet again, several successful off balanced throws from this area and these need to be practiced.

Almost all the coaches expected an overarm throw in this area of the field during a run out opportunity and this was the case in the data presented. Once again, overarm throws dominated successful chances. However, we saw an increased number of side/hip throws. Again, as the evidence provides, this needs to be worked on by coaches during practice sessions.

Most of the coaches assumed, correctly, when it came to successful run outs, with half expecting direct hits to account for most of the opportunities and the other half believing that run out opportunities would come from mostly being collected at the stump. In total most run out opportunities were not collected at the stump, nor did they hit the stumps. This shows two

concerns, firstly, players are not getting to the stump to support the thrower, and secondly, if a player cannot get to the stumps in time, the player is missing the target. Although 71% of throws did require a direct hit, with 29% not, meaning that players weren't doing their job when getting to the stumps.

There was an increase in coaches who now expected a bounce throw from this zone. This zone saw most of its throws with a bounce throw, and a great number of these were successful run outs. Again, this links to zone 1 and 2 which shows that throws with a bounce have greater run out successes.

Only 33% of run out opportunities were taken in this zone, showing a large amount of missed chances. With the information provided within this study, hopefully coaches can use this to increase more successful run outs when the opportunity arises.

#### **ZONE 4**

Long-on was the position within this zone that got the most run out opportunities for all run out chances and successful chances. However, deep mid-wicket was followed in a close second in both regards. Most coaches expected deep mid-wicket to have the most opportunities. This is something that coaches can continue to work on, as well as looking at long-on as an important position.

As players look to score more aggressively in the final few overs, it is not unsurprising that more run out chances were present during overs 15 to 20. Coaches expected the same. When fielding out in their positions, always, players need to be ready for a run out opportunity. The team's best fielders should be fielding here during these periods of the game.

Again, the majority of the coaches felt that players would throw from a balanced position and this was the case for most run out opportunities in this zone. This again is suggested to be the case by literature which has been explained throughout. When the ball is coming out to the boundary, the player will have more time to move into a balanced position when picking up the ball. This area of the field also requires a more balanced throw for distance and accuracy due to being further away from the target. We did see some successful run outs in this area from off balanced positions and coaches and players must identify when they may need to do this and practice accordingly.

Again, all but one coach expected the throws to be overarm from this area in the field. We saw this being the case with successful throws too. Most side/hip throws that came in from the boundary during unsuccessful run outs turned into missed opportunities. Players in this area of the field should continue their best to throw with an overarm action if possible.

Most of the coaches expected run out opportunities not to need a direct hit, which was in fact the case most of the time. During successful run outs this certainly was the case. However, half the chances from the boundary during missed chances needed a direct hit, and this is a big task for the fielder. Whereas the other half were collected. This means that there was a poor throw in terms of accuracy, alternatively, a bad collection at the stumps. These are areas that need to be perfected in fielding, particularly for run out chances.

Finally, it was clearly that almost all, coaches expected a bounce in from the boundary. This happened almost 80% of the time. Again, with a greater amount of these coming from the successful chances. Which in turn links to all the other areas of the field which indicates that throws that bounce once, have a greater chance of success in a run out opportunity.

Just less than half (46%) of the run out chances from this zone are being missed and with the information provided with this study, hopefully coaches can use this to increase more successful run outs when the opportunity arises.

## **PRACTICAL APPLICATIONS**

Coaches can use this information to get the best information relayed to players, or from a tactical point of view. Coaches can also use this information to form drills from different zones when it comes to training. From a tactical point of view, coaches may want to place their best thrower in the team in the position that is likely to get a run out opportunity at different stages of the game.

### **ZONE 1**

- wicket-keepers must be able to perform a run out themselves and be able to throw at a target with their glove on and off;
- players need to be able to create run out opportunities using both hands, as well as using one hand to retrieve the ball. Although, two hands are safer than one, this is something that needs further practice as more one hand pick ups' could result in increased run outs;
- coaches should encourage balanced throws as often as possible, but coaches should also attempt to add in more randomized throws, which could see players throwing off balance and experimenting on what works for each player;
- players within this area must look to practice overarm throws, as well as underarm throws that are recommended by coaches;
- accuracy practice from this zone, in terms of attempting more direct hits, are needed from players. If this is the case, there will be a greater number of run out chances that become successful within this zone; and
- coaches need to encourage players to throw short of the target, as previously covered, it helps with additional pace, as a player is throwing with a lower trajectory, which also has seen more run out chances come from it.

### **ZONE 2**

- positions of importance in terms of run outs in this zone were point and cover, these continually need to be worked on;
- players need to be aware throughout the entire duration of the game, however, the greatest chance of a run out opportunity coming the way of players in this area are in

overs 7 to 14. With this knowledge, coaches can relay this information to players with objective data;

- players need to be able to create run out opportunities using both hands, as well as using one hand to retrieve the ball. Although, two hands are safer than one, this is something that needs further practice as more one hand pick ups' could result in increased run outs;
- players need to consistently be given the freedom to experiment with the quicker release of the side/hip throw, to allow a training pattern to emerge, as well as for greater consistency, as this throw is already a difficult (in terms of accuracy) throwing style;
- while direct hits all the time would be ideal, it isn't always possible. With greater attention being paid to players getting up to the stumps to take the ball and effect the run out, needs to be worked on within this zone; and
- players need to be coached into throwing with a bounce within this zone. Data from this study indicates there has been greater success with a bounce throw within this zone.

### **ZONE 3**

- extra cover received the most chances for run out opportunities in this zone. Run outs need to be practiced for this position and distance more frequently to allow for a better chance in the game;
- this zone saw most run outs during the overs towards the end of the game. However, there were equal amounts of successful run outs that happened in the first six overs of the innings. Throws from this area need to be practiced for the different times of the game;
- again, coaches should look to continually allow players to experiment and get used to picking the ball up with one hand, where possible.
- while throwing from a balanced position is ideal, it is helpful to allow players to experiment to throw from off balanced positions because during a game if the opportunity presents itself, players must be able to learn to throw off balanced.
- players must firstly look to get themselves into a position to throw overarm from this area of the field. However, side/hip throws must continually be practiced from this area.
- players on the field firstly need to work hard to support the thrower by getting to the stumps, and secondly making sure when they are there, that they are performing the task the best they can, which involves catching the throw and taking the ball to the

stumps. This needs to be practiced in match like scenarios with pressure and speed. Players also need to work hard to be able to hit the stumps from this area of the field; and

- players need to be coached into throwing with a bounce within this zone. Data from this study indicates there has been greater success with a bounce throw within this zone.

#### **ZONE 4**

- long-on and deep mid-wicket received the most chances and this is where the coach would want the best fielders during the part of the game where the ball is expected to come to them. As mentioned, this would be in the final overs of the game, overs 15 to 20;
- coaches must continue to encourage players to get into a strong balanced position when throwing from this area of the field. However, they must practice scenarios where they may need to throw off balance to enable them to still be able to perform a run out when an opportunity arises;
- players need to ensure that they make accurate and retrievable throws for someone to collect at the stumps. It also shows that players need to work on getting to the stumps to collect a throw; and
- players need to be coached into throwing with a bounce within this zone. Data from this study indicates there has been greater success with a bounce throw within this zone.

While the study contained a large amount of subjective analyses and opinion, it highlighted the desperate need for an increase in this sort of study within the game of cricket, and more specifically, fielding. With little to no scientific research to compare to, at this point in time, run out research will only have this study to use as a foundation, showing a greater necessity for further research. As most sport continues to grow and develop, cricket has taken vast steps in the right direction, however, more practical information, much like this study, needs to be done to continue to grow and enhance the game. It is clear that whilst coaches do have a sound understanding of what ought to take place to achieve a successful run out opportunity, the real time evidence does not always align to their perceptions, which has been highlighted by the author in this study. This study has shown the key differences between what coaches should focus on in order to determine, and possibly predict, whether a run out will be successful or unsuccessful.

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# Perceptions on variables that lead to a run out chance in two IPL seasons

This research project has two parts - one part is done by us, the researchers and the second part by you, the coach. Both are relevant to the same context, fielding (more specifically, run outs) during the IPL competition.

First the researchers will video analyze run outs and chances that were deemed close, but missed from two IPL seasons. Videos will be received from one of the video analysts. 11 components will be looked at within a run out opportunity from start to finish. Please see table 1 below showing what components will be used and what each one means as you will also need to use these.

The field will be split into four different zones, please see figure 1, for the four different areas. The run out take must take place in that zone, not where the fielder started. For example a player on the boundary (zone 4) might have had to run into zone 3 to collect and throw. So the answer there would be zone 3.

The second part of the research is where you come in and is the questionnaire here, that you need to fill in. You will be asked questions on your perceptions of what you believe will happen

- during a run out chance (successful or close miss). Below is a brief explanation of what you need to do using the information provided above.

We are asking if you could please fill in the survey below choosing the option that you feel would be best suited to creating a run out chance as an IPL fielder. For the purpose of this please do not refer to any documents or videos, etc that you may have on the topic and rather answer the questions based on your coaching experience. Please do keep referring to the figure and table if you need a reminder of the zones or the terms used. The data provided will be anonymous and will not be referred to individual coaches.

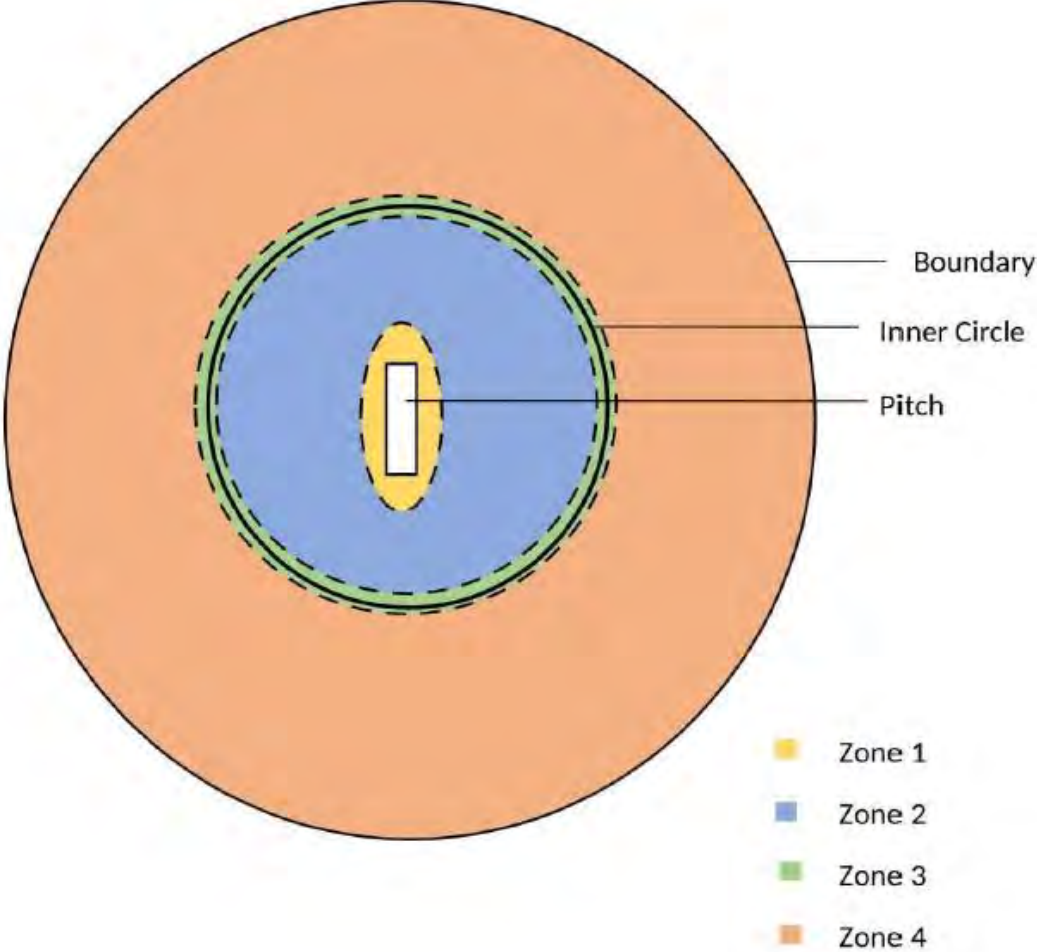
By completing this questionnaire you consent to participating in this research which has been approved by the Rhodes University Ethics Committee. Thank you for participating in this research, it is appreciated.

\*Required

Table 1

VARIABLE	DEFINITION
<b>Positions</b>	Self-explanatory
<b>Overs</b>	
1-6	Powerplay
7-14	Middle overs
15-20	Death overs
<b>Collection Side</b>	
Strong	Ball that comes to the players dominant hand
Weak	Ball that comes to the players non-dominant hand
Straight	Ball that comes towards player straight on.
<b>Collection Type</b>	
Pick-up	Where the player remains on both feet to gather the ball
Dive	Where a fielder dives to a direction (Laterally or forward) to collect the ball
Slide	When a player goes onto a knee with momentum to slide next to the ball
<b>1 or 2 Hand(s) used</b>	
1 Hand	When the fielder retrieved the ball with one hand.
2 Hands	When the fielder retrieved the ball with two hands.
<b>Balanced or Off Balanced</b>	
Balanced	When the fielder threw from a balanced position.
Off Balanced	When the fielder threw from an off balanced position.
<b>Throw Type</b>	
Overarm	When the fielder draws the ball back over the shoulder, then the ball is thrown over the shoulder
Side/hip throw	When the arm is approximately parallel to the floor
Underarm	A throw when the ball is drawn back with hand pointing to the floor before release
<b>Throw Intension</b>	
Speed & Accuracy	Fielder looked to have the intent of throwing for both speed and accuracy.
Accuracy	Fielder threw the ball slowly looking for accuracy.
Speed	Fielder looked to throw as hard as possible.
<b>Throw End Point</b>	
Missed	The ball ended up missing the wicket and collected away from the wickets after a throw.
Collected	The ball was collected at the wickets by another player (fielder or keeper) after a throw.
Direct	The ball went directly onto the wickets after a throw.
<b>Number of Bounces</b>	
1 bounce	The ball bounced once after going past or to the wickets.
No bounce	The ball went directly onto the stumps or was at that height when passing the stumps without a bounce.
More than 1 bounce	The ball bounced more than once after going past or to the wickets.
<b>Had to be direct hit to be out</b>	
Yes	The throw had to hit the stumps directly or it would not have been out.
No	The throw did not require a direct hit to be out and a fielder could have collected it to dislodge the balls and it would have been out.

Figure 1



1. Do you consent to complete the survey? \* *Mark only one oval.*

Yes

No

Personal Details:

2. Full Name\*

---

3. Highest Cricket Coaching Qualification: \*

---

4. What is the highest level you have coached? \* *Mark only one oval.*

International

Franchise/Domestic/County

Semi-professional

Academy/Age group provincial/domestic/county

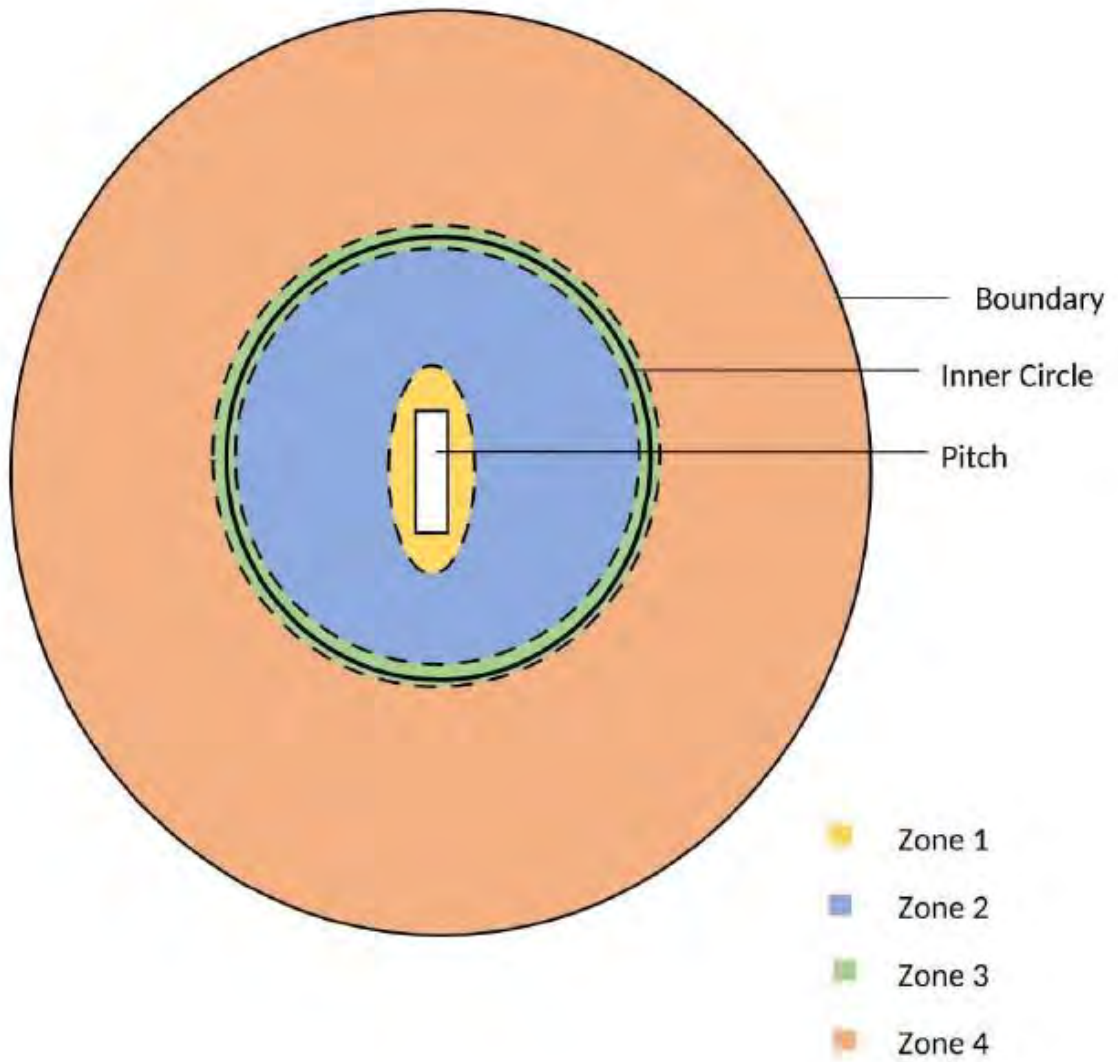
School

## Table and 'Zones' Reminder

Table 1

<b>VARIABLE</b>	<b>DEFINITION</b>
<b>Positions</b>	Self-explanatory
<b>Overs</b>	
1-6	Powerplay
7-14	Middle overs
15-20	Death overs
<b>Collection Side</b>	
Strong	Ball that comes to the players dominant hand
Weak	Ball that comes to the players non-dominant hand
Straight	Ball that comes towards player straight on.
<b>Collection Type</b>	
Pick-up	Where the player remains on both feet to gather the ball
Dive	Where a fielder dives to a direction (Laterally or forward) to collect the ball
Slide	When a player goes onto a knee with momentum to slide next to the ball
<b>1 or 2 Hand(s) used</b>	
1 Hand	When the fielder retrieved the ball with one hand.
2 Hands	When the fielder retrieved the ball with two hands.
<b>Balanced or Off Balanced</b>	
Balanced	When the fielder threw from a balanced position.
Off/Balanced	When the fielder threw from an off balanced position.
<b>Throw Type</b>	
Overarm	When the fielder draws the ball back over the shoulder, then the ball is thrown over the shoulder
Side/hip throw	When the arm is approximately parallel to the floor
Underarm	A throw when the ball is drawn back with hand pointing to the floor before release
<b>Throw Intension</b>	
Speed & Accuracy	Fielder looked to have the intent of throwing for both speed and accuracy.
Accuracy	Fielder threw the ball slowly looking for accuracy.
Speed	Fielder looked to throw as hard as possible.
<b>Throw End Point</b>	
Missed	The ball ended up missing the wicket and collected away from the wickets after a throw.
Collected	The ball was collected at the wickets by another player (fielder or keeper) after a throw.
Direct	The ball went directly onto the wickets after a throw.
<b>Number of Bounces</b>	
1 bounce	The ball bounced once after going past or to the wickets.
No bounce	The ball went directly onto the stumps or was at that height when passing the stumps without a bounce.
More than 1 bounce	The ball bounced more than once after going past or to the wickets.
<b>Had to be direct hit to be out</b>	
Yes	The throw had to hit the stumps directly or it would not have been out.
No	The throw did not require a direct hit to be out and a fielder could have collected it to dislodge the bails and it would have been out.

Figure 1



5. ZONE 1: What Fielding Position is most likely to have a run out chance?

\_\_\_\_\_

6. ZONE 2: What Fielding Position is most likely to have a run out chance? \*

\_\_\_\_\_

7. ZONE 3: What Fielding Position is most likely to have a run out chance? \*

\_\_\_\_\_

8. ZONE 4: What Fielding Position is most likely to have a run out chance? \*

\_\_\_\_\_

9. ZONE 1: What overs do most run out opportunities occur? \* *Mark only one oval.*

Overs 1-6

Overs 7-14

Overs 15-20

10. ZONE 2: What overs do most run out opportunities occur? \* *Mark only one oval.*

Overs 1-6

Overs 7-14

Overs 15-20

11. ZONE 3: In what overs do most run out opportunities occur? \* *Mark only one oval.*

Overs 1-6

Overs 7-14

Overs 15-20

12. ZONE 4: In what overs do most run out opportunities occur? \* *Mark only one oval.*

Overs 1-6

Over 7-14

Overs 15-20

13. ZONE 1: What collection side do you think the ball was collected for the most run out opportunities? \*

*Mark only one oval.*

Strong

Weak

Straight

14. ZONE 2: What collection side do you think the ball was collected for the most run out opportunities? \*

*Mark only one oval.*

Strong

Weak

Straight

15. ZONE 3: What collection side do you think the ball was collected for the most run out opportunities? \*

*Mark only one oval.*

Strong

Weak

Straight

16. ZONE 4: What collection side do you think the ball was collected for the most run out opportunities? \*

*Mark only one oval.*

Strong

Weak

Straight

17. ZONE 1: What collection type was used for most run out opportunities? \* *Mark only one oval.*

Pick up

Slide

Dive

18. ZONE 2: What collection type was used for most run out opportunities?

\* *Mark only one oval.*

Pick up

Slide

Dive

19. ZONE 3: What collection type was used for most run out opportunities? \*

*Mark only one oval.*

Pick up

Slide

Dive

20. ZONE 4: What collection type was used for most run out opportunities?

\* *Mark only one oval.*

Pick up

Slide

Dive

21. ZONE 1: How many hand(s) do you think were used to pick up the ball in most run out opportunities? \*

*Mark only one oval.*

1 Hand

2 Hands

22. ZONE 2: How many hand(s) do you think were used to pick up the ball in most run out opportunities? \*

*Mark only one oval.*

1 Hand

2 Hands

23. ZONE 3: How many hand(s) do you think were used to pick up the ball in most run out opportunities? \*

*Mark only one oval.*

1 Hand

2 Hands

24. ZONE 4: How many hand(s) do you think were used to pick up the ball in most run out opportunities? \*

*Mark only one oval.*

1 Hand

2 Hands

25. ZONE 1: Would a player be balanced or off-balance to create the most run out chances? \*

*Mark only one oval.*

Balanced

Off-Balanced

26. ZONE 2: Would a player be balanced or off-balance to create the most run out chances? \*

*Mark only one oval.*

Balanced

Off-Balanced

27. ZONE 3: Would a player be balanced or off-balance to create the most run out chances? \*

*Mark only one oval.*

Balanced

Off-Balanced

28. ZONE 4: Would a player be balanced or off-balance to create the most run out chances? \*

*Mark only one oval.*

Balanced

Off-Balanced

29. ZONE 1: What throwing type do you think would be used to create the most chances? \*

*Mark only one oval.*

Overarm

Side/hip throw

Underarm

30. ZONE 2: What throwing type do you think would be used to create the most chances? \*

*Mark only one oval.*

Overarm

Side/hip throw

Underarm

31. ZONE 3: What throwing do you think would be used to create the most chances?

*\* Mark only one oval.*

- Overarm
- Side/hip throw
- Underarm

32. ZONE 4: What throwing type do you think would be used to create the most chances? \*

*Mark only one oval.*

- Overarm
- Side/hip throw
- Underarm

33. ZONE 1: What throwing intention would a player have to create the most run out chances? \*

*Mark only one oval.*

- Speed & Accuracy
- Accuracy
- Speed

34. ZONE 2: What throwing intention would a player have to create the most run out chances? \*

*Mark only one oval.*

- Speed & Accuracy

Accuracy

Speed

35. ZONE 3: What throwing intention would a player have to create the most run out chances? \*

*Mark only one oval.*

Speed & Accuracy

Accuracy

Speed

36. ZONE 4: What throwing intention would a player have to create the most run out chances? \*

*Mark only one oval.*

Speed & Accuracy

Accuracy

Speed

37. ZONE 1: Where did the ball end up in most chances? \* *Mark only one oval.*

Direct hit

Collected

Missed

38. ZONE 2: Where did the ball end up in most chances? \* *Mark only one oval.*

Direct hit

Collected

Missed

39. ZONE 3: Where did the ball end up in most chances? \*

*Mark only one oval.*

Direct hit

Collected

Missed

40. ZONE 4: Where did the ball end up in most chances? \* *Mark only one oval.*

Direct hit

Collected

Missed

41. ZONE 1: How many bounces were there before the ball reached the stumps in run out chances? \*

*Mark only one oval.*

- No bounce
- 1 bounce
- More than 1 bounce

42. ZONE 2: How many bounces were there before the ball reached the stumps in run out chances? \*

*Mark only one oval.*

- No bounce
- 1 bounce
- More than 1 bounce

43. ZONE 3: How many bounces were there before the ball reached the stumps in run out chances? \*

*Mark only one oval.*

- No bounce
- 1 bounce
- More than 1 bounce

44. ZONE 4: How many bounces were there before the ball reached the stumps in run out chances? \*

*Mark only one oval.*

- No bounce
- 1 bounce
- More than 1 bounce

45. ZONE 1: Did the throw need to be a direct hit to be out? \* *Mark only one oval.*

- Yes
- No

46. ZONE 2: Did the throw need to be a direct hit to be out? \* *Mark only one oval.*

- Yes
- No

47. ZONE 3: Did the throw need to be a direct hit to be out? \* *Mark only one oval.*

- Yes
- No

48. ZONE 4: Did the throw need to be a direct hit to be out? \* *Mark only one oval.*

Yes

No

49. ZONE 1: What percentage of the chances created resulted in successful run outs? \* *Mark only one oval.*

0-10%

11-20%

21-30%

31-40%

41-50%

51-60%

61-70%

71-80%

81-90%

91-100%

50. ZONE 2: What percentage of the chances created resulted in successful run outs? \*  
*Mark only one oval.*

- 0-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%
- 81-90%
- 91-100%

51. ZONE 3: What percentage of the chances created resulted in successful run outs?\*

*Mark only one oval.*

- 0-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%

81-90%

91-100%

52. ZONE 4: What percentage of the chances created resulted in successful run outs?\*

*Mark only one oval.*

0-10%

11-20%

21-30%

31-40%

41-50%

51-60%

61-70%

71-80%

81-90%

91-100%

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Google Forms

## Appendix B – Rhodes Ethical Clearance



**RHODES UNIVERSITY**

Grahamstown • 6140 • South Africa

Department of Human Kinetics and Ergonomics, Upper African Street, Grahamstown, 6139

08 June 2021

**To whom it may concern**

**Ethics amendment for application entitled “*Workloads placed on elite and sub-elite cricketers in South Africa: analysis of cricket South Africa (CSA) database*”**

The following document seeks permission to make amendments to the ethics application number “RU-HSD-16-11-001” that was approved on the 13th of April 2017 by Doctor Sharli Paphitis.

The amendment seeks to include a brief questionnaire to be filled out by the strength and conditioning specialists of the players so that player workload can be tracked in more detail. An additional questionnaire will also be filled out by coaches to determine their perceptions of fielding practices at different levels. The experimental procedures, information to participants/coaches, risks and benefits, privacy and anonymity as well as feedback and confidentiality will all be the same as the original application. Additionally permission will be sought from any new participants prior to data collection.

Your help in this matter is greatly appreciated.

Regards

A handwritten signature in black ink, appearing to read 'Lee Pote', on a light blue background.

Dr. Lee Pote

On Thu, Jul 1, 2021 at 11:15 AM Siyanda Manqele <[s.mangele@ru.ac.za](mailto:s.mangele@ru.ac.za)> wrote:

Dear Lee

Your application for amendment was APPROVED.

Kind regards

Siyanda